EDUCATIONAL QUALITY AND ASSESSMENT PROGRAMME [EQAP]

Pacific Community
Communauté du Pacifique

SOUTH PACIFIC FORM SEVEN CERTIFICATE [SPFSC]

INFORMATION and COMMUNICATION TECHNOLOGY PRESCRIPTION

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SOUTH PACIFIC FORM SEVEN CERTIFICATE
INFORMATION and COMMUNICATION TECHNOLOGY

Contents

INFORMATION AND COMMUNICATION TECHNOLOGY

PREAMBLE AND RATIONALE

This prescription defines the requirements for the South Pacific Form Seven Certificate Information and Computer Technology.

This prescription is derived from a revision of the South Pacific Board for Educational Assessment (SPBEA) prescription in Information Technology and a wide review of international trends in senior secondary school Information and Computer Technology prescriptions.

Information and Communication Technology continues to be a rapidly changing field which encompasses a very large realm. New trends in the study of ICT indicate a rapid expansion of content, and what was relevant a short time ago has changed markedly. It is anticipated that this evolution will continue because there is no apparent end to developments in this particular technology.

This course is comparable in standard to other Year 13 courses available in the international field. The course is designed so students may continue their studies in ICT at a tertiary level, or complete their formal education at the end of Year 13.

COURSE AIMS

Information and Communication Technology encompasses a vast realm of knowledge and skills. This course is designed to let the student explore a number of different aspects of that realm and to engender an attitude of challenge and exploration within these aspects. The use of ICT to generate original content is intended to encourage the student to experiment with the medium as a tool rather than as an end in itself.

It is intended that students work in teams for particular sections so that they gain experience of how many ICT environments function.

It is intended that students should be able to see ICT as a means of creating a solution to particular problems, and to be able to choose an appropriate tool from the vast number available to produce the solution.

This course is generic in its approach. It is recognised there are multiple ways in ICT to reach any particular end point. Students should recognise this and they should be encouraged to be creative within the medium to ensure they are fully engaged in the course.

PREREQUISITES

Students should have completed a course of study in Computer Studies or its equivalent at Year 12 level.

Schools should ideally meet these conditions to ensure students succeed in ICT:

1. The school needs enough computers running WinXP or higher (or equivalent operating system) to give each student individual access to a computer for at least 1 hour per week.
2. ICT classes should be scheduled to use the computers for each teaching period.
3. The computers should be networked.
4. Internet access needs to be available, preferably regularly.

Teachers must see themselves as facilitators of learning rather than transmitters of knowledge. Teachers must acknowledge that in some areas their students will know more than them and they must use this to the advantage of the class rather than suppress such student knowledge.

GENERAL OBJECTIVES

On completing this course students should be able to:

- Use ICT to produce appropriate solutions to a variety of IT problems and utilise effective ICT tools to reach that solution

- Recognise that ICT is a very large realm of knowledge and that further study in it will lead to greater specialisation in a narrowing field

- Act as a responsible Digital Citizen who respects the law, the rights of others, and keeps safe in a digital world

CONTENT COMPONENTS

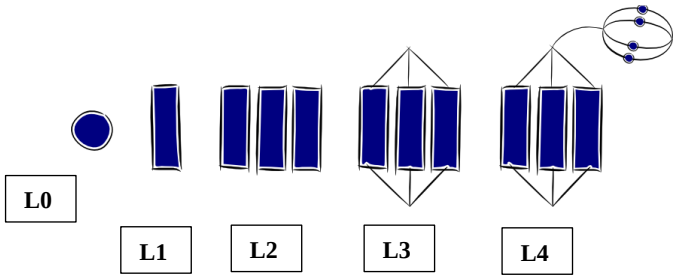
The content of the SPFSC ICT course is organised under five strands and a number of sub-strands under each strand. These are outlined below:

STRAND NUMBER	STRAND TITLE	SUB STRAND NUMBER	SUB-STRAND TITLE
1.	OPEN SOURCE AND PROPRIETARY SOFTWARE AND MEDIA	1.1	Software sources
		1.2	Installation & recommendations
		1.3	Graphics
		1.4	Video
		1.5	Audio
		1.6	Integrated Media Output
2.	ETHICS OF ICT, ENVIRONMENTAL ISSUES, CLIMATE CHANGE AND SAFE PRACTICES	2.1	Piracy
		2.2	Security
		2.3	Privacy
		2.4	Copyright & Intellectual property
		2.5	Longevity of information held in electronic form
		2.6	E waste
		2.7	Raw materials & Sustainability
		2.8	Health
		2.9	Identity theft
		2.10	Physical security
3.	PROGRAMMING	3.1	Design
		3.2	Coding & Testing
4.	WEBSITE DESIGN AND DEVELOPMENT	4.1	Design
		4.2	Development
		4.3	Testing
5.	MICROPROCESSOR CONTROL	5.1	Microprocessor hardware
		5.2	Software creation
		5.3	Embedded microprocessors

UNPACKING LEARNING OUTCOMES

In this prescription, Learning Outcomes are stated at three levels of generality: Major Learning Outcomes (MLOs) are stated at the strand level, Key Learning Outcomes (KLOs) are stated at the sub-strand level, and Specific Learning Outcomes (SLOs) are unpacked from the Key Learning Outcomes. Each SLO is a combination of a cognitive skill and a specific content component. Each SLO is given a skill level, level 1 – 4, and this skill level results from the categorisation of the cognitive skill that is embedded in the SLO using the SOLO taxonomy[1].

The SOLO taxonomy provides a simple, reliable and robust model for three levels of understanding – surface deep and conceptual (Biggs and Collis 1982).



At the **prestructural** level (L0) of understanding, the task is inappropriately attacked, and the student has missed the point or needs help to start. The next two levels, unistructural and multistructural are associated with bringing in information (surface understanding). At the **unistructural** level (L1), one aspect of the task is picked up, and student understanding is disconnected and limited. The jump to the multistructural level is quantitative. At the **multistuctural** level (L2), several aspects of the task are known but their relationships to each other and the whole are missed. The progression to relational and extended abstract outcomes is qualitative. At the **relational** level (L3), the aspects are linked and integrated, and contribute to a deeper and more coherent understanding of the whole. At the **extended abstract** level (L4), the new understanding at the relational level is re-thought at another conceptual level, looked at in a new way, and used as the basis for prediction, generalisation, reflection, or creation of new understanding (adapted from Hook and Mills 2011). [http://pamhook.com/solo-taxonomy/..]

The progression from Level 1 to Level 4 is exemplified in the progression from *define* →*describe* → *explain* → *discuss* with each succeeding level indicating a *higher level of understanding,* as follows:

- **define** – to state a basic definition of a concept [*Unistructural or L1*]
- **describe** – to give the characteristics of, or give an account of, or provide annotated diagrams. [*Multistructural or L2*]
- **explain** – to provide a reason for a relationship – an event and its impact, a cause and an effect, as to *how* or *why* something occurs. [*Relational or L3*].
- **discuss** – this means *linking ideas* (descriptions, explanations) to make generalisations or predictions or evaluations. It may involve relating, comparing, analysing, and justifying. [*Extended abstract or L4*].

[1] Structure of Observed Learning Outcomes by Biggs and Collis (1982)

LEARNING OUTCOMES

STRAND 1: Open Source and Proprietary Software

Major Learning Outcome (Inf1):

Students are able to differentiate between Open Source and Proprietary software, design and develop a product in two or more of the three defined areas of media by using available ICT tools.

SUB STRAND 1.1: SOFTWARE SOURCES

Key Learning Outcome (Inf1.1):

Students are able to differentiate between Open Source and Proprietary software by recognising Open Source software is generally free of charge whereas Proprietary software must be purchased.

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**identify** the two categories of software: Open Source and Proprietary.	1	inf1.1.1.1
2.	**define** *open source software*.	1	inf1.1.1.2
3.	**define** *Proprietary software*.	1	inf1.1.1.3
4.	**identify** requirements that a Proprietary software needs before it can be used.	1	inf1.1.1.4
5.	**identify** features of Proprietary software that are supplied.	1	inf1.1.1.5
6.	**describe** the strengths the Open Source model of software development.	2	inf1.1.2.1
7.	**describe** the weaknesses of the Open Source model of software development.	2	inf1.1.2.2
8.	**describe** the strengths of Propriety model of software development.	2	inf1.1.2.3
9.	**describe** the weaknesses of the Propriety model of software development.	2	inf1.1.2.4
10.	**locate** Open Source software.	2	inf1.1.2.5
11.	**locate** free trial versions of Propriety Software.	2	inf1.1.2.6
12.	**explain** the strengths of the Open Source model of software development.	3	inf1.1.3.1
13.	**explain** the weaknesses of the Open Source model of software development.	3	inf1.1.3.2
14.	**explain** the strengths of the Open Source model of software development.	3	inf1.1.3.3
15.	**explain** the weaknesses of the Propriety model of software development.	3	inf1.1.3.4
16.	**download** Open Source software.	3	inf1.1.3.5
17.	**locate** and download Open Source software.	3	inf1.1.3.6
18.	**download** free trial versions of Propriety Software.	3	inf1.1.3.7
19.	**discuss** the strengths and weaknesses of the Open Source and Propriety models of software development.	4	inf1.1.4.1

SUB STRAND 1.2: INSTALLATION

Key Learning Outcome (Inf1.2):
Students are able to install/uninstall softwares and make recommendations on software.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**describe** the importance of uninstalling software.	2	inf1.2.2.1
2.	**describe** software installation using the default settings.	2	inf1.2.2.2
3.	**install** software using the default settings.	2	inf1.2.2.3
4.	**un-install** software using the default settings.	2	inf1.2.2.4
5.	**explain** Open Source software.	3	inf1.2.3.1
6.	**explain** free trial versions of Propriety Software.	3	inf1.2.3.2
7.	**install** software using the default settings.	3	inf1.2.3.3
8.	**un-install** software using the default settings.	3	inf1.2.3.4
9.	explain the importance of uninstalling software.	3	inf1.2.3.5
10.	**evaluate** software critically.	4	inf1.2.4.1
11.	**make** recommendations based on the evaluation.	4	inf1.2.4.2

SUB STRAND 1.3: GRAPHICS

Key Learning Outcome (Inf1.3):
Students are able to display understanding of processing hardware by selecting and using an appropriate graphics card for a particular graphics processing task.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *graphics card*.	1	inf1.3.1.1
2.	**define** *animated object*.	1	inf1.3.1.2
3.	**describe** the features of graphics card for a particular graphics processing task.	2	inf1.3.2.1
4.	**describe an** appropriate graphics software, or an appropriate programming language, to design an animated object.	2	inf1.3.2.2
5.	**describe an** appropriate graphics software, or an appropriate programming language, to develop an animated object.	2	inf1.3.2.3
6.	**describe** how graphics software is used, to process either photos, or computer artwork, or scanned pictures.	2	inf1.3.2.4
7.	**describe** an appropriate graphics software, or an appropriate programming language, to implement an animated object.	2	inf1.3.2.5
8.	**create** and process graphic file using one advance feature.	2	inf1.3.2.6
9.	**create** and process graphic file using advance features.	2	inf1.3.2.7
10.	**explain** how an appropriate graphics card is used for a particular graphics processing task.	3	inf1.3.3.1

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
11.	**explain** how an appropriate graphics software, or an appropriate programming language, to design, develop, and implement an animated object.	3	inf1.3.3.2
12.	**use** appropriate graphics software, or an appropriate programming language to design an animated object.	3	inf1.3.3.3
13.	**use** appropriate graphics software, or an appropriate programming language to develop an animated object.	3	inf1.3.3.4
14.	**explain** how graphics software is used, to process either photos, or computer artwork, or scanned pictures, using advanced features of the software.	3	inf1.3.3.5
15.	**select** an appropriate graphics card for a particular graphics processing task.	4	inf1.3.4.1
16.	**use** appropriate graphics software, or an appropriate programming language, to implement an animated object.	4	inf1.3.4.2
17.	**use** graphics software, to process either photos, or computer artwork, or scanned pictures, using advanced features of the software.	4	inf1.3.4.3

SUB STRAND 1.4: VIDEO

Key Learning Outcome (Inf1.4):

Students are able to display understanding by selecting and using appropriate video peripherals for a particular function.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** the term *video peripherals.*	1	inf1.4.1.1
2.	**identify** at least one video peripherals.	1	inf1.4.1.2
3.	**name** appropriate video peripherals for a particular function	1	inf1.4.1.3
4.	**identify** at least one video processing software.	1	inf1.4.1.4
5.	**provide** evidence of competence by using video processing software, to process video files.	2	inf1.4.2.1
6.	**create** and process video file using one advanced feature.	2	inf1.4.2.2
7.	**create** and process video file using advance features.	2	inf1.4.2.3
8.	**explain** how an appropriate video peripheral is used for a particular function.	3	inf1.4.3.1
9.	**provide** evidence of competence by using video processing software, to process video files using advanced features of the software	3	inf1.4.3.2
10.	**explain** how a video processing software, is used to process video files using advanced features of the software.	3	inf1.4.3.3
11.	**select** appropriate video peripherals for a particular function and discuss the basis for selection.	4	inf1.4.4.1
12.	**use** video processing software, to process video files using advanced features of the software.	4	inf1.4.4.2

SUB STRAND 1.5: AUDIO

Key Learning Outcome (Inf1.5):
Students are able to display understanding by selecting and using appropriate audio peripherals for a particular function.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** the term *audio peripherals.*	1	inf1.5.1.1
2.	**identify** at least one audio peripherals.	1	inf1.5.1.2
3.	**identify** at least one audio software.	1	inf1.5.1.3
4.	**describe** how to select appropriate audio peripherals for a particular function.	2	inf1.5.2.1
5.	**describe** how to use audio processing software, to process audio files.	2	inf1.5.2.2
6.	**create** and process an audio file using one advanced feature.	2	inf1.5.2.3
7.	**create** and process an audio file using advanced features.	2	inf1.5.2.4
8.	**select** appropriate audio peripherals for a particular function.	3	inf1.5.3.1
9.	**use** audio processing software, to process audio files.	3	inf1.5.3.2
10.	**explain** how to use audio processing software, to process audio files using advanced features of the software.	3	inf1.5.3.3
11.	**select** appropriate audio peripherals for a particular function and discuss the basis for selection.	4	inf1.5.4.1

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
12.	**use** audio processing software, to process audio files using advanced features of the software.	4	inf1.5.4.2

SUB STRAND 1.6: INTEGRATED MEDIA OUTPUT

Key Learning Outcome (Inf1.6):
Students are able to provide evidence of competence by integrating two or more of graphic, video, or audio files to create a combined media output.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**integrate** two of graphic, video, or audio files to create a combined media output.	2	inf1.6.2.1
2.	**integrate** three of graphic, video, or audio files to create a combined media output.	3	inf1.6.3.1
3.	**integrate** four or more of graphic, video, or audio files to create a combined media output.	4	inf1.6.4.1
4.	**process** media files with two or more features and run the output media.	4	inf1.6.4.2

STRAND 2: Ethics of ICT, Environmental Issues, Climate Change, Safe Practices

Major Learning Outcome (Inf2):
Students are able to discuss the following concepts as they relate to ICT: piracy, security, copyright, longevity of electronic information storage, and intellectual property: Discuss in depth the environmental problems generated by the technology; Employ established best practices when interacting with technology to demonstrate understanding of ICT safety issues.

SUB STRAND 2.1: PIRACY

Key Learning Outcome (Inf2.1):
Students are able to discuss piracy as they relate to ICT.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** the term *piracy.*	1	inf2.1.1.1
2.	**identify** the two ethical components of piracy.	1	inf2.1.1.2
3.	**describe** piracy.	2	inf2.1.2.1
4.	**describe** the laws relating to piracy.	2	inf2.1.2.2
5.	**explain** the impact of piracy.	3	inf2.1.3.1
6.	**discuss** analytically the ethical issues that piracy creates using examples.	4	inf2.1.4.1

SUB STRAND 2.2: SECURITY

Key Learning Outcome (Inf2.2):
Students are able to discuss security as they relate to ICT.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *computer virus*.	1	inf2.2.1.1
2.	**define** *computer worm.*	1	inf2.2.1.2
3.	**list** the different types of computer security.	1	inf2.2.1.3
4.	**describe** threats posed by computer criminals including employees.	2	inf2.2.2.1
5.	**describe** threats posed by computer criminals including hackers, crackers.	2	inf2.2.2.2
6.	**describe** threats posed by computer criminals including organized crime and terrorists.	2	inf2.2.2.3
7.	**describe** the features of computer crimes involving creation of viruses.	2	inf2.2.2.4
8.	**describe** the features of computer crimes involving creation of worms.	2	inf2.2.2.5
9.	**explain** threats posed by computer criminals including employees, hackers, crackers, organized crime, and terrorists.	3	inf2.2.3.1
10.	**explain** the impact of creation of viruses.	3	inf2.2.3.2
11.	**explain** the impact of creation of worms.	3	inf2.2.3.3
12.	**explain** in detail ways to ensure computer security.	3	inf2.2.3.4
13.	**discuss** the interrelationships between creation of viruses and creation of worms and the combined impact of the two on the necessity of computer security.	4	inf2.2.4.1

SUB STRAND 2.3: PRIVACY

Key Learning Outcome (Inf2.3):
Students are able to discuss privacy as they relate to ICT.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *privacy.*	1	inf2.3.1.1
2.	**define** *large databases.*	1	inf2.3.1.2
3.	**define** *private networks.*	1	inf2.3.1.3
4.	**describe** features of large databases.	2	inf2.3.2.1
5.	**describe** features of private networks.	2	inf2.3.2.2
6.	**describe** features of the internet.	2	inf2.3.2.3
7.	**describe** the primary issues of privacy	2	inf2.3.2.4
8.	**explain** the impact of large databases on privacy.	3	inf2.3.3.1
9.	**explain** the impact of private networks on privacy.	3	inf2.3.3.2
10.	**explain** the impact of internet on privacy.	3	inf2.3.3.3
11.	**explain** the effects of privacy on accuracy.	3	inf2.3.3.4
12.	**explain** the effects of privacy on property.	3	inf2.3.3.5
13.	**explain** the effects of privacy on access.	3	inf2.3.3.6
14.	**discuss** the impact of privacy on accuracy, property and access using specific examples.	4	inf2.3.4.1

SUB STRAND 2.4: COPYRIGHT & INTELLECTUAL PROPERTY

Key Learning Outcome (Inf2.4):

Students are able to discuss copyright as they relate to ICT and challenges that ICT has created for owners of intellectual property..

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *copyright.*	1	inf2.4.1.1
2.	**define** *copyright laws.*	1	inf2.4.1.2
3.	**define** *plagiarism.*	1	inf2.4.1.3
4.	**define** *digital rights.*	1	inf2.4.1.4
5.	**define** *Intellectual Property*.	1	inf2.4.1.5
6.	**identify** plagiarism, including digital rights.	2	inf2.4.2.1
7.	**describe** ways to protect copyright laws.	2	inf2.4.2.2
8.	**describe** Intellectual Property.	2	inf2.4.2.3
9.	**describe** the process of ownership of Intellectual Property.	2	inf2.4.2.4
10.	**outline** some measures that have been taken in the ICT field to protect ownership of intellectual property.	2	inf2.4.2.5
11.	**describe** computer ethics including copyright laws and plagiarism.	2	inf2.4.2.6
12.	**explain** the challenges that ICT has created for owners of Intellectual Property.	3	inf2.4.3.1
13.	**explain** computer ethics including copyright laws and plagiarism.	3	inf2.4.3.2
14.	**discuss the** rights of the owner of Intellectual Property and how these rights are challenged and resolved by ICT and intellectual property laws.	4	inf2.4.4.1
15.	**discuss** computer ethics including copyright laws and plagiarism.	4	inf2.4.4.2

SUB STRAND 2.5: LONGEVITY OF INFORMATION HELD IN ELECTRONIC FORM

Key Learning Outcome (Inf2.5):
Students are able to discuss the implication of long term storage of electronic data.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *long term storage*.	1	inf2.5.1.1
2.	**define** *on-line identity*.	1	inf2.5.1.2
3.	**describe** how electronic data can be stored for many years.	2	inf2.5.2.1
4.	**describe** the process of long term storage of personal information.	2	inf2.5.2.2
5.	**explain** the implications of long term storage of personal information.	3	inf2.5.3.2
6.	**discuss** in depth the implications of long term storage of personal information	4	inf2.5.4.1
7.	**discuss** analytically the implications of having an on-line identity in a social media context	4	inf2.5.4.2

SUB STRAND 2.6: E WASTE

Key Learning Outcome (Inf2.6):
Students are able to demonstrate understanding of the way ICT is impacting the environment through e-waste.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *e-waste.*	1	inf2.6.1.1
2.	**identify** ways of disposing e-waste.	1	inf2.6.1.2
3.	**describe** the physical waste problem that computers create.	2	inf2.6.2.1
4.	**list** ways of disposing computer waste.	2	inf2.6.2.2
5.	**describe** dumping in landfill as a method of disposing of e-waste.	2	inf2.6.2.3
6.	**describe** freighting to third world ports for partial recycling followed by dumping as a method of disposing of e-waste.	2	inf2.6.2.4
7.	**describe** recycling as a method of disposing of e-waste.	2	inf2.6.2.5
8.	**describe** ways technology could be used to reduce the problems associated with e-waste.	2	inf2.6.2.6
9.	**describe** mineral extraction as a method of disposing of e-waste.	2	inf2.6.2.7
10.	**explain** the effect on the environment of dumping in landfill.	3	inf2.6.3.1
11.	**explain** the effect on the environment of freighting to third world ports for partial recycling followed by dumping as a method of disposing of e-waste.	3	inf2.6.3.2
12.	**explain** the effects of dumping in landfill as a method of disposing of e-waste.	3	inf2.6.3.3
13.	**explain** the effect on the environment of dumping in landfill.	3	inf2.6.3.4

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
14.	**explain** how freighting to third world ports for partial recycling followed by dumping as a method of disposing of e-waste.	3	inf2.6.3.5
15.	**explain** the effect on the environment of recycling as a method of disposing of e-waste.	3	inf2.6.3.6
16.	**explain** the effect on the environment of mineral extraction as a method of disposing of e-waste.	3	inf2.6.3.7
17.	**explain** ways technology could be used to reduce the problems associated with e-waste.	3	inf2.6.3.8
18.	**discuss** the impacts of the various ways of disposing of e-waste on the environment and the economy in a country using examples.	4	inf2.6.4.1
19.	**evaluate** the different methods of disposing e-waste to decide on which is the best method in a stated context.	4	inf2.6.4.2

SUB STRAND 2.7: RAW MATERIALS & SUSTAINABILITY

Key Learning Outcome (Inf2.7):

Students are able to demonstrate understanding of the way ICT is impacting the environment specifically on raw materials; discuss ways an environmentally sustainable ICT industry could be developed and discuss connections between climate change and ICT.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	describe the electrical power requirements of common ICT equipment.	2	inf2.7.2.1
2.	describe options for reducing electricity usage by common ICT equipment.	2	inf2.7.2.2
3.	list the raw materials consumed in the manufacture of ICT equipment.	2	inf2.7.2.3
4.	describe ways computer materials can be recycled.	2	inf2.7.2.4
5.	describe ways to implement ICT solutions that are sustainable and not just fashionable.	2	inf2.7.2.5
6.	describe ways an environmentally sustainable ICT industry could be developed.	2	inf2.7.2.6
7.	explain why ICT equipment is a significant consumer of electricity.	3	inf2.7.3.1
8.	explain the effects of the extraction raw materials consumed in the manufacture of ICT equipment on the environment.	3	inf2.7.3.2
9.	explain the effects of recycling of computer materials on costs and the environment.	3	inf2.7.3.3
10.	explain the effect of implementing ICT solutions that are sustainable and not just fashionable.	3	inf2.7.3.4
11.	explain the connection between climate change and ICT and how this is impacted by E-waste.	3	inf2.7.3.5
12.	explain the connection between climate change and ICT and how this is impacted by electric power requirements.	3	inf2.7.3.6
13.	explain the connection between climate change and ICT and how this is impacted by raw material consumption.	3	inf2.7.3.7

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
14.	explain the connection between climate change and ICT and how this is impacted by sustainability.	3	inf2.7.3.8
15.	explain how increased demand for electricity affects the environment.	4	inf2.7.4.1
16.	discuss options for reducing electricity usage by common ICT equipment.	4	inf2.7.4.2
17.	report research findings on ways computer materials can be recycled and the impact of these on costs and environment.	4	inf2.7.4.3
18.	discuss the sustainability of the ICT industry in terms of ways to implement ICT solutions that are sustainable and not just fashionable and the necessary laws that need to link up to the sustainability of the ICT industry.	4	inf2.7.4.4
19.	discuss the interrelationships between climate change and ICT in terms of extraction and consumption of raw materials for ICT, the power consumption of ICT equipment and sustainability of the ICT industry.	4	inf2.7.4.5

SUB STRAND 2.8: HEALTH

Key Learning Outcome (Inf2.8):
Students are able to demonstrate understanding of health issues related to using ICT equipment.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**outline** the health issues that are directly related to using ICT equipment	2	inf2.8.2.1
2.	**describe** best operating practices when interacting with technology.	2	inf2.8.2.2
3.	**explain** the impacts of health issues that are directly related to using ICT equipment	3	inf2.8.3.1
4.	**discuss** the health issues that are directly related to using ICT equipment and how best to mitigate these health issues using specific examples.	4	inf2.8.4.1

SUB STRAND 2.9: IDENTITY THEFT

Key Learning Outcome (Inf2.9):
Students are able to demonstrate understanding of the implications of identity theft.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *phishing.*	1	inf2.9.1.1

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
2.	**define** *identity theft*.	1	inf2.9.1.2
3.	**state** the types of phishing techniques.	1	inf2.9.1.3
4.	**identify** ways to protect users from identity theft.	1	inf2.9.1.4
5.	**describe** how phishing works.	2	inf2.9.2.1
6.	**explain** the serious implications of identity theft.	3	inf2.9.3.1
7.	**differentiate** two or more phishing techniques.	3	inf2.9.3.2
8.	**discuss** the impacts of phishing and identity theft in the use of ICT in the work place using examples.	4	inf2.9.4.1

SUB STRAND 2.10: PHYSICAL SECURITY

Key Learning Outcome (Inf2.10):

Students are able to demonstrate understanding of the importance of physically protecting ICT equipment.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *encryption.*	1	inf2.10.1.1
2.	**define** *biometric security.*	1	inf2.10.1.2
3.	**identify** the most common measures of physical security used in any organisation.	1	inf2.10.1.3
4.	**describe** the theoretical component of physical security to prevent theft of hardware.	2	inf2.10.2.1
5.	**describe** the process of encryption of hard drives	2	inf2.10.2.2
6.	**describe** the use of biometric security measures.	2	inf2.10.2.3
7.	**describe** the most common measures of physical security used in any organisation.	2	inf2.10.2.4
8.	**explain** the necessity of physical security to prevent theft of hardware.	3	inf2.10.3.1
9.	**explain the necessity of** encryption of hard drives.	3	inf2.10.3.2
10.	**discuss** the impacts of threats that are associated with the physical security of ICT hardware and the corresponding measures that are taken by work places	4	inf2.10.4.1

STRAND 3: Programming

Major Learning Outcome (Inf3):

Students are able to demonstrate understanding of programming through the use of appropriate programme languages.

SUB STRAND 3.1: DESIGN

Key Learning Outcome (Inf3.1):

Students are able to demonstrate competency in using design tools to create a program.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *programming.*	1	inf3.1.1.1
2.	**define** *program.*	1	inf3.1.1.2
3.	**define** *software.*	1	inf3.1.1.3
4.	**list** the six steps of programming.	1	inf3.1.1.4
5.	**use** one simple variable in the solution.	1	inf3.1.1.5
6.	**use** simple variables in the solution.	1	inf3.1.1.6
7.	**use** one modular coding practice.	1	inf3.1.1.7
8.	**use** one simple indexed data structures.	1	inf3.1.1.8
9.	**use** simple indexed data structures.	1	inf3.1.1.9
10.	**list** the six steps of programming.	2	inf3.1.2.1
11.	**describe** the six steps of programming.	2	inf3.1.2.2
12.	**describe** the features of top-down design tools.	2	inf3.1.2.3
13.	**describe** the features of pseudocode design tools.	2	inf3.1.2.4
14.	**describe** the features of flowcharts design tools.	2	inf3.1.2.5
15.	**describe** the features of logic structure design tools.	2	inf3.1.2.6
16.	**describe** the problem to be solved in plain language.	2	inf3.1.2.7
17.	**use** simple conventions in pseudocode, or plain English, or flowchart in the document.	2	inf3.1.2.8
18.	**explain how** top-down design tools assist in programming.	3	inf3.1.3.1
19.	**explain how** pseudocode design tools assist in programming.	3	inf3.1.3.2
20.	**explain** how flowcharts design tools assist in programming.	3	inf3.1.3.3
21.	**explain** how logic structure design tools assist in programming.	3	inf3.1.3.4
22.	**design** a simple computer program.	3	inf3.1.3.5
23.	**use** recognised conventions in pseudocode, or plain English, or flowchart in the document.	3	inf3.1.3.6
24.	**design** a computer program using one or a combination of design tools.	4	inf3.1.4.1
25.	**discuss** the impact of using one or a combination of design tools on programming using specific examples.	4	inf3.1.4.2
26.	**develop** a document that fully describes the logic of the solution using either pseudocode, or plain English, or a flowchart or a combination of two or more that uses recognised conventions.	4	inf3.1.4.3
27.	**test** the code manually to show that it is working accurately and discuss the testing process.	4	inf3.1.4.4

SUB STRAND 3.2: CODING & TESTING

Key Learning Outcome (Inf3.2):

Students are able to demonstrate competency in coding, using a programming language, by constructing and testing a solution to a complex problem using established coding practices.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *debugging*	1	inf3.2.1.1
2.	**define** *testing.*	1	inf3.2.1.2
3.	**use** one variable in the solution.	1	inf3.2.1.3
4.	**use** simple variables in the solution.	1	inf3.2.1.4
5.	**use** one indexed data structure	1	inf3.2.1.5
6.	**use** simple indexed data structures.	1	inf3.2.1.6
7.	**use** simple modular coding practices.	1	inf3.2.1.7
8.	**use** indexed data structures.	2	inf3.2.2.1
9.	**use** modular coding practices	2	inf3.2.2.2
10.	**describe** how to test the program.	2	inf3.2.2.3
11.	**identify** errors/bugs in the program.	2	inf3.2.2.4
12.	**test** simple program.	2	inf3.2.2.5
13.	**use** variables in the solution.	3	inf3.2.3.1
14.	**apply** modular coding practices in a program.	3	inf3.2.3.2
15.	**apply** indexed data structures in a program.	3	inf3.2.3.3
16.	**set** out the code so each major section is differentiated.	3	inf3.2.3.4
17.	**write** detailed comments in the code to explain the purpose of each section of code.	3	inf3.2.3.5
18.	**test** the program.	3	inf3.2.3.6
19.	**debug** a simple program.	3	inf3.2.3.7
20.	**design** and develop a program using a coding system with clearly differentiated sections.	4	inf3.2.4.1
21.	**test** a more complex program using systematic testing.	4	inf3.2.4.2

STRAND 4: Website Design and Development

Major Learning Outcome (Inf4):

Students are able to demonstrate understanding of internet connectivity by designing, developing and testing a website which incorporates data from a purpose built database.

SUB STRAND 4.1: DESIGN

Key Learning Outcome (Inf4.1):

Students are able to demonstrate understanding of graphic and website design principles

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** the term 'website'.	1	inf4.1.1.1
2.	**list** the elements of good graphic design.	2	inf4.1.2.1
3.	**outline** the principles of good website design.	2	inf4.1.2.2
4.	**describe** the interaction processes between a website and its purpose built database.	2	inf4.1.2.3
5.	**explain** the importance of a good website design.	3	inf4.1.3.1
6.	**explain** the interaction processes between a website and its purpose built database.	3	inf4.1.3.2

SUB STRAND 4.2: DEVELOPMENT

Key Learning Outcome (Inf4.2):

Students are able to demonstrate understanding and skill in developing a website which incorporates data from a purpose built database.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**create** simple media files (graphics, video, audio) for the website.	1	inf4.2.1.1
2.	**describe** how to use a text editor to write the code for one CSS file which controls the design of the website.	2	inf4.2.2.1
3.	**describe** how to create a database to be used in conjunction with the website.	2	inf4.2.2.2
4.	**enter** data into the database	2	inf4.2.2.3
5.	**write** simple HTML code for a three page website.	2	inf4.2.2.4
6.	**create** a database to be used in conjunction with the website.	2	inf4.2.2.5
7.	**create** original media files (graphics, video, audio) for the website.	3	inf4.2.3.1
8.	**use** a text editor to write the code for one CSS file which controls the design of the website.	3	inf4.2.3.2
9.	**create** a database to be used in conjunction with the website.	3	inf4.2.3.3

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
10.	**write** conventionally correct HTML code for a three page website.	3	inf4.2.3.4
11.	**use** a text editor to write the code for an CSS file which controls the design of the website.	4	inf4.2.4.1
12.	**using** a text editor write conventionally correct HTML code for a three page website.	4	inf4.2.4.2

SUB STRAND 4.3: TESTING

Key Learning Outcome (Inf4.3):
Students are able to demonstrate understanding and skill in testing a created website which incorporates data from a purpose built database.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**test** all links in a website	1	inf4.3.1.1
2.	**describe** how to test all links.	2	inf4.3.2.1
3.	**describe** how to test the database if it is returning correct information to the website.	2	inf4.3.2.2
4.	**describe** how to validate HTML and CSS code.	2	inf4.3.2.3
5.	**test** the database is returning correct information to the website.	2	inf4.3.2.4
6.	**validate** simple HTML and CSS code.	2	inf4.3.2.5
7.	**test** the database is returning correct information to the website.	3	inf4.3.3.1
8.	**validate** HTML and CSS code	3	inf4.3.3.2
9.	**test** the database is returning correct information to the website.	4	inf4.3.4.2
10.	**validate** complex HTML and CSS code.	4	inf4.3.4.3

STRAND 5: Microprocessor Control

Major Learning Outcome (Inf5):

Students are able to show understanding of the principles of control by programming a microprocessor to sense, measure, record and respond to a parameter of the physical environment.

SUB STRAND 5.1: MICROPROCESSOR HARDWARE

Key Learning Outcome (Inf5.1):

Students are able to demonstrate understanding of the components of a microprocessor.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *microprocessor.*	1	inf5.1.1.1
2.	**identify** features of a microprocessor.	1	inf5.1.1.2
3.	**describe** the operation of a microprocessor in terms of input, processing, storage, and output.	2	inf5.1.2.1
4.	**describe** the interaction between processing and storage in the microprocessor.	2	inf5.1.2.2
5.	**explain** the interaction between processing and storage in the microprocessor.	2	inf5.1.2.3
6.	**describe** why hardware will only function usefully when software controls the processing.	3	inf5.1.3.1
7.	**explain** why hardware will only function usefully when software controls the processing.	3	inf5.1.3.2

SUB STRAND 5.2: SOFTWARE CREATION

Key Learning Outcome (Inf5.2) - Software creation:

Students are able to demonstrate understanding of writing a high level program.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *machine code*.	1	inf5.2.1.1
2.	**define** *programming language.*	1	inf5.2.1.2
3.	**name** some programming languages.	1	inf5.2.1.3
4.	**identify** features of a machine code.	1	inf5.2.1.4
5.	**describe** the relationship between a programming language and a machine code.	1	inf5.2.1.5
6.	**describe** how a program written in a high level language is changed into machine code.	1	inf5.2.1.6
7.	**describe** machine code.	2	inf5.2.2.3
8.	**write** a simple program to make the microprocessor measure a physical parameter.	2	inf5.2.2.4
9.	**write** additional codes that will make the microprocessor record measurements of a physical parameter over time.	2	inf5.2.2.5
10.	**develop** a simple process that will allow the graphical display of recorded measurements as a function of time.	2	inf5.2.2.6
11.	**write** a simple program that responds with an output when a critical change in the physical environment is detected.	2	inf5.2.2.7

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
12.	**explain** the relationship between a programming language and a machine code.	3	inf5.2.3.1
13.	**explain** how a program written in a high level language is changed into machine code.	3	inf5.2.3.2
14.	**write** a high level program to make the microprocessor measure a physical parameter	3	inf5.2.3.3
15.	**write** additional code that will make the microprocessor record measurements of a physical parameter over a period of time.	3	inf5.2.3.4
16.	**develop** a process that will allow graphical display of recorded measurements as a function of time.	3	inf5.2.3.5
17.	**write** a program that responds with an output when a critical change in the physical environment is detected	3	inf5.2.3.6
18.	**explain** how a program written in a high level language is changed into machine code	4	inf5.2.4.1
19.	**develop** a complex process that will allow graphical display of recorded measurements as a function of time.	4	inf5.2.4.2
20.	**write** a complex high level program to make the microprocessor measure a physical parameter.	4	inf5.2.4.3
21.	**write** further code that will make the microprocessor record measurements of a physical parameter over a period of time.	4	inf5.2.4.4
22.	**write** a high level program that responds with an output when a critical change in the physical environment is detected.	4	inf5.2.4.5
23.	**discuss** how a program written in a high level language is changed into machine code.	4	inf5.2.4.6

SUB STRAND 5.3: EMBEDDED MICROPROCESSORS

Key Learning Outcome (Inf5.3):

Students are able to demonstrate understanding of how a microprocessor will respond when a critical change in the physical environment has occurred.

Specific Learning Outcomes (SLO):

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
1.	**define** *dedicated microprocessor.*	1	inf5.3.1.1
2.	**identify** *features of a dedicated microprocessor.*	1	inf5.3.1.2
3.	**describe** situations where a dedicated microprocessor is built into a manufactured product.	2	inf5.3.2.1
4.	**describe** why it is important that the software that drives the embedded microprocessor is error free.	2	inf5.3.2.2
5.	**describe** how an embedded microprocessor can detect a change in its environment.	2	inf5.3.2.3
6.	**describe** why an embedded microprocessor should be programmed to respond when a critical change in its environment occurs.	2	inf5.3.2.4
7.	**describe** a suitable output response from a microprocessor when a critical change has occurred in its environment.	2	inf5.3.2.5
8.	**explain** why it is important that the software that drives the embedded microprocessor is error free.	3	inf5.3.3.1

SLO #	Specific Learning Outcomes (SLO): *Students are able to*	SKILL LEVEL	SLO CODE
9.	**explain** how an embedded microprocessor can detect a change in its environment.	3	inf5.3.3.2
10.	**explain** why an embedded microprocessor should be programmed to respond when a critical change in its environment occurs.	3	inf5.3.3.3
11.	**discuss** why it is important that the software that drives the embedded microprocessor is error free.	4	inf5.3.4.1
12.	**discuss** how an embedded microprocessor can detect a change in its environment.	4	inf5.3.4.2
13.	**discuss** why an embedded microprocessor should be programmed to respond when a critical change in its environment occurs.	4	inf5.3.4.3

ASSESSMENT

The assessment of the prescription is in two parts (external and internal assessment).

1. External assessment (EA): 60%
2. Internal assessment (IA): 40%

The principal, or principal's nominee, will certify that the prescription requirements have been fulfilled.

Suggested Teaching Times and Weightings

	OUTCOMES	EXTERNAL / INTERNAL	SUGGESTED TIME	WEIGHTING
1	Open Source and Proprietary Software and Media	External Internal	4 weeks 2 weeks	9% 10%
2	Ethics of ICT, Environmental Practice & Safe Practice in ICT	External	5 weeks	15%
3	Programming Programming Project	External Internal	5 weeks 2 weeks	12% 10%
4	Website Design and Development Website Development Project	External Internal	5 weeks 2 weeks	12% 10%
5	Microprocessor Control	External Internal	5 weeks 2 weeks	12% 10%
	Total		**32 weeks**	**100%**

Assessment Blueprint

Strand	Assessment Type	SKILL LEVEL/ SCORE				Weight
		1	2	3	4	
1. Open Source and Proprietary Software and Media	EA					**9**
	IA					**10**
2. Ethics of ICT, Environmental Practice & Safe Practice in ICT	EA					**15**
3. Programming	EA					**12**
	IA					**10**
4. Website Design and Development	EA					**12**
	IA					**10**
5. Microprocessor Control	EA					**12**
	IA					**10**
Total number of items		**20**	**15**	**10**	**5**	
Total skill score		**20**	**30**	**30**	**20**	**100**

External Assessment (60%)

This prescription will be examined by **a three hour** written paper. The weightings given to each topic within the examination will be approximately:

OUTCOMES	WEIGHTING
Open Source and Proprietary Software & Media production	9
Ethics of ICT, environmental practice & safe practice in ICT	15
Programming	12
Website Design and Development	12
Microprocessor Control	12
Total	**60%**

Candidates may be required to apply knowledge, understanding and acquired skills to unfamiliar situations.

Internal Assessment (40%)

There are four tasks that make up the internal assessment component. They are practical components in ICT that require a demonstrated skill or a synthesised output.

PRACTICAL COMPONENT OF ICT	WEIGHTING
1. Media Production	10%
2. Programming	10%
3. Website Development	10%
4. Microprocessor Control	10%
Total	**40**

All tasks are to be design by the teacher (TDT) and are to assess the specified learning outcomes (SLO) indicated in the marking criteria. The internal components address the following skills:

TASK 1 (10%) Instructions

STRAND 1: OPEN SOURCE AND PROPRIETARY SOFTWARE & MEDIA PRODUCTION

Students will

a. create original media files (graphics, video, audio);
b. process the files;
c. output a final file that integrates two or more media into a final product.

TASK 2 (10%) Instructions

STRAND 3: PROGRAMMING

Students will:

a. design a computer program;
b. express the logic of the program using pseudocode, or plain English, or a flowchart;
c. code the program using current practices
    - Modular
    - Using decisions and loops
    - Avoiding any type of GoTo statement
d. test the code to show that it is working accurately;
e. document all the stages of the task.

TASK 3 (10%) Instructions

STRAND 4: WEBSITE DESIGN AND DEVELOPMENT

Students will:

a. test that all links work;
b. test that the database is returning correct information when interrogated by the website;
c. validate all HTML and CSS code;

TASK 4 (10%) Instructions

STRAND 4: MICROPROCESSOR CONTROL

Students will:

a. write a high level code to manipulate a microprocessor as per requirements;
b. test the code to show that it is working accurate

APPENDICES

Appendix 1: Assessment Schedule – IA Task 1: Media

	SLO	SKILL LEVEL	EVIDENCE	STUDENT RESPONSE LEVEL			
				Level 1	Level 2	Level 3	Level 4
A2a	inf1.3.2.6	2	A graphic file created and processed using one advanced feature.	Graphic created but not processed.	A graphic file created and processed using one advanced feature.		
A2b	inf1.3.2.7	2	Second graphic file created and processed using another different advanced feature.	Graphic created but not processed.	Second graphic file created and processed using another advanced feature.		
A2c	inf1.4.2.2	2	one video file created and processed using one advanced feature.	Video created but not processed.	One video file created and processed using one advanced feature.		
A2d	inf1.4.2.3	2	Second video file created and processed using another different advanced feature.	Video created but not processed.	Second video file created and processed using another advanced feature.		
A2e	inf1.5.2.3	2	one audio file created and processed using one advanced feature.	Audio created but not processed.	One audio file created and processed using one advanced feature.		
A2f	inf1.5.2.4	2	second audio file created and processed using another different advanced feature.	Audio created but not processed.	Second audio file created and processed using another different advanced feature.		
A2g	inf1.6.2.1	2	two or more files created and combined into a media output.	Two files created but not combined.	Two or more files created and combined into a media output.		
A2h	inf1.6.4.2	4	each of the combined file shows evidence of processing with at least two advanced features.	Each of the combined file shows evidence of processing without any advanced features.	Each of the combined file shows evidence of processing with only one advanced feature.	Each of the combined file shows evidence of processing with only one advanced features and run for more than 3 minutes.	Each of the combined file shows evidence of processing with at least two advanced features and run for more than 3 minutes.

Appendix 2: Assessment Schedule - IA Task 2: Programming

	SLO	SKILL LEVEL	EVIDENCE	STUDENT RESPONSE LEVEL			
				Level 1	**Level 2**	**Level 3**	**Level 4**
C1a	inf3.1.4.3	4	Document fully and clearly describes the logic of the solution using either pseudocode, or plain English, or a flowchart.	Document does not describe the logic of the solution.	Document describes the logic of the solution, but does not use using either pseudocode, or plain English, or a flowchart.	Document adequately describes the logic of the solution.	Document fully and clearly describes the logic of the solution.
C1b	inf3.2.1.3	1	One variable used in the development of the programme.	One variable used in the development of the programme.			
C1c	inf3.2.1.4	1	Another or more variables used in the development of the programme.	Another or more variables used in the development of the programme.			
C1d	inf3.2.1.7	1	Modules used.	Modules used.			
C1e	inf3.2.1.6	1	One indexed data structure used.	One indexed data structure used			
C1f	inf3.2.1.5	1	Another/ more data structures used.	Another/ more data structures used			
C1g	inf3.2.2.5	2	Program runs and produces an output.	Program runs but no correct output.	Program runs and produces an output.		
C1h	inf3.2.4.2	4	The program systematically tested.	Program runs but with no output.	Program runs with wrong output.	Program runs with a correct output.	Program runs and produces the required output.

Appendix 3: Assessment Schedule – Internal assessment Task 3: Website Development

#	SLO	SKILL LEVEL	EVIDENCE	STUDENT RESPONSE LEVEL			
				Level 1	Level 2	Level 3	Level 4
D1a	inf4.2.1.1	1	More than 1 original media file created.	More than 1 original media file created.			
D1b	inf4.2.3.2	3	Text editor used to create a properly formatted CSS file with comments, which interacts completely successfully with all of the HTML pages.	Text editor used to create a CSS file which interacts with at least one of the HTML pages.	Text editor used to create a properly formatted CSS file which interacts successfully with at least one of the HTML pages.	Text editor used to create a properly formatted CSS file with comments, which interacts completely and successfully with all of the HTML pages.	
D1c	inf4.2.2.5	2	Database file exists with multiple fields.	File exists, but it is not a database (or equivalent) file.	Database file exists with multiple fields.		
D1d	inf4.2.2.3	2	Logically consistent data exists in more than one field.	Data exists in one field only.	Logically consistent data exists in more than one field.		
D1e	inf4.2.3.4	3	Conventionally correct HTML code functions on all three pages.	HTML code does not function.	HTML code functions on all three pages.	Conventionally correct HTML code functions on all three pages.	
D1f	inf4.3.1.1	1	All links work.	All links work.			
D1g	inf4.3.2.4	2	Correct data consistently returned.	Correct data returned sometimes.	Correct data consistently returned.		
D1h	inf4.3.2.5	2	All four files validate correctly.	At least one of the four files validate correctly.	All four files validate correctly.		

Appendix 4: Assessment Schedule – IA Task 4: Microprocessor Control

#	SLO	SKILL LEVEL	EVIDENCE	STUDENT RESPONSE LEVEL			
				Level 1	Level 2	Level 3	Level 4
E1a	inf5.2.1.5	1	Clearly describes the relationship and gives one or more examples in detail.	Clearly describes the relationship and gives one or more examples in detail.			
E1b	inf5.2.1.6	1	Conversion process fully explained with one or more examples included.	Conversion process fully explained with one or more examples included.			
E1c	inf5.2.2.4	2	Program runs and gives an indication that it has correctly measured the physical parameter.	Program runs and does not give an indication that it has correctly measured the physical parameter.	Program runs and gives an indication that it has correctly measured the physical parameter.		
E1d	inf5.2.2.5	2	Program runs and records an accurate series of measurements over a period of time.	Program runs and does not record an accurate series of measurements over a period of time.	Program runs and records an accurate series of measurements over a period of time.		
E1e	inf5.2.2.6	2	Process functions and produces an accurate graph of the measurement as a function of time.	Process functions and produces a graphical display.	Process functions and produces an accurate graph of the measurement as a function of time.		
E1f	inf5.2.4.5	4	Program runs with a response and the critical change is accurately detected.	Program does not run due to errors.	Program runs without detectable response.	Program runs with detectable response.	Program runs with a response and the critical change is accurately detected.
E1g	inf5.2.2.7	2	Program runs with a response and the critical change is accurately detected.	Program does not run due to errors.	Program runs with a response and the critical change is accurately detected.		

Appendix 5: Verb taxonomy

<table>
<tr><th>BLOOMS TAXONOMY</th><th>SOLO TAXONOMY</th><th>SKILL LEVEL SCORE</th><th>SKILL LEVEL BAND</th><th>DESCRIPTORS</th></tr>
<tr><td rowspan="2">Knowledge</td><td>Unistructural
• students make simple and obvious connections between pieces of information</td><td>1</td><td rowspan="3">1</td><td rowspan="3">Mastery of the basic knowledge and skills that are fundamental for proficient work.</td></tr>
<tr><td rowspan="2">Comprehension</td><td>Multistructural
• a number of connections are made, but not the metaconnections between them</td><td>2</td></tr>
<tr><td rowspan="2">Application</td><td rowspan="2">Relational
• the students see the significance of how the various pieces of information relate to one another</td><td rowspan="2">3</td><td rowspan="2">2</td><td rowspan="2">Solid academic performance for the given learning outcome and competency over challenging subject matter including subject-matter knowledge, application of such knowledge to real world situations.</td></tr>
<tr><td>Synthesis, Analysis, Evaluation</td></tr>
<tr><td>Extended Abstract
• at this level students can make connections beyond the scope of the problem or question, to generalise or transfer learning into a new situation</td><td>4</td><td>3</td><td>Presumes mastery of both the Basic and Proficient levels and represents superior academic performance.</td></tr>
</table>

Note : the progression from *define* → *describe* → *explain* → *discuss* indicates *higher levels of understanding* as follows:

- **stating or defining** – statement of one idea or a definition
- **describe** – means to characterise, or give an account of, or outline features of or provide annotated diagrams.
- **explain** – means to provide a reason as to *how* or *why* something occurs, to link event and impact, cause and effect, event and a reason etc..
- **discuss** – this means *linking ideas* (descriptions, explanations) to show understanding.

***Appendix 6*:**

South Pacific Form Seven Certificate

IA Summary Form

INFORMATION AND COMMUNICATIONS TECHNOLOGY

Country: _____ ***School:*** _____

Task	Brief Description of tasks	Start Date	End Date	Weighting
1. Media Production				10%
2. Programming				10%
3. Website Development				10%
4. Microprocessor Control				10%
TOTAL				**40%**

Note: 1. Be specific about dates, not just Week 3 Term 1, etc.

2. Assessment schedules for the tasks are provided in the prescription. Teachers must use these.

Teacher's Name and Signature: ……

Principal's Name and Signature: ……

Appendix 7: Web Based Resources

1. http://csunplugged.org/ Computer Science resources which don't require a computer.

2. Free on line courses – many specialist subject areas http://ww2.openculture.com/computer_science_free_courses

3. HTML and CSS on line tutorials http://www.w3schools.com/

Appendix 8: Text Resources

1. **Year 12 Programming and Problem Solving**, Student Workbook in Python, Garner & Robins University of Otago
2. **The Non-Designer's Design Book**, Robin Williams. http://www.amazon.com/NonDesigners-Design-Book-Robin-Williams/dp/0321193857. This book covers the basics of good graphical page design.

ADVISORY SECTION

Integration with other studies

ICT is a large area of study in its own right. It is also a technology that is used extensively in non-technical ways. Students are encouraged to use their ICT skills to further their studies in other subjects. If another subject's requirements can be fulfilled while simultaneously completing the requirements of the ICT course, then students should be encouraged to pursue this integration process.

Resource CD

A CD containing resources for ICT is attached with this document. It includes freely available software, and freely available pdf documents.

1. Open Source and Proprietary Software

a. Where possible students should be able to locate and download reputable open source software.
b. Students should gain practical experience of using different applications which are designed to perform similar tasks so they can critically evaluate the software.

2. Media production

a. Students must create their own graphic, video, and audio files. Students must realise they cannot use other artists' music, video, or photo or picture files.
b. Animated .gif files can be created using Gimp.
c. Animated .gif files can be created from individual .gif files, using UnFREEZ.
d. Processing of the material must be at an advanced level. A professional output of at least 3 minutes duration is expected.

3. **Ethics of ICT, Environmental Practice, Safe Practice in ICT**

Phishing resource material is at http://en.wikipedia.org/wiki/Phishing
Encryption resource material can be found at
http://www.commoncriteriaportal.org/files/epfiles/st_vid3008-st.pdf

4. **Programming**

a. Any programming language may be used provided it allows indexed data structures.
b. Students are expected to use a suitable editor which gives a Command Line Interface (CLI) to create code.
c. The teacher may give any problem as their Internal Assessment task, to the students to solve, provided it is not trivial, and it allows the use of modular programming and at least one indexed data structure.
d. Students' coding is expected to follow accepted current practice.
    i. Modular
    ii. Use of loops
    iii. Use of decision structures
    iv. Use of variables
    v. Complete avoidance of Go To statements or equivalents.
e. Python3 is recommended as a language because it forces the use of good programming practice. See http://www.python.org/
f. Python has an extension, called Turtle, which allows for immediate visual feedback. To enhance engagement of the learner this type of approach is encouraged.
g. Python can be downloaded at http://www.python.org/
h. Python turtle can be downloaded at http://pythonturtle.org/
i. Students who wish to go a lot further with programming may be interested in Pygame. This can be investigated at http://www.pygame.org/download.shtml

5. Website Design and Development

a. Principles of good web page design are found in Robin William's book "The Non-Designer's Design Book". http://www.amazon.com/Non-Designers-Design-Book-Robin-Williams/dp/0321193857
b. The HTML and CSS code must be constructed using a text editor. This ensures students understand the significance of each line of code in HTML and CSS.
c. Suitable text editors are Notepad++, SciTE, and GNU Emacs. Other editors can be researched at http://sixrevisions.com/tools/12-excellent-free-texteditors-for-coders/
d. Suitable code validators can be found at http://www.w3schools.com/web/web_validate.asp

6. Microprocessor Control

a. An easy to program, readily available, and reasonably priced microprocessor is the Picaxe 08M2 chip. Other microprocessors include Arduino, and Raspberry Pi. There are more specialised microprocessors available. A web search will produce information about them.
b. The software needed to program the picaxe microprocessor can be downloaded at http://www.picaxe.com/Software/PICAXE/PICAXE-Programming-Editor/
c. To understand how a particular program behaves the simulation function of the software shows the state of each pin of the microprocessor.
d. A manual and extensive help files come with the editor. Look in the Help menu.
e. Environmental measurements may include light, temperature, noise, location, infra-red, and touch.
f. A microprocessor must produce an output to show that it has responded to a change in its environment.
g. Recorded data from the picaxe 08M2 can be exported to a spreadsheet, and then plotted as a graph.

7. Project work

a. Media
    i. Graphics can be photos or computer generated art work or scanned drawings. All graphical material must be original and created by the student. This ensures ethical practice.
    ii. Graphics can be processed in any software that has advanced features. The GIMP is recommended. It is available at www.gimp.org. Paint.NET is also recommended and is available at http://www.dotpdn.com/downloads/pdn.html with on-line tutorials at http://forums.getpaint.net/index.php?/forum/18-tutorials-publishingonly/
    iii. Many phones have photo and video cameras incorporated. These can be used to create original material.
    iv. Video can be processed using any video editing software. Windows Movie Maker is recommended and is included in Windows installations.
    v. All video must be original and created by the student.
    vi. Audio can be processed using audio editing software. *Audacity* is recommended. It is available at http://audacity.sourceforge.net/
    vii. All audio files must be original and created by the student.

b. Programming
    i. Students need to show good programming practice by:
        1. using a modular approach.
        2. including extensive comments in their code.
    ii. Students should test each module of code as they proceed in the creation of their program. Testing the code while it is being built is a much easier way to correct mistakes than leaving it all to the end.
    iii. A list is an example of an indexed data structure.

c. Website development
    i. PHP and MySQL are the desirable way to create a database that works with the website. PHP can be downloaded from http://www.php.net/

ii. A tutorial about PHP is at http://www.php.net/tut.php

iii. Students are not expected to set up a web server, but if they wish to do so then they should be encouraged to do it. The recommended way is to create a LAMP server. The students who attempt this will learn a great deal. A LAMP server for windows can be found at http://winlamp.sourceforge.net/

iv. MS Access can supply static information to a web page. See http://databases.about.com/od/tutorials/ss/accessweb.htm for more information. Using MS Access will satisfy the requirements of the prescription. A LAMP server will give a much better experience of current web technology.

The End