

Information Communication Technologies

Upper Secondary Syllabus



Papua New Guinea
Department of Education

Issued free to schools by the Department of Education

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Teachers, inspectors, tertiary educators and the have developed this syllabus through meetings, workshops and consultations.

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Secretary's message

This Information Communication Technologies Syllabus is to be used by teachers to teach Upper Secondary students (Grades 11 and 12) throughout Papua New Guinea. This syllabus builds upon concepts, skills and attitudes learnt in Lower Secondary and provide a sound foundation for further learning.

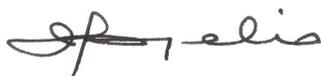
The Upper Secondary Information Communication Technologies Syllabus links to the National Education Plan's vision, which is that secondary education enables students to achieve their individual potential to lead productive lives as members of the local, national and international community.

This subject provides the opportunity for deeper understanding of the information technology and computing revolution, which will enable students to meet individual needs as well as local and global demands and challenges. Students with Information Communication Technologies knowledge and skills will be equipped to participate fully in the global world of the 21st century.

Secondary schools offering this syllabus are offering vital knowledge and skills training, which is relevant to and will support the achievement of the Government's development priorities.

Teachers play a leading role by being innovative and creative and keeping abreast of new information and technological innovation.

I commend and approve this syllabus as the official curriculum for Information Communication Technologies to be used in all schools with Grades 11 and 12 students throughout Papua New Guinea.



DR JOSEPH PAGELIO

Secretary for Education

Introduction

This syllabus is based on the curriculum principles from the National Curriculum Statement. It has been designed using learning outcomes that identify the knowledge, skills, attitudes and values that all students achieve or demonstrate by the end of Grade 12. It is linked to the national curriculum learning area Culture and Community and builds on the knowledge and skills students have learnt since elementary grades. This Information Communication Technologies Syllabus offers a number of pathways to post-secondary study and the workforce. It has specialised and general applications in both areas.

Lower Secondary Design and Technology	Lower Secondary Design and Technology	Upper Secondary Information Communication Technologies	Upper Secondary Information Communication Technologies
strands	units	strands	units
Planning Making Marketing Evaluating	Computing Computer Basics Word Processing 1 Presentation Graphics Options Word Processing 2 Databases Information Management Spreadsheets 1 Spreadsheets 2 The Internet School-developed Units	Information Communication Technology	Computer Fundamentals Advanced Word Processing Computers and Society Advanced Spreadsheets Database 1 Internet 1 Desktop Publishing Information and Communication Systems Database 2 Internet 2 Multimedia Computers and Employment

As Information Communication Technologies requires a good level of English competency, students need to be fluent in reading, writing and speaking English for research, report writing and oral and written presentations, as well as for data entry and software application uses.

Information technology (IT) has been an essential tool in nation building since its inception in the middle of the 20th century. The use of computers has grown into a powerful medium, which helps drive the economies and social and political environments of most developed nations. The influence of IT has gained momentum tremendously in Papua New Guinea in the last decade. Papua New Guinea has developed information communication technologies (ICTs) to meet its needs and demands. This syllabus is designed to cater for this growing need.

Students must have computer knowledge and skills to study this syllabus. It is *not* suitable for beginners.

Information Communication Technologies is to be timetabled for 240–250 minutes per week in Grades 11 and 12.

Rationale

Development in technology has progressed very fast. The technological revolution is significantly changing the world. ICT is pervasive, penetrating all sectors of the economy, creating new jobs, changing others and enhancing many activities. These activities include changes in existing laws and ethical values and, most importantly, the articulation of technical skills to gain employment. ICT is playing an increasing role in all areas of life.

In order for Papua New Guinea to keep abreast with the global community, ICT must become an integral part of business, government and education. The continual improvements in ICT will eventually break the geographical barriers in Papua New Guinea. Geographical isolation will no longer be a hindrance to Papua New Guinea's advancement; rather, ICT will create a virtual bridge to unite the whole country.

Students studying ICT develop technical, practical, personal and organisational skills. They are at the forefront of advances in communication, information technology and computing. They have the tools to enable access to up-to-date and relevant information. Studying ethical issues related to ICT helps develop good moral values and respect for other cultures.

The study of ICT benefits students when they pursue further education and training or employment and when they actively participate in their communities.

Aims

Information Communication Technologies aims to enable students to:

- make a worthwhile contribution to the social and economic development of the country through the use of ICT skills
- develop knowledge, skills, values and attitudes in ICT that will be transferable to their career paths and future life directions
- provide students with knowledge of ICT that enhances their personal and professional productivity
- break the geographical barriers of Papua New Guinea
- develop knowledge and skills to enable them to compete globally.

Strands

The study of Information Communication Technologies is described in the following strands:

Information

'Information literacy' is the ability to gather information from multiple sources, select relevant material and organise it into a form that will allow the user to make quality decisions or take specific actions.

This strand identifies the information that is taken from data. Whatever data is encoded in the computer is interpreted in various ways to collect accurate and reliable information. This information comes in a variety of ways after processing, organising and analysing data to meet the needs of the end user.

Students learn concepts in data input, processing and output to help them to make informed decisions on information found in all areas of their lives.

Communication

Communication deals with the process involved in the transfer of information from one place to another. This transfer can happen in a variety of ways. In computer communications, data travels electronically at very high speed. The speed of computer communication creates a big impact on computer users, in ways never imagined before. Continuous improvement in the use of satellite communications and the internet are making the world a smaller place.

Students understand the use of a range of communications hardware and software devices. They develop an awareness of the opportunities provided by the growing need for communication.

Technology

Technology is about the knowledge and creative processes that are involved in the development of hardware and software tools, techniques and the use of materials. Technology is designed and produced to meet a range of human needs, from personal to business, education and government.

Students learn about technologies that meet user needs and the impacts of those technologies.

Learning outcomes

The Information Communication Technologies learning outcomes identify the knowledge, skills, and attitudes and values all students achieve or demonstrate at the end of Grade 12. The learning outcomes for Information Communication Technologies are listed below.

Students can:

1. identify and describe computer hardware and software and their functions and capabilities
2. identify and describe a variety of information systems and how these are used within organisations
3. demonstrate knowledge and understanding of the legal and ethical issues of using and producing IT solutions and their effects on the society
4. describe suitable network designs to solve small business or organisational needs
5. demonstrate knowledge of procedures for protecting and keeping data securely on a computer or network
6. describe the hardware and software required for electronic communication between computers and computer systems including methods of connection
7. demonstrate understanding of the internet and e-mail and the issues involved
8. apply advanced skills and concepts in creating solutions to information problems using a range of information software
9. develop multimedia presentations using a range of hardware and software devices.

Learning outcomes mapped against units												
Learning outcomes	Grade 11 units						Grade 12 units					
	11.1	11.2	11.3	11.4	11.5	11.6	11.7	12.1	12.2	12.3	12.4	12.5
1. Identify and describe computer hardware and software and their functions and capabilities	✓							✓				
2. Identify and describe a variety of information systems and how these are used within organisations			✓			✓		✓		✓		
3. Demonstrate knowledge and understanding of the legal and ethical issues of using and producing IT solutions and their effects on the society			✓					✓				
4. Describe suitable network designs to solve small business or organisational needs								✓				
5. Demonstrate knowledge of procedures for protecting and keeping data securely on a computer or network			✓					✓				
6. Describe the hardware and software required for electronic communication between computers and computer systems including methods of connection								✓				
7. Demonstrate understanding of the internet and e-mail and the issues involved			✓			✓				✓		✓
8. Apply advanced skills and concepts in creating solutions to information problems using a range of information software		✓		✓	✓		✓		✓	✓	✓	✓
9. Develop multimedia presentations using a range of hardware and software devices										✓	✓	

Unit sequence and content

Grade 11 units	Grade 12 units
<p>11.1 Computer Fundamentals <i>10 weeks</i></p> <ul style="list-style-type: none"> • Information-processing cycle • A brief history of computers • Generations of computers • Classification of computers • Input devices • Output devices • Storage devices • System box <p>11.2 Advanced Word Processing <i>10 weeks</i></p> <ul style="list-style-type: none"> • Working with styles and templates • Creating mail merge and labels • Working with columns • Working with outline and long documents • Sharing information with other programs • Sharing information with other programs • Sharing information with other people • Working with online forms <p>11.3 Computers and Society <i>10 weeks</i></p> <ul style="list-style-type: none"> • Impacts on society • Measures to protect computers and data • Environmental, social and ethical issues • Government controls and laws on ICT • Ergonomics in ICT <p>11.4 Advanced Spreadsheets <i>10 weeks</i></p> <ul style="list-style-type: none"> • Working with advanced formatting, style and outlining • Working with multiple worksheets and workbooks • Using advanced functions • Creating pivot tables and analysing data • Integrating with other applications • Protecting and auditing form and template <p>11.5 Database 1 <i>10 weeks</i></p> <ul style="list-style-type: none"> • Getting started • Working with data • Working with tables and relationships • Creating and customising queries • Creating and customising forms • Creating useful reports 	<p>12.1 Information and Communication Systems <i>30 weeks</i></p> <ul style="list-style-type: none"> • Information systems • Networking • Communication systems <p>12.2 Database 2 <i>10 weeks</i></p> <ul style="list-style-type: none"> • Exploring advanced table features • Using relationships • Creating advanced queries • Forms • Integrating main form and subforms • Working with report sections <p>12.3 Internet 2 <i>10 weeks</i></p> <ul style="list-style-type: none"> • Creating a new webpage • Working with images and multimedia effects • Creating hyperlinks • Working with special effects <p>12.4 Multimedia <i>10 weeks</i></p> <ul style="list-style-type: none"> • Introduction • Creating interactive presentations • Delivering and controlling a presentation • Integrating multimedia with other applications <p>12.5 Computers and Employment <i>3 weeks</i></p> <ul style="list-style-type: none"> • Career options in ICT • Job search on the internet and in other media • Formatting résumés or CVs • Formatting job application letters

Grade 11 units	Grade 12 units
<p>11.6 Internet 1 <i>10 weeks</i></p> <ul style="list-style-type: none">• Web fundamentals• Web security• Search techniques• Website evaluation• Evaluating internet-based resources• Communication protocols• Electronic mail (e-mail) <p>11.7 Desktop Publishing <i>10 weeks</i></p> <ul style="list-style-type: none">• Working with publications• Planning and designing a page• Working with text• Drawing and working with graphic objects• Working with tables• Sending and printing the publication	

Grade 11 units

It is suggested that the practical units be taught concurrently with the theory units throughout the year.

11.1 Computer Fundamentals

Term 1: 10 weeks (theory—1 lesson per week)

This unit is designed for students who require an introduction to the basic terminology, concepts and operations needed for success in this course. The unit covers basic system software and application software operation and the operation of hardware.

Learning outcomes

Students can:

1. identify and describe computer hardware and software and their functions and capabilities.

To achieve the learning outcome, students:

- identify and demonstrate appropriate use of a range of hardware and software components and peripheral devices
- describe the major components of a computer system and explain their functions.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Information-processing cycle

- what is a system?
 - water cycle, digestive system, knowledge databases, transaction systems, accounting systems, expert systems
- what is a computer?
- what is a computer system?
- input, processing, storage, output, communication

A brief history of computers

- early times
- the abacus
- the pioneers
- the modern computer
 - characteristics of computers

Generations of computers

- first generation of computers
- second generation of computers
- third generation of computers
- fourth generation of computers
- fifth generation of computers

Classification of computers

- supercomputers
- mainframe computers
- workstations
- microcomputers
- artificial intelligence (AI)

Input devices

- keyboards
 - traditional keyboard (QWERTY)
 - specialty keyboards (dumb, intelligent, internet terminals)
 - wireless keyboards
- pointing devices
 - mouse (USB optical, ps2)
 - touchpad
 - touch screen
 - trackball
 - light pen
 - joystick
- source data-entry devices
- scanner devices
 - optical scanners (flatbed scanner, portable scanner)
 - barcode readers (handheld wand readers, platform scanners)
 - character and mark recognition devices: magnetic-ink character recognition (MICR); optical-character recognition (OCR); optical-mark recognition (OMR)
- human-biology input devices (biometric scanner)
 - face recognition system
 - speech or voice recognition system
 - finger and palm prints recognition system
- image capturing devices
 - digital still camera
 - digital video camera
 - webcams and video-input devices
- videoconferencing camera
- digitising devices
 - graphics tablets

- digital note pads
- audio input devices
 - voice (voice recognition systems): discrete-speech recognition systems; continuous-speech recognition systems
 - music (musical interface digital interface [MIDI])
- sensors; found in:
 - aerial survey; astronomy; automation; biometrics; communication satellites; defence system; guided missiles; intelligent transport systems; naval vessels; robot; solar energy; space lab; surveillance technology; thermometer; torpedo (weapon); traffic control
- radio-frequency identification tag (RFID)
 - pager
 - pulsar
 - radar identification (IFF)

Output devices

- monitors
 - cathode-ray tube (CRT)
 - flat-panel monitor or liquid crystal display (LCD)
 - e-books (e-book readers)
 - data projectors
 - high-definition television (HDTV)
- printers
 - impact printers (dot-matrix)
 - non impact (laser, thermal printer, ink-jet)
 - photo printers
 - plotters
 - Braille
- audio and video output devices
 - sound output (audio speakers, headphones)
 - video output (video conferencing)
 - voice output (text-to-speech system [narrator])
- combination input and output devices
 - fax machines
 - multifunction devices (MFD)
 - internet telephone (telephony)
 - terminals (dumb, intelligent, network/thin client/network computer, internet/web)

Storage devices

- units of measurement
 - bits, bytes, kilobytes, megabytes, gigabytes, terabytes

Primary (internal)

- random access memory (RAM)

- read-only memory (ROM)

Secondary (external)

- floppy disks
- memory stick (flash drive)
- smart cards (sd, smart media)
- hard disk
- optical disc
- CD-ROM disc
- DVD-ROM, DVD-video, and laser discs
- Blu-ray disk
- erasable optical discs (CD-RW, DVD-RAM, DVD-RW, and DVD+RW)

System box

- main board (central processor unit (CPU), buses, peripheral communication interface (PCI))
- power supply unit
- cooling fan
- ports (USB, serial, parallel, PS2, RJ45)

Software

- definition (operating system and application softwares)
- system software (operating systems, device and utility drivers)
- application software
- care and appropriate use of hardware and software

11.2 Advanced Word Processing

Term 1: 10 weeks (practical)

In this unit students extend and further develop their word-processing skills to design solutions to problems presented through a case study or design brief. The emphasis is placed on the design and production of a word-processed document to suit the needs of a business or organisation. Access to a computer and word-processing application is required.

Learning outcomes

Students can:

8. apply advanced skills and concepts in creating solutions to information problems using a range of information software.

To achieve the outcome, students:

- apply advanced skills and concepts to create suitable documents for the end user
- integrate word processing with other applications to create well-designed documents.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Working with styles and templates

- creating and applying a character style
- creating and applying a paragraph style
- copying styles between documents
- modifying and deleting a style
- creating a document from a template
- creating and modifying a document template

Creating mail merge and labels

- selecting the document type
- selecting the starting document
- selecting the recipients
- adding records to the data source
- writing and previewing the letter
- performing a mail merge
- printing the letters

Customising and enhancing the mail merge

- modify the main document

- insert merge fields using mail merge toolbar
- using 'If...Then...Else' fields
- changing the format of the merged data

Creating mailing labels

- creating the mailing labels
- locating a data source for the mailing labels
- arranging the content of labels
- completing the mailing labels

Working with columns

- creating columns for an entire document
- creating columns for part of a document
- creating columns for an existing document

Formatting columns

- changing the number of columns
- changing the width of columns
- adding vertical lines between columns
- using column breaks

Working with outline and long documents

Creating footnotes and endnotes

- inserting a footnote
- inserting an endnote
- converting footnotes to endnotes

Creating and updating a table of contents

Organising a document in outline view

- creating a document in outline view
- viewing a document's organisation using outline view
- reorganising a document using outline view

Sharing information with other programs

Using word processing with spreadsheet, multimedia and databases

- including a spreadsheet in a word-processing document
- using spreadsheets as mail merge data source
- using a word-processing outline to create a multimedia presentation
- inserting databases into an existing document

Working with object linking and embedding (OLE)

- creating a new embedded object
- creating a linked object or embedded object from an existing file
- creating a linked object using paste link

- editing an embedded object in the source program

Sharing information with other people

Creating documents with restricted permission

- creating documents with restricted permission
- viewing documents with restricted permission
- allowing users to view a document without a word-processing application
- allowing users to print document with restricted permission
- changing the user's access level
- setting an expiration date for a document
- attaching referral information in a restricted document
- removing a document with restricted permission

Protecting document from unauthorised changes

- setting a password to open and modify a document
- restricting formatting and editing of a document
- allowing editing in a protected document
- authorising reviewers to insert comments and tracked changes only
- restricting reviewers to inserting comments only
- removing document protection

Working with online forms

Creating an online form

- creating the main document
- designing and laying out the form

Inserting form fields

- inserting a text, date and number form field
- inserting a check box form field
- specifying a check box option
- inserting a drop-down list form field
- assigning help text for a form field

Preparing the form for distribution

- protecting a form in Word
- filling in a form in Word
- saving and printing the data from a form

11.3 Computers and Society

Term 2: 10 weeks (theory—1 lesson per week)

In this unit students learn to appreciate and understand the impacts that developments in information and communication technologies have on themselves and communities worldwide. In doing so, students also discuss environmental, social and ethical issues to do with ICT. The government law on ICT is also addressed here. Students are introduced to different threats to computers and the importance of safeguarding data at the individual and organisational level.

Learning outcomes

Students can:

2. identify and describe a variety of information systems and how these are used within organisations
3. demonstrate knowledge and understanding of the legal and ethical issues of using and producing IT solutions and their effects on the society
5. demonstrate knowledge of procedures for protecting and keeping data securely on a computer or network
7. demonstrate understanding of the internet and e-mail and the issues involved.

To achieve the learning outcomes, students:

- describe and make informed judgements about the effects of the use of computers in our society
- identify different ways of safeguarding important data and computer hardware and software
- demonstrate their understanding of viruses and spyware and critically discuss the different methods of controlling them
- understand Government controls and laws on ICT
- discuss environmental, social and ethical issues around the use of ICT
- discuss the importance of proper work ethics when using computers.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Impacts on society

- computers in
 - business
 - communications
 - education
 - entertainment

- home
- medical world
- military or national security
- scientific research
- employment and career opportunities
 - telecommuting
 - call centres
 - e-commerce
 - online or phone banking

Measures to protect computers and data

- protection of data
 - backup procedures
 - disaster-recovery plans
 - encryption
- identification and access
 - what you have (cards; keys; signatures; badges)
 - what you know (PINs; passwords; digital signatures)
 - who you are (physical traits (biometric devices))
- safety requirements—user and equipment
 - virus and antivirus
 - spyware and antispyware
 - cleaning agents
 - system failures
 - computer theft and vandalism

Environmental, social and ethical issues

- moral and ethical issues
 - work ethics: social responsibility (content and control of information)
 - issues affecting society (computer crimes; HIV and AIDS; hackers and crackers; pornography)
 - identity theft (wallet or purse theft; mail theft; mining the trash; telephone solicitation; insider access to databases)
 - economic issues (technology, the job killer?; haves and have-nots)
- environmental problems
 - manufacturing by-products
 - disposal of by-products (e-waste management)
 - environmental blight
 - possible risks of nanotechnology
- mental health problems
 - isolation
 - gambling
 - stress
 - fussing with computers

- information overload

Government controls and laws on ICT

- impact of copyright laws
- internet ethics and objectionable materials
- government controls and laws on ICT

Ergonomics in ICT

- design of furniture
- placement of equipment
- keyboarding techniques
- work routine
- total work environment
- design of software

11.4 Advanced Spreadsheets

Term 2: 10 weeks

This unit aims to develop students' knowledge and skills to equip them to use advanced spreadsheets as a tool to make informed personal and work place choices. Students use spreadsheets to solve information problems in a business or organisational setting.

Learning outcomes

Students can:

8. apply advanced skills and concepts in creating solutions to information problems using a range of information software.

To achieve the learning outcome, students:

- demonstrate the ability to use advanced features and functions of spreadsheet tools to record and analyse data
- apply appropriate techniques in formatting, manipulating and protection of data
- apply advanced skills, techniques and strategies to creatively and methodically apply spreadsheets
- demonstrate the use of formulas.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Working with advanced formatting, style and outlining

Customising data appearance with advanced formatting

- using built-in number formats
- customising number and data format
- using conditional formatting

Maintaining format consistency with style

- adding style box tool to the toolbar
- creating, applying and redefining style
- deleting style
- merging style from another workbook

Using data outlining

- creating an outline automatically
- removing outline
- creating outline manually
- using subtotal to create outline

- show or hide details using outline symbols
- removing subtotal

Working with multiple worksheets and workbooks

Using 3-D formula across worksheets

- entering 3-D formula across worksheets
- entering 3-D formula across worksheets using function

Using range names

- defining a range name
- defining a 3-D range name using the menu
- redefining the cell reference in a range name
- deleting a range name
- using range names in formulas

Combining worksheets and data from different workbooks

- consolidating data
- moving or copying worksheets to another workbook

Linking information from different worksheets and workbooks

- linking information using copy and paste link
- update link

Using advanced functions

Using financial functions

- using the PMT function
- using the ABS function

Using logical functions

- using logical test
- using IF function to return a text
- using IF function to return a value
- using the nested IF function
- using OR, AND, and COUNTIF function

Using VLOOKUP function

- using VLOOKUP to find data
- limiting the lookup value for exact match
- using the closest match for the lookup value

Creating pivot tables and analysing data

Creating a pivot table

- creating a pivot table from an Access database

Updating a pivot table

- updating information in a pivot table
- adding information in a pivot table
- arranging information in a pivot table
- removing information from a pivot table
- creating a page in a pivot table
- displaying pages on separate sheets

Modifying a calculated field in a pivot table

- changing function for a calculated field
- inserting a calculated field
- deleting calculated fields

*Creating a chart from a pivot table**Exploring what-if table*

- creating one variable what-if table
- creating two variable what-if tables

Using scenarios

- creating scenarios
- applying scenarios
- editing scenarios
- deleting scenarios

Implementing problem solving

- using Goal Seek
- loading Add-Ins
- using Solver

Integrating with other applications*Importing and exporting data*

- using the text import wizard
- exporting data to another file type
- copying data from other applications
- inserting objects
- exporting data to Excel workbook in another application
- getting specific information using a database query
- editing a database query

Protecting and auditing form and template*Creating a new workbook using a template*

- creating a new workbook using a built-in template on the computer
- creating a new workbook using 'Office online'
- creating a new template

- creating a new workbook from own template
- editing the template

Protecting worksheet style, contents and elements

- protecting and unprotecting the worksheet
- unlocking cells for editing in protected worksheet
- hiding cell formulas in protected sheet
- setting password to edit a specific range
- granting selected users edit range without passwords
- protecting and unprotecting workbook structure

Protecting the worksheet from unauthorised user access

- setting a password to open
- removing a password to open
- setting a password to modify

11.5 Database 1

Term 3: 10 weeks

In this unit students extend and further develop their database skills. Using these skills, they design a solution to a problem presented through a case study or design brief. The unit emphasises developing skills in interrogating databases.

Learning outcomes

Students can:

8. apply advanced skills and concepts in creating solutions to information problems using a range of information software.

To achieve the learning outcome, students:

- understand how databases work and how they are implemented in business and organisations
- collect and organise data to manipulate reports, forms and queries.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Getting started

Understanding how a database works

- starting databases
- opening, saving and closing a database

Getting familiar with the database screen

- using the menu
- moving the toolbar and menu bar
- using the toolbar button
- using the shortcut menu with right-mouse click

Getting help and maintenance

- searching for help
- using the content help
- using the 'type a question for help' box
- using 'Office assistance' help
- getting help in a dialogue box
- detecting and repairing errors in a database
- how to restart a database when it is not responding

Working with database objects

- opening a table
- opening a query
- opening a form
- opening a report
- renaming an object

Working with data

Managing data

- navigating through records
- moving to a specific record
- adding records
- editing records
- deleting records

Controlling and searching records

- sorting records
- finding records
- filtering records by selection
- filtering records by criteria

Working with tables and relationships

Creating and customising tables

- creating a new blank database
- creating a new table
- setting primary key
- rearranging fields
- adding a field
- deleting fields
- changing data type

Getting external information

- importing tables
- linking tables

Managing relationships

- deleting table relationships
- creating table relationships

Creating and customising queries

Creating select queries

- creating queries quickly

Controlling queries output

- opening or switching query to design view
- rearranging fields
- deleting fields
- adding a field
- sorting the query output
- filtering the query output with criteria
- setting multiple criteria
- hiding a field

Creating and customising forms

Creating forms effectively

- creating a form quickly with AutoForm
- saving and renaming a form
- creating a form using a form wizard

Customising forms

- opening form design view
- showing or hiding field list
- showing or hiding toolbox
- resizing control
- moving both control and label
- moving control and label separately
- deleting a field control
- adding a field control

Creating useful reports

Creating reports

- creating a report using AutoReport
- creating mailing labels
- setting page margins
- changing page orientation
- numbering pages

11.6 Internet 1

Term 4: 10 weeks (theory—1 lesson per week)

This unit introduces students to the fundamentals of the internet and its application in the wider context. Students are introduced to different search techniques to enable them to effectively search and retrieve information from the World Wide Web.

Learning outcomes

Students can:

2. identify and describe a variety of information systems and how these are used within organisations
7. demonstrate understanding of the internet and e-mail and the issues involved.

To achieve the outcomes, students:

- describe and discuss the different components of the internet
- learn different search techniques to search for information and to critically evaluate web-based resources
- demonstrate understanding of e-mail, its importance in business and government and its safe use.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Web fundamentals

- the internet
- internet service providers (ISPs)
- types of connection (dialups, broadband, wireless)
- the World Wide Web (WWW)
- HTTP
- a webpage
- HTML
- URLs
- browsers
- setting up an internet connection
- effective use of browsers
- using search engines
- listing favourites
- pages for quick viewing
- sharing bookmarks and favourites

- finding pages recently visited
- making pages available for offline viewing

Web security

- spyware
- hacking
- firewalls

Search techniques

- simple search techniques (keyword searching)
- advanced search techniques (boolean operators, search engines, advanced searching)
- citing internet resources
- safe use of the internet

Creating bookmark links

- creating bookmarks
- creating a link to a bookmark on the current page
- creating a link to a bookmark on another page
- creating an image map

Website evaluation

- download time
 - fast download of pages
- navigational ease
 - moving easily from page to page
 - links are working
- attractive
 - pages are attractive and suitable
- content
 - information is correct and clearly labelled
- graphics, videos, and sounds
 - have a purpose
 - help the users understand the content
- currency
 - regular updating of content
- accuracy
 - authenticity of the author

Evaluating internet-based resources

- author
 - an authority on the topic or subject
 - creator or compiler of other information sources
- producer

- clearly shown
- well-known professional organisation
- site
 - URL clearly noted
 - ending (suffix: .edu, .ac, .com, .org and so on)
 - location clearly indicated
- publication
 - single page or part of a series
 - abstract or full text of an article
 - publisher location
- purpose
 - to inform others of new research
 - summarise existing research
 - advocate a position
 - stimulate discussion
- date of publication
 - date the page is published
 - regularly updated
- arrangement
 - information is clearly presented
 - easy to locate the information
- intended audience
 - who the information is targeting (professionals, advocates, consumers and so forth)
- coverage
 - covers the information required
 - is linked to other related articles
- writing style or reasoning
- information presented in a thoughtful, orderly, well-reasoned manner and is well-researched
 - assumptions and opinions well-documented
 - any bias is easy to detect
- references
 - well-documented
 - link to primary sources
 - current and relevant

Saving pictures or text from a webpage

- save an image from a webpage
- print an image from a webpage

Web browser add-ons

- how add-ons end up on your computer
- some add-ons can shut down your browser

Communication protocols

- transmission control protocol or internet protocol (TCP/IP)
- file transfer protocol (FTP)

Electronic mail (e-mail)

- sending e-mail messages
- reading messages
- spam
- phishing or malicious e-mail messages
- transfer of viruses via e-mail

Organising e-mail messages

- deleting an e-mail message
- finding e-mail messages in message folders
- managing e-mail messages with rules
- add, delete, or switch folders
- move or copy a message to another folder
- store messages on an e-mail server
- additional e-mail management

Introducing the address book

- open the address book
- add a contact to the address book
- add names directly from e-mail messages to the address book
- import a business card
- change contact information
- create a group of contacts
- add a contact to an existing group
- create a business card
- add a digital ID to the address book from another source
- organise names in the address book

Organising contacts and folders

- deleting contacts from your address book
- printing address book information

11.7 Desktop Publishing

Term 4: 10 weeks

In this unit, students are introduced to basic skills in desktop publishing, including the manipulation of text and graphics to enhance document production. Students develop skills in creating and working with documents including the use of publishing software.

Learning outcomes

Students can:

8. apply advanced skills and concepts in creating solutions to information problems using a range of information software.

To achieve the learning outcome, students:

- apply advanced skills and concepts to create flyers, brochures, information leaflets, banners and newsletters that suit the needs of the end user.

Content

Students acquire knowledge and skills through the learning and teaching of this content:

- working with publications
- planning and designing a page
- working with text
- drawing and working with graphic objects
- working with tables
- sending and printing the publication

Examples of desktop-publishing software

Pagemaker®, Adobe Illustrator, Photoshop, Publisher, Quark Xpress

Working with publications

- creating a publication from a design template
- adding and editing personal information
- crafting a publication
- managing a publication

Planning and designing a page

- choosing a page layout
- navigating a page
- adding headers and footers
- applying background

Working with text

- creating and formatting text boxes
- linking text boxes
- formatting fonts
- formatting text
- inserting and formatting WordArt

Drawing and working with graphic objects

- using the drawing tools
- using peripherals such as a scanner, digital camera or mobile phone to transfer data and pictures
- formatting and enhancing graphic objects
- inserting Clip Art and pictures
- working with a design gallery
- manipulating graphic objects

Working with tables

- working with tables
- formatting tables

Sending and printing the publication

- sending the publication
- previewing and printing the publication

Grade 12 units

12.1 Information and Communication Systems

Terms 1–3: 10 weeks per term (2 lessons per week for the whole year)

Information systems use people and processes to change data into information. A roll book is an example of a paper-based information system. In this unit students learn about the role computers play in an information system and how data is communicated across networks. These systems support people who are working together by enabling them to exchange and share data and information.

'Information and Communication Systems' is a year-long unit. It is taught in parts as a theory topic under three subtopics: 'Information systems'; 'Network systems'; and 'Communication systems'.

Learning outcomes

Students can:

1. identify and describe computer hardware and software and their functions and capabilities
2. identify and describe a variety of information systems and how these are used within organisations
3. demonstrate knowledge and understanding of the legal and ethical issues of using and producing IT solutions and their effects on society
4. describe suitable network designs to solve small business or organisational needs
5. demonstrate knowledge of procedures for protecting and keeping data securely on a computer or network
6. describe the hardware and software required for electronic communication between computers and computer systems including methods of connection.

To achieve the outcomes, students:

- analyse and describe an information system in terms of the information processes and equipment required
- describe the effects of information systems on the individual, society and the environment
- describe and set up a simple local area network (LAN)
- describe communications hardware, software and methods of connection
- describe suitable data protection and security procedures for a network.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Information systems

- what a system is
- what an information system is
- the role of a network in an information system
- characteristics of an information system

Types and purposes of information systems

- database, communications, transaction processing, decision support, automated manufacturing, multimedia
- manage information used within an organisation
- data security and protection in the network
 - back up and restore procedures
 - antivirus protection
 - firewalls

Designing and planning an information system

- components of information systems (hardware, software and people)
- relationship between information processing and the components of an information system
- settings for information systems (business, education, government)

Issues related to information systems

- acknowledgement of data sources (copyright)
- the Freedom of Information act
- privacy principles
- accuracy and reliability of data sources
- access to data, ownership and control of data
- new trends in the organisation, processing, storage and retrieval of data, such as data warehousing and data mining

Networking

- definition
- characteristics and functions of network devices (hardware: servers, clients, peripherals, switches, routers, cables)
- storage media: capacity, capabilities and limitations
- client–server versus peer-to-peer
- cabling standards
- system software (device or utility drivers; operating systems such as Windows, Unix, Oracle, Mac OS)

Specification of local area network (LAN)

- design topology of LAN (star, bus, hybrid)

Hardware installation

- cabling: straight turn; cross link or cross over

Network software

System software

- network operating systems
- workstation operating system
- antivirus software
- firewall
- device and utility drivers

Application software

- general-purpose software
 - word processing
 - spreadsheets
 - databases
 - desktop publishing
 - web browsing
- specialised software
 - MYOB
 - AccPac
 - Pronto
 - Quickbooks Pro
 - autoCAD
 - Adobe Illustrator

Basic LAN setup

- checking cable connections
- connecting equipment
- checking network adaptors and protocols
- checking TCP/IP setup
 - using ipconfig.exe
- checking PING utility
- Windows networking options (user names and passwords)
- checking files and print sharing
- file folders and sharing options

Communication systems

- what a communication system is
- examples of communication systems
- transmitting and receiving in communication systems
- information processes in communication systems
- current issues related to communication systems
- transmission media (satellite, fibre optics, cables, infra-red)

Essentials of communications

- hardware required (modem, cables, routers, switches or hubs)

- software required (log-on procedures, protocol)
- protocol and 'handshaking' (TCP/IP, wireless application protocol or WAP), hypertext transfer protocol (HTTP), file transfer protocol (FTP)
- dialup
- synchronous and asynchronous
 - parity

Methods of connection (media)

- cables: UTP (Cat 5, 6 and so on), fibre optics
- wireless: infrared, Bluetooth, microwave and satellites
- telephone: dialup, broadband, asymmetric digital subscribers line (ADSL)
- costs and benefits of transmission media

Hardware and software associated with communications via the internet

- browsers and search engines
- voice mail and facsimile, videoconferencing and teleconferencing, telecommuting

12.2 Database 2

Term 1: 10 weeks

Students learn to appreciate that computer database systems have a capacity to store, retrieve and manipulate data better than non-computer systems. Students develop skills in modifying existing databases and designing new databases for specific purposes.

Learning outcomes

Students can:

8. apply advanced skills and concepts in creating solutions to information problems using a range of information software.

To achieve the outcome, students:

- use, design, create and evaluate databases and justify decisions made when querying them
- create, add, delete, sort, filter and set multiple criteria in a query
- collect and organise data to manipulate reports, forms and queries
- apply the basic features of databases to print out accurate relevant and timely reports.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Exploring advanced table features

Setting table fields properties

- controlling field size
- customising text format
- customising number and currency format
- customising date and time format
- control input pattern using input mask
- changing the display of field name using caption
- specifying a default value
- prompting error using validation rule
- customising an error message
- making a field compulsory
- how to index a field
- creating lookup value for a field
- updating values in a lookup list

Using relationships

- creating one-to-one relationships
- solving many-to-many relationship problems

Creating advanced queries

- creating multiple related tables query
- using formula and calculated fields
- changing field name display

Running queries

- how to run make table queries to create new tables
- how to run append queries to add records
- how to run delete queries to remove records

Forms

- creating a form using form wizard
- viewing form design
- repositioning controls and labels
- moving control and label separately
- controlling cursor with tab order
- changing control properties
- selecting multiple controls
- creating form header and footer
- inserting label
- formatting text properties
- applying special effects
- adding text box field control
- adding unbound text box control
- inserting function in control
- inserting calculated control
- inserting option group control
- inserting combo box control
- inserting list box control
- inserting command button

Integrating main form and subforms

- creating subform, creating main form, integrating subform into main form

Working with report sections

- creating a report using a wizard
- reorganising labels and controls in sections
- inserting calculated control
- changing the format for a control

12.3 Internet 2

Term 2: 10 weeks

This unit introduces students to the various authoring languages required to design and publish webpages on the World Wide Web. Students are given the opportunity to design and develop webpages using web design applications or an HTML editor (WYSIWYG) and are shown the procedures involved in publishing their webpages.

Learning outcomes

Students can:

2. identify and describe a variety of information systems and how these are used within organisations
7. demonstrate understanding of the internet and e-mail and the issues involved
8. apply advanced skills and concepts in creating solutions to information problems using a range of information software
9. develop multimedia presentations using a range of hardware and software devices.

To achieve the outcomes, students:

- create a webpage using special effects, hyperlinks and other web components
- integrate other applications in creating a presentable webpage.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Creating a new webpage

- creating a one-page website
- creating a website using wizard or templates
- opening and/or closing a website
- display or hide the folder list
- opening and/or closing a webpage

Working with web folder

- creating a folder
- renaming a folder
- moving a file to a folder
- deleting a folder

Working with images and multimedia effects

Inserting images

- inserting an image or an AutoShape
- adding fill colour to an AutoShape
- inserting WordArt
- inserting a ClipArt image

Customising images

- resizing and aligning an image
- adding alternative text to an image
- adding a border to an image
- adding space around an image
- creating a thumbnail image

Inserting background sound and video clips

- inserting background sound on a webpage
- removing background sound from a webpage
- inserting video on a webpage
- setting the properties for a video
- displaying message if the video cannot play
- removing a video from a webpage

Creating hyperlinks

Inserting text and image hyperlinks

- inserting a text or image link to another page on the current website
- inserting a text or image to a page on a different website
- inserting an e-mail link
- changing link colours

Working with special effects

Creating web components

- inserting and editing an animation
- reversing the scroll direction of the animation
- setting the speed and movement of the animation
- changing animation size
- changing animation background colour
- inserting a hit counter
- setting hit counter number of digits

Using special effects

- creating animated pages with page transition

12.4 Multimedia

Term 3: 10 weeks

In this unit students investigate the effects of multimedia on the communication, presentation and manipulation of information. They gain an understanding of, and experience in, developing solutions to problems using multimedia applications.

Learning outcomes

Students can:

8. apply advanced skills and concepts in creating solutions to information problems using a range of information software
9. develop multimedia presentations using a range of hardware and software devices.

To achieve the outcomes, students:

- explain the different uses of multimedia and interactive multimedia applications
- use design tools to represent the design of a multimedia presentation
- capture images using imaging devices, connect image devices to computers, download and save unedited images in a computer
- do a presentation of the movie or slideshow to an audience.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Introduction

- definition
- different types of media
- different multimedia applications
- terminology and jargon commonly used
- hardware and software requirements
- techniques or steps

Creating interactive presentations

Creating hyperlinks in a presentation

- create hyperlink to a location in the current presentation
- create hyperlink to a specific slide in another presentation
- create hyperlink to a file or webpage
- create hyperlink to an e-mail address

Creating action buttons

- inserting music or sound effects on a slide
- inserting an action button on every slide

Adding music and sound

- inserting music or sound effects on a slide
- stopping the sound during a presentation
- playing a CD during a presentation
- adding a sound effect to an animation in PowerPoint

Adding movies and animated GIFs

- adding a movie or animated GIF on a slide
- starting a movie on a mouse-click

Delivering and controlling a presentation

Applying animation effects and transitions

- applying an animation scheme
- applying custom animations to text and objects
- applying custom animations to the elements of a chart
- adding transitions to a slide

Delivering your presentation

- running an on-screen presentation
- navigating between slides during presentation
- marking up slides using a pen during presentation
- using highlight annotation during presentation
- keeping ink annotations after presentation

Setting timing and creating self-running presentations

- set timing for a slide show manually
- create a self-running presentation

Creating custom shows within a presentation

- creating and presenting a custom show
- create a hyperlink to a custom show
- adding and removing slides in a custom show
- removing a custom show

Packaging a presentation

- packaging for CD
- viewing a packaged presentation

Integrating multimedia with other applications

- for example: embedding a spreadsheet into a slide; editing an embedded object; linking to a spreadsheet; exporting multimedia files to another document

12.5 Computers and Employment

Term 4: 3 weeks

This unit helps prepare students for the workforce after Grade 12. Students learn to format an electronic curriculum vitae (CV) and job application letters.

Learning outcomes

Students can:

7. demonstrate understanding of the internet and e-mail and the issues involved
8. apply advanced skills and concepts in creating solutions to information problems using a range of information software.

To achieve the outcomes, students:

- use a range of computer skills to prepare CVs and job application letters
- do job search on the internet
- identify possible ICT careers.

Content

Students acquire knowledge and skills through the learning and teaching of this content.

Career options in ICT

- IT manager
- programmer
- systems analyst
- systems administrator
- webmaster

Job search on the internet and in other media

- using search engines to find job opportunities
- searching websites of businesses with career opportunities

Formatting résumés or CVs

- searching the internet for sample CV formats
- formatting CVs

Formatting job application letters

- searching the internet for sample job application letters
- formatting job application letters

Assessment components, weighting and tasks

The internal assessment mark for Information Communication Technologies is to be based on the Grade 11–12 syllabus only. Final assessment should be based on a range and balance of assessment instruments. One task may be used to assess several components. The components, weightings and tasks for Grade 11 and 12 units are detailed below.

Components, weightings and tasks for Grade 11 units

Component	Weighting	Tasks
Tests and examinations	100	These may include multiple-choice items, short answers and extended responses
Research, investigation and communication (including group work)	50	These tasks can include elements within class, particularly in the presentation phase. Tasks may be undertaken over a period of time. The communication may be oral, written or electronic
Practical work	150	Use a variety of application software to create solutions to information problems to meet the needs of users
Marks	300	

Components, weightings and tasks for Grade 12 units

Component	Weighting	Tasks
Tests and examinations	100	These may include multiple-choice items, short answers and extended responses
Research, investigation and communication	50	These tasks can include elements within class, particularly in the presentation phase. Tasks may be undertaken over a period of time. The communication may be oral, written or electronic
Practical work	150	Use a variety of application software to create solutions to information problems to meet the needs of users
Marks	300	

Assessment, examinations and certification

Assessment and reporting practices described here are detailed further in the *National Assessment and Reporting Policy for Papua New Guinea* (2003) and in other support materials produced by the Department of Education.

Assessment is an important component of teaching for learning and is integrated into the learning and teaching activities of Information Communication Technologies. Continuous assessment in Information Communication Technologies provides feedback to students and the teacher on students' progress towards achievement of the learning outcomes. It helps students improve their standards of achievement by knowing what they need to do well and where they need to improve. In Information Communication Technologies, teachers will gather evidence from students' work during the course of the term and use those continuous assessments to improve their teaching and students' learning.

Assessment

The main purpose of assessment is to improve student learning.

Assessment needs to be *for* learning as well as *of* learning. It is used to evaluate and improve learning and teaching, report achievement and provide feedback to students on their progress.

Assessment measures students' achievement of learning outcomes as described in the syllabus. It is the ongoing process of identifying, gathering and interpreting information about students' achievement of the learning outcomes.

Learning and teaching using an outcomes approach requires teachers to plan their teaching and assess learner performance in relation to outcomes, using criteria derived from those outcomes. Assessment involves focusing less on whether a learner has 'passed' or 'failed' and more on what outcomes a learner has achieved and in which areas further support is required.

Assessment in Information Communication Technologies

A student's achievement in Information Communication Technologies at the end of Grade 12 will be assessed against the learning outcomes. Assessment of student progress towards achieving these learning outcomes is cumulative throughout Grades 11 and 12.

It is important that teachers plan the learning and teaching sequence so that there is a balanced spread of assessment during the year. Some tasks, such as investigations or case studies, can be designed so that they are completed over a period of time rather than at the end of the unit. Other tasks can be done immediately the relevant section of the unit or topic has been covered.

Assessment for certification

A student's overall achievement in Information Communication Technologies will be both internally and externally assessed. The final award for each student will be a combination of the internal assessment mark provided by the school and the examination mark.

Internal assessment

Internal assessment provides a measure of a student's achievement based on a wider range of syllabus content and outcomes than may be covered by the external examination alone.

For Information Communication Technologies, the internal assessment marks will provide a summation of each student's achievements in Grades 11 and 12. The assessment tasks used to determine the internal assessment mark must comply with the components, weightings and types of tasks specified in the tables on page 43. A variety of tasks gives students the opportunity to demonstrate all the learning outcomes in different ways to improve the validity and reliability of the assessment.

All schools must meet the requirements for internal assessment as specified in the *Grade 12 Assessment, Examination and Certification Handbook*.

External examination

The external examination provides a measure of student achievement of those aspects of the learning outcomes that can be reliably measured in an examination setting. Questions for the external examination in Information Communication Technologies will be developed using the outcomes, knowledge and skills in the syllabus.

Recording

All schools must meet the requirements for maintaining and submitting student records as specified in the *Grade 12 Assessment, Examination and Certification Handbook*.

Certification

Candidates will be awarded the national certificate only if they meet all requirements for internal and external assessment. Eligibility rules for the award of certificates are specified in the *Grade 12 Assessment, Examination and Certification Handbook*.