*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

# 6. COURSE SUMMARIES

## 6.1. Studio 1

| SMS Code | ID502001/IA502001 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 5 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | None | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite): No* | | | |

### Aims

To introduce learners to the fundamentals of professionalism in a technical environment.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Communicate appropriately in informal and semi-formal written and verbal contexts.
2. Discern functional and non-functional aspects within a problem domain in the context of data modelling.
3. Use collaboration tools and workflows to contribute to a simple group project.

### Indicative Content

- Problem domains
- Design thinking
- Introduction to databases
- Time management
- Report writing
- Oral presentations
- Version control (GitHub)
- Object-oriented concepts

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Performance and output review | 100% | 1, 2, 3 | Competency | Must pass |

34

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.2. Studio 2

| | | | |
|---|---|---|---|
| *SMS Code* | ID503001/IA503001 | *Directed Learning hours* | 60 |
| *Level* | 5 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self Directed Learning hours* | 90 |
| Prerequisites | ID502001/IA502001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To introduce learners to user-centric and technical project planning techniques to create solutions to simple IT problems.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Employ sound communication in order to elicit user requirements to inform the planning process.

2. Work as a member of a team to produce a simple technical output.

### Indicative Content

- Basic iterative development
- UML
- Basic project management skills and tools
- Design thinking
- Stand-up meetings
- Client interviews
- Introduction to user stories

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Performance and output review | 100% | 1, 2 | Competency | Must pass |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.3.    Programming 1

| | | | |
|---|---|---|---|
| *SMS Code* | ID510001/IA510001 | *Directed Learning hours* | 60 |
| *Level* | 5 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | None | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To introduce learners to the concepts of program design and programming fundamentals.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Create programs using basic programming constructs and simple data structures to solve specified problems.

2.    Apply a logic depiction method to decompose appropriate simple problems.

### Indicative Content

- Program Design
- Algorithms
- Structured diagrams UML
- If statements, Nested Ifs, Switch statements
- Loops
- Arrays
- Data Types and Records
- Reading Files of Records
- Text files
- Version control

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Weekly Checkpoints | 10% | 1,2 | Percentage | Cumulative 50% pass |
| Assignment | 20% | 1,2 | Percentage | |
| Practical Test | 35% | 1,2 | Percentage | |
| Final Exam | 35% | 1,2 | Percentage | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.4.　　Programming 2

| | | | |
|---|---|---|---|
| *SMS Code* | ID511001/IA511001 | *Directed Learning hours* | 60 |
| *Level* | 5 | *Workplace or Practical Learning hours* | |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID510001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To enable learners to build simple object-oriented (OO) applications and to identify situations that are most appropriate for OO implementation.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.　　Build interactive, event-driven GUI applications using pre-built components.

2.　　Declare and implement user-defined classes using encapsulation, inheritance and polymorphism.

### Indicative Content

IN511001 is a second programming course with a focus on Object Oriented programming, and as such uses an object oriented programming language and development environment.

• 　　Problem analysis and decomposition
• 　　Principles of good class design
• 　　Logic of basic algorithms
• 　　Use of core complex data structures
• 　　Good programming practices that are independent of the language or model used

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Project 1 | 25% | 1,2 | Percentage | Cumulative 50% pass |
| Project 2 | 35% | 1,2 | Percentage | |
| Theory examination | 30% | 1,2 | Percentage | |
| Classroom Tasks | 10% | 1,2 | Percentage | |

### Resources:

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.5.     Fundamentals of Web Development

| | | | |
|---|---|---|---|
| *SMS Code* | ID512002/IA512002 | *Directed Learning hours* | 60 |
| *Level* | 5 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID510001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To enable learners to use basic technologies for the development of web-based functionality.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Develop simple web-based applications using industry relevant client/server-side programming languages and basic client/server communication.
2.    Use industry relevant tools and workflows in the development of web-based applications.

### Indicative Content

- Web communication (client/server relationship)
- HTML, CSS and JavaScript
- Libraries/frameworks
- Responsive design
- APIs
- Basic deployment

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Skills Based Assessment | 30% | 1, 2 | Percentage | Cumulative 50% pass |
| Project | 70% | 1, 2 | | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.6.    Introduction to Networks

| | | | |
|---|---|---|---|
| *SMS Code* | ID515001/IA515001 | *Directed Learning hours* | 60 |
| *Level* | 5 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | none | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

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

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Design and build a simple local area network using device addressing schemes and basic network configurations.

2.    Configure and troubleshoot end-to-end connectivity between local and remote networks using security best practices.

### Indicative Content

- OSI model
- Types of networks
- Application layer functionality
- Transport layer protocols (TCP/UDP)
- Network Layer protocols (IPv4)
- Layer 3 Addressing and subnetting
- Data link layer concepts and addressing
- Network cabling
- Configuring and testing a network

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion requirements |
|---|---|---|---|---|
| Weekly quiz | 20% | 1,2 | Percentage | Cumulative 50% pass |
| Skills based assessment | 50% | 1,2 | Percentage | |
| Theory Exam | 30% | 1,2 | Percentage | |

A single final result to be entered in SMS at completion.

### Resources Required:

Cisco Network Academy Routing and Switching series "Introduction to Networks."
Student Lab Manual"

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.7.    Platforms and Devices

| *SMS Code* | ID520003/IA520003 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 5 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | None | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

The aim of this course is to enable learners to use a range of devices, platforms and concepts utilised within the IT industry.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.  Install and configure operating systems on devices for functionality and network connectivity.

2.  Select and apply systems tools, command line and scripting to configure, maintain, and secure operating systems in local and virtual settings.

3.  Troubleshoot hardware and operating system faults for the main components of a computer.

### Indicative Content

- Installing, configuring and selecting PC hardware components
- Operating systems installation and maintenance (systems tools)
- Overview of operating systems (mobile, desktop, service, etc.)
- Use a VM & develop basic understanding of virtualisation
- Basic use of transmission protocols (e.g. FTP, SSH)
- File systems
- Backup and RAID systems
- Troubleshooting hardware and software
- Connecting and configuring devices (Bluetooth, Wi-Fi, printers, etc.)/Mounting drives
- Command line proficiency
- Basic network configuration
- 'Embedded' (Raspberry Pi, Arduino, Development platforms)
- Environmental impact of IT
- Identify sustainability issues involved in purchasing, using and disposing of devices.

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Exam | 40% | 1, 2, | Percentage | Cumulative 50% pass |
| Skills-based assessment | 40% | 1, 2, 3 | Percentage | |
| Assignment 1 | 10% | 2 | Percentage | |
| Assignment 2 | 10% | 1, 3 | Percentage | |

A single final result to be entered in SMS at completion.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

### Resources

Online/Lab Book

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.8.    Maths for IT

| | | | |
|---|---|---|---|
| *SMS Code* | ID521001/IA521001 | *Directed Learning hours* | 60 |
| *Level* | 5 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | none | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To introduce learners to mathematical concepts and methods that underpin computer systems.  This course is primarily sited within the field of discrete mathematics.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Use the mathematical structures and algorithms that underpin digital systems.

2.    Apply mathematical methods to solve problems that are sited in an Information Technology context.

### Indicative Content

All theoretical areas will be presented within an information technology context.

*   Logic circuits
*   Decimal and binary number systems
*   Vectors and matrices
*   Randomness and probability
*   Factorials, permutations and combinations
*   Check digits
*   Random number generation
*   Encryption
*   Algorithms, iteration, recursion
*   Hash tables and hash functions
*   Computational complexity

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading scheme | Completion requirements |
|---|---|---|---|---|
| Test 1 | 25% | 1,2 | Percentage | Cumulative 50% pass |
| Test 2 | 25% | 1,2 | Percentage | |
| Test 3 | 25% | 1,2 | Percentage | |
| Test 4 | 25% | 1,2 | Percentage | |

### Resources

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.9.    Year One Special Topic

| SMS Code | ID530151/IA530151 | *Directed Learning hours* | 30 |
|---|---|---|---|
| *Level* | 5 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 120 |
| Prerequisites | none | *Total Learning Hours* | 150 |
| *Course approved in another Programme:* Yes<br>Special Topic papers are approved within a number of programmes | | | |

### Aims

This course is designed for learners to pursue an individual course of study which will focus in depth on a particular aspect of Information Technology.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Analyse a specific topic whilst applying the underlying principles and concepts to the field of study.

### Indicative Content

The process may include

- Producing a proposal for the Special Topic
  - Purpose and scope of the Special Topic identified
  - Skills and knowledge required in the Special Topic identified
  - Learning and assessment plan developed
- Carrying out Special Topic work.
  - Work log/progress report compiled
  - Progress reviewed with supervisor
  - Assessment material/report presented

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Negotiated project | 100% | 1 | Percentage | 50% pass |

### Resources

**Required:**

- For permission to undertake this course, pre-arranged supervision with a staff member with specialist knowledge in the learner's proposed topic area is required. Specific content to meet the outcomes will be agreed between the lecturer and learner.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.10.    Studio 3

| | | | |
|---|---|---|---|
| *SMS Code* | ID606001/IA606001 | *Directed Learning hours* | 60 |
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID503001/IA503001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To enable learners to use an industry-relevant project management approach to produce simple, functional group outputs.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Analyse user requirements to inform technical project work and produce user-centric functionality.

2.    Employ ethical and sustainable development methodologies and tools in a team environment.

### Indicative Content

- Iterative design thinking strategies
- User-driven development
- Modern team collaboration and development frameworks
- Sound communication and project management strategies
- High-quality technical outputs

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Performance and outputs review | 100% | 1, 2 | Competency | Must pass |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.11.    Studio 4

| SMS Code | ID622001/IA622001 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID606001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To produce a professional, high-quality group project, adhering to industry-relevant quality assurance and ethical practices.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Select and apply industry-standard tools and processes to solve non-trivial problems in a team environment.

2.    Analyse and manage development challenges to create production-quality outputs.

### Indicative Content

- Security, privacy, quality, user experience and deployment
- Modern quality assurance practices
- Appropriate use of automation
- Efficient cross-discipline teamwork

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Performance and output review | 100% | 1, 2 | Competency | Must pass |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.12. Databases 2

| SMS Code | ID605001/IA605001 | Directed Learning hours | 60 |
|---|---|---|---|
| Level | 6 | Workplace or Practical Learning hours | 0 |
| Credits | 15 | Self-Directed Learning hours | 90 |
| Prerequisites | IN505001, IN511001 | Total Learning Hours | 150 |
| Is this course approved in another Programme (outside of the IT suite):  No | | | |

### Aims

To give an understanding of the fundamentals of database management systems with emphasis on relational systems.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Plan and build a normalised relational database to solve a specified problem.

2. Use syntactically correct SQL to write database queries that ensure data integrity.

### Indicative Content

* Role of relational databases and relational database management systems
* Formal database theory – relational algebra, functional dependencies and normalisation.
* Architecture of relational database management systems
* Query construction and optimisation
* Data modelling
* Design and implementation of relational databases
* Principles of database administration and database security

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Worksheets | 20% | 2 | Percentage | Cumulative 50% pass |
| Design and build assignment | 40% | 1,2 | Percentage | |
| Examination | 40% | 1,2 | Percentage | |

### Resources Required:

Churcher, Clare (2012) Beginning database design: From novice to professional. Apress.

*46*

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.13.    Introductory Application Development Concepts

| | | | |
|---|---|---|---|
| *SMS Code* | ID607001/IA607001 | *Directed Learning hours* | 60 |
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self Directed Learning hours* | 90 |
| Prerequisites | IN511001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To introduce the concepts of application development including algorithms, data structures and design patterns that are required to use a simple, industry-relevant development framework.

### Learning Outcomes
At the successful completion of this course, learners will be able to:

1.  Design and build secure applications with dynamic database functionality following an appropriate software development methodology.

### Indicative Content

*   Server and client-side programming
*   Design patterns e.g. MVC (Model View Controller)
*   Database integration (ORMs)
*   Database migration
*   Automated testing
*   Session based authentication

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Practical | 20% | 1 | Percentage | Cumulative 50% pass |
| Project | 80% | 1 | Percentage | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.14.    Intermediate Application Development Concepts

| | | | |
|---|---|---|---|
| *SMS Code* | ID608001/IA608001 | *Directed Learning hours* | 60 |
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self Directed Learning hours* | 90 |
| Prerequisites | ID607001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To extend the concepts of application development including algorithms, data structures and design patterns that are required to use a complex, industry-relevant frameworks or libraries.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.  Apply design patterns and programming principles using software development best practices.

2.  Design and implement full-stack applications using industry relevant programming languages.

### Indicative Content

- APIs (Application Programming Interfaces)
- Database integration
- Deployment
- Design patterns
- Frameworks or libraries
- ORMs (Object-Relational Mappings)
- Session based authentication
- Automation testing
- Security
- Parallelism

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Practical | 20% | 1 | Percentage | Cumulative 50% pass |
| Assessment 1 | 20% | 1, 2 | Percentage | |
| Assessment 2 | 30% | 1, 2 | Percentage | |
| Assessment 3 | 30% | 1, 2 | Percentage | |

### Resources

No required text

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.15.    Switching, Routing and Wireless Essentials

| *SMS Code* | ID615008/IA615008 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | IN515001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

The aim of this course is to enable learners to apply knowledge of router and switch operation, network architecture and services to configure small-to-medium business networks.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Design and build a network for availability and redundancy.

2.    Configure and troubleshoot flexible local area networks using virtual and wireless technologies.

### Indicative Content

- Basic switching concepts and the operation of Cisco switches
- Enhanced switching technologies such as VLANs, VLAN Trunking Protocol (VTP), Rapid
- Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree Protocol (PVSTP), and 802.1q
- The purpose, nature, and operations of a router, routing tables, and the route lookup process
- Static routing and default routing
- How VLANs create logically separate networks and how routing occurs between them
- Dynamic routing protocols, distance vector routing protocols, and link-state routing protocols
- Basic operations of routers in a small routed network:
- The purpose and types of access control lists (ACLs)
- The operations and benefits of Dynamic Host Configuration Protocol (DHCP)
- Wireless LAN concepts and configuration
- LAN security concepts

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Weekly tests | 10% | 1, 2 | Percentage | Cumulative 50% pass |
| Skills based assessment | 30% | 1, 2 | Percentage | |
| Assignment | 40% | 1, 2 | Percentage | |
| Theory exam | 20% | 1, 2 | Percentage | |

A single final result to be entered in SMS at completion.

### Resources

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

**Required:**

Cisco Network Academy "Switching, Routing and Wireless Essentials" online course access.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.16.    Operating Systems Concepts

| | | | |
|---|---|---|---|
| *SMS Code* | ID616001/IA616001 | *Directed Learning hours* | 60 |
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | IN510001 & IN520002 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

This course aims to introduce the basic mechanisms of an operating system, and its management among various components. Learners will navigate, configure, and manage contemporary operating systems for basic system administration. This course lays a solid foundation for more advanced courses in system administration, virtualization, and security.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.  Perform automated user and permissions management in a computing system.
2.  Analyse and manage process, memory, storage, and network management modules in operating systems.
3.  Evaluate the design and process models of contemporary operating systems.

### Indicative Content

- Core operating system concepts: scheduling, memory management, process management
- Operating system design aspects: monolithic vs microkernel, case study of Linux.
- Linux shell commands and exploring system internals with shell
- User, process, file and memory management with Linux commands
- Customizing Linux Kernel and loadable kernel modules
- Process/Thread management and synchronization
- Services and Daemons, networking interface
- Bash Scripting
- Basic System Administration tasks with scripting
- File systems
- Networking with Linux Systems

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Assignment | 30% | All | Percentage | Cumulative 50% pass |
| Class exercises | 40% | 1, 2 | Percentage | |
| Exam | 30% | All | Percentage | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
**Updated: Academic Committee 14 June 2022**

### 6.17. Operations Engineering 1

| SMS Code | ID609001/IA609001 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID616001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

This course will provide learners with the knowledge and hands-on skills to perform systems administration tasks securely within different computing platforms using the command line interface.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Identify the key tools/services for administering different computing systems

2. Develop advanced shell scripts to automate system administration tasks

3. Use cloud and directory services for enterprise computing infrastructure

### Indicative Content

- Network and firewall configuration
- Advanced user/group management and permissions
- Advanced scripting for system administration
- Ticketing for system administration
- Backup and disaster recovery
- Directory services in different OSs
- Configuring and deploying cloud services and resources
- Hardening operating systems and networks
- Containers

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Assignment | 30% | 2 | Percentage | Cumulative 50% pass |
| Practical | 40% | 1, 2, 3 | Percentage | |
| Exam | 30% | 1, 2, 3 | Percentage | |

### Resources

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.18.    Embedded Systems

| | | | |
|---|---|---|---|
| *SMS Code* | ID620001/IA620001 | *Directed Learning hours* | 60 |
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | IN520002 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### *Aims*

To introduce learners to the core principles of computer hardware and architecture and to acquaint them with a range of embedded application contexts.  (This paper is *not* intended to provide the skills required to design a better CPU, nor is it intended to teach learners to write in assembler.)

### *Learning Outcomes*

At the successful completion of this course, learners will be able to:

1.  Analyse the parameters of a problem domain that can be solved with an embedded systems solution.

2.  Implement a complete embedded systems solution that meets the requirements of solving a problem domain.

### *Indicative Content*

- Low-level hardware (registers, buses, and clocks, memory, storage, I/O, addressing, etc.)
- Low-level instruction processing
- CPU design principles
- High-level architecture (e.g. caching, VM, dedicated hardware, multicore processing, etc.)
- Embedded application areas with microprocessors and microcontrollers
- Theory and principles of embedded/control systems
- Embedded system hardware
- Embedded system software
- Embedded system project work

### *Assessment*

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Project work | 100% | 1,2 | Percentage | 50% pass |

### *Resources*

### Required:

This paper will require appropriate hardware, materials and SDKs for construction of modern embedded systems.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.19. Automation and Robotics

| SMS Code | ID621001/IA621001 | Directed Learning hours | 60 |
|---|---|---|---|
| Level | 6 | Workplace or Practical Learning hours | 0 |
| Credits | 15 | Self-Directed Learning hours | 90 |
| Prerequisites | ID620001 | Total Learning Hours | 150 |
| Is this course approved in another Programme (outside of the IT suite):  No | | | |

### Aims

To extend and refine learners micro-electronics skills in order to build artefacts which are physically complex, behaviourally complex and highly interactive.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Apply core electronic and mechanical principles to robotics/automated systems design.

2. Design a robotics/automated solution to a specified problem following principles of interaction design.

3. Use an appropriate software development platform to implement simple interactive robotics/automated systems.

### Indicative Content

- Discussion of historical development of automated systems
- Survey of application areas
- Robotics simulator work
- Sensors
- Hardware of robotics/automated/ubiquitous systems
- Development software – options and issues
- Interaction design – human factors and machine design principles
- Project work – Design and construction of interactive robotics/automated systems

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| In-class practicals | 10% | 3 | Percentage | Cumulative 50% pass |
| Theory examination | 10% | 1,2,3 | Percentage | |
| Project 1 | 30% | 1,2,3 | Percentage | |
| Project 2 | 50% | 1,2,3 | Percentage | |

54

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.20. Introductory Game Development

| *SMS Code* | ID623001 | *Teaching Hours* | 48 |
|---|---|---|---|
| *Level* | 6 | | |
| *Credits* | 15 | *Self-Directed Study Hours* | 102 |
| Prerequisite | IN/ID511001: Programming 2 | *Total Learning Hours* | 150 |
| *This course approved in another Programme: Yes (BDes(Com)* | | | |

### Aim

To introduce the concepts of game development including algorithms and data structures that are required to use a simple, industry-relevant framework.

### Learning Outcomes

At the successful completion of this course, tauira will be able to:

1. Design and build usable games using various introductory algorithms following an appropriate software development methodology.

### Indicative Content

- Introduction to Unity scripting
- Game mechanics
- Maze generation
- AI strategy

### Assessment

Assessment will be based on stated outcomes.

| Assessment Activity | Weighting | Learning Outcomes | Pass Criteria |
|---|---|---|---|
| Portfolio | 100% | 1 | 50% pass |

### Resources:

This paper will be taught using Unity & Visual Studio Code. An installer for Unity & Visual Studio Code are available https://unity3d.com/get-unity/download & https://code.visualstudio.com/download. Please refer any problems with downloads or installers to Rob Broadley in D205a

### Readings

No textbook is required for this course. URLs to useful resources will be provided in the lecture notes.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.21.    Year Two Special Topic

| SMS Code | ID630151/IA630151 | *Directed Learning hours* | 30 |
|---|---|---|---|
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 120 |
| Prerequisites | 120 credits at L5 | *Total Learning Hours* | 150 |
| *Course approved in another Programme:* Yes<br>Special Topic papers are approved within a number of programmes | | | |

### Aims

To allow learners to carry out semi-independent exploration into a specific information technology topic to a depth not supported by an existing Bachelor of Information Technology paper.  Learners will negotiate objectives, learning plan, assessment criteria and time frame with a supervising lecturer who will provide direction throughout the project.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Examine and discuss a specific topic whilst applying the underlying principles and concepts to the field of study.

### Indicative Content

Learners will research and apply chosen aspects of their information technology topic.  Sources would typically include academic journals, textbooks, and credible web sites.  Selection and location of resource materials will be supported by a staff supervisor.  Content will include both theoretical material and applied skills development.

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Negotiated project | 100% | 1 | Percentage | 50% pass |

A single final result to be entered in SMS at completion.

### Resources

**Recommended:**

Because of the independent work required, Special Topic papers are more challenging, and require more mature academic skills than traditional format papers at the same level.  It is suggested that Special Topics only be permitted when learners have:

•    Demonstrated excellent literacy and work habits in previous courses

•    Pre-arranged supervision with a staff member with specialist knowledge in the learner's proposed topic area.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.22.    Studio 5

| | | | |
|---|---|---|---|
| *SMS Code* | ID728001/IA728001 | *Directed Learning hours* | 15 |
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 135 |
| Prerequisites | ID622001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To enable learners to apply technical skills within complex IT projects. To extend learner professional behaviour through group work, professional development activities and external engagement.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.  Analyse real-world problems and create IT systems to solve them;

2.  Apply technical and theoretical skills to unfamiliar and complex situations;

3.  Contribute as a member of a team in a structured development process.

### Indicative Content

Learners complete the development of large, real client driven projects under supervision.

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Performance and output review | 100% | 1, 2, 3 | Competency | Must pass |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
**Updated: Academic Committee 14 June 2022**

## 6.23. Studio 6

| | | | |
|---|---|---|---|
| *SMS Code* | ID732001 | *Directed Learning hours* | 15 |
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 135 |
| Prerequisites | ID728001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To enable learners to extent their skills within a complex IT project. **Learning Outcomes**

At the successful completion of this course, learners will be able to:

1. Critically evaluate and apply a range of processes to unfamiliar and complex problems.
2. Engage in advanced study in specialist areas.
3. Demonstrate responsibility for leadership within a project group.

### Indicative Content

Learners complete the development of large, real client driven projects under supervision.

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Performance and output review | 100% | 1, 2, 3 | Competency | Must pass |

### Resources

**Required:**
Varies according to project needs.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.24.    Developing Flexible IT Courses

| SMS Code | ID703001 | Directed Learning hours | 60 |
|---|---|---|---|
| Level | 7 | Workplace or Practical Learning hours | nil |
| Credits | 15 | Self-Directed Learning hours | 90 |
| Prerequisites | IN502001 | Total Learning Hours | 150 |
| Is this course approved in another Programme (outside of the IT suite):  No | | | |

### Aims

To prepare learners for the training role that is often performed by information technology professionals.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Design, create, implement and evaluate a computer-based tutorial to teach technical skills or knowledge to a specified audience.

2. Design, conduct and evaluate a blended IT training programme to meet a specified set of needs including Treaty of Waitangi considerations.

### Indicative Content

- Evaluate training materials
- Screen recording software
- Writing interactive quizzes
- Tutorial writing
- Learning Tools
- Learning styles and adult learners
- Training needs analysis for a new system
- Training methods
- Conduct training sessions
- Evaluation
- Computer based training
- Interactive facilitation

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Tutorial Creation | 50% | 1, 2 | Percentage | Cumulative 50% pass |
| Teach a lesson | 50% | 1, 2 | Percentage | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
**Updated: Academic Committee 14 June 2022**

## 6.25. Quality Assurance and Software Testing

| | | | |
|---|---|---|---|
| *SMS Code* | ID733001 | *Directed Learning hours* | 60 |
| *Level* | 7 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | None | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To lay the foundation for a potential career in the Information Technology field as a software tester. To understand the fundamental principles and processes of software testing, including production of detailed test plans and effective test results.  To develop practical software testing skills enabling the production of more robust code.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.   Plan, execute and document the testing process using automated and manual tests.

2.   Analyse and critique industry standard software testing theory, the significance of software testing and its place in the software development life cycle.

### Indicative Content

- Static testing – reviews, walkthroughs, static analysis etc…
- Dynamic testing
  - Structure-based – statement, decision, condition
  - Specification-based – equivalence partitioning, boundary analysis, state transition, decision table, use case
  - Experience-based testing – error guessing, exploratory
- Software Testing theory (including an ISTQB Foundation Level qualification)
- Winapp driver and Appium
- Selenium Webdriver
- Test Plan production – automated and flexible
- Practical detection of errors in a variety of unfamiliar contexts
- Writing correct, clear, and professional test results to allow developers to reproduce and fix errors.
- Researching and exploring the (ethical and social) implications of major software failures

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Presentation | 15% | 2 | Percentage | Cumulative 50% pass |
| Software Testing Theory Exam | 30% | 2 | Percentage | |
| Applied Testing Checkpoints | 15% | 1, 2 | Percentage | |
| Applied Testing Project | 40% | 1, 2 | Percentage | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.26. Databases 3

| *SMS Code* | ID705001/IA705001 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID605001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To provide learners with skills and understanding necessary to design and implement enterprise databases, and to administer database management systems.  To become acquainted with the range of tools and platforms available for developing large databases.  To explore current areas of research in database implementation, use and management.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Implement troubleshooting techniques to solve complex database performance issues.

2. Design and develop relational databases to meet specified requirements that are subject to high-availability, high-reliability, security, and performance constraints.

3. Critically analyse database administrator tasks in order to determine a management approach.

### Indicative Content

- Application areas
- Information analysis techniques
- Survey of modern software and hardware for database construction and management
- Advanced data modelling
- Use of stored procedures
- Construction of complex queries
- Transactions and concurrency
- Advanced topics in data security
- Data mining and other processing methodologies

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Exam | 25% | 2,3 | Percentage | Cumulative 50% pass |
| Project Work | 65% | 1,2,3 | Percentage | |
| DBA assessment | 10% | 2,3 | Percentage | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.27. Security

| *SMS Code* | ID724001/IA724001 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 7 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID616001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To provide learners with theoretical knowledge and accompanying technical skills in the field of information security. Learners are guided through the process of identifying and analysing security threats and vulnerabilities, then mitigating them by implementing robust and industry-accepted solutions. The course uses an attack then defend mentality - allowing learners to learn how attacks are conducted, then mitigating the vulnerabilities.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Analyse and apply information security best practices to mitigate common applications, network and system security vulnerabilities for enterprise networks.

2. Examine essential cryptography concepts and implement appropriate solutions to maintain information security requirements for modern information systems.

### Indicative Content

- Information security mechanisms
- Cryptography
- Network security
- Web application security
- Server hardening
- Computer forensics

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Laboratory Assessment | 15% | 1,2 | Percentage | Cumulative 50% pass |
| Assignments | 60% | 1,2 | Percentage | |
| Exam | 25% | 1,2 | Percentage | |

### Resources Required:

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.28.    Advanced Application Development Concepts

| SMS Code | ID730001 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self Directed Learning hours* | 90 |
| Prerequisites | ID608001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To enable learners to build and deploy optimised and efficient applications using a range of advanced industry tools and frameworks.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Critically evaluate and implement a range of programming paradigms to solve unfamiliar problems.
2.    Create efficient full-stack applications using advanced industry techniques, tools and frameworks.

### Indicative Content

- Progressive web applications
- Database replication
- Advanced design patterns
- Code optimisation e.g. tree shaking, code splitting, dynamic loading
- Code minimisation and obfuscation
- Code compression
- Benchmarking tools
- CDNs (Content Delivery Networks)
- Client/server-side caching techniques
- Message queues
- WebSockets

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Practical | 20% | 1 | Percentage | Cumulative 50% pass |
| Project | 80% | 1, 2 | Percentage | |

### Resources

No required text

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.29.   Advanced Algorithms

| SMS Code | ID711002 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID608001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To enable learners to use a wide variety of advanced algorithms and tools required for development of efficient solutions to complex computational problems.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Evaluate the ecosystem of algorithmic tools available to produce efficient software.

2.    Implement appropriate algorithms and data structures to solve nontrivial computational problems.

3.    Optimize the usage of computational resources while programming.

### Indicative Content

- Genetic (i.e. evolutionary) algorithms
- Computer graphics
- Modelling and simulation
- Natural language processing
- Optimization
- Data analytics
- Measuring algorithmic efficiency
- Industrial control
- Signal processing
- Block chain
- Searching, sorting and hashing
- Learning algorithms
- Security

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Programming Assignment 1 | 25% | 1,2,3 | Percentage | Cumulative 50% pass |
| Midyear exam | 25% | 1,2,3 | Percentage | |
| Programming Assignment 2 | 25% | 1,2,3 | Percentage | |
| Final exam | 25% | 1,2,3 | Percentage | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## *Resources*

**Required:** No required text, learners will be directed to online materials.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.30.   Mobile Application Development

| | | | |
|---|---|---|---|
| *SMS Code* | ID721001/IA721001 | *Directed Learning hours* | 60 |
| *Level* | 7 | *Workplace or Practical Learning hours* | *0* |
| *Credits* | 15 | *Self Directed Learning hours* | 90 |
| Prerequisites | ID607001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To learn the specifics of mobile applications design and development. Learners will be able to develop a mobile application and publish it to a mainstream app store.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.     Implement and publish complete, non-trivial, industry-standard mobile applications following sound architectural and code-quality standards

2.     Identify relevant use cases for a mobile computing scenario and incorporate them into an effective user experience design.

3.     Follow industry standard software engineering practice in the design of mobile applications.

### Indicative Content

•     Interaction and interface design for mobile
•     Advantages and limitations of native mobile apps vs. web-based apps
•     User-centred design and testing
•     Hardware opportunities and constraints.
•     SDKs, APIs, libraries and other tools
•     Software architectures for mobile
•     Publishing policies and procedures

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Practical | 20% | 2, 3 | Percentage | Cumulative 50% pass |
| Project | 80% | 1, 2, 3 | Percentage | |

### Resources

No required text

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.31.    Artificial Intelligence and Data Science

| *SMS Code* | ID727001 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | IN511001, IN521001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

The aim of this course is to enable learners to choose and deploy the appropriate machine intelligence tool to solve problems that demand a cognitive component. Possible applications are: computer vision, natural language processing, recommendation systems, data analytics, anomaly detection, conversational agents (i.e. chatbots), machine translation, autonomous navigation, robotic control and a myriad of others.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Analyze the principles, advantages, limitations, applications and implications of data-driven artificial intelligence to be a productive and responsible practitioner.

2.    Choose, implement and evaluate models to solve machine learning problems.

3.    Apply data science techniques to fetch, scrub, explore, manipulate, visualize, evaluate and interpret complex quantitative data.

### Indicative Content

- Artificial neural network (convolutional, LSTMs, GRUs)
- Web crawling and scraping to gather data
- Data analytics
- Transfer learning
- Language models (word embeddings, contextualized word embeddings, chatbots)
- Generative models (generative adversarial networks, Autoencoders)
- Reinforcement learning
- GPU computation
- Ethics and AI
- Learning theory (bias/variance tradeoffs, sensitivity/specificity trade-offs, validation, regularization, learning curves);
- Machine intelligence APIs

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Assignment 1 | 25% | 1,2,3 | Percentage | Cumulative 50% pass |
| Assessment 1 | 25% | 1,2,3 | Percentage | |
| Assignment 2 | 25% | 1,2,3 | Percentage | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

| Assessment 2 | 25% | 1,2,3 | Percentage | |
|---|---|---|---|---|

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

### 6.32.    Operations Engineering 2

| | | | |
|---|---|---|---|
| *SMS Code* | ID734001 | *Directed Learning hours* | 60 |
| *Level* | 7 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID609001 | *Total Learning Hours* | 150 |
| *NQF Unit standards assessed in this course: No* | | | |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### *Aims*

To enable learners to practice the configuration, management and troubleshooting of systems within an enterprise network including aspects of both application and operating systems components.

### *Learning Outcomes*

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

1.    Implement advanced system operations and administration tasks for Information Technology systems.

2.    Formulate disaster recovery and mitigation policies for enterprise infrastructures.

3.    Discuss aspects of ethics and social responsibility in a systems administration role.

4.    Use a configuration management scheme for systems operation and management.

### *Indicative Content*

- Building and distributing packages
- Managing different servers for system operations
- Performance tuning and troubleshooting of computing systems
- Deploying network monitoring systems
- Implement configuration management systems for systems operation
- Social responsibility and ethics of working in a systems administration role
- Configuration of backup systems for disaster recovery – including backup, recovery and availability management
- Implementing system administration best practices

### *Assessment*

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Individual Performance Review | 20 | 1,2,3 | Percentage | Cumulative 50% pass |
| Team Operational Exercise | 60 | 1,2,3,4 | Percentage | |
| Exam | 20 | 1,2,3,4 | Percentage | |

69

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.33. UX Engineering

| SMS Code | ID729002 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 7 | *Workplace or Practical Learning hours* | *nil* |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID608001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To enable learners to build upon front-end development skills with a view to designing and building screens with inclusive, flexible and sound user experience. This course highlights the importance of both technical and design excellence in sustainable and ethical software development.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Use advanced front-end technologies and workflows to efficiently develop high-quality user interfaces.

2. Design and build optimal solutions to complex user experience problems.

### Indicative Content

- Design thinking processes
- Usability principles, metrics, and heuristics
- UXD research and planning techniques
- User's needs and requirements, including those with special needs
- User testing and design testing
- Advanced CSS and preprocessors
- Semantic, inclusive and sustainable markup

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Practical | 40% | 1, 2 | Percentage | Cumulative 50% pass |
| Development assignment | 60% | 1, 2 | Percentage | |

### Resources

70

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.34.    Administering a Virtual Infrastructure

| | | | |
|---|---|---|---|
| *SMS Code* | ID720001/IA720001 | *Directed Learning hours* | 60 |
| *Level* | 7 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID719001 | *Total Learning Hours* | 150 |
| *NQF Unit standards assessed in this course: No* | | | |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### *Aims*

Learners will gain in-depth knowledge and techniques used to efficiently implement, optimize and trouble-shoot a virtual infrastructure.

### *Learning Outcomes*

At the successful completion of this course, learners will be able to:

1. Plan, install and configure a virtual infrastructure with storage and networking

2. Deploy virtual machines and virtual applications in cloud platforms

3. Establish, monitor and troubleshoot service levels for enterprise cloud infrastructure

4. Critically analyse key performance factors in virtualised systems.

### *Indicative Content*

- Install and configure a virtual environment
- Management techniques and key performance metrics used to identify CPU, network, memory and application performance bottlenecks in a virtualised environment.
- SAN planning and implementation
- Troubleshooting hypervisor problems

### *Assessment*

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Case study – plan and evaluate | 25 | 1,2 | Percentage | Cumulative 50% pass |
| Case study – implement and deploy | 25 | 2,3,4 | Percentage | |
| Exam | 30 | All | Percentage | |
| Skills Based Assessment | 20 | 1,3 | Percentage | |

*Note: Literacy and/or numeracy assessed within current assessment tasks are mapped against Learning Progressions.*

### *Resources*

**Required:**
VMware VCP learner manual for vSphere 5

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

VMware VCP and Lab Excercises for vSphere 5

**Recommended:**

Cafaro, M. & Aloiso, G. (2011). *Grids, Clouds and Virtualization.* Springer-Verlag: London. [ISBN 978-0-85729-049-6]

Wolf, C. & Halter, E.M. (2005). *Virtualization*. Springer-Verlag: New York. [ISBN: 978-1590594957]

Gaurav S. (2010).*Scheduling and Isolation in Virtualization*.VDM Verlag Dr. Müller.[ISBN: 978-3639295139]

Boursas, L.; Carlson, M.; Hommel, W.; Sibilla, M.; Wold, K. (Eds.), (2009). *Systems and Virtualization Management: Standards and New Technologies*. Springer- Verlag: Germany. [ISBN: 978-3540887072]

Haletky, E.L., (2011). *VMware ESX Server in the Enterprise,* Pearson: Boston MA. [ISBN: 978-0132302074]

Edward Haletky, (2011) *VMware ESX and ESXi in the Enterprise: Planning Deployment of Virtualization Servers* (2nd ed.). Pearson: Boston MA. [ISBN: 978-0137058976]

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.35.    Advanced Networking

| | | | |
|---|---|---|---|
| *SMS Code* | ID723001 | *Directed Learning hours* | 60 |
| *Level* | 7 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID615006 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To provide learners with an understanding of how to evaluate and apply advanced networking protocols, services and concepts to the design, deployment and maintenance of medium to large scale networks.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Design and implement scalable, fault tolerant solutions for facilitating high performance local area and wide area networks.

2. Design and implement policies to provide network security and increased performance.

3. Investigate and evaluate new industry technologies for the purpose of increasing network flexibility and performance.

### Indicative Content

- Border gateway protocol (BGP)
- Spanning Tree (STP)
- Link aggregation (PAgP, LACP)
- Hot standby routing protocol (HSRP), gateway load balancing protocol (GLBP)
- Multi area open shortest path first (OSPF)
- Virtual routing and forwarding (VRF)
- Multi protocol label switching (MPLS) virtual private networks (VPN)
- Software defined networking (SDN)
- Quality of service (QoS)

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Research assignment | 15% | 3 | Percentage | Cumulative 50% pass |
| Design and implementation project | 40% | 1,2,3 | Percentage | |
| Final theory exam | 25% | 1,2,3 | Percentage | |
| Final practical exam | 20% | 1,2 | Percentage | |

### Resources

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

### 6.36.    Enterprise Networking, Security and Automation

| *SMS Code* | ID735001 | *Directed Learning hours* | 60 |
|---|---|---|---|
| *Level* | 7 | *Workplace or Practical Learning hours* | nil |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID615008/IA615008 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aims

To enable learners to understand and apply knowledge of architectures and considerations related to designing, securing, operating, and troubleshooting enterprise scale networks.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.    Design and implement scalable and secure solutions for enterprise networks.

2.    Implement network management and monitoring services to provide increased networking availability and integrity.

3.    Investigate and evaluate how virtualisation, automation and controller-based architectures affect modern networks.

### Indicative Content

- Network design
- Quality of service
- Access control lists
- Network address translation
- Advanced routing protocols
- Network virtualisation
- Network automation
- Network management
- Software defined networking

### Assessment

This course is developed, and quality controlled by Cisco.  The weighting of the assessments has been localised. The chapter exam and theory exam assessments are controlled by Cisco.

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Assignment | 50% | 1,2,3 | Percentage | Cumulative 50% pass |
| Skills Based Assessment | 30% | 1 | Percentage | |
| Theory Exam | 20% | 1,2,3 | Percentage | |

A single final result to be entered in SMS at completion.

### Resources Required:

Cisco Network Academy "Enterprise, Networking, Security and Automation" online course access.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.37.    Internet of Things and Cloud Computing

| | | | |
|---|---|---|---|
| *SMS Code* | ID736001/IA736001 | *Directed Learning hours* | 60 |
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID620001/IA620001 & ID609001/IA609001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aim

To enable learners to investigate and analyse the applicability of an IoT solution for a real-world problem and develop an IoT application involving cloud computing.

### Learning Outcomes

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

1.    Analyse models, methodologies and standards in cloud-based information systems infrastructure.

2.    Critically analyse IoT systems architecture, components, and applications in relation to the cloud

3.    Construct technical design specification and develop IoT solutions to be deployed on the cloud

### Indicative Content

- Introduction to the Internet of Things
- Machine-to-Machine Communications
- IoT applications, benefits, opportunities, and challenges
- IoT use cases and scenarios (smart home, agritech, healthcare, activity monitoring etc.)
- IoT system architecture
- IoT cloud platform
- Interoperability in IoT
- IoT networks (Sigfox, LoRa, etc.)
- Cloud computing core concepts, benefits, value proposition
- Cloud computing models: IaaS, PaaS, SaaS
- Sensor-Cloud
- Cloud applications in the industry
- DevOps and cloud
- Security of cloud computing
- IoT Security

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Case Study Analysis | 40% | 1 | Percentage | Cumulative |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

| Project: Design and Develop a Cloud-based IoT Solution | 60% | 1, 2, 3 | Percentage | weighted average of 50% or more |
|---|---|---|---|---|

### *Resources*

### Recommended Texts

Gu, J. (2020). Cloud Computing Architecture: Technologies and Practice (Advances in Computer Science), De Gruyter, 1 edition.

Lea, P. (2018). Internet of Things for Architects: Architecting IoT solutions by implementing sensors, communication infrastructure, edge computing, analytics, and security, Packt Publishing, ISBN-13: 978-1788470599.

Erl, T., Puttini, R. (2013). Cloud Computing: Concepts, Technology & Architecture, Prentice Hall, 1 edition.

Greengard, S. (2015). The Internet of Things (The MIT Press Essential Knowledge series), The MIT Press, ISBN-13: 978-0262527736.

### Online

Internet of Things with Python and Raspberry Pi, LinkedIn Learning,
https://www.linkedin.com/learning/internet-of-things-with-python-and-raspberry-pi?u=76194218

Learning Cloud Computing: Core Concepts, LinkedIn Learning,
https://www.linkedin.com/learning/learning-cloud-computing-core-concepts-2/change-your-career-with-cloud-computing?u=76194218

Learning Cloud Computing: Cloud Governance, LinkedIn Learning,
https://www.linkedin.com/learning/learning-cloud-computing-cloud-governance-2?u=76194218

Cybersecurity with Cloud Computing, LinkedIn Learning,
https://www.linkedin.com/learning/cybersecurity-with-cloud-computing?u=76194218

AWS Academy (Accessible via OPAIC)

Microsoft Self-paced Labs, https://www.microsoft.com/handsonlabs/SelfPacedLabs

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.38.  Advanced Game Development

| | | | |
|---|---|---|---|
| *SMS Code* | ID737001/IA737001 | *Directed Learning hours* | 60 |
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 90 |
| Prerequisites | ID511001/IA511001 | *Total Learning Hours* | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### *Aim*

To enable learners to apply game programming techniques and tools to develop an effective game.

### *Learning Outcomes*

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

1.    Design and develop a game using industry standard tools, technologies and practices.

### *Indicative Content*

- Game graphics and audio concepts
- Graphical game programming
- Game programming with C#
- Unity3D Development
- Scripting in Unity
- AR and VR concepts
- Google VR
- ARCore
- Game APIs

### *Assessment*

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Assignment | 30% | 1 | Percentage | Cumulative 50% pass |
| Project: Game Development + Demo | 70% | 1 | percentage | |

### *Resources*

**Recommended Texts**

Byl, P.D. (2019). Holistic Game Development with Unity 3e: An All-in-One Guide to Implementing Game Mechanics, Art, Design and Programming, CRC Press; 3 edition, ISBN-13: 978-1138480629.

Gregory, J. (August 15, 2014). Game Engine Architecture, A K Peters/CRC Press; 2 edition, ISBN-13: 978-1466560017.

**Online**

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

C# for Unity Game Development, LinkedIn Learning, https://www.linkedin.com/learning/c-sharp-for-unity-game-development/welcome?u=56590297

C++ Game Programming, LinkedIn Learning https://www.linkedin.com/learning/c-plus-plus-game-programming-1/the-course-overview?u=56590297

Google for Games: https://games.withgoogle.com/

Game Code School: http://gamecodeschool.com/tutorials/

GameDev Academy, https://gamedevacademy.org/category/tutorials/vr-ar-tutorials/

VR Game Development, https://vrgamedevelopment.pro/

Unity: AR Visualization 01 Basic Concepts, Linkedin Learning, https://www.linkedin.com/learning/unity-ar-visualization-01-basic-concepts?u=76194218

**Tools and Development Platforms**

Unity (unity.com)

Google VR for everyone

Google ARCore

AR/VR Headsets / Goggles

Smartphones

Google cardboard

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.39.    Business Analysis and Intelligence

| | | | |
|---|---|---|---|
| *SMS Code* | ID738001/IA738001 | *Directed Learning hours* | 60 |
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| Credits | 15 | Self-Directed Learning hours | 90 |
| Prerequisites | ID521001/IA521001 | Total Learning Hours | 150 |
| *Is this course approved in another Programme (outside of the IT suite):  No* | | | |

### Aim

To enable learners to apply the theories, methods, and tools for analysing business processes, and propose solutions for a variety of organisational problems.

### Learning Outcomes

On successful completion of this course learners will be able to:

1.    Select and apply business analysis theories, methods, and tools to solve organisational issues.

2.    Analyse characteristics of business problems and the use of artificial intelligence for achieving business intelligence.

3.    Analyse data and apply data analytics processes to propose justified recommendations for organisational problems.

### Indicative Content

- Types, roles and skill sets of business analysts
- Business analysis core concepts
- Business analysis knowledge areas
- Business analysis perspective, tools, and techniques
- Business analysis competencies
- The digital BA
- Machine learning algorithms for business problems
- Data-driven innovation and disruption
- Potential for business improvements
- Data analytics
- Forecasting for businesses

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Case Study Analysis Report | 30% | 2 | Percentage | Cumulative 50% pass |
| Project | 70% | 1, 2, 3 | Percentage | |

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

### *Resources*

**Recommended Texts**

Albright, S., & Winston, W. (2017). Business analytics: Data analysis and decision making (6th ed.). Stamford, CT: Cengage Learning.

Sharda, R. (2020). Business Intelligence and Analytics: Systems for Decision Support (10th Edition), Pearson, ISBN-13: 978-0133050905.

IIBA. (2015). A Guide to the Business Analysis Body of Knowledge (Babok Guide). International Institute of Business Analysis.

**Online**

Business Analysis Foundations, LinkedIn Learning, https://www.linkedin.com/learning/topics/business-analysis?u=76194218.

Business Analysis Foundations: Business Process Modelling, LinkedIn Learning, https://www.linkedin.com/learning/topics/business-analysis?u=76194218.

Requirements Elicitation and Analysis, LinkedIn Learning, https://www.linkedin.com/learning/topics/business-analysis?u=76194218.

Become a Business Intelligence Specialist, LinkedIn Learning, https://www.linkedin.com/learning/paths/become-a-business-intelligence-specialist?u=76194218.

Business Intelligence Tutorial – Learn Latest BI Features & Applications, Data Flair, https://data-flair.training/blogs/business-intelligence/

**Tools and Development Platforms**

Power BI

Tableau

R

SWOT

Trello

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.40. Year Three Special Topic

| *SMS Code* | ID730151/IA730151 | *Directed Learning hours* | 15 |
|---|---|---|---|
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 135 |
| Prerequisites | 120 L5 credits, 90 L6 credits | *Total Learning Hours* | 150 |
| *Course approved in another Programme:* Yes<br>Special Topic papers are approved within a number of programmes | | | |

### Aims

To allow learners to carry out independent exploration into a specific information technology topic to a depth not supported by an existing Bachelor of Information Technology paper.  Learners will negotiate objectives, learning plan, assessment criteria and time frame with a supervising lecturer.

### Learning Outcomes

At the successful completion of this course, learners will be able to:

1.   Critically analyse a specific topic whilst applying the underlying principles and concepts to the field of study.

### Indicative Content

Learners will research and apply chosen aspects of their information technology topic.  Sources would typically include academic journals, textbooks, and credible web sites.  Content will include both theoretical material and applied skills development.

### Assessment

| Assessment Activity | Weighting | Learning Outcomes | Assessment Grading Scheme | Completion Requirements |
|---|---|---|---|---|
| Negotiated project | 100% | 1 | Percentage | 50% pass |

### Resources

**Recommended:**

Because of the independent work required, Special Topic papers are more challenging, and require more mature academic skills than traditional format papers at the same level.  It is suggested that Special Topics only be permitted when learners have:

1.   Demonstrated excellent literacy and work habits in previous courses

2.   Pre-arranged supervision with a staff member with specialist knowledge in the learner's proposed topic area.

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.41.    Unspecified Credits – Level 5

| *SMS Code* | ID550001/IA550001 | *Directed Learning hours* | 0 |
|---|---|---|---|
| *Level* | 5 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 0 |
| Prerequisites | n/a | *Total Learning Hours* | 0 |
| *Course approved in another Programme:* Yes<br>Special Topic papers are approved within a number of programmes | | | |

### Aims

This paper is intended to act as a repository for "unspecified credits" where the learner undertakes courses from outside the BInfoTech.  Up to 15 credits of these may normally be used.

Any course that is recognised as contributing to a degree may be used for these credits.  The contribution to a learner's credit count will be calculated on the basis of EFTS contribution of the external paper (ie 0..125 EFTS = 15 credits).

There will be no fee charged for this paper.

### Learning Outcomes

The outcomes for the "unspecified credit" are not described here, as they are, by definition, external. To be eligible for this paper, the learning outcome of the external papers taken must not significantly overlap with other papers undertaken by that learner.

### Indicative Content

n/a

### Assessment

n/a

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.42.    Unspecified Credits – Level 6

| *SMS Code* | ID650001/IA650001 | *Directed Learning hours* | 0 |
|---|---|---|---|
| *Level* | 6 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 0 |
| Prerequisites | n/a | *Total Learning Hours* | 0 |
| *Course approved in another Programme:* Yes<br>Special Topic papers are approved within a number of programmes | | | |

### Aims

This paper is intended to act as a repository for "unspecified credits" where the learner undertakes courses from outside the BInfoTech.  Up to 15 credits of these may normally be used.

Any course that is recognised as contributing to a degree may be used for these credits.  The contribution to a learner's credit count will be calculated on the basis of EFTS contribution of the external paper (ie 0.125 EFTS = 15 credits).

There will be no fee charged for this paper.

### Learning Outcomes

The outcomes for the "unspecified credit" are not described here, as they are, by definition, external. To be eligible for this paper, the learning outcome of the external papers taken must not significantly overlap with other papers undertaken by that learner.

### Indicative Content

n/a

### Assessment

n/a

*84*

*Programme Document:*
*OT5173 Bachelor of Information Technology*
*OT5174 Graduate Certificate in Information Technology*
*OT5175 Graduate Diploma in Information Technology*

*Approved: Academic Board 12 May 2020*
*Updated: Academic Committee 14 June 2022*

## 6.43.  Unspecified Credits – Level 7

| *SMS Code* | ID750001/IA750001 | *Directed Learning hours* | 0 |
|---|---|---|---|
| *Level* | 7 | *Workplace or Practical Learning hours* | 0 |
| *Credits* | 15 | *Self-Directed Learning hours* | 0 |
| Prerequisites | n/a | *Total Learning Hours* | 0 |
| *Course approved in another Programme:* Yes<br>Special Topic papers are approved within a number of programmes | | | |

### Aims

This paper is intended to act as a repository for "unspecified credits" where the learner undertakes courses from outside the BInfoTech.  Up to 15 credits of these may normally be used.

Any course that is recognised as contributing to a degree may be used for these credits.  The contribution to a learner's credit count will be calculated on the basis of EFTS contribution of the external paper (ie 0.125 EFTS = 15 credits).

There will be no fee charged for this paper.

### Learning Outcomes

The outcomes for the "unspecified credit" are not described here, as they are, by definition, external. To be eligible for this paper, the learning outcome of the external papers taken must not significantly overlap with other papers undertaken by that learner.

### Indicative Content

n/a

### Assessment

n/a

*85*