Schedule of courses

Compulsory courses

- IT6502 - Project Management
- IT7510 - Capstone Project

Elective courses

Level 6

- CS6501 - Information Security II
- CS6502 - Linux System Administration
- CS6503 - Digital Forensics
- CS6504 - Cryptography and Blockchain Fundamentals
- DS6501 - Social Data Analytics
- DS6502 - Data Analysis and Visualisation
- DS6503 - Data Mining Tools and Techniques
- DS6504 - Business Intelligence and Big Data
- ID6501 - Responsive Website Design
- NI6504 - Cloud Computing
- SD6501 - Mobile Application Development
- SD6502 - Programming II
- SD6503 - Testing and Secure Coding
- SD6504 - Game Development
- IT6501 - Systems Analysis and Design

Level 7

- CS7501 - Information Security III
- CS7504 - Security for Dev Ops
- CS7505 - Incident Response & Digital Forensics
- DS7501 - Data Mining for Business Analytics
- DS7502 - Data Warehouse Design and Implementation
- ID7502 - Human Computer Interaction
- SD7501 - Web Application Development
- SD7502 - Intelligent Systems Development
- IT7502 - Digital Ethics
- IT7508 - Internship

Level 5 - If you must, but only 1 allowed.

- IT5501 - Mathematics for IT
- IT5502 - Communications for IT
- IT5504 - Information Security I
- IT5507 - Fundamentals of Data Science
- IT5505 - Interaction Design Fundamentals
- IT5506 - Introduction to Networking
- IT5503 - Programming I
- IT5509 - Software Testing Fundamentals

Course title	**Project Management**		
Course Codes	IT6502	**Level**	6
Status	**Compulsory**	**Credits**	15
Prerequisite	IT5502 Communications for IT	**Course offered in**	Refer Course Selection Sheet
Co-requisites	None	**Duration**	1 trimester

Aim

- 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

Course content

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

Learning objectives

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

Course title	**Capstone Project**		
Course Codes	IT7510	**Level**	7
Status	Compulsory	**Credits**	45
Prerequisite	240 credits at levels 5 and above with one level 7 paper IT6502 Project Management		
Course offered in	Refer Course Selection Sheet	**Duration**	1 trimester

Aim

- 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

Course content

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

Learning objectives

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

Course title	**Information Security II**		
Course Codes	CS6501	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

Aim

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

Course 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

Learning objectives

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

Course title	**Linux System Administration**		
Course Codes	CS6502	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5504 Information Security I IT5506 Introduction to Networking	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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.

Course 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

Learning objectives

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

Course title	**Digital Forensics**		
Course Codes	CS6503	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5504 Information Security I IT5506 Introduction to Networking	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

Aim

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

Course 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

Learning objectives

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

Course title	**Cryptography and Blockchain Fundamentals**		
Course Codes	CS6504	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5504 Information Security I IT5506 Introduction to Networking	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

Aim

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

Course 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

Learning objectives

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

Course title	**Social Data Analytics**		
Course Codes	DS6501	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5507 Fundamentals of Data Science	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

Aim

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

Course 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

Learning objectives

1. Identify and explain contemporary text mining tasks typically applied to document collections
2. Perform introductory text mining tasks on publically 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

Course title	**Data Analysis and Visualisation**		
Course Codes	DS6502	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5507 Fundamentals of Data Science	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Data Mining Tools and Techniques**		
Course Codes	DS6503	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5507 Fundamentals of Data Science	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Business Intelligence and Big Data**		
Course Codes	DS6504	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5507 Fundamentals of Data Science	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Responsive Web Design**		
Course Codes	ID6501	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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.

Course title	**Cloud Computing**		
Course Codes	NI6504	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5506 Introduction to Networking	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Mobile Application Development**		
Course Codes	SD6501	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5503 Programming I IT5507 Fundamentals of Data Science	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Programming II**		
Course Codes	SD6502	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5503 Programming I	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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,

Course title	**Testing and Secure Coding**		
Course Codes	SD6503	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	SD6502 Programming II	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Game Development**		
Course Codes	SD6504	**Level**	6
Status	Elective	**Credits**	15
Prerequisite	IT5503 Programming I IT5501 Mathematics for IT	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Systems Analysis and Design**		
Course Codes	IT6501	**Level**	6
Status	**Compulsory**	**Credits**	15
Prerequisite	IT5507 Fundamentals of Data Science IT5503 Programming I	**Course offered in**	Refer Course Selection Sheet
Co-requisites		**Duration**	1 trimester

Aim

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

Course content

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

Learning objectives

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

Course title	**Information Security III**		
Course Codes	CS7501	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	IT5504 Information Security I IT5506 Introduction to Networking	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Special Topic in Cyber Security**		
Course Codes	CS7502	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	IT5504 Information Security I IT5506 Introduction to Networking	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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.

Course title	**Security for DevOps**		
Course Codes	**CS7504**	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Incident Response & Digital Forensics**		
Course Codes	**CS7505**	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Data Mining for Business Analytics**		
Course Codes	DS7501	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	DS6502 Data Analysis and Visualisation	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

Aim

To provide learners with practical experience in developing analytical tools that provide

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**,** 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

Course title	**Data Warehouse Design and Implementation**		
Course Codes	DS7502	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	DS6503 Data Mining Tools and Techniques	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

Aim

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

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

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

Course title	**Human Computer Interaction**		
Course Codes	ID7502	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	IT5505 Interaction Design Fundamentals	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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, User centred design research, prototyping techniques and technologies

Course title	**Web Application Development**		
Course Codes	SD7501	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	IT5507 Fundamentals of Data Science SD6502 Programming II	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

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, Web Application Deployment

Course title	**Intelligent Systems Development**		
Course Codes	SD7502	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	IT5501 Mathematics for IT SD6502 Programming II	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Digital Ethics**		
Course Codes	IT7502	**Level**	7
Status	**Compulsory**	**Credits**	15
Prerequisite	IT5502 Communications for IT	**Course offered in**	Refer Course Selection Sheet
Co-requisites		**Duration**	1 trimester

Aim

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

Course 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

Learning objectives

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

Course title	**Internship**		
Course Codes	IT7508	**Level**	7
Status	Elective	**Credits**	15
Prerequisite	Completion of 240 credits at level 5 and above	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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

Course title	**Mathematics for IT**		
Course Codes	IT5501	**Level**	5
Status	**Compulsory**	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Co-requisites	None	**Duration**	1 trimester

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.

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

Learning objectives

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

Course title	**Communications for IT**		
Course Codes	IT5502	**Level**	5
Status	**Compulsory**	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Co-requisites	None	**Duration**	1 trimester

Aim

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

Course 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

Learning objectives

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

Course title	**Information Security I**		
Course Codes	IT5504	**Level**	5
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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.

Course content

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

Learning objectives

- Explain information security fundamentals
- Analyse personal security
- Identify threats to computer security
- Identify and apply internet security procedures
- Examine mobile security
- Identify risks to Internet privacy

Course title	**Fundamentals of Data Science**		
Course Codes	IT5507	**Level**	5
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

Aim

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

Course 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

Learning objectives

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

Course title	**Interaction Design Fundamentals**		
Course Codes	IT5505	**Level**	5
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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 objectives

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

Course title	**Introduction to Networking**		
Course Codes	IT5506	**Level**	5
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

Aim

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

Course content

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

Learning objectives

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.

Course title	**Programming I**		
Course Codes	IT5503	**Level**	5
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

Aim

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

Course 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

Learning objectives

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.

Course title	**Software Testing Fundamentals**		
Course Codes	IT5509	**Level**	5
Status	Elective	**Credits**	15
Prerequisite	None	**Course offered in**	Refer Course Selection Sheet
Duration	1 trimester		

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.

Course content

Testing principles, Test process, Procedures and processes in software testing. Range psychology of testing, Software development models, Test Development Process, and categories of test design techniques, designing test cases for given control flows. Test organization, Test planning and estimation, Test progress monitoring and control, Configuration management, and Risk and testing, Incident reporting, Effective use of tools, and potential benefits and risks

Learning objectives

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.