

## ISCG5400: Hardware Fundamentals

Course number:	ISCG5400	Level:	5	Credits:	15
Main programme:	BCS			Compulsory	
Pathway(s):					
Requisites / Restrictions:					
Other programmes:	GDCMP				
NZSCED field of Study:	020117	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
54		96	150

### Outcome Statement:

To provide students with a good working knowledge of information technology hardware.

### Learning Outcomes:

1. Describe a wide selection of hardware components and explain their functions, including selection issues and managing peripherals.
2. Identify and configure a selection of information technology hardware resources.
3. Demonstrate and describe preventative maintenance of information technology hardware.
4. Explain the current and emerging trends in information technology hardware.

### Learning and Teaching:

Lectures, laboratory work, and personal research

### Topics:

Topics include: description function and selection of a wide range of computer hardware components, identifying and configuring hardware resources, describing preventative maintenance of computer hardware, current and emerging trends on Information Technology. **Assessment:**

Weighting	Nature of assessment	Learning Outcomes
25%	Assignment	3
35%	Test(s)	1, 2
40%	Exam	1, 4

### Learning resources required:

Access to hardware components

Required textbook: refer to the current programme booklist.

### Learning resources recommended:

### Other Programmes:

GDCMP	Elective	
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### Version Tracking:

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions; reference to an old programme removed
	4 – 8 July 2022	S 2 2022	AACSC Emeeting	Redundant word from LO 2 removed; Changes in assessment weightings and their alignments with LOs

ISCG5401: Operating System Fundamentals					
Course number:	ISCG5401	Level:	5	Credits:	15
Main programme:	BCS			Compulsory	
Pathway(s):					
Requisites / Restrictions:					
Other programmes:	GDCMP				
NZSCED field of Study:	020117	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
52		96	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities. Students are required to attend 100% of all scheduled classes.

### Outcome Statement:

The aim of this course is to provide students the understanding of fundamental concepts of operating systems (OS), functionalities and architectures of operating systems, and how they are designed to meet requirements from users, hardware, and software. Students will gain hands-on experience on using MS Windows and Linux system commands and programs to explore various topics covered by the course.

### Learning Outcomes:

1. Demonstrate knowledge of operating system concepts and structures, and processes and inter-process communications
2. Demonstrate knowledge of memory management, I/O management, file systems, and user management and security.
3. Use system commands and programs to monitor and manage processes and system resources
4. Use system commands and programs to manage files, users, and access controls

### Learning and Teaching:

This course will be taught in an integrated manner employing Lectures, demonstrations, discussions and laboratory (practical) classes

An understanding of the principles and fundamental concepts of computer systems will be reinforced with practical work.

Students learn by doing real practical work.

Collaborative Knowledge Building and Learning

Communities

Online support material will enhance the students' ability to learn at their own pace.

### Topics:

- Course structure and assessments, History of OS, Types of OS
- *OS Concepts and Structure* - Operating System Services, User Operating System Interface, System Calls and Programs, Operating System Structure
- *Processes and Process scheduling* - Process model, creating, and states, Threads model, Multi-threading model, Process and CPU scheduling
- *Inter-process communication* - Inter-process communication (IPC) concepts, Classical IPC problems, Synchronization/ Deadlocks, Client-Server Communication
- *Memory management* - Logical and Physical address spaces, Memory Swapping, Allocation, Paging and Segmentation, Virtual memory (VM)
- *Storage management* - Storage structure and File & Directory systems, File permission and access controls
- *I/O Systems* – I/O Hardware and I/O Software
- *Security and User management* - Security environments, Protection mechanisms, Authentication, User management, Malware and defence systems

### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
10%	Summative assessments	1,2,3,4
25%	In-class Test 1	1, 3
25%	In-class Test 2	2, 4
40%	Final exam	1, 2, 3, 4

### Feedback:

Feedback is sought throughout the course using a range of assessment tools including: Class forum and survey

### Learning resources required:

Text Book: refer to the current programme booklist.

Specific resources/readings will be provided during the course.

Handouts given and/or directions to Short Term Loans in the library

### Learning resources recommended:

Booklist & resources published via Moodle

### Other Programmes:

GDCMP	Elective	
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### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change
	17/10/2013	Sem 1, 2014	PC	Changes in Course Aims, Learning Outcomes, Topics, Assessments
	9/08/2021	S 1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions; reference to an old programme removed

## ISCG5403: Networking Fundamentals

Course number:	ISCG5403	Level:	5	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:					
Other programmes:	GDCMP				
NZSCED field of Study:	020113	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
54		96	150

### Outcome Statement:

To provide students with a good working knowledge of the concepts of Networking and Data Communications fundamentals.

### Learning Outcomes:

	Learning outcomes
1.	Discuss basic Data communications, Network Concepts and network topologies.
2.	Discuss different types of transmission media and identify issues relating to them.
3.	Discuss Network Protocols and standards
4.	Discuss Networking components
5.	Discuss advance principles of Data Communications
6.	Explain current and emerging trends in Data Communications.

### Learning and Teaching:

Lectures, Discussions and Demo.

### Topics:

Topics include: discussion of basic network concepts and topologies, transmission media and related issues, network protocols and standards, principles of data communication, current and emerging trends in data communications **Assessment:**

Weighting	Nature of assessment	Learning outcomes
30	Test 1 (Theory Test)	1, 2, 3, 4
30	Tests 2 (Practical Test)	1, 2, 3, 4, 5
40	Final Exam	3, 4, 5, 6

**Learning resources required:**

Textbook: refer to the current programme booklist.

**Learning resources recommended:****Other Programmes:**

GDCMP	Elective	
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**Version Tracking:**

Version No.	Date of Change	Effective from	Approved by	Description of change
	9/08/2021	S 1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions; reference to an old programme removed

ISCG5420: Programming Fundamentals					
Course number:	ISCG5420	Level:	5	Credits:	15
Main programme:	BCS			Compulsory	
Pathway(s):					
Requisites / Restrictions:					
Other programmes:	GDCMP				
NZSCED field of Study:	020103	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
54		96	150

**Outcome Statement:**

To introduce students to the basic principles of designing and developing small computer programs within the context of programming language.

**Learning Outcomes:**

	Learning Outcomes
1.	Design small computer programs as solutions to simple problems
2.	Implement the designs by writing well-structured programs that follow enforced programming language conventions and programming standards.
3.	Test, debug and document small computer programs.

**Learning and Teaching:**

Lectures, Laboratory work, Self-directed study.

**Topics:**

Topics may include: variable types, mathematical operators, logical operators, flowcharts, conditional statements, iterations (loops), arrays, text files, functions, classes and objects.

**Assessment:**

Weighting	Nature of assessment	Learning Outcomes
25%	Programming assignment for designing coding and testing simple programs	2,3
35%	Practical Tests requiring coding of small computer programs	1
40%	Final Exam	1,2

**Learning resources required:**

Textbook: Refer to current programme booklist

**Learning resources recommended:**

**Other Programmes:**

GDCMP	Elective	
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**Version Tracking:**

Version No.	Date of Change	Effective from	Approved by	Description of change
	10/06/2019	S 2 2019	Prog Improvement Comm	Minor changes in Course Topics; Minor changes in the Nature of Assessments and their alignment to Learning Outcomes
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions; reference to an old programme removed

ISCG5421: Programming Principles & Practice					
Course number:	ISCG5421	Level:	5	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Prerequisites (for BCS): ISCG5420				
Other programmes:	GDCMP				
NZSCED field of Study:	020103	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
54		96	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### Outcome Statement:

To advance the knowledge of programming beyond an introductory level, in the context of a programming language.

### Learning Outcomes:

1. Implement the designs by writing well-structured programs that follow enforced programming language conventions and programming standards.
2. Identify the fundamental data requirements of an intermediate-level program.
3. Apply the logic structures of the language.
4. Select and use intermediate-level data structures
5. Write a complete program whilst adhering to available coding standards

### Learning and Teaching:

Topics may be taught in an integrated manner  
 Supervisor / student meetings/discussions  
 Collaborative and/or individual projects  
 Analyses of written, visual, aural and performance texts

### Topics:

classes, objects, methods, properties, data types, decisions, iterations, static and dynamic data structures, graphical user interfaces, inheritance, event-driven programming, exception handling, text files & binary files, database connection

### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.



Weighting	Nature of assessment	Learnin
50%	Programming assignment(s) which include design, coding and testing of an intermediate level application	91,2,3,4, 5
50 % 20%	Practical Tests which require the writing and modification of intermediate level program code	1,2,3,4
20% 30%	Final Exam	1,2,3,4,5

#### Feedback:

Feedback is sought throughout the course using a range of assessment tools including: Formal reflection, class forum and end of course survey

#### Learning resources required:

No set texts  
Specific readings will be provided during the course.

#### Learning resources recommended:

Booklist & resources published via Moodle Computer lab  
Classroom/Performance spaces Equipment

#### Other Programmes:

GDCMP	Elective	
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#### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change
	7/10/2015	S1 2016	PC	Changes in Assessment Weightings
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions

ISCG5423: Introduction to Databases					
Course number:	ISCG5423	Level:	5	Credits:	15
Main programme:	BCS			Compulsory	
Pathway(s):					
Requisites / Restrictions:					
Other programmes:	GDCMP				
NZSCED field of Study:	020111	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
54		96	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities. Students are required to attend 100% of all scheduled classes.

### Outcome Statement:

To provide students with an introduction to database systems

### Learning Outcomes:

1. Describe different types of data, system data objects, and operations on data.
2. Create database designs to solve given business problems.
3. Implement database designs to solve given business problems in a database using an SQL software package.
4. Create SQL queries to solve given business problems.
5. Explain the meaning of the terms used in a database management environment.

### Learning and Teaching:

This course will be taught in an integrated manner employing lectures, discussions, on-line tutorials, on-line exercises, self-directed study.

Online support material will enhance the students' ability to learn at their own pace.

### Topics:

Data, data types, set theory, DBMS terms, entity relationship diagrams, creation of tables and queries using SQL DDL & SQL DML. Other topics as negotiated

### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
25%	Practical Test 1 – in class test using a DBMS to create tables and queries,	1, 3, 4
25%	Practical Test 2 – in class test using a DBMS to create views and queries.	4
40%	Final Exam	1, 2, 5
10%	Quizzes on Moodle	

### Feedback:

Feedback is sought throughout the course using a range of assessment tools including: Class forum and survey.

### Learning resources required:

Text Book: refer to the current programme booklist.

Specific resources/readings will be provided during the course.  
Handouts given and/or directions to Short Term Loans in the library.

**Learning resources recommended:**

Booklist & resources published via Moodle

**Other Programmes:**

GDCMP	Elective	
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	2/05/ 2017	Effective SS2016-17/ S1 2017	Portfolio Ropu	Changes in assessment types and weighting
	9/08/2021	S 1 2022	AACSC Chair's Action	Inactive old courses removed as pre-requisites, co-requisites and restrictions; reference to an old withdrawn programme removed

<b>ISCG5424: Information Systems Concepts</b>					
<b>Course number:</b>	ISCG5424	<b>Level:</b>	5	<b>Credits:</b>	15
<b>Main programme:</b>	BCS				
<b>Pathway(s):</b>					Compulsory
<b>Requisites / Restrictions:</b>	Restrictions: ISCG5410				
<b>Other programmes:</b>	GDCMP				
<b>NZSCED field of Study:</b>	020301	<b>Delivery mode:</b>	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
54		96	150

### Outcome Statement:

To provide students with an introduction to information systems and the role they play within industry. The main purpose of this course is to enable a student to engage with a range of information system elements and to make choices for future specialist study.

### Learning Outcomes:

1. Explain the fundamentals of systems theory
2. Explain the Systems Development Lifecycle and system requirements
3. Analyse business situations requiring problem solving
4. Elicit system requirements using a variety of techniques
5. Model the requirements using a variety of techniques

### Learning and Teaching:

This course is taught using a number of case studies.

This course will be taught in an integrated manner employing lectures, demonstrations, discussions and laboratory (practical) classes

An understanding of the principles and fundamental concepts of computer systems will be reinforced with practical work.

Students learn by doing real practical work.

Collaborative Knowledge Building and Learning

Learning Communities

Online support material will enhance the students' ability to learn at their own pace.

### Topics:

Systems theory, stages in the SDLC (requirements analysis, systems analysis, systems development, systems implementation and systems maintenance), data flow diagrams, activity diagrams, requirement elicitation techniques, selected modelling tools. Other topics as negotiated.

**Assessment:**

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
60%	Assignment(s) : for a given case study, students identify the problem, use requirement elicitation techniques to understand the case study, and use modeling techniques to model the requirements	3, 4, 5
40%	Test(s) – Students undertake one or more theoretical and/or practical tests to show that they understand the underlying concepts	1, 2, 3, 4, 5

**Feedback:**

Feedback is sought throughout the course using a range of assessment tools including: Class forum and survey

**Learning resources required:**

Text Book: refer to the current programme booklist.  
Specific resources/readings will be provided during the course.  
Handouts given and/or directions to Short Term Loans in the library.

**Learning resources recommended:**

Booklist & resources published via Moodle

**Other Programmes:**

GDCMP	Elective	Restrictions:	ISCG5410
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**Version Tracking:**

Version No.	Date of Change	Effective from	Approved by	Description of change
	30/09/14	Sem 1, 2015	Prog Comm	Changes in LOs and assessments
	9/08/2021	S1 2022	AACSC Chair's Action	Reference to an old withdrawn programme removed

## ISCG5430: Professional Skills for IT Practitioners

Course number:	ISCG5430	Level:	5	Credits:	15
Main programme:	BCS			Compulsory	
Pathway(s):					
Requisites / Restrictions:					
Other programmes:					
NZSCED field of Study:	020399	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
54		96	150

**Outcome Statement:**

This course aims to develop the student's professional competencies using relevant Information Technology (IT) software to enhance their interpersonal and research skills in creating, retrieving, using and disseminating information in a range of settings.

### Learning Outcomes:

	<b>Learning outcomes</b>
1.	The student will be able to participate effectively in a variety of conversations, to make meaning, hear alternative perspectives and relay information both as an individual and as a contributing member of an Information Technology team across technical, gender, age and cultural boundaries.
2.	The student will be able to Define a problem, determine, create, seek and retrieve the required information from a variety of sources and utilise this information to effect a solution using information technology to support the outcome.
3.	The student will be able to Translate information needs into an information search strategy that is adaptable to the wide variety of information sources available.
4.	The student will be able to Communicate effectively by exploring the integration of contemporary audio-visual communication tools and software applications with written and spoken communication to prepare presentations and technical documentation that achieve both technical accuracy and user friendliness.
5.	The student will be able to Develop a strategy for evaluating personal efficacy, as well as that of the team, in achieving a goal.

### Learning and Teaching:

Online forum, collaborative activities, discussions, interviews, problem-based learning, audio-visual presentations, lectures.

### Topics:

Topics include: requirements analysis, interpersonal skills, approaches to solving IT problems, written IT documents, information retrieval, writing and presenting technical reports, professional IT organisations

### Assessment:

<b>Weighting</b>	<b>Nature of assessment</b>	<b>Learning outcomes</b>
50%	A portfolio of evidence that demonstrates how a variety of verbal and written communication skills are applied in an IT situation	1, 2, 4, 5
50%	Research: a technical report written and presented on a given topic	2, 3, 4

### Learning resources required:

Required Text: refer to the current programme booklist.

**Learning resources recommended:**

**Other Programmes:**

Not Applicable		
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	7/08/2014	S2 2014	PC	Final Exam dropped and nature and weighting of assessments changed
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as pre-requisites, co-requisites and restriction; reference to a withdrawn programme removed

SCG6401: DATA COMMUNICATIONS AND NETWORKS					
Course number:	ISCG6401	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisite (for BCS): ISCG5403 Co-requisite (for BCS): ISCG5430				
Other programmes:	GDCMP				
NZSCED field of Study:	020113	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

### Outcome Statement:

To provide the students with the knowledge of the concepts of data communication and networking.

### Learning Outcomes:

1. Describe a selection of network components and protocols.
2. Evaluate the use and function of a selection of data communication hardware.
3. Evaluate a selection of network configurations, apply planning and design issues.
4. Analyse and evaluate a selection of data communication services.

### Learning and Teaching:

Lectures, Discussion, Research

### Topics:

Topics include: communication addressing, Tcp / IP protocols, LAN/WAN protocols, case studies on networks.

### Assessment:

<b>Weighting</b>	<b>Nature of assessment</b>	<b>Learning Outcomes</b>
10%	Quiz	1,2
40%	Assignment: Create a report detailing the network of a medium to large company. Present findings to class.	1,3,4
50%	Final exam	1, 2, 3

### Learning resources recommended:

### LEARNING RESOURCES:

Recommended Texts: refer to the current programme booklist.



**Other Programmes:**

GDCMP	<b>Elective</b>	
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as pre-requisites; co-requisites and restrictions

## ISCG6402: Network Administration and Support

Course number:	ISCG6402	Level:	6	Credits:	15
Main programme:	BCS			Compulsory	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG5400 and ISCG5403 Co-requisites (for BCS): ISCG5430				
Other programmes:	GDCMP				
NZSCED field of Study:	020113	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

### Outcome Statement:

To provide students with an insight into various local area network configurations.

### Learning Outcomes:

1. Demonstrate an understanding of local area network components and design.
2. Demonstrate a working knowledge of the available facilities and the setup of peer-to-peer networks.
3. Demonstrate a working knowledge of the available facilities and the setup of client/server networks.
4. Demonstrate a working knowledge of the available facilities and the setup of virtual environment.

### Learning and Teaching:

Lectures, discussions, practical – labs and research

### Topics:

Topics include: fundamental knowledge about network administration; implementation and management of peer-to-peer, client server and virtual network environment.

### Assessment:

Weighting	Nature of assessment	Learning outcomes
40%	Final Exam	1, 2, 3, 4
60%	Practical test on common network administration & support activities	1, 2, 3, 4

### Learning resources required:

Required Text: refer to the current programme booklist.

### Learning resources recommended:

**Other Programmes:**

GDCMP	<b>Elective</b>	
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	June 2020	S2 2020	ACC	Delete Assessment 3 (Report) with 15% weighting; Increase Assessment 2 (Test) weighting to 60% from current 45%
	9/08/2021	S 1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions; reference to an old withdrawn programme removed

ISCG6403: Network Operating Systems Management					
Course number:	ISCG6403	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG5401 Co-requisites (for BCS): ISCG5430				
Other programmes:	GDCMP				
NZSCED field of Study:	020303	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

### Outcome Statement:

To provide the knowledge and skills required to install, manage and maintain small Linux networks.

### Learning Outcomes:

1.	Compare, compile and install kernels
2.	Compare, compile and/or install kernel modules and device drivers
3.	Integrate, manage and query the kernel modules
4.	Create and use intermediate level shell scripts
5.	Compare different methods of automation and implement the most appropriate
6.	Integrate and implement network and related services
7.	Differentiate between entries in the system log files and use the appropriate ones to troubleshoot and manage the network
8.	Estimate security measures and implement appropriate countermeasures

### Learning and Teaching:

Lectures, demonstrations, discussions and laboratory (practical) classes Students learn by doing real practical work.

They understand network operating system management tasks and concepts by installing and maintaining their own network

Collaborative knowledge building and learning communities

### Topics:

Topics include: compiling and installing kernels, configuring and maintaining network services, automating system administration tasks.

**Assessment:**

Weighting	Nature of assessment	Learning outcomes
60%	Tests (practical and/or theoretical) covering kernels, kernel modules and device drivers, networking, shell scripting and automation	1, 2, 3, 4, 5 and 8
40%	OPEN BOOK Practical Test covering networking, log files and implementation of security measures	5, 6, and 7

**Learning resources required:**

Text Book: refer to the current programme booklist.

Additional notes, slides and external links (essential) made available on BlackBoard and/or Moodle.

**Learning resources recommended:**

External links (recommended) made available on Blackboard and/or Moodle.

**Other Programmes:**

GDCMP	Elective	
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**Version Tracking:**

Version No.	Date of Change	Effective from	Approved by	Description of change
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as pre-requisites, co-requisites and restriction; reference to an old withdrawn programme removed

ISCG6404: Web Server Management					
Course number:	ISCG6404	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Prerequisite (for BCS only): ISCG6402; Co-requisite (for BCS): ISCG5430				
Other programmes:	GDCMP				
NZSCED field of Study:	020303	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### **Outcome Statement:**

To provide the students with the knowledge and skills necessary to design, develop, configure and maintain the infrastructure of an Internet / Intranet website.

### **Learning Outcomes:**

1. Plan and organise Web site infrastructure for Intranet and Internet
2. Install and configure an Internet server
3. Demonstrate use of software tools for developing a Web site
4. Install and configure a Web browser
5. Install and configure a proxy server
6. Install and configure a mail server
7. Describe the copyright and privacy issues associated with the Internet
8. Identify and discuss Internet security issues

### **Learning and Teaching:**

Lectures, demonstrations, discussions and laboratory (practical) classes; Students learn by doing practical work.

### **Topics:**

Implementing a web server; implementing a mail server; identifying security issues related to the servers; implementing measures that need to be taken to protect the servers.

### **Assessment:**

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcome
20%	Research assignment covering infrastructure planning, including mandatory oral exam	1
60%	Practical assignment covering server and browser installation and website development, including mandatory oral exam	2, 3, 4, 5, 6
20%	In-class test covering copyright, privacy and security issues and explanation and/or discussion about components of LOs 5 and 6	7, 8 and Explain and/or discuss components of 5 and 6

#### Feedback:

Feedback is sought throughout the course using a range of assessment tools including: Formal reflection, class forum and end of course survey

#### Learning resources required:

Text Book: refer to current programme booklist

Additional notes, slides and external links (essential) made available on Moodle.

#### Learning resources recommended:

External links (recommended) made available on Moodle

#### Other Programmes:

GDCMP	Elective	
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#### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions; reference to withdrawn programme removed

ISCG6407: Fundamental Concepts in Cyber Security					
Course number:		ISCG6407	Level: 6		Credits: 15
Main programme:		BCS			Elective
Pathway(s):					
Requisites / Restrictions:		Pre-requisites (for BCS): 5403			
Other programmes:		GDCMP			
NZSCED field of Study:		020303	Delivery mode:	Face to Face	
Hours directed:	Hours in the Workplace:		Hours Self-directed:		Total Learning Hours:
32			118		150

### Outcome Statement:

To provide students with a clear understanding of fundamental concepts of cyber security as well as develop the knowledge needed to understand security risks and mitigation mechanisms associated with the implementation and management of IT infrastructure.

### Learning Outcomes:

	Learning outcomes
1.	Analyse and describe the principles of information in the context of cyber security threats and attacks, covering basic information security concepts
2.	Investigate techniques used by hackers to penetrate systems and launch attacks
3.	Differentiate and integrate legal, privacy and ethical aspects in the context of cyber security to develop a security policy
4.	Review basic security issues related to wired, wireless and mobile networks covering authentication, message encryption and key management
5.	Analyse different mitigation mechanisms and prevention to determine and evaluate possible security solutions

### Learning and Teaching:

Lectures, laboratory work, collaborative knowledge building, student research, student presentations, self-directed study

### Topics:

Cyber Security threats and attacks; hacking; legal, privacy and ethical aspects in the context of cyber security; basic security issues related to wired, wireless and mobile networks; mitigation mechanisms and prevention methods to determine and evaluate possible security solutions

### Assessment:



Weighting	Nature of assessment	Learning outcomes
10%	In-class Tests	1,2,3,4,and 5
40%	Research project that includes the analysis of a current cyber-attack, investigation plan and finding	1,2,3,4,and 5
50%	Final Exam	1,2,3,4, and 5

#### Learning resources required:

Textbooks: Distributed Systems, Ross J. Anderson. (2008, available online)

#### Learning resources recommended:

Supplemental: Liars and outliers, Bruce Schneier (2012)  
Principles of Information Security, Fourth Edition or Later  
Hands-on Ethical Hacking and Network Defence  
New Zealand Information Security Manual (NZISM) 2011  
Research papers Online databases

#### Other Programmes:

GDCMP	Elective	
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#### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change

### ISCG6411: PROJECT PLANNING AND CONTROL

Course number:	ISCG6411	Level:	6	Credits:	15
Main programme:	BCS			Compulsory	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG5410 or ISCG5424; Pre-requisite (for GDCMP): ISCG5424 Co-requisites (for BCS): ISCG5430				
Other programmes:	GDCMP				
NZSCED field of Study:	020303	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

#### Outcome Statement:

To provide students with a knowledge of the requirements of project planning by using project management techniques and tools, monitoring and controlling projects, using project management software, and applying reviewing techniques.

**Learning Outcomes:**

	<b>Learning outcomes</b>
1.	The student will be able to apply project planning principles.
2.	The student will be able to demonstrate the use of project management tools and techniques.
3.	The student will be able to create project management documentation.
4.	The student will be able to apply monitoring and control techniques.

**Learning and Teaching:**

Practical exercises, group activities, research activities, case studies and interactive discussions

**Topics:**

Topics include: identification of the range of requirements for a small IT project, application of these requirements.

**Assessment:**

<b>Weighting</b>	<b>Nature of assessment</b>	<b>Learning Outcomes</b>
60%	A range of project reports reflecting the life cycle of a project	2, 3, 4
40%	Final exam	All

**Learning resources required:**

Textbook: refer to the current programme booklist.

**Learning resources recommended:**

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG5424
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions; reference to an old withdrawn programme removed

ISCG6414: Systems Analysis and Design					
Course number:	ISCG6414	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites: ISCG5424(or ISCG5410) and ISCG 5421 Co-requisites: ISCG5430				
Other programmes:					
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
39		111	150

### Outcome Statement:

To enable students to analyse simple and complex information systems, model business and systems requirements, and document design solutions using appropriate methods, tools, and standards. To enable students to design and document simple and complex solutions using object oriented analysis and design modelling techniques.

### Learning Outcomes:

	<b>Learning outcomes</b>
1.	Explain the concepts of the Systems Life Cycle and Systems Development Life Cycle. Identify and evaluate the methods used in the Systems Development Life Cycle
2.	Apply process, data and object modelling techniques and tools
3.	Solve a business systems problem by choosing a method and applying the analysis and design techniques.

### Learning and Teaching:

Interactive discussions, class exercises, research activities, lab exercises and case studies

Topics:

Topics include systems development approaches and methodologies, systems analysis, systems design.

### Assessment:

<b>Weighting</b>	<b>Nature of assessment</b>	<b>Learning Outcomes</b>
20%	A professional systems proposal	1, 2, 3
40%	A design specification from a system proposal	1, 2, 3
40%	Final assessment	1, 2, 3

**Learning resources required:**

Textbook: refer to the current programme booklist.

Student access to Moodle

**Learning resources recommended:**

Other Programmes: NA

**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	10/07/2015	S 1 2016	PC	Changes in Pre-req, Course Aim, LOs, Topics and Assessments
	June 2018	S2 2018	PIC	Changes to assessment weightings
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions

## ISCG6420: INTERNET AND WEBSITE DEVELOPMENT

Course number:	ISCG6420	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS only): ISCG5420 and ISCG5421 Co-requisites (for BCS): ISCG5430				
Other programmes:	GDCMP				
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

**Outcome Statement:**

To provide the students with knowledge of advanced concepts of the Internet and website design and development

<b>Learning Outcomes:</b>	
1.	Explain and apply the fundamentals of CSS (Cascading Style Sheets).
2.	Explain and apply the fundamentals of JavaScript.

3.	Use current client-side website development languages/technologies create a complex commercial or educational website.
4.	Use the features of Web/Multimedia authoring packages to create a complex commercial or educational website with effective navigational interface.

### Learning and Teaching:

Lectures, tutorials and lab practical

### Topics may include:

Advanced client side technologies to implement website designs, animations and communicate with the web server

### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning Outcomes
20%	Assignment – implementation of a simple website to demonstrate mastery of JavaScript and CSS	1, 2
30%	Test – practical demonstration to demonstrate mastery of client side techniques	3, 4
50%	Project	1, 2, 3, 4

### Learning resources required:

A web server, web browser, text editor and internet access from Unitec

### Learning resources recommended:

### Other Programmes:

GDCMP	Elective	
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### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change
1	July 2018	Sem 2, 2018	TKK / PR	Removed expanded outcomes and learning resources.
	9/08/2021	Sem 1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restriction; ISCG5421 added as a new pre-requisite for BCS students; reference to an old withdrawn programme removed

ISCG6421: GUI Programming					
Course number:	ISCG6421	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Prerequisites (for BCS): ISCG5421 and ISCG5423 Co-requisites (for BCS): ISCG5430				
Other programmes:	GDCMP				
NZSCED field of Study:	020103	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### Outcome Statement:

To provide the student with the concepts of and practice in the use of event driven programming in the context of a selected language and a standard interface using windows, icons, menus and pointers.

### Learning Outcomes:

1. Demonstrate competency in the use of a GUI programming language and environment.
2. Demonstrate the use of a GUI language for the creation of an effective database front end
3. Demonstrate the testing, debugging and documentation of GUI programs.
4. Analyse the way in which a GUI model affects the development effort, the programme structure and the interaction with the user.

### Learning and Teaching:

Topics may be taught in an integrated manner  
 Supervisor / student meetings/discussions  
 Collaborative and/or individual projects  
 Analyses of written, visual, aural and performance texts

Topics:

Developing, testing and integrating forms, controls and events; integrating with databases, SQL querying, report generation.

### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes

20%	Programming assignment to design and develop a graphical user interface program	1, 3
40%	Programming assignment to design and develop an intermediate level graphical user interface program that acts as a front end to a database.	1, 2, 3
40%	Final Exam	1, 2, 3, 4

### Feedback:

Feedback is sought throughout the course using a range of assessment tools including: Formal reflection, class forum and end of course survey

### Learning resources required:

No set texts.

Specific readings will be provided during the course.

### Learning resources recommended:

Booklist & resources published via Moodle

Computer lab

Classroom/Performance spaces

Equipment

### Other Programmes:

GDCMP	<b>Elective</b>	
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### Version Tracking:

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021`	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions; reference to a withdrawn programme removed.

ISCG6422: Multimedia Programming					
Course number:	ISCG6422	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG5420 Co-requisites (for BCS): ISCG5430				
Other programmes:	GDCMP				
NZSCED field of Study:	020103	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
39		111	150

### Outcome Statement:

To provide the students with a knowledge of the issues pertaining to the design of multimedia applications and the tools used to create a multimedia application for the use in a commercial or education field

### Learning Outcomes:

	Learning outcomes
1.	Critically analyse commercially available multimedia products and their suitability for meeting the needs of the proposed target audience.
2.	Design and develop appropriate programming solutions for complex multimedia problems that require the use of the advanced features of multimedia tools.
3.	Design and develop appropriate programming solutions for complex multimedia problems that require the use of the embedded programming language of multimedia tools.
4.	Create a high level design, using best practice from Human-Computer Interaction (HCI), given a problem specification and specific target audience.

### Learning and Teaching:

Lectures, demonstrations, discussions and practical classes.  
Students learn by doing real practical work. Learning communities.

### Topics:

Topics include: analysis of multimedia products; designing and developing multimedia applications using multimedia tools and their embedded programming language; creating high level design using best practice for human – computer interaction.

### Assessment:

Weighting	Nature of assessment	Learning outcomes
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40%	Open Book, One or more practical test(s) using multimedia tools	2,3
60%	One or more <b>project(s)</b> creating multimedia application(s). These are assessed <b>in stages</b> .	1,2,3,4

### Learning resources required:

Materials provided on Moodle.

Additional notes, slides and external links made available on Moodle.

### Learning resources recommended:

Resources available on the internet

### Other Programmes:

GDCMP	<b>Elective</b>	
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### Version Tracking:

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restriction; reference to an old withdrawn programme removed

ISCG6423: Database Design and Development					
Course number:	ISCG6423	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Prerequisites (for BCS only): ISCG5421 and ISCG5423; Co-requisite (for BCS): ISCG5430 Prerequisite (for GDCMP): As approved by the relevant Academic Authority				
Other programmes:	GDCMP				
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### **Outcome Statement:**

To apply the principles of data management with database technology.

#### **Learning Outcomes:**

1. Demonstrate an understanding of database management systems.
2. Produce a conceptual data model for a given set of requirements.
3. Develop a logical database design for a given set of requirements and for a given conceptual design.
4. Develop a physical database design from a given logical design.
5. Write and test procedures for a database application that meet business requirements.

### **Learning and Teaching:**

Topics may be taught in an integrated manner  
Supervisor / student meetings/discussions  
Collaborative and/or individual projects  
Analyses of written, visual, aural and performance texts

#### **Topics:**

Conceptual, logical and physical design of a database; development of an intermediate level database application using development tools.

### **Assessment:**

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

<b>Weighting</b>	<b>Nature of assessment</b>	<b>Learning outcomes</b>
40%	Assignment(s) – database design and development	2, 3, 4
20%	Practical Test on database application	5
40%	Final Exam	1, 2, 3, 4

### **Feedback:**

Feedback is sought throughout the course using a range of assessment tools including: Formal reflection, class forum and end of course survey

### **Learning resources required:**

No set texts.

Specific readings will be provided during the course.

### **Learning resources recommended:**

Booklist & resources published via Moodle

Computer lab

Classroom/Performance spaces Equipment

### **Other Programmes:**

GDCMP	<b>Elective</b>	As approved by the relevant Academic Authority
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### **Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	30/04/2015	S2 2015	PC	ISCG5421 added as the new pre-requisite replacing ISCG5420
	7/10/2015	S1 2016	PC	Changes in LOs and Assessment
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restriction

ISCG6424: User Interface Design					
Course number:	ISCG6424	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG5421 Co-requisites (for BCS): ISCG5430				
Other programmes:	GDCMP				
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

#### **Outcome Statement:**

To provide students with knowledge of the requirements of user interface design by using software to develop usable forms, prototype systems, and develop on-line documentation.

#### **Learning Outcomes:**

	<b>Learning outcomes</b>
1.	Explain the fundamental principles of good forms design (GUI and text based).
2.	Develop user interface strategies.
3.	Explain the principles of prototyping.
4.	Design input and output screens and reports.
5.	Develop on-line help, on-screen documentation and on-line tutorials.

#### **Learning and Teaching:**

Lectures, Laboratory work, Self-directed study.

#### **Topics:**

Topics include: using prototyping tools to apply the principles of good user interface design to input and output screens and reports at an intermediate level; compare and contrast a variety of interfaces.

#### **Assessment:**

<b>Weighting</b>	<b>Nature of assessment</b>	<b>Learning outcomes</b>
30%	Assignment on development of an intermediate level interface design	1, 2,4

30%	Assignment – report comparing and contrasting interface designs	3,5
40%	Final Exam	1, 2, 3, 4, 5

**Learning resources required:**

Textbook: refer to the current programme booklist.

**Learning resources recommended:**

**Other Programmes:**

GDCMP	Elective	
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	ACCSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restriction

ISCG6425: Data Warehousing					
Course number:	ISCG6425	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG5423				
Other programmes:	GDCMP				
NZSCED field of Study:	020117	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32.5		117.5	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities. Students are required to attend 100% of all scheduled classes.

#### Course aim:

To introduce students to the concepts of data warehousing and decision-making, data warehouse design and implementation, data sourcing and data quality, Extract-Transform-Load (ETL) procedure, and online analytical processing (OLAP). Students will gain hands-on experience using Microsoft SQL server for implementing data warehouses.

#### Learning Outcomes:

1. Demonstrate knowledge of data warehouse architecture, schema, and data modelling
2. Demonstrate knowledge of ETL, data integration and data quality
3. Demonstrate understanding of decision making process
4. Demonstrate knowledge and usage of OLAP, data cubes
5. Implementing SQL in data warehouse environment
6. Use data warehousing tools for implementing data warehouses

#### Topics:

- Data warehouse architecture and schema
- Introduction to SQL server for Data warehouse
- Dimensional modelling
- ETL, data integration, and data quality
- Data sourcing
- OLAP and Data cubes
- SQL in data warehouse
- Data warehouse and Business Intelligence
- And other appropriate, related topics

#### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
30%	Assignment: Analysis, design and develop data models and ETL for data warehouse based on a case study	1,2,4,5
30%	Assignment: Analysis, design and develop a complete data warehouse solution based on a case study	1, 2, 3,4,5
40%	Test (s)	1, 2, 3, 4

### Learning and teaching approaches:

This course will be taught in an integrated manner employing Lectures, demonstrations, discussions and laboratory (practical) classes

An understanding of the principles and fundamental concepts of computer systems will be reinforced with practical work.

Students learn by doing real practical work.

Collaborative Knowledge Building and Learning

Learning Communities

Online support material will enhance the students' ability to learn at their own pace.

### Feedback:

Feedback is sought throughout the course using a range of assessment tools including:

Class forum and survey

### Learning resources required:

Text Book: refer to the current programme booklist.

Specific resources/readings will be provided during the course.

Handouts given and/or directions to Short Term Loans in the library

### Learning resources recommended:

Booklist & resources published via Moodle

### Other Programmes:

GDCMP	Elective	
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### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change
		S1 2014	PC	New elective course added to BCS; also available in the GDCMP
		S1 2015	PC	Some changes in course assessments





ISCG6426: Data Structures and Algorithms					
Course number:	ISCG6426	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Prerequisites (for BCS): ISCG5421; Pre-requisite (for GDCMP) As approved by the relevant academic authority				
Other programmes:	GDCMP				
NZSCED field of Study:	020111	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
39		111	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### Outcome Statement:

This course introduces the fundamental data structures and algorithms used in software development, extending the object-oriented concepts taught in the pre-requisite subject Programming Principles and Practice. The course will cover searching and sorting, linked data structures such lists and trees as well as hash tables. Upon completion of this course students will be able to implement a variety of data structures and algorithms, and will have an expert knowledge of the scalability and design trade-offs of these algorithms.

### Learning Outcomes:

1. Apply object oriented design and implementation techniques.
2. Interpret the trade-offs and issues involved in the design, implementation, and application of various data structures with respect to a given problem
3. Explain the purpose and answer questions about data structures and design patterns that illustrate strengths and weaknesses with respect to resource consumption
4. Assess the impact of data structures on algorithms
5. Analyse the scalability of data structures and algorithms in terms of both space and time complexity

### Learning and Teaching:

Topics may be taught in an integrated manner

Supervisor / student meetings/discussions

Collaborative and/or individual projects

Analyses of written, visual, aural and performance texts

Topics:

1. Sorting
2. Bubble Sort
3. Merge Sort
4. Insertion Sort
5. Selection Sort
6. Quick Sort
7. Searching
8. Brute Force Search
9. Binary Search
10. Linked Lists

11. Double Linked Lists
12. Stacks
13. Queues
14. Binary Trees
15. Depth First Search
16. Breadth First Search
17. Recursion
18. Hash Tables
19. Complexity
20. Divide and Conquer
21. Backtracking

### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
30%	Lab Exercises: completed individually or in small groups on classroom topics and implementation	1,2,3,4,5
40%	Assignment(s): small project related to implementing and using a data structure, and (or) an algorithm in a real world situation.	1,2,3,4,5
30%	Final Exam	1,2,3,4,5

### Learning resources required:

No set texts.

Specific readings will be provided during the course.

### Learning resources recommended:

Booklist & resources published via Moodle

Computer lab

Classroom/Performance spaces

Equipment

### Other Programmes:

GDCMP	<b>Elective</b>	Pre-requisites: As approved by the relevant academic authority
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### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change
	30/4/2015	S 2 2015	PC	New course added as a BCS elective; also available in the GDCMP
	June 2020	S 2 2020	ACC	Remove ISCG5421 as a pre-requisite for GDCMP students

ISCG6435: Special Topic					
Course number:	ISCG6435	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	None				
Other programmes:	GDCMP				
NZSCED field of Study:	029999	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32.5		117.5	150

### Outcome Statement:

The inclusion of a special topic is to allow the school to offer courses at this level that deal with current, but possibly transient issues, and that make use of the particular expertise of individual staff members, including visitors.

Each special topic offered will be documented either in the form of a standard description using the heading above, or as a learning and assessment contract with the individual student(s) taking the course.

Each special topic offered must be approved by the Programme Committee and the Faculty Academic Committee and endorsed by the Academic Board.

### Learning Outcomes:

	Learning outcomes
1.	As determined

### Learning and Teaching:

Lectures, practical sessions, research and self-directed study

Topics:

As determined by the special topic offered.

### Assessment:

Weighting	Nature of assessment	Learning outcomes
	As determined	

**Learning resources required:** as determined

### Other Programmes:

GDCMP	Elective	
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S 1 2022	AACSC Chair's Action	Pre-requisites for BCS removed

ISCG6441: Visual Game Design					
Course number:	ISCG6441	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	None				
Other programmes:	GDCMP				
NZSCED field of Study:	020103	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
39		111	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities. Students are required to attend 100% of all scheduled classes.

### Outcome Statement:

To provide the students with knowledge of concepts and theories related to game design and the ability to analyse games from the non-technical perspective.

### Learning Outcomes:

	Learning outcomes
1.	Critically analyse game design problems utilizing the terminology of gaming.
2.	Critique traditional and contemporary games from a non-technical perspective.
3.	Produce a coherent game design document and associated prototype.

### Learning and Teaching:

Lectures, demonstrations, discussions and practical classes.

Students learn by doing real practical work.

Learning communities.

Lectures, practical sessions, research and self-directed study.

### Topics:

Topics include: Visual Design, Audio Design, Interactive Storytelling, Human Factors, Creative Thinking, Design Problems, Game Design Problems, Game Design Requirements, Game Genres, History & Mythology, Ethics, Cinematography, Game Design Documents, Prototyping, Prototype Testing, Conceptual Game Design, Serious Game Design, Practical Game Design and Designing Fun Experiences.

### Assessment:

Weighting	Nature of assessment	Learning outcomes
25%	Individual game design criticism of a contemporary video game.	1, 2
25%	Individual game design criticism of a traditional non-video game, for example Chess.	1, 2

50%	Group Game Design Document and Game Prototype.	1, 2, 3
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### Learning resources required:

Multimedia software, audio-video equipment and access to a learning management system.

Materials provided on Moodle.

Additional notes, slides and external links made available on Moodle.

### Learning resources recommended:

Resources available on the internet

### Other Programmes:

GDCMP	Elective	
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### Version Tracking:

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>

ISCG6442: Game Programming					
Course number:	ISCG6442	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Prerequisites (for BCS): ISCG5421; Pre-requisite (for GDCMP): As approved by relevant Academic Authority Co-requisites (For BCS and GDCMP): ISCG6426				
Other programmes:	GDCMP				
NZSCED field of Study:	020103	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
39		111	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### Outcome Statement:

To provide students with programming knowledge and mathematical concepts required for effective game development.

### Learning Outcomes:

1. Utilise a collection of physics and mathematical concepts for a game.
2. Develop a simple text-based game.
3. Develop a sprite-based game using widely accepted techniques, including physics, mathematics and programming concepts

### Learning and Teaching:

Lectures, demonstrations, discussions and practical classes

Students learn by doing real practical work.

Learning communities.

Lectures, practical sessions, research and self-directed study

### Topics:

Programming Concepts for Games, Physics Concepts for Games, and Mathematical Concepts for Games, Logic and Decision Making for Games

### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
20%	Test: Logic and Problem Solving for Games	1
30%	Individual Game Project	1, 2
50%	Sprite Based Game Project (Group/Individual)	1, 3

**Feedback:**

Feedback is sought throughout the course using a range of assessment tools including:  
Formal reflection, class forum and end of course survey

**Learning resources required:**

Multimedia software, audio-video equipment and access to a learning management system  
Materials provided on Moodle.

Additional notes, slides and external links made available on Moodle.

**Learning resources recommended:**

Booklist & resources published via Moodle  
Computer lab  
Classroom/Performance spaces  
Equipment

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: As approved by Programme Leader; Corequisite: ISCG6426
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	5/5/2014	S 2 2014	PC	New course added as an elective
	30/4/2015	S 2 2015	PC	ISCG6426 added as a co-requisite
	30/4/2015	S 2 2015	PC	Changes in Assessment Weighting



ISCG6488: Negotiated Study					
Course number:	ISCG6488	Level:	6	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites: Approval by relevant Academic Authority AND student must have completed 180 credits towards the BCS degree.				
Other programmes:					
NZSCED field of Study:	020399	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
By negotiation		By negotiation	150

### Outcome Statement:

To enable a student to follow a course of self-directed in-depth study in an approved topic area.

### Learning Outcomes:

	Learning outcomes:
1.	Negotiated by student and the course developer

### Learning and Teaching:

As negotiated with student, and the course developer

Topics:

Topics to be negotiated with student and the course developer

### Assessment:

Weighting	Nature of assessment	Learning outcomes
100%	Negotiated by student and the course developer	All

### Learning resources:

As negotiated with student and the course developer

### Other Programmes: NA

### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change



ISCG7142: Information Systems and Analysis					
Course number:	ISCG7142	Level:	7	Credits:	15
Main programme:	GDCMP			Elective	
Pathway(s):					
Requisites / Restrictions:	Restrictions (for BCS): ISCG6414				
Other programmes:	BCS				
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32.5		117.5	150

### Outcome Statement:

To familiarise participants with the characteristics of information systems together with the processes and tools used in developing computer application systems. This course provides participants an introduction to information systems in the business context, and techniques and tools to perform feasibility analysis and requirement analysis in various software development methodologies.

### Learning Outcomes:

	Learning outcomes:
1.	Identify the purpose, types and evolution of information systems
2.	Prepare a feasibility report for a business solution
3.	Perform system analysis using modelling tools and Agile user stories

### Learning and Teaching:

Lectures, Case Studies, Group Discussions, Individual and Group Exercises

#### Topics:

Topics include: purpose and types of Information Systems, Systems Development Methodologies, Systems Analysis, Systems Design, Agile Requirement Analysis

### Assessment:

Weighting	Nature of assessment	Learning outcomes
30%	Written assignment on information systems; Types, evolution, applicability to business	1
35%	Written assignment on system feasibility; Feasibility report using well known feasibility criteria	2
35%	Written assignment on system analysis and design; documenting system requirements using a CASE tool and using user stories	

**Learning resources:**

Refer to current programme booklist

**Other Programmes:**

BCS	<b>Elective</b>	Restriction: ISCG6414
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S 1 2022	AACSC Chair's Action	Inactive old pre-requisites, co-requisites and restriction removed; ISCG7142 added as a new BCS elective course

## ISCG7400: Computer Systems Security

Course number:	ISCG7400	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS and GDCMP): ISCG6402				
Other programmes:	GDCMP				
NZSCED field of Study:	029901	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

### Outcome Statement:

To provide students with an insight into computer systems security and carry out advanced tasks in planning, operation and monitoring of comprehensive systems security.

### Learning outcomes:

1.	Critically analyse and describe elements of Computer System Security.
2.	Critically analyse and describe a selection of hardware and physical layer security solutions.
3.	Research and analyse network security issues and solutions from the LAN and WAN (Internet) perspectives.
4.	Critically evaluate platform specific operating systems and application security issues and solutions.
5.	Analyse a given case study with a view to determining and evaluating possible security solutions

### Learning and Teaching:

Lectures, Discussion, Practical – Labs and Research

### Topics:

Topics include elements of Computer Systems Security, selection of hardware and physical layer security solutions, network security issues and solutions, platform specific operating systems and application security issues and solutions, case studies for evaluating security solutions.

### Assessment:

Weighting	Nature of assessment	Learning outcomes
40%	Exam	1, 2, 3, 4 and 5
20%	Quiz Test	1, 2, 3, 4 and 5
40%	Assignment	3, 4 and 5

### Learning resources required:

Required Texts: Security+ Guide to Network Security Fundamentals, Edition (TBA) by Mark Ciampa.  
Access to Hardware and Software as per the required text above.

**Learning resources recommended:** TBA

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG6402
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	7/10/2015	S 1, 2016	PC	Change of Assessments
	9/08/2021	S 1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions

ISCG7401: ADVANCED DATA COMMUNICATIONS					
Course number:	ISCG7401	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS and GDCMP): ISCG6401				
Other programmes:	GDCMP				
NZSCED field of Study:	020113	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32.5		117.5	150

### Outcome Statement:

To provide the students with knowledge and application of latest development in data communications and networking.

### Learning Outcomes:

	Learning outcomes
1.	Analyse and describe a selection of the latest LAN and WAN technologies widely used and protocols.
2.	Learn the latest technologies in wireless communications.
3.	Learn about Internet addressing (how messages get to destination)
4.	Describe network security, Internet network, and network management.
5	Critically evaluate alternative approaches using different network and data communication technologies and techniques in distributed data environments.
6	Demonstrate skills in gathering information, assessing, planning and implementing efficient data communication techniques.

### Learning and Teaching:

Lectures, Discussion, Practical - Research

### Topics:

Topics include: planning advanced IP addressing, designing WANs, evaluating latest protocols; analysing wireless networks; evaluating network security and management.

### Assessment:

Weighting	Nature of assessment	Learning outcomes
10%	Quiz	1,2,3

40%	Assignment – report on a large company detailing and assessing network components	All
50%	Final Exam (closed Book)	All

**Learning resources required:**

Recommended Text: Refer to the current programme booklist.

**Learning resources recommended:**

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG6401
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions;



ISCG7402: Network Design and Implementation					
Course number:	ISCG7402	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS and GDCMP): ISCG6401 and ISCG6402				
Other programmes:	GDCMP				
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32.5		117.5	150

### Outcome Statement:

To provide students with an insight into various large network technologies

### Learning Outcomes:

Learning outcomes
1. Design and Implement a Large Network Infrastructure System.
2. Design and Implement Name Resolution Techniques.
3. Design and Implement a Wide Area Network System.
4. Design, Implement and Configure Network Security and Routers.
5. Design and Implement Voice over IP solution

### Learning and Teaching:

Lectures, Discussion, Practical – Labs and Research

#### Topics:

Topics include: researching, planning, designing and implementing large network infrastructure technologies. Includes name resolution techniques, security, routing and voice over IP

### Assessment:

Weighting	Nature of assessment	Learning outcomes
40%	Exam	1, 2, 3, 4, 5
60%	Practical tests on common network design and implementation issues.	1, 2, 3, 4, 5

### Learning resources required:

Required Texts: None

**Learning resources recommended:** Various appropriate websites and in class notes.

### Other Programmes:

GDCMP	Elective	Pre-requisites: ISCG6401 ISCG6402
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### Version Tracking:

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisite, co-requisite and restriction;

## ISCG7404: Computer Forensic Investigations

Course number:	ISCG7404	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS and GDCMP): ISCG6401 and ISCG6402				
Other programmes:	GDCMP				
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
54		96	150

### Outcome Statement:

To provide enable students to plan and conduct a digital forensic investigation.

### Learning Outcomes:

	Learning outcomes
1.	Discuss Computer Investigation
2.	Explain Data Sources and Acquisition Methods
3.	Describe how to secure a Computer Incidence or Crime Scene
4.	Investigate Digital Forensic tools and their use for Forensic Analysis and Validation
5.	Select suitable analysis tools and apply them in a simulated investigation

### Learning and Teaching:

Lectures, Laboratory work, Self- directed study.

#### Topics:

- Understanding Computer Investigations - The Investigator's Office and Laboratory
- Data Acquisition
- Processing Crime and Incident Scenes
- Current Computer Forensics Tools
- Computer Forensics Analysis and Validation
- Recovering Graphics Files
- Network Forensics
- E-mail Investigations
- Cell Phone and Mobile Device Forensics
- Report Writing for High-Tech Investigations

### Assessment:

Weighting	Nature of assessment	Learning outcomes
20%	Test(s)	1,2,3
40%	Written report that includes the analysis of tools, investigation plan and findings from case study scenarios	4,5

40%	Final Exam	1,2,3,4
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**Learning resources required:** Textbook:  
Refer to the current programme booklist.

**Learning resources recommended:**

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: 6401 and 6402
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>

ISCG7407: Advanced Cyber Security					
Course number:	ISCG7407	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG6403 and ISCG6407 Pre-requisite (for GDCMP): ISCG6407				
Other programmes:	GDCMP				
NZSCED field of Study:	020303	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32		118	150

### Outcome Statement:

To provide students with a deep understanding of the principles of information security in cyber space, enabling them to analyse various phases in the Cyber Attack Cycle and plan prevention mechanisms into their network design.

### Learning Outcomes:

	Learning outcomes.
1.	Critically analyse and describe the principles of information and infrastructure security in the context of cyber security.
2.	Critically analyse and describe a selection of security technologies and solutions
3.	Critically analyse and describe various common cyber security threats according to risk mitigation priority and describe triple stages of these attacks.
4.	Research and analyse cyber security issues and solutions from the risk mitigation priority perspectives.
5.	Critically analyse different mitigation mechanisms and prevention to determining and evaluating possible security solutions.
6.	Critically analyse and describe different solutions for preventing cyber-attacks, and describe different network protection systems

### Learning and Teaching:

Lectures, laboratory work, collaborative knowledge building, student research, student presentations, selfdirected study

### Topics:

Topics include Cyber Space and IT Security, Network Security Technology, Cyber Attack Cycles, Cyber Security and types of threats and hacking toolkits, Cryptography, Prevention of cyber-attacks, and network protection systems

**Assessment:**

Weighting	Nature of assessment	Learning outcomes
50%	Assignments and research project that includes the analysis of current cyber-attack, investigation plan and findings from case study scenarios	1, 2, 3, 4 and 5
50%	Final Exam	1,2,3,4,5,6

**Learning resources required:**

Textbook: Principle of Information Security, Fourth Edition or Later  
 ISBN-13: 978-1-111-13821-9  
 Hands-on Ethical Hacking and Network Defence  
 ISBN-13:978-1-4354-8609-9

**Learning resources recommended:**

Supplemental: New Zealand Information Security Manual (NZISM) 2011  
 Research papers  
 Online databases

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG6407
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**Version Tracking:**

Version No.	Date of Change	Effective from	Approved by	Description of change
	9/08/2021	S1 2022	AACSC Chair's Action	An inactive course that is removed from the BCS is removed as a pre-requisite for this course

**ISCG7408: Malware Analysis**

<b>Course number:</b>	ISCG7408	<b>Level:</b>	7	<b>Credits:</b>	15
<b>Main programme:</b>	BCS			Elective	
<b>Pathway(s):</b>					
<b>Requisites / Restrictions:</b>	Pre-requisites (for BCS and GDCMP): ISCG6407				
<b>Other programmes:</b>	GDCMP				
<b>NZSCED field of Study:</b>	020303	<b>Delivery mode:</b>	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
39		111	150

**Outcome Statement:**

To give students an insight into the fundamental concepts of malware analysis, the knowledge needed to understand the security risks of malware infections and the mitigation mechanisms required to be implemented and managed for securing IT infrastructure.

**Learning Outcomes:**

	Learning outcomes
1.	Programming language knowledge necessary to analyse malware
2.	Static and Dynamic analysis of malware
3.	Understanding malware functionality and how malware enables the underground economy
4.	Reverse engineering and obfuscation techniques used in modern malware
5.	Shellcode analysis
6.	Rootkit analysis

**Learning and Teaching:**

Lecture, Demonstrations, Laboratory work, collaborative knowledge building, student research, student presentations, self-directed study

**Topics:**

Topics include

Programming languages necessary to analyse malware

Static and Dynamic analysis of malware

Malware functionality - how malware enables the underground economy

Reverse engineering and obfuscation techniques used in modern malware

Shellcode analysis

**Assessment:**

Weighting	Nature of assessment	Learning outcomes
60%	Research Project(s) and/or Assignment(s) that include the analysis of current malware in a lab environment, presentation of investigation plan and findings	1, 2, 3, 4, 5
10%	Class Test(s)	1, 2
30%	Final Exam	1, 2, 3, 4, 5, 6

**Required learning resources:**

Michael Sikorski and Andrew Honig: *Practical Malware Analysis: A Hands-on Guide to Dissecting Malicious Software* (Paperback) No Starch Press, March 2012 ISBN: 9781593272906

After Semester 1 2014: selections from

Erez Metula : *Managed Code Rootkits: Hooking into Runtime Environments* Syngress Media 2010 ISBN: 9781597495745

**Recommended learning resources:**

Michael Ligh, Steven Adair, Blake Hartstein and Matthew Richard: *Malware Analyst's Cookbook and DVD: Tools and Techniques for Fighting Malicious Code*, John Wiley & Sons Ltd (2010) ISBN: 9780470613030

James M. Aquilina, Cameron H. Malin, Eoghan Casey and Rob Maxwell (Ed): *Malware Forensics Field Guide for Windows Systems*: Digital Forensics Field Guides, Syngress Media (2012) ISBN: 9781597494724

Jack Koziol, John Heasman, Felix Lindner, Gerardo Richarte, Dave Aitel, Chris Anley, Sinan Eren, Neel

Mehta, Riley Hassell: *The Shellcoder's Handbook: Discovering and Exploiting Security Holes*, John Wiley & Sons Ltd (2007) ISBN: 9780470080238

**Optional resources:**

Adam Young and Moti Yung: *Malicious Cryptography: Exposing Cryptovirology*, John Wiley & Sons Ltd (2004) ISBN: 9780764549755

**Other Programmes:**

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG6407
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	4 – 8 July 2022	S 2 2022	AACSC Emeeting	Add the missing LO 6 to Assessment 3 (Final Exam)



ISCG7410: Information Systems Management					
Course number:	ISCG7410	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS and GDCMP): ISCG6411				
Other programmes:	GDCMP				
NZSCED field of Study:	020303	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

### Outcome Statement:

To develop an understanding of the importance of managing information systems through the systems life cycle. To be able to develop information systems strategic plan and the subsequent tactical and operational plans which are aligned with and contribute to the achievement of corporate business goals. To develop an understanding of the way in which corporate information systems, corporate structure and corporate culture are inter-related.

### Learning Outcomes:

	<b>Learning outcomes</b>
1.	Explain the importance of information, information systems and information planning. Identify key issues for Information Technology Managers.
2.	Analyse and distinguish between strategic aspects of information technology as opposed to operational aspects. Analyse the problems of aligning information systems options with business strategies.
3.	Critique business cases utilising Information and Communication Technology (ICT) for achieving corporate objectives and goals.
4.	Identify and analyse the trends in Information and Communication Technology (ICT).
5.	Develop approaches for managing information systems resources.
6.	Analyse issues associated with information systems operation.
7.	Be able to measure and justify information systems investments.
8.	Investigate the roles of IS managers or Vice President (VP) of Information Systems

### Learning and Teaching:

Interactive discussion, class exercises, research activities, laboratory exercises and case studies

### Topics:

Topics include: information systems; strategic importance of information systems to business; information systems planning; aligning IS strategy with business goals (IT plan, financial plan, HR plan, application considerations).

**Assessment:**

<b>Weighting</b>	<b>Nature of assessment</b>	<b>Learning Outcomes</b>
30%	Test – IT business strategies/alignment	1, 2, 3
40%	Assignment – assess how Information System is used and managed in a real environment	4, 5, 6, 7
30%	Final examination	All

**Learning resources required:**

Textbook: Refer to the current programme  
booklist.

Student access to the Blackboard system

**Learning resources recommended:****Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG6411
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions

## ISCG7411: Project Management Methodologies

Course number:	ISCG7411	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites:    Dep irtmental Consent Required				
Other programmes:	GDCMP				
NZSCED field of Study:	080315	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32		118	150

### Outcome Statement:

To provide a comprehensive understanding and practical knowledge of the application of Project Management Principles, Themes, Processes and Techniques

### Learning Outcomes:

1.	Demonstrate understanding of Project Management methodologies
2.	Effectively apply project management theory to given project scenarios
3.	Demonstrate knowledge of the Principles, Themes, Processes and Techniques used in project management methodologies.

### Learning and Teaching:

Lectures, collaborative knowledge building, practical workshops, self directed study

#### Topics:

Principles of project management, roles and responsibilities in project organisation, directing a project, initiating a project, business case, quality, progress, risk management, understanding project management methodologies, applying project management theory to given real-world project scenarios (including individual and team-based responses), controlling a stage, managing product delivery, managing a stage boundary, closing a project, tailoring methodologies

### Assessment:

Weighting	Nature of assessment	Learning outcomes
50%	Multiple choice exam: Students will be tested on their theoretical understanding of project management methodologies as set out the methodology manual or the Unitec based examination	1 & 3
25%	Group assessment: Effective application of project management theory to given project scenarios	1,2 &3

25%	Individual assessment: Effective application of project management theory to given project scenarios	1,2 &3
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**Learning resources required:**

Textbook: Appropriate Manual  
Lecture notes, websites.

**Learning resources recommended:**

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: Departmental Consent Required
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>

ISCG7412: Risk Management					
Course number:	ISCG7412	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites: Departmental Consent Required				
Other programmes:	GDCMP, Global				
NZSCED field of Study:	080399	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32		118	150

### Outcome Statement:

To provide a comprehensive understanding and practical knowledge of the application of a Management of Risk Framework

### Learning Outcomes:

1.	Demonstrate knowledge of the four elements of the Management of Risk Framework
2.	Demonstrate knowledge of management of risk documents
3.	Demonstrate knowledge of management of risk techniques
4.	Demonstrate understanding of the 4 perspectives of risk management: Strategic, programme, project and operational, in relation to the IT industry
5.	Apply the principles, approach, processes, embedding and reviewing of management of risk to given scenarios effectively
6.	Successfully complete a Risk Health Check to a given scenario
7.	Apply the Risk Maturity Model to a given scenario effectively

### Learning and Teaching:

Lectures, collaborative knowledge building, practical workshops, self directed study

#### Topics:

Introduction to Management of Risk, Principles of Risk Management, Elements of Risk Framework and Risk Approach including Policy, Process, Strategies, and Techniques, Risk Management Documents, perspectives of risk management in relation to the IT industry, Completing Management of Risk Health Check to a given scenario, effective application of the Risk Maturity Model to a given scenario

### Assessment:

Weighting	Nature of assessment	Learning outcomes
50%	Multiple choice exam: Students will be tested on their theoretical understanding of Management of Risk as set out in the methodology manual or the Unitec based examination	1,2, 3,4, 5

25%	Group assessment: Effective application of Management of Risk Theory to given scenarios	All
25%	Individual assessment: Effective application of Management of Risk theory to given scenarios	All

#### **Learning resources**

**required:** Textbook:  
Appropriate Manual Lecture notes, websites.

#### **Learning resources recommended:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
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#### **Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: Departmental Consent Required
Global	<b>Elective</b>	Pre-requisites: Departmental Consent Required

#### **Version Tracking:**

ISCG7413: Testing and Quality Assurance Management					
Course number:	ISCG7413	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS and GDCMP): Consent from relevant Academic Authority				
Other programmes:	GDCMP				
NZSCED field of Study:	020303	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

### Outcome Statement:

Students will apply testing and quality assurance methods and techniques in the development of ICT solutions.

### Learning Outcomes:

	<b>Learning outcomes</b>
1.	Discuss the role of the Quality Assurance Manager
2.	Manage the test process, test execution and defect tracking
3.	Manage requirement definition, validation and refinement
4.	Apply test project management and risk management

### Learning and Teaching:

Lectures, tutorials, practical exercises and laboratory work.

### Topics:

Topics include: management perspective on what to test in information technology projects; how to organise and resource a test division; how to plan, manage change and risk and lead a test team.

### Assessment:

<b>Weighting</b>	<b>Nature of assessment</b>	<b>Learning Outcomes</b>
30%	Assignment – create a business case for a test department	1, 2
40%	Project – create a test tracking database	1,2,3,4
30%	Final examination	2, 3,4

### Learning resources required:

Textbook: Refer to the current programme booklist.  
Student access to the Blackboard system

### Learning resources recommended:

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: Relevant Academic Authority consent
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions



ISCG7414: Business Systems Analysis					
Course number:	ISCG7414	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG6414; Pre-requisite (for GDCMP): ISCG7142				
Other programmes:	GDCMP				
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32.5		117.5	150

### Outcome Statement:

This course addresses advanced business analysis and logical design. It is intended that the students critically analyse a business information system, and determine and document the business requirements for a new information system.

### Learning Outcomes:

	Learning outcomes
1.	Define the role of the business analyst throughout the phases of a information system development life cycle
2.	Apply business process modelling
3.	Determine and document Business Requirements
4.	Apply logical modelling

### Learning and Teaching:

Lecture, tutorials, self- directed study and laboratory work.

### Topics:

Topics include: Business Analysis fundamentals, workflow and business process modelling; requirements elicitation and validation; advanced UML modelling.

### Assessment:

Weighting	Nature of assessment	Learning Outcomes
15%	Assignment – create a high level analysis document	1
40%	Project – create a requirements specification	2 ,3, 4,5
45%	Final Examination	2 ,3, 4,5

### Learning resources required:

Textbook: Refer to the current programme booklist.

Student access to the Blackboard system

**Learning resources recommended:**

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG7142
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions;

ISCG7420: Web Application Development					
Course number:	ISCG7420	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Prerequisites (for BCS): ISCG6414 or ISCG7142, ISCG6421 and ISCG6420; Pre-requisite (for GDCMP): ISCG7142, ISCG6421 and ISCG6420				
Other programmes:	GDCMP				
NZSCED field of Study:	020399	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32.5		117.5	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities. Students are required to attend 100% of all scheduled classes.

### Outcome Statement:

To provide students with knowledge and skills for developing client-server and web-based applications in the Intranet/Internet environment

### Learning Outcomes:

1. Discuss the philosophy of client-server computing and its impact to the computing industry.
2. Discuss the tools used in providing web-based applications.
3. Design and implement a dynamic web application using a range of languages/technologies/tools.
4. Discuss and evaluate the available data access technologies.
5. Design and develop a database client-server solution that meets specified organisational requirements using database and modern data access technologies.

### Learning and Teaching:

Lectures, tutorials and laboratory practicals

Topics: designing and developing database driven web applications by using current web client/server technologies, tools and languages.

### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
60%	Programming assignment to design & develop a database driven dynamic web application	2,3,4
40%	Assignment to implement assignment 1 by using different technology and then critique the two technologies	1, 5

### Feedback:

Feedback is sought throughout the course using a range of assessment tools including:  
Formal reflection, class forum and end of course survey

### Learning resources required:

A web server which supports multiple server-side languages/technologies, internet access from Unitec and the following software:

- Internet Explorer
- Mozilla Firefox
- Pycharm
- Python Django
- React JS
- Microsoft Visual Studio
- .Net Framework
- MS SQL Server
- MySQL

### Learning resources recommended:

#### Other Programmes:

GDCMP	<b>Elective</b>	Pre-requisites: ISCG7142, ISCG6421 and ISCG6420
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#### Version Tracking:

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restriction; ISCG7142 added as a new BCS elective
	27 Jan – 3 Feb 2022	S1 2022	AACSC	Changes in the alignments of some of the course LOs to course assessments; removal of dated software/ tech platforms and introduction of a few new platforms

ISCG7421: Advanced Programme Development					
Course number:	ISCG7421	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG6414 or ISCG7142 and ISCG6421 Pre-requisite (for GDCMP): ISCG6421 and ISCG7142				
Other programmes:	GDCMP				
NZSCED field of Study:	020399	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

### Outcome Statement:

To provide students with the ability to investigate and use advanced techniques that extend the standard development environment so that the student is competent in approaches required by full-scale commercial GUI development in a given GUI language.

### Learning Outcomes:

	Learning outcomes
1.	Obtain information from the internet, manuals, textbooks and supplied sample code to acquire in depth knowledge of a range of advanced technical features that extend the standard development environment of a given GUI language.
2.	Demonstrate the ability to successfully apply such features and techniques when writing code to solve selected problems in the given GUI language
3.	Be able to communicate the knowledge in a form which other programmers will find usable, relevant and easily intelligible.

### Learning and Teaching:

Lectures, laboratory work, self-directed study.

### Topics:

Topics include: researching advanced level techniques, building controls and writing advanced level programming applications.

### Assessment:

Weighting	Nature of assessment	Learning outcomes
50%	Design and development of advanced computer programs	1, 2,3
10%	Written report on a current live issue including evaluation of a technique relevant to this issue.	1,2,3
40%	Final Exam	1, 2,3

### Learning resources required:

Textbook: Refer to the current programme  
booklist.

**Learning resources recommended:**

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG6421 and ISCG7142
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions; ISCG7142 added as a new BCS elective

ISCG7424: Mobile Software Development					
Course number:	ISCG7424	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG6414 or ISCG7142 and ISCG6421; Pre-requisite (for GDCMP): ISCG7142 and ISCG6421 Co-requisite (for BCS and GDCMP): ISCG6426				
Other programmes:	GDCMP				
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
32.5		117.5	150

### Outcome Statement:

To provide students with the ability to investigate and use advanced techniques that extend the standard software development environment so that the student is competent in approaches required in the development and deployment of software applications for mobile devices.

### Learning Outcomes:

	Learning outcomes
1.	Acquire in depth knowledge of a range of advanced technical features that extend the standard software development environment to cater for the development of software for mobile devices by obtaining information from the internet, manuals, textbooks and supplied sample code.
2.	Demonstrate the ability to successfully apply such features and techniques when writing code to solve selected problems in the given language for a mobile device.
3.	Communicate the knowledge from learning outcome 1, in a form that other programmers will find usable, relevant and easily intelligible.

### Learning and Teaching:

After the initial sessions students will be expected to present an idea for a mobile application that they want to develop. The best ideas will be selected and students put into teams to develop these applications. The students who have the product vision will each lead a team of developers. The finished products will be presented to our industry partner who will select one of them to sponsor and commercialise as a BCS level 7 Project with that group of students.

Lectures, laboratory work, self-directed study

Topics:

Topics include: researching advanced level techniques, building controls and writing advanced level programming applications.

### Assessment:

Weighting	Nature of assessment	Learning outcomes	Type
70%	Design / develop mobile applications based on prescriptive assignment description(s).	1,2	Individual

30%	Semester long, group work project to design, develop, test and present a mobile application.	1,2,3	Group
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### Learning resources required:

Textbook: Refer to the current programme booklist.

### Learning resources recommended:

### Other Programmes:

GDCMP	Elective	Pre-requisites: ISCG7142 and ISCG6421; Corequisite: ISCG6426
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### Version Tracking:

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restriction; ISCG7142 added as a new BCS elective



ISCG7425: JAVA ENTERPRISE PROGRAMMING					
Course number:	ISCG7425	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS and GDCMP): ISCG6423 & ISCG6421 Co-requisite (for BCS and GDCMP): ISCG6426				
Other programmes:	GDCMP				
NZSCED field of Study:	020103	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
32	18	100	150

### Outcome Statement:

To critically review the concepts of enterprise component based programming with the Java programming language. The course will comprehensively examine a range of enterprise technologies and frameworks such as Hibernate, Spring, Struts and Java beans. The subject will also cover RMI and socket programming, and the development of a graphical user interface using the Java Swing library.

### Learning Outcomes:

1. Design and develop Java software using a variety of component based frameworks
2. Ability to select an appropriate framework for a specific software development problem
3. Debug frameworks such as Hibernate and Spring
4. Critique and analyse the architectural software stack of systems that use these enterprise frameworks

### Learning and Teaching:

- The subject will use a workshop format with code examples discussed during a one-hour lecture period
- Practical sessions will be held to review the theory discussed in the lecture from a practical point of view
- Assessment items will have two parts: the first part will specify the minimum knowledge required to pass the subject, and the second part will include challenge questions to push a student's boundaries.

### Topics:

- Java Language and Syntax Review
- J2EE
- Hibernate and Object Relational Mappings
- Spring and other J2EE containers
- Application Servers
- Enterprise Service Bus and Mule
- Model View Controllers and Struts
- Java Server Faces

**Assessment:**

Each of the assessments listed below will demonstrate a student's practical knowledge of enterprise java programming. The assessments address the living curriculum main characteristics such as Creativity, Curiosity, Problem Solving, Collaboration, Self-efficacy and Reflection.

Weighting	Nature of assessment	Learning outcomes
30%	Lab Exercises - Students are required to work on a set of programming exercises given during each lecture and submit their solutions on Moodle throughout the semester	1, 2, 3 and 4
45%	Assignment - The programming assignment will examine students' knowledge of Enterprise Java Programming.	1, 2 and 3
25%	Final Exam	1, 2, 3 and 4

**Learning Resources Required:**

Lecture notes, online tutorials, conference proceedings, journals, websites.

**Learning Resources Recommended:**

1. Brian Goetz, 2006. *Java Concurrency in Practice*. 1 Edition. Addison-Wesley Professional.
2. Elliotte Rusty Harold, 2004. *Java Network Programming, Third Edition*. Third Edition. O'Reilly Media.
3. Jan Graba, 2006. *An Introduction to Network Programming with Java*. 2nd Edition. Springer.
4. Joshua Bloch, 2005. *Java™ Puzzlers: Traps, Pitfalls, and Corner Cases*. Edition. AddisonWesley Professional.
5. Kenneth L. Calvert, 2008. *TCP/IP Sockets in Java Bundle: TCP/IP Sockets in Java, Second Edition: Practical Guide for Programmers (The Practical Guides)*. 2 Edition. Morgan Kaufmann.
6. Merlin Hughes, 1999. *Java Network Programming, 2nd Edition*. 2nd Edition. Manning Publications.

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG6423 & ISCG6421 Co-requisite: ISCG6426
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**Version Tracking:**

Version No.	Date of Change	Effective from	Approved by	Description of change
	26/09/2013	S1, 2014	PC	Course added to BCS as a new elective; also available in the GDCMP

ISCG7426: Data Mining					
Course number:	ISCG7426	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG5421 and ISCG6425; Pre-requisite (for GDCMP): ISCG6421 and ISCG6425 or as approved by relevant Academic Authority Co-requisites (for BCS and GDCMP): ISCG6426				
Other programmes:	GDCMP				
NZSCED field of Study:	020111	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
39		111	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### Outcome Statement:

To provide students with the knowledge, tools and techniques required for mining complex data sets and to present the results to non-technical audiences.

### Learning Outcomes:

1. Demonstrate an in-depth knowledge of modern data mining techniques
2. Apply data mining techniques for examining, processing and evaluating raw input data to discover, interpret and measure interesting patterns
3. Present data mining results in a form that non-technical audiences will find usable, relevant and intelligible

### Learning and Teaching:

Topics may be taught in an integrated manner  
Supervisor / student meetings / discussions  
Collaborative and / or individual projects  
Analysis of written, visual, aural and performance texts

#### Topics:

Introduction to data concepts (Classes, Data types, Instances and Attributes), Data preparation methods

(Sampling, Training and Test datasets, Data cleansing, Feature Selection and Cross-validation methods),

Data mining techniques (which may include Classifications, Clustering, Association rules, Ensemble Learning and Regressions) and Evaluation methods (which may include ROC curves, correlation, parametric and non-parametric tests of difference)

### Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
40%	Individual Assignment(s): Given a case study, design, develop and evaluate data mining techniques for solving problems	1, 2
60%	Group Assignment(s)*: Given a complex case study, design, develop and evaluate data mining techniques and present the mined results to non-technical audiences. <i>*Marked in stages and individually.</i>	1, 2, 3

### Feedback:

Feedback is sought throughout the course using a range of assessment tools including:  
Formal reflection, class forum and end of course survey

### Learning resources required:

Specific readings will be provided during the course.

### Learning resources recommended:

Data Mining: Practical Machine Learning Tools and Techniques (3<sup>rd</sup> Edition) by I.H. Witten, E. Frank & M.

Hall

The Elements of Statistical Learning (2<sup>nd</sup> Edition) by T. Hastie, R. Tibshirani & J. Friedman

Booklist & resources published via Moodle

Computer lab

Classroom/Performance spaces

Equipment

### Other Programmes:

GDCMP	Elective	Pre-requisites: ISCG6421 and ISCG6425 or as approved by the relevant academic authority; Co-requisites: ISCG6426
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### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change
	4/11/2014	Sem 1 2015	PC	New elective course added to BCS; also available in GDCMP
	5/11/2015	Sem 1 2016	PC	New co-requisite added

ISCG7427: Agile and Lean Software Delivery					
Course number:	ISCG7427	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): ISCG6414 or ISCG7142 Pre-requisite (for GDCMP): ISCG7142				
Other programmes:	GDCMP				
NZSCED field of Study:	020305	Delivery mode:	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
39		111	150

### Outcome Statement:

To equip participants with the mindset, knowledge, tools and techniques to succeed in Agile software development projects. To help participants to understand Agile and Lean principles and practices, and allows participants to gain experience in working in an Agile environment using industry leading Agile team collaboration tools.

### Learning Outcomes:

	Learning outcomes
1.	Recognise and adopt an Agile Mindset
2.	Recognise and Practice Team Interactions
3.	Recognise Value Driven Development
4.	Design Customer and User Involvement Process
5.	Design Agile Process and Perform Agile Planning

### Learning and Teaching:

Designed for participants to learn by experiencing an Agile mindset via a combination of lectures, class discussions, team exercises and a group project.

### Topics:

Topics include: Agile development principles, the Scrum framework, Extreme Programming (XP) practices, Lean development principles, Kanban practices, Test Driven Development, team collaboration, and scaling of Agile teams

### Assessment:

Weighting	Nature of assessment	Learning outcomes
50%	Written Test on Agile mindset and practices (week 5)	1, 2, 3, 4 ,5

50%	Group Project: Oral presentation and demonstration of product from Agile project. Assessed as a group with peer review component. (week 13)	1, 2, 3, 4, 5
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### Learning resources required:

Refer to the current programme booklist

### Learning resources recommended:

Cohn, M. (2010). *Succeeding with Agile: Software Development Using Scrum*. Addison-Wesley.  
Poppendieck, M, and Poppendieck, T. (2003). *Lean Software Development Toolkit*. Addison-Wesley.  
Smith, G, and Sidky, Ahmed. (2009). *Becoming Agile in an Imperfect World*. Manning.

### Accreditation

Upon passing the course, participants will achieve ICAgile Certified Professional (ICP) status. ICP is a certification issued by International Consortium for Agile that differentiates participants to industry peers as understanding the Agile mindset.

### Other Programmes:

GDCMP	<b>Elective</b>	Pre-requisites: ISCG7142
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### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change
	9/08/2021	S1 2022	AACSC Chair's Action	ISCG7142 added as a new BCS elective

ISCG7430: Project					
Course number:	ISCG7430	Level:	7	Credits:	45
Main programme:	BCS			Compulsory	
Pathway(s):					
Requisites / Restrictions:	<p>Pre-requisites: ISCG6411, ISCG5400, ISCG5401, ISCG5420, ISCG5423, ISCG5424 and ISCG5430 and 195 BCS credits;</p> <p>Each project proposal will be considered by a sub- committee of the Programme Committee, and will only be approved if the student has completed courses that are considered to be an appropriate preparation for the specific project.</p> <p>This course must be taken in the last semester of study for the Bachelor in Computing Systems.</p>				
Other programmes:					
NZSCED field of Study:	020399	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
20		430	450

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities. Students are required to attend 100% of all scheduled classes.

### Outcome Statement:

To provide students with the opportunity to research, select, integrate, and apply a range of techniques and technology in the solution of a complete realistic problem.

### Learning Outcomes:

	Learning outcomes
1.	Prepare a project proposal and plan.
2.	Analyse and document user requirements.
3.	Research and critically evaluate new developments.
4.	Select appropriate techniques and technologies to apply to the project.
5.	Apply the selected techniques and technologies.
6.	Document and present the project process and deliverables.
7.	Analyse the project solving process followed, and identify possible improvements.
8.	Identify and analyse ethical issues as they arise.

### Learning and Teaching:

#### Topics:

Topics include: students solving a realistic business problem in the IT area of their study; students work closely with their sponsoring organisation and Unitec supervisor to understand and solve the problem presented; evidence of project management and the processes used are collected during the project.

**Performance Criteria**

- One performance criterion for all projects will be that the project deliverables satisfy the user requirements as identified, or as renegotiated in the course of the project.
- A second criterion will be the completion of an analysis of the project process, including an evaluation of methods used and suggestions for possible improvements in subsequent projects.

Projects will require the students to deal with a complex realistic situation that cannot be resolved simply by the application of tools, techniques and products with which the student is already familiar.

**Assessment:**

Weighting	Nature of assessment	Learning outcomes
10%	Proposal describing project outcomes and deliverables	1
80%	Project body and write up. Content will depend on project	2 - 8
10%	Presentation to assessment panel and others	6 - 8

**Learning resources required:** all material from previous courses

**Learning resources recommended:**

**Other Programmes:**

NA		
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**Version Tracking:**

Version No.	Date of Change	Effective from	Approved by	Description of change
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restrictions;



ISCG7431: Capstone Project					
Course number:	ISCG7431	Level:	7	Credits:	60
Main programme:	BCS			Compulsory	
Pathway(s):					
Requisites / Restrictions:	<p>Prerequisites: ISCG6411, ISCG5400, ISCG5401, ISCG5420, ISCG5423, ISCG5424 &amp; ISCG5430 &amp; 195 BCS credits;</p> <p>Restrictions: ISCG7430</p> <p>This course must be taken in the final semester of study for the Bachelor of Computing Systems (fulltime) and in the final year for the BCS (part-time).</p> <p>For work-based learning: Entry subject to approval of the relevant Academic Authority and a negotiated contract with an approved organisation.</p>				
Other programmes:	None				
NZSCED field of Study:	080315	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
100		500	600

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities. Students are required to attend 100% of all scheduled classes.

### Outcome Statement:

To provide students with the opportunity to research, select, integrate, and apply a range of techniques and technology in the solution of a complete realistic problem. Wherever possible students should undertake a project on behalf of a client or situated in an industrial or business environment.

### Course requirements:

Each project proposal will be considered by a sub-committee of the Programme Committee, and will only be approved if the student has completed courses that are considered to be an appropriate preparation for the specific project (for example three related level 7 courses).

Students must enhance their depth of knowledge within the Computing Discipline and within their area of capability (that extends their knowledge and does not just use their existing knowledge). Usually, this will mean developing alternative solutions to a problem using a Computing solution. When proposing project ideas students must be mindful that they will be proposing a project in the domain of Computing. Usually this will be within one of the pathways offered for the Bachelor of Computing undertaking the role of a Computing professional:

- Software Engineering (programmer, architect, designer)
- Game Development (programmer, designer, developer)
- Cyber Security (malware analyst, network security engineer)
- Computer Networks & Cloud Computing (network engineer, network designer)
- Business Intelligence (database developer, database designer, business systems analyst)

### Learning Outcomes:

1. Prepare and present a project proposal and plan—usually in response to a client or workplace need.
2. Analyse and document user requirements.
3. Research and critically evaluate possible new developments that could impact the project.
4. Select appropriate techniques and technologies to apply to the project.
5. Apply the selected techniques and technologies.

6. Manage the project professionally, addressing ethical issues and project risks in an appropriate manner.
7. Analyse the project solving process followed, and identify possible improvements.
8. Document and present the project process and deliverables in a public forum.

### **Learning and Teaching:**

- Students progressively enhance their presentation skills throughout this course.
- Topics may be taught in an integrated manner
- Supervisor/student meetings/discussions
- Collaborative and/or individual projects

Students provide regular progress presentations (weekly for fulltime and fortnightly for part-time). Students are expected to actively participate in all discussions related to presentations by all students undertaking the projects.

Students will participate in workshops may include, for example: stress management; risk management; client-management; ethical, moral and legal obligations as a practitioner; presentation skills; communication skills; written communication for Computing professionals; research and investigation techniques; managing teams; teamwork; project management and control; roles and responsibilities; and negotiation tactics.

### **Topics:**

students solving a realistic business problem in the Computing area of their study; students work closely with their sponsoring organisation and Unitec supervisor to understand and solve the problem presented; evidence of project management and the processes used are collected during the project.

**Notes:** Students are encouraged to work in teams and should be discouraged from working alone on projects. Wherever possible, students will be encouraged to undertake learning in the workplace. Any project must satisfy the programme committee that it of sufficient complexity and significant enough for a final year project. Students may, elect to produce a portfolio of mini-projects instead of a major undertaking—this will be encouraged for students undertaking part-time studies and working full-time. Students must be mindful of their obligations to study and if employed fulltime should undertake the project part-time.

### **Assessment:**

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
10%	Present a proposal describing project outcomes and deliverables to a panel of experts.	1
80%	Project deliverables including reports etc.	2-7
10%	Presentation to assessment panel and others.	8

### **Feedback:**

Feedback is sought throughout the course using a range of assessment tools including: Informal & formal reflection, class forum, and end of course survey.

**Learning resources required:**

No set texts.

Specific readings will be provided during the course.

**Learning resources recommended:**

Booklist & resources published via Moodle

Computer lab

Classroom/Performance spaces

Equipment

**Other Programmes:**

NA		
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	7 November 2014	Semester 1 2015	FAC Standing Committee	New 60-credit BCS compulsory course added
	9/08/2021	S1 2022	AACSC Chair's Action	Inactive old courses removed as prerequisites, co-requisites and restriction;

ISCG7435: Special Topic 1						
Course number:		ISCG7435	Level:	7	Credits:	15
Main programme:		BCS			Elective	
Pathway(s):						
Requisites / Restrictions:						
Other programmes:		GDCMP				
NZSCED field of Study:		020399	Delivery mode:	Face to Face		
Hours directed:	Hours in the Workplace:		Hours Self-directed:		Total Learning Hours:	
32.5			117.5		150	

### Outcome Statement:

The inclusion of a special topic is to allow SCIT to offer courses at this level that deal with current, but possibly transient issues, and that make use of the particular expertise of individual staff members, including visitors.

Each special topic offered will be documented either in the form of a standard description using the heading above.

Each special topic offered must be approved by the Programme Committee and the Undergraduate Board of Studies and endorsed by the Academic Board.

### Learning Outcomes:

	Learning outcomes
1.	As determined

### Learning and Teaching:

Lectures, practical sessions, research and self-directed study

Topics:

As determined by the special topic offered.

### Assessment:

Weighting	Nature of assessment	Learning outcomes
	As determined	

**Learning resources required:** as determined

**Learning resources recommended:**

### Other Programmes:

GDCMP	Elective	Restrictions: As determined
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**Version Tracking:**

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>

ISCG7440: Advanced Game Design					
Course number:	ISCG7440	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites: ISCG6441				
Other programmes:	GDCMP				
NZSCED field of Study:		Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
39		111	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### Outcome Statement:

To extend the students' knowledge of principles, theories, and practice of game design. Students will gain an in depth understanding of the design process through undertaking research and analysis, idea generation, concept development and the final communication of their design proposals for a given project brief.

Learning outcomes:
1. Critically examine game design from a specific perspective utilising academic theory.
2. Evaluate player-centric design process and video games as a social tool.
3. Develop a personal and/or group approach to game ideation and game development addressing a specified game problem/goal.
4. In-depth exploration of appropriate media, methods and techniques for a proposed game project.
5. Develop and playtest an advanced game prototype, analyse the results, refine the prototype.

### Learning and Teaching:

Topics may be taught in an integrated manner  
 Supervisor / student meetings/discussions  
 Collaborative and/or individual projects  
 Analyses of written, visual, aural and performance texts

#### Topics:

Advanced game criticism and academic theories.  
 Design process in game development.  
 Game design problems and solutions.  
 Developing visual and audio design.  
 Prototyping and analysis.  
 Gamefication and Instructional Games.  
 Societal impact through games.  
 2D and 3D game engines.  
 3D Animation and Modeling software.  
 Virtual reality and the future of gaming.

**Assessment:**

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
30%	Individual game design criticism of a contemporary video game from a specific perspective such as psychoanalytic theory, feminist theory or critical theory.	1,2
70%	Individual or group project including: Project Proposal and Pitch (20%), Game Design Document (20%) and Advanced Game Prototype (30%). The Game Prototype outcome will be specified in the Project Proposal. This will be negotiated based on individual game complexity and may include a playable game product, detailed level design, or in depth character and world development.	1,2,3,4,5

**Feedback:**

Feedback is sought throughout the course using a range of assessment tools including:  
Formal reflection, class forum and end of course survey

**Learning resources required:**

No set texts.  
Specific readings will be provided during the course.

**Learning resources recommended:**

Booklist & resources published via Moodle  
Computer lab  
Classroom/Performance spaces  
Equipment

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG6441
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**Version Tracking:**

Version No.	Date of Change	Effective from	Approved by	Description of change
	20/04/2016	S2 2016	PC	New elective course added to the BCS and GDCMP

ISCG7441: Advanced Game Programming					
Course number:	ISCG7441	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisite (for BCS): ISCG6442; Pre-requisite (for GDCMP): ISCG6442 or as approved by the relevant academic authority				
Other programmes:	GDCMP				
NZSCED field of Study:	020103	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
39		111	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### Outcome Statement:

To provide students with the ability to investigate and use advanced programming techniques to solve complex game development problems.

### Learning Outcomes:

1. Utilise, review, and enhance graphical and animation techniques to support game projects.
2. Utilise, review, and enhance physics and mathematical techniques to support game projects.
3. Document, create, and test a video game prototype or proof of concept.
4. Document a post-mortem of findings regarding the rapid prototype.

### Learning and Teaching:

The lecturer must consider the capabilities of the students entering the course to ensure they understand some key concepts before embarking on more complex tasks (for instance the students' capability in undertaking more complex elements, should we recommend a 2D Rapid Game Prototype as the project and merely introduce 3D concepts rather than expect their use in the game).

Lecturers support students in developing team skills and their project plans to support the development of the project—specific emphasis is given to the idea of pre-planning and attempting to get gameplay features into the prototype as quickly as possible. Students are advised to use place-holder assets or prebuilt assets that are easily plugged into the game engine.

Only if time permitting should the students attempt to create a Beta Game—that is one that is game complete; smaller games better afford the ability to create a Beta Game in the timeframe allowed for this course.

Lecturers will stop students aiming for a Gold game (unless this is achievable)—that is feature complete, game complete, and polished game ready for publication. Perhaps, there is a possibility to aim for that goal if they work with game artists from another department or if the students themselves wish to carry on with the project after the completion of this course. However, interacting with 3<sup>rd</sup> parties is time consuming and the programmers will have to provide adequate instructions for artists to create assets (for example sprite sheet sizes, sprite sizes, object sizes, object composition, etc.) One prospect for the students to consider is the redevelopment of their existing sprite games created in the



prerequisite course (ISCG6442—Game Programming) and take it to a further level of polish, the Beta release would essentially become a gold release.

Student teams are expected to present progress updates of their game project each week. Students will present success stories for the other teams to utilize their wisdom. Students also present issues that have arisen during the following week for lecturer and class feedback to attempt to solve complex issues as a collective.

Individual Students will be able to construct their own specialist knowledge of game development concepts by undertaking individual tasks within the group context, some students may concentrate more on graphical programming, engine programming, mathematical or physics programming, or game-play programming. The students and lecture discuss each week the individual tasks that each team member works on, this is documented.

Students document their individual learning in their self-reflective journal; this will include difficulties that they overcame, problems solved, problems encountered, etc. Students are encouraged to present these findings to the class so they can increase their knowledge and understanding of game prototyping.

Finally, students collate these findings into a reflective post-mortem.

### **Some Philosophical Positions:**

Lecturers should:

- Relate any contextual industry thoughts when appropriate for maximum learning—including relating the student work to the game design concepts employed;
- Play the role of guardian and searcher of knowledge to teach students how to find useful information;
- Ensure that the students usually create (in the first instance) a feature complete prototype that could mean that the game still has placeholder assets.
- As students will be working in teams, lecturers should co-construct project plans with the teams for more effective execution—attempting to give students tips and tricks to make the development faster.
- Lecturers should advise students of the possibility of tense situations often encountered during team work, however, lecturers should encourage students to be open and honest to overcome these kinds of difficulties and encourage effective risk management.

The lecturer acts as a role of co-constructor to assist the students in the production of their game prototypes—ensuring that class activities build to rapid prototypes quickly.

Lectures, laboratory work, self-directed study

**Notes:** Students are encouraged to work in teams and should be discouraged from working alone on projects.

Topics:

Graphical Game Programming, Physics and Mechanical Simulation for Games, Rendering and Graphical Pipelines, Graphical Engines and Pipelines, Middleware, and Rapid Game Prototyping.

2D/3D Graphics Programming, Debugging, and Testing

- 2D Game Development Recap
- Game Engine Programming
- Collisions/Responses
- Animations
- Game Play
- GUI Elements
- Placeholder Assets
- Texturing Basics/Skins & Materials

Some Topics for Discussion are:

- Team & Project Management for Rapid Prototyping
- Individual Management for Rapid Prototyping
- People & Management for Rapid Prototyping
- Working with artists and audio specialists—getting assets

**Assessment:**

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
40%	Group: Rapid Game Prototype: Alpha—Feature Complete Testing (Prototype and Test Report).	1,2,3
40%	Group: Rapid Game Prototype: Beta—Game Testing (Prototype and Test Report). It is possible, depending on the complexity of the game, that this is an Alpha Stage 2 delivery, partially Game Complete.	1,2,3
20%	Individual Post-mortem of Findings and Individual Prototype Journal.	4

**Feedback:**

Feedback is sought throughout the course using a range of assessment tools including:

- Informal & formal reflection, class forum, and end of course survey.

**Learning resources required:**

No set texts.

Specific readings will be provided during the course.

**Learning resources recommended:**

- Booklist & resources published via Moodle
- Computer lab/Classrooms
- Equipment

**Other Programmes:**

GDCMP	<b>Elective</b>	Pre-requisites: ISCG6442 or as approved by relevant academic authority
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**Version Tracking:**

Version No.	Date of Change	Effective from	Approved by	Description of change
	4/11/2014	S1 2015	PC	New elective added to the BCS and also available in the GDCMP

## ISCG7444: Cloud Application Design and Development

<b>Course number:</b>	ISCG7444	<b>Level:</b>	7	<b>Credits:</b>	15
<b>Main programme:</b>	BCS			Elective	
<b>Pathway(s):</b>					
<b>Requisites / Restrictions:</b>	Pre-requisites (for BCS): ISCG5421 or ISCG6420 Pre-requisite (for GDCMP): ISCG6420 or as approved by the academic authority				
<b>Other programmes:</b>	GDCMP				
<b>NZSCED field of Study:</b>	020305	<b>Delivery mode:</b>	Face to Face		

<b>Hours directed:</b>	<b>Hours in the Workplace:</b>	<b>Hours Self-directed:</b>	<b>Total Learning Hours:</b>
39		111	150

Students are expected to adhere to Unitec's policy on conduct in respect of staff, fellow students, and in the use of resources and facilities.

### Outcome Statement:

This course explores the best practices and emerging principles for the design & development of cloudbased applications.

### Learning outcomes:

1. Develop specialist knowledge and critical understanding of Cloud computing concepts and technologies in order to solve real-world problems.
2. Analyse software engineering methods used for designing, developing, and implementing Cloud-based software solutions.
3. Investigate cloud-based software development techniques, including types of cloud infrastructure, providers, and cloud-based services in response to requirement specifications.
4. Develop a cloud-based application using industry standard tools and techniques.

### Learning and Teaching:

Students and lecturers discuss the concepts of virtualization technologies along with the architectural models of cloud computing. Students and academic staff present prominent cloud computing technologies that are available in the marketplace.

Students investigate software engineering methods used for designing, developing, and implementing Cloud-based software solutions in group discussions facilitated by expert academic and industry guests.

Various application case studies from domains such as science, business/commercial, engineering, gaming, and marketing (e.g. social networking) are introduced in response to individual and collective needs, along with associated architecture and how to leverage various cloud technologies. These case studies allow the students to investigate the mechanisms needed to harness cloud computing in their own respective endeavours.

Finally, the course details many open research problems and opportunities that have arisen from the rapid uptake of cloud computing.

The course also provides hands on practice throughout the laboratory sessions for the students to put their theory into practice and develop applications using industry standard cloud environments.

## Topics:

### Introduction to Cloud computing

#### Foundations of Cloud Technologies

- Distributed Computing
- Virtualization
- Service Oriented Computing

#### Cloud Computing Core Concepts

- Definition of Cloud Computing
- Types of Cloud
- Cloud Computing Reference Model
  - IaaS, PaaS, SaaS
  - XaaS – Everything as a service

#### IaaS: Defining Your Infrastructure on Demand

- Infrastructure Provisioning
- Compute on Demand
- Storage on Demand
- Virtual Networking

#### SaaS: Applications as Service Compositions in the Cloud

- A case study for example “Google Docs”
- Characteristics and Advantages of SaaS
- Service Marketplace

#### PaaS: Developing Elastically Scalable Applications

- Cloud Computing Platforms
- Application Architecture and Composition
- IBM BlueMix, CloudFoundry, Microsoft Azure, Heroku, AppEngine

#### Engineering Applications in the Cloud

- From Concept to Implementation
- Architecture and Design
- Service Selection
- Development Operations

#### Cloud Computing and the Industry

- Economic Primer
- Legal Implications
- Standardisation
- Open Source Software
- Security

## Assessment:

Students will be advised of all matters relating to summative assessment at the outset of the course. Overall course grades will represent a balanced assessment of achievement in relation to all stated learning outcomes.

Weighting	Nature of assessment	Learning outcomes
40%	Test(s)	1, 2, 3

60%	Project: Develop and demonstrate a Cloud-based application. This includes progress and final report(s) as well as presentation(s).	1, 2, 3, 4
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### Feedback:

Feedback is sought throughout the course using a range of assessment tools including:  
Informal & formal reflection, class forum, and end of course survey.

### Learning resources required:

No set texts.

Specific readings will be provided during the course.

### Learning resources recommended:

Booklist & resources published via Moodle

Computer lab

Classroom/Performance spaces

Equipment

### Other Programmes:

GDCMP	Elective	Pre-requisites: ISCG6420 or as approved by the academic authority
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### Version Tracking:

<i>Version No.</i>	<i>Date of Change</i>	<i>Effective from</i>	<i>Approved by</i>	<i>Description of change</i>
	4/11/2014	S1 2015	PC	New elective course added to the BCS; also available in the GDCMP

ISCG7488: Negotiated Study					
Course number:	ISCG7488	Level:	7	Credits:	15
Main programme:	BCS			Elective	
Pathway(s):					
Requisites / Restrictions:	Pre-requisites (for BCS): Approval by the relevant Academic Authority AND completion of 240 credits towards the BCS degree, including 60 credits at Level 6 or above; Pre-requisites (for GDCMP): Relevant Academic Authority Approval and completion of 60 credits towards GDCMP				
Other programmes:	GDCMP				
NZSCED field of Study:	020399	Delivery mode:	Face to Face		

Hours directed:	Hours in the Workplace:	Hours Self-directed:	Total Learning Hours:
By negotiation		By negotiation	150

#### Outcome Statement:

To enable a student to follow a course of self-directed in-depth study in an approved topic area.

#### Learning Outcomes:

	Learning outcomes:
1.	Negotiated by student and the course developer

#### Learning and Teaching:

As negotiated with student, and the course developer

Topics:

Topics to be negotiated with student and the course developer

#### Assessment:

Weighting	Nature of assessment	Learning outcomes
100%	Negotiated by student and the course developer	All

#### Learning resources:

As negotiated with student and the course developer

#### Other Programmes:

GDCMP	Elective	Pre-requisites: Relevant Academic Authority Approval AND completion of 60 credits towards the GDCMP
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#### Version Tracking:

Version No.	Date of Change	Effective from	Approved by	Description of change
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