Information Technology

STUDY DESIGN

Victorian Curriculum and Assessment Authority
2002

Accredited by the Victorian Qualifications Authority
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Detail from a VCE work of Annundhini Pararajasingham: The Bathers 1993, mixed media, 1300 x 1000 mm. Copyright remains the property of the artist.

Information Technology
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IMPORTANT INFORMATION

Accreditation period

Units 1–4: 2003–2006

Accreditation period ends 31 December 2006

Other sources of information

The *VCE Bulletin* is the only official source of changes to regulations and accredited studies. The *VCE Bulletin*, including supplements, also regularly includes advice on VCE studies. It is the responsibility of each VCE teacher to refer to each issue of the *VCE Bulletin*.

To assist teachers in assessing school-assessed coursework in Units 3 and 4 the Victorian Curriculum and Assessment Authority will publish annually an assessment guide which will include advice on the scope of the tasks and the criteria for assessment.

The *VCE Administrative Handbook* for the current year contains essential information on assessment and other procedures.

VCE providers

Throughout this study design the term 'school' is intended to include both schools and other VCE providers.

Photocopying

VCE schools only may photocopy parts of this study design for use by teachers.

Introduction

RATIONALE

This study focuses on the processing of data and the management of information to meet a range of individual and societal purposes.

The rapid pace of development in information technology (IT) is having a major influence on virtually all aspects of society. Not only does information technology have the capacity to change how existing tasks and activities are undertaken, but it also creates new opportunities in work, study, recreation, and in personal relationships. Social relations and cultural values also influence the way information technology is used.

It is important that students learn to use information technology and also learn about its capacities, scope and limitations. They need to become innovative in perceiving possible uses of information technology, and to orient themselves towards the future, with an awareness of the implications of these possible uses.

With appropriate knowledge and skills, students will be equipped to make use of information technology and make informed choices, both at a personal level and within the workplace, about the nature of future developments and directions in this exciting and challenging field.

AIMS

This study is designed to enable students to:

- acquire and apply knowledge and skills in using information technology;
- initiate and respond to technological change;
- understand the technical components and structure of information systems and the interactions of these components;
- acquire and apply knowledge of the characteristics of information and its management;
- understand the stages associated with information systems development;
- acquire and apply skills, techniques and strategies to creatively and methodically solve problems requiring software solutions and/or system change;
- understand how information technology shapes, and is shaped by, social relations and cultural values;
- develop a critical perspective on the use of information technology in society;
- use information technology as a tool for work, learning, leisure and communication.

STRUCTURE

The study is made up of six units:

Unit 1: Information Technology

Unit 2: Information Technology

Unit 3: Information Processing and Management

Unit 4: Information Processing and Management

Unit 3: Information Systems

Unit 4: Information Systems

Each unit deals with specific content and is designed to enable students to achieve a set of outcomes. Each outcome is described in terms of the key knowledge and key skills students are required to demonstrate.

ENTRY

There are no prerequisites for entry to Units 1, 2 and 3. Students must undertake Unit 3 prior to undertaking Unit 4. Students may elect to do all six units in this study.

DURATION

Each unit involves at least 50 hours of scheduled classroom instruction.

CHANGES TO THE STUDY DESIGN

During its period of accreditation minor changes to the study will be notified in the *VCE Bulletin*. The *VCE Bulletin* is the only source of changes to regulations and accredited studies and it is the responsibility of each VCE teacher to monitor changes or advice about VCE studies published in the *VCE Bulletin*.

MONITORING FOR QUALITY

The Victorian Curriculum and Assessment Authority will, from time to time, undertake an audit of Information Technology to ensure the study is being taught and assessed as accredited. Teachers must ensure that all records and samples of student work are maintained and available should the study be subject to audit. The details of the audit procedures and requirements are published annually in the *VCE Administrative Handbook*. Schools will be notified during the teaching year of schools and studies to be audited.

SAFETY

It is the responsibility of the school to ensure that duty of care is exercised in relation to the health and safety of all students undertaking the study.

COMMUNITY STANDARDS

It is the responsibility of the school to ensure that all activities in this study are conducted within ethical guidelines. This is of particular concern in the use of information located on the Internet. When acquiring and using data, the provisions of the *Privacy Act 1988* and the *Privacy Amendment (Private Sector) Act 2000*, must be considered.

EQUIPMENT

The quantity and nature of information technology resources required will depend on the units offered, the number of students taking the units and the applications of information technology to be studied.

The following information technology resources are regarded as minimum requirements for students to be able to demonstrate the required outcomes.

Equipment:

- computers
- printers
- a range of software tools, each supporting the solution of a different type of problem. Problem types and associated tools include:
  - formatting, storing and retrieving text; for example, word processor, text editor, database management system, integrated text management package
  - creating mathematical models; for example, spreadsheet, statistical package, symbolic mathematical package, discrete and continuous simulation packages
  - creating graphical output; for example, drawing and graphical packages, desktop publishing packages
  - creating multimedia information; for example, packages to edit, retrieve, insert, delete information such as text, sound, static image, moving image
  - accessing remote information; for example, email, bulletin board, remote program execution, online information retrieval, packages supporting access to satellite data, gophers, World Wide Web access
  - program preparation; for example, tools that support programming, including editing, compilation, execution, debugging/testing, and presentation in graphic form
- link to Internet
- an ergonomically sound work environment, including adjustable seats, appropriate lighting, sound insulation of printers.

Additional resources could include:

- alternative input and output devices; for example, light pen, scanner, digital camera, speakers, plotter
- access to resources external to the school; for example, technology centres.

Assessment and reporting

SATISFACTORY COMPLETION

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit. Designated assessment tasks are provided in the details for each unit. The Victorian Curriculum and Assessment Authority will publish annually an assessment guide, which will include advice on the scope of the assessment tasks and the criteria for assessment for Units 3 and 4.

Teachers must develop courses that provide opportunities for students to demonstrate achievement of outcomes. Examples of learning activities are provided in the Advice for Teachers section.

Schools will report a result for each unit to the Victorian Curriculum and Assessment Authority as S (Satisfactory) or N (Not Satisfactory).

Completion of a unit will be reported on the Statement of Results issued by the Victorian Curriculum and Assessment Authority as S (Satisfactory) or N (Not Satisfactory). Schools may report additional information on levels of achievement.

AUTHENTICATION

Work related to the outcomes will be accepted only if the teacher can attest that, to the best of their knowledge, all unacknowledged work is the student's own. Teachers need to refer to the current year's *VCE Administrative Handbook* for authentication procedures.

LEVELS OF ACHIEVEMENT

Units 1 and 2

Procedures for the assessment of levels of achievement in Units 1 and 2 are a matter for school decision. Assessment of levels of achievement for these units will not be reported to the Victorian Curriculum and Assessment Authority. Schools may choose to report levels of achievement using grades, descriptive statements or other indicators.

Units 3 and 4

The Victorian Curriculum and Assessment Authority will supervise the assessment of all students undertaking Units 3 and 4.

In Information Technology the student's level of achievement will be determined by school-assessed coursework, and an end-of-year examination. The Victorian Curriculum and Assessment Authority will report the student's level of performance on each assessment component as a grade from A+ to E or UG (ungraded). To receive a study score, students must achieve two or more graded assessments and receive S for both Units 3 and 4. The study score is reported on a scale of 0–50. It is a measure of how well the student performed in relation to all others who took the study. Teachers should refer to the *VCE Administrative Handbook* for the current year for details on graded assessment and calculation of the study score. Percentage contributions to the study score are as follows:

- Unit 3 school-assessed coursework: 25 per cent
- Unit 4 school-assessed coursework: 25 per cent
- Units 3 and 4 examination: 50 per cent

Details of the assessment program are described in the sections on Units 3 and 4 in this study design.

Unit 1: Information Technology

The focus of this unit is the study of how individuals use, and can be affected by, information technology in their daily lives. Students acquire and apply a range of knowledge and skills to create solutions that inform, persuade, educate or entertain. The output produced from solutions may be information, such as a flyer, or they may be actions, such as controlling the lights for a school musical. Students examine the functions and technical capabilities of hardware and software components and investigate how these components are configured to form a computer system.

Students explore how their lives are affected by information technology. They critically evaluate the quality of information available from Internet sources and assess the social effects of using information technology for the purposes of informing, persuading, educating or entertaining.

For this unit students are required to demonstrate achievement of three outcomes. Each outcome requires the demonstration of knowledge and skills focusing on the three aspects of the Information Technology study design, namely:

- using information technology to acquire information or create solutions;
- understanding the characteristics of, and relationships between, the components of computer systems;
- examining how information technology shapes, and is shaped by behaviour, attitudes and relationships.

The emphasis given to each of these aspects varies for each outcome. When using information technology, students should use a software tool capable of producing a solution that informs, persuades, entertains or educates. There are no restrictions on the software tool that students can study.

AREAS OF STUDY

1. IT techniques: solutions and outputs

This area of study focuses on the use of information technology to solve problems. Students are expected to use a range of processing techniques and suitable formats and conventions in order to create solutions that inform, persuade, entertain or educate. When acquiring data and information, students are expected to evaluate the quality of the source and the content.

This area of study will include:

- characteristics of data and information and reasons for their use;
- types of solutions that can be created through the use of information technology;
- types of information that informs, persuades, educates or entertains;
- sources of information;

- a problem-solving methodology: analyse, design, develop, test, document, implement and evaluate;
- techniques for representing the design of solutions and output;
- an overview of the major steps associated with information processing: acquisition, input, validation, manipulation, storage, output, communication, retrieval and disposal;
- techniques for acquiring and manipulating data and information;
- Internet search strategies for expanding or refining the scope of information sought;
- formats and conventions applied to information in order to achieve its purpose;
- presentation characteristics of websites that fulfil different purposes;
- criteria for evaluating the effectiveness of solutions and output;
- factors affecting the quality of information;
- criteria for evaluating the credibility of electronic and non-electronic information sources;
- procedures for effectively managing the production and handling of data and information.

2. IT: possibilities and consequences

This area of study focuses on reasons for using information technology, and how lives are affected by these applications. In particular, students are expected to describe the social effects of using information technology for the purposes of informing, persuading, entertaining or educating, and to evaluate how personal opinions or decisions are affected by the quality of information acquired via the Internet.

This area of study will include:

- settings in which computer systems are used to create solutions and output that inform, persuade, educate or entertain;
- personal uses of computer systems;
- effects on behaviour, attitudes and relationships resulting from the use of information technology;
- ethical and legal considerations relating to the use of information acquired from the Internet;
- factors affecting personal opinions or decisions, such as gender, race and cultural context.

3. IT: components of computer systems

This area of study focuses on the functions and technical capabilities of hardware and software components of computer systems. Students are expected to examine the configuration of computer systems and to explore the technology used to support the Internet.

This area of study will include:

- functions, characteristics, capabilities and limitations of hardware and software components;
- relationships between the capabilities of the hardware and software components;
- overview of computer system architecture;
- factors affecting the design of a computer system;
- factors to consider when installing peripherals;
- roles and capabilities of the technology used to publish and access information on the Internet;
- methods taken by search engines to scan the web.

OUTCOMES

For this unit students are required to demonstrate achievement of three outcomes. As a set these outcomes encompass all areas of study for the unit.

Outcome 1

On completion of this unit the student should be able to use information technology to create a solution that informs, persuades, educates or entertains, and to describe how behaviour, attitudes and relationships are affected by the use of information technology for this purpose.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1, 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- types of solutions that can be created through the use of information technology to produce updatable information that informs, persuades, educates or entertains, such as templates for print and online documents and program codes for games;
- types of information that informs, persuades, educates or entertains, such as flyers to inform of an event, advertisements to persuade, online instruction manuals to educate, games to entertain;
- characteristics of information produced for different purposes, such as structure (for example, detailed, summarised); form (for example, text, sound, moving and still images, statistical); layout and meaning of text and symbols (for example, linear and non-linear, order of text and placement of icons, sentence construction, formality and tone of presentation);
- functions, characteristics, capabilities and limitations of hardware and software components used to produce solutions and output; for example, motherboard, RAM, CD-ROM drive, software tools, keyboard, digital camera;
- a problem-solving methodology to analyse, design, develop, test, document, implement and evaluate solutions and output that meet the needs of informing, persuading, educating or entertaining;
- techniques for representing the design of solutions and output, such as annotated diagrams for the layout of output, user interface and input screens; flow charts for identifying automated processes; storyboards for identifying relationships between modules;
- an overview of the major steps associated with information processing: acquisition, input, validation, manipulation, storage, output, communication, retrieval and disposal;
- techniques for manipulating data and information, such as inserting a graphic image from a digital camera into a presentation file, cropping an image to fit a designated size in a web page or a newsletter, inserting a hyperlink in a web page;
- formats and conventions applied to information in order to achieve its purpose, such as selecting the format (or layout) of presentation based on data types, purposes of information, audience needs and available technology; applying mandatory conventions (for example, inclusion of an Australian Business Number on business stationery); applying preferred conventions (for example, use of Australia Post preferred address on envelopes); applying optional conventions (for example, the use of bold or italics for emphasis and the number of colours used in an electronic publication);

- criteria for evaluating the effectiveness of a solution and output, such as readability, completeness, attractiveness, accuracy, ease of use, achievement of purpose;
- procedures for effectively managing the production and handling of data and information related to the creation of a solution and output; for example, regular backing-up of files, applying virus-checking methods to reduce data infection, structuring file directories, naming conventions for directories/folders and files;
- effects on behaviour, attitudes and relationships resulting from the use of information technology for the purposes of informing, persuading, educating or entertaining.

Key skills

To achieve this outcome the student should demonstrate the ability to

- identify the characteristics of information that meets the identified need stated in a design brief;
- apply techniques to represent the design of a solution (and output, where appropriate);
- select appropriate software tools and apply suitable functions, formats and conventions to process data and produce an effective solution (and output, where appropriate);
- apply techniques and procedures to manage the production and handling of electronic files;
- evaluate a solution (and output, where appropriate) in terms of its effectiveness in meeting an identified need;
- describe how behaviour, attitudes or relationships are affected by using information technology for the purpose of informing, persuading, educating or entertaining.

Outcome 2

On completion of this unit the student should be able to propose and justify the components and configuration of a computer system to meet a personal need.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1, 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- settings in which computer systems are used to create solutions and output that inform, persuade, educate or entertain; for example, homes, schools, libraries;
- personal uses of computer systems; for example, accessing and downloading music files and online games, researching family history using the Internet, creating games, 'chatting' with known and unknown people, purchasing goods and services, recording financial transactions;
- functions, characteristics, capabilities and limitations of hardware and software components; for example, speed of operation, capacity, cost, security, ease of use of components such as operating systems, interface slots, digital cameras, application software, modems;
- sources of information about the characteristics and capabilities of hardware and software components, such as technical references (for example, product catalogues, user manuals), mass media (for example, radio and television, newspapers, magazines), electronic resources (for example, Internet, CD-ROMs);
- factors to consider when installing peripherals, such as compatibility between components and interfacing issues;

- overview of computer system architecture including the main components and their connections; for example, the cpu, buses, RAM, and essential peripherals: keyboard, disk drives, mouse;
- relationships between the capabilities of the hardware and software components; for example, colour font onscreen prints black on a black and white printer, low-resolution monitor will give poor display of photographs;
- factors affecting the design of a computer system; for example, compatibility of components, ability to produce required information, ability to fulfil required functions such as running a digital versatile disk (DVD), cost, ease of use, need to secure confidential information, health and safety consideration such as the weight of a laptop.

Key skills

To achieve this outcome the student should demonstrate the ability to

- outline the requirements for a computer system, including its purpose and its function;
- access information from different sources (at least one electronic) to identify possible components and configurations;
- select the required components and describe their functions;
- justify the selection of the components in terms of how they assist in achieving the specified purpose;
- represent diagrammatically how the components are configured to form a computer system.

Outcome 3

On completion of this unit the student should be able to assess the extent to which the quality of information acquired via the Internet influences personal opinions or decisions.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1, 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- roles and capabilities of the technology used to publish and access information on the Internet, such as modems to convert and transmit signals, browsers to translate the code of web pages and display the results, transmission media to connect computers; for example, telephone lines, fibre optic cable;
- characteristics of data and information, such as the unprocessed, unorganised and discrete nature of data; the refined, organised and value-added nature of information;
- reasons for using information; for example, to become informed about a current event (inform), to assist in making decisions about the purchase of a good or service (persuade), to increase the level of understanding of a concept (educate), to be amused (entertain);
- factors affecting the quality of information; for example, suitability, reliability, meaning, accuracy, accessibility, completeness, timeliness and bias;
- criteria for evaluating the credibility of Internet sources, such as authority (for example, .edu websites compared to .org websites), currency (for example, date of posting an item to a newsgroup), cultural context (for example, biases and values belonging to, or associated with, the authors);

- presentation characteristics of websites that fulfil different purposes; for example, elaborate design for sites that intend to persuade, action-based design for sites to entertain, use of special symbols, text-equivalent versions of images and Braille displays to inform people with special needs;
- methods taken by search engines to scan the web; for example, search engines that index on the basis of keywords, topic headings or concepts, and meta-search engines that compile the results of multiple search engines or enable the searching of several engines from one place;
- Internet search strategies for expanding or refining the scope of information sought; for example, identifying keywords and synonyms for the information needed, constructing a search strategy using appropriate commands such as Boolean operators and proximity operators;
- ethical and legal considerations relating to the use of information acquired from the Internet; for example, obtaining, storing and publishing information that does not breach copyright laws or privacy principles and respects the intellectual property of others by citing sources; requesting permission to establish an external link from your own website;
- factors affecting personal opinions or decisions, such as biases, cultural context and peer pressure.

Key skills

To achieve this outcome the student should demonstrate the ability to

- explain why information is required to assist in shaping personal opinions or making personal decisions;
- construct and perform an Internet search strategy to access information relating to an identified need;
- compare the approach taken by different search engines to locate information;
- evaluate how the presentation of the information affects the impact of a message;
- examine and compare information from various Internet sources to evaluate the reliability, accuracy, authority, completeness, accessibility, timeliness and points of view or bias;
- store relevant information, using appropriate file management procedures and techniques;
- use information technology to present a comparison of the quality of the information retrieved and an explanation of how differences in quality affect the extent to which the information can be relied on for validating personal opinions or decisions;
- apply suitable citing techniques for each information source.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe.

Demonstration of achievement of Outcomes 1, 2 and 3 must be based on the student's performance on a selection of assessment tasks. Where teachers allow students to choose between tasks they must ensure that the tasks they set are of comparable scope and demand. Assessment tasks for this unit are:

- designing and developing a solution in response to a design brief, using information technology tools and techniques;
- visual presentations, such as a poster and an electronic file (for example, multimedia, presentation);
- short written reports;
- oral reports supported by visual presentations;
- tests (short answer, open book, practical).

Unit 2: Information Technology

The focus of this unit is the study of how individuals and organisations, such as small businesses, charitable institutions, sporting clubs and government agencies use, and can be affected, by information systems. Students acquire and apply a range of knowledge and skills to create solutions that assist in controlling systems or managing information. The output produced from solutions may be information, such as pay advice statements or actions, such as the ringing of an alarm. Students also work in project teams to coordinate the creation of electronic publications. They evaluate the extent to which the publications fulfil social, legal and ethical responsibilities.

Students examine the roles and functions of the components of information systems and investigate how these components are configured to form a small local area network. The proposed network is evaluated in terms of its potential economic effect on individuals or organisations.

For this unit students are required to demonstrate achievement of three outcomes. Each outcome requires the demonstration of knowledge and skills focusing on the three aspects of the Information Technology study design, namely:

- using information technology to create solutions and output;
- understanding the characteristics of, and relationships between, the components of information systems;
- examining how information systems shape, and are shaped by, the behaviours and attitudes of individuals and organisations and the relationship between them.

The emphasis given to each of these aspects varies for each outcome. When using information technology to solve information problems, students should use at least two software tools. One software tool must be capable of controlling systems or managing information (Outcome 1). The software tool should be selected from these types of software: programming languages, databases, spreadsheets. The other software tool must be capable of producing an electronic publication for use on a network (Outcome 2). The software tool should be selected from these types of software: web authoring, multimedia authoring, presentation. If students have undertaken Unit 1 they may continue to use the software tool previously studied.

AREAS OF STUDY

1. IT techniques: processes and management

This area of study focuses on the techniques, procedures and methods for efficiently and effectively processing data and managing information. Students will use a range of techniques for the software tools studied and apply suitable formats and conventions when creating solutions and output. Strategies for managing the development of an electronic publication by a team are also included in this area of study.

This area of study will include:

- characteristics of data and information and reasons for their use;
- characteristics of information produced for different purposes;
- purposes of solutions;
- types of information required for different purposes;
- sources of information;
- factors affecting the quality of solutions and output;
- a problem-solving methodology: analyse, design, develop, test, document, implement and evaluate;
- techniques for representing the design of solutions and output;
- an overview of the major steps associated with information processing: acquisition, input, validation, manipulation, storage, output, communication, retrieval and disposal;
- methods and techniques for acquiring and manipulating data and information;
- methods and techniques to enhance the quality of data;
- formats and conventions applied to information in order to achieve its purposes;
- procedures and techniques used for effectively managing the storage, communication, retrieval and disposal of information;
- procedures used for effectively managing the production and handling of data and information;
- strategies for coordinating the technical and human resources;
- criteria for evaluating the efficiency of processing and the effectiveness of solutions and output.

2. IT: applications and implications

This area of study focuses on reasons for using information systems, and how individuals and organisations are affected by these applications. In particular, students are expected to describe the economic effects of using networked information systems, and to evaluate an electronic publication in terms of its ability to fulfil social, legal or ethical responsibilities.

This area of study will include:

- reasons for individuals and organisations using information systems;
- settings in which information systems are used;
- social, legal and ethical considerations relating to the creation of an electronic publication;
- economic effects on individuals and organisations resulting from the implementation of networks.

3. IT: information systems

This area of study focuses on the types and characteristics of networked information systems. Students are expected to examine the configurations of information systems and networks.

This area of study will include:

- functions, characteristics, capabilities and limitations of hardware and software components;
- types of information systems used by individuals and organisations;
- components of information systems including people, equipment, procedures, data;
- types of networks and data communications systems;
- an overview of network topologies, including strengths and weaknesses;
- an overview of network operating systems and network architecture;
- factors affecting the design of a networked information system.

OUTCOMES

For this unit students are required to demonstrate achievement of three outcomes. As a set these outcomes encompass all areas of study for the unit.

Outcome 1

On completion of this unit the student should be able to use information technology to create a solution that controls a system or manages information, and evaluate the efficiency of processing and the effectiveness of the solution.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1 and 3.

To achieve this outcome the student should demonstrate knowledge of

- characteristics of information produced for different purposes, such as structure (for example, modularity in a program; relational and flat file structure in a database), nature of output (for example, control signal from automated system, financial statement from a spreadsheet), method acquiring data (for example, sensors, data-entry screens);
- purposes of solutions, including controlling systems (for example, water pollution-recording programs that capture data via probes), and managing information (for example, spreadsheet files to monitor cash flows);
- functions, characteristics, capabilities and limitations of hardware and software components used to create solutions and output; for example, the capacity, speed of operation, ease of use of components such as application software, digital camera, CD-ROM drive;
- a problem-solving methodology: analyse, design, develop, test, document, implement and evaluate;
- factors affecting the quality of solutions and output such as ease of use, attractiveness, readability, accuracy of information;
- techniques for representing the design of solutions and output, such as annotated diagrams for the layout of output, user interface and input screens, flow charts for identifying automated processes, hierarchy charts, Input–Process–Output charts to represent the relationships between data, processes and output;
- an overview of the major steps associated with information processing: acquisition, input, validation, manipulation, storage, output, communication, retrieval and disposal;

- methods and techniques to enhance the quality of data; for example, organising data into fields, applying data validation techniques;
- techniques for manipulating data and information, such as inserting a graphic image from a digital camera into a data-entry form, creating macros to link files, sorting techniques;
- formats and conventions applied to information in order to achieve its purpose, such as presenting statistics in the format of tables, graphs or worded explanations, and applying conventions, such as using indentations to accentuate the structure of program statements, right aligning of numbers in columns to maintain unit values;
- criteria for evaluating the efficiency of processing and the effectiveness of a solution and output, such as speed, effort and cost of processing techniques (efficiency), the accuracy, clarity, readability and attractiveness of output, and achievement of purpose of solution and output (effectiveness);
- procedures and techniques for managing the storage, communication, retrieval and disposal of information; for example, regular archiving of files, meaningful file- and directory-naming procedures.

Key skills

To achieve this outcome the student should demonstrate the ability to

- identify the characteristics of a solution (and output, where appropriate) that enable it to meet an identified purpose;
- apply techniques to represent the design of a solution (and output, where appropriate);
- select appropriate software tools and apply suitable functions, formats and conventions to process data efficiently and produce an effective solution (and output, where appropriate);
- apply techniques and procedures to manage the production and handling of electronic files;
- evaluate the efficiency of processing data and the effectiveness of the solution (and output, where appropriate).

Outcome 2

On completion of this unit the student, individually and as a team member, should be able to develop a project plan, create an electronic publication that promotes a point of view, and evaluate the project plan and the publication.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1, 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- characteristics of electronic publications produced for different purposes, such as structure (for example, detailed, sampled), form (for example, text, sound, moving and still images, statistical), structure and meaning of text and symbols (for example, linear and non-linear, order of text and placement of icons, and presentation);
- functions, characteristics, capabilities and limitations of hardware and software components used to create electronic publications; for example, speed, clarity and capacity of components such as browsers, modems, digital cameras, application software, scanners;
- a problem-solving methodology: analysing, designing, developing, testing, documenting, implementing and evaluating;

- sources of information on specific topics, such as mass media (for example, radio and television, newspapers, magazines), electronic resources (for example, Internet, CD-ROMs);
- factors affecting the quality of electronic publications, such as provision of alternative viewing options for people with special needs, time to download graphic images, currency and validity of information, ease of use, attractiveness, readability;
- strategies for coordinating the technical and human resources required to create an electronic publication including identifying tasks, allocating responsibilities, developing timelines, determining indicators to monitor the progress of plans;
- social, legal and ethical considerations relating to the creation of an electronic publication; for example, requesting permission to establish an external link from an existing website, acknowledging copyright laws and privacy principles, including information that does not place individuals or groups at risk, or offend sections of the community;
- techniques for representing the design of electronic publications, such as storyboards for identifying relationships between modules, maps for identifying navigation pathways;
- an overview of the major steps associated with information processing: acquisition, input, validation, manipulation, storage, output, communication, retrieval and disposal;
- techniques for manipulating data and information, such as inserting a hyperlink in a web page, using an alt tag to label a button;
- formats and conventions applied to an electronic publication in order to suit its purposes; for example, suitable colour selection for screen viewing, placement of icons, grouping of text into meaningful blocks;
- procedures used for effectively managing the production and handling of data and information related to the creation of an electronic publication by a team; for example, file naming conventions for directories/folders and files, regular backing-up of files.

Key skills

To achieve this outcome the student should demonstrate the ability to

- identify and acquire data to support the team's viewpoint to be expressed in a publication;
- propose a design option and explain why the option was or was not selected by the team for development;
- prepare aspects of a project plan that identifies tasks and responsibilities of the team, timelines, indicators for monitoring progress;
- adjust the project plan if appropriate;
- apply techniques and procedures to manage the production and handling of the designated tasks and files, in accordance with the project plan;
- work effectively as a team member;
- evaluate the effectiveness of the project plan in terms of its ability to assist in coordinating the tasks and responsibilities of each team member;
- evaluate the electronic publication in terms of the extent to which it fulfils social, legal or ethical responsibilities.

Outcome 3

On completion of this unit the student should be able to design a small local area network (LAN) and describe a potential economic effect for an individual or an organisation resulting from the implementation of the network.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1, 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- reasons for individuals and organisations using information systems; for example, entertainment, sharing of resources, management of personal finances, predicting business outcomes;
- settings in which information systems are used; for example, homes, and organisations such as partnerships, government departments, public companies, cooperatives;
- types of information systems used by individuals and organisations; for example, expert, transactional and decision support systems for monitoring progress, predicting business outcomes, entertaining and transferring information;
- the components of an information system including people, equipment, procedures, data;
- functions, characteristics, capabilities and limitations of hardware and software components of a network; for example, speed of operation, ease of use, capacity and security of components, such as operating systems, interface slots, application software, modems;
- sources of information about the characteristics and capabilities of network topologies and network architecture, such as technical references (for example, product catalogues, user manuals), mass media (for example, radio and television, newspapers, magazines), electronic resources (for example, Internet, CD-ROMs);
- types of networks, such as local area networks (LAN) and wide area networks (WAN);
- an overview of types of data communications systems such as fibre optic cabling, wireless links;
- an overview of network topologies, including strengths and weaknesses;
- an overview of network operating systems, network architecture and protocols;
- factors affecting the design of a networked information systems; for example, compatibility of components, bandwidth, ability to produce required information, cost, need to secure confidential information, ability to fulfil required functions;
- economic effects on individuals and organisations resulting from the implementation of networks; for example, ability to work from home reduces travelling costs, acquisition of new skills may incur a training expense, improved communications speed may improve decision-making, sharing resources reduces cost.

Key skills

To achieve this outcome the student should demonstrate the ability to

- identify a need for a network;
- outline the requirements for the network including its purpose and type;
- access information from different sources (at least one electronic) to identify possible components and configurations;

- select the required components, describe their functions and explain how they assist in achieving the purpose of the network;
- diagrammatically represent the network;
- describe the economic effects of the implementation of the network for an individual or organisation.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe.

Demonstration of achievement of Outcomes 1, 2 and 3 must be based on the student's performance on a selection of assessment tasks. Where teachers allow students to choose between tasks they must ensure that the tasks they set are of comparable scope and demand. Assessment tasks for this unit are:

- designing and developing a solution in response to a design brief, using information technology tools and techniques;
- visual presentations, such as a poster and an electronic file (for example, multimedia, presentation);
- short written reports;
- oral reports supported by visual presentations;
- tests (short answer, open book, practical).

Unit 3: Information Processing and Management

Units 3 and 4 are designed to be taken as a sequence. This unit focuses on why information is used in organisations and the ways in which it is processed and managed. Examples of organisations include small, medium and large businesses, charitable institutions, sporting clubs and government agencies.

The key concepts of this unit are the steps in information processing, and a methodology for solving information problems. In this unit students explore the information processing steps of acquisition, input, validation, manipulation, storage, retrieval, output, communication and disposal. Typically, a problem-solving methodology involves the stages of analysis, design, development, testing, documentation, implementation and evaluation. In Unit 3 all of these stages are required except for documentation; this is covered in Unit 4.

In this unit students explore how organisations manage the storage, communication and disposal of data and information in order to minimise threats to the integrity of data and security of information, and to optimise efficient information handling.

Students should use at least one software tool that enhances the presentation of information so that its message is communicated effectively. The software tool should be selected from these types of software: desktop publishing, web authoring, analytical and illustration graphics, and multimedia authoring. This software tool must be used for both Outcomes 1 and 2. For Outcome 2 an additional software tool may also be used.

AREAS OF STUDY

1. IT techniques: solving information problems

This area of study focuses on the techniques, procedures and methods used to produce useful information. At least one software tool that enhances the presentation of information should be selected for study. Students are to apply a range of processing techniques and appropriate formats and conventions to transform data into useful information (output). For Outcome 1, the output may be a sampler; meaning that it highlights the main features of this software tool without solving the information problem. For Outcome 2, this software tool is used on its own, or in conjunction with another, to solve an information problem.

This area of study will include:

- characteristics of data and information;
- a problem-solving methodology: analyse, design, develop, test, document, implement and evaluate;

- reasons why information problems occur;
- characteristics of audiences;
- problem analysis methods;
- techniques for representing the design of solutions and output;
- the major steps associated with information processing: acquisition, input, validation, manipulation, storage, output, communication, retrieval and disposal;
- interdependence between hardware and software, and how this affects the ability to manipulate data;
- techniques for validating data;
- techniques and procedures for manipulating data and information;
- solution attributes to be tested;
- testing techniques;
- formats, and mandatory, preferred and optional conventions applied to information to meet different needs;
- factors affecting the effectiveness of solutions and output;
- factors affecting the value and suitability of solutions and output;
- procedures used for effectively managing the production and handling of data and information;
- criteria for evaluating the usefulness of software functions for particular purposes.

2. Organisations and information

This area of study focuses on how organisations use a range of procedures, techniques and equipment to manage the storage, communication and disposal of data and information. Organisations need to establish and apply appropriate file management procedures and techniques in order to efficiently and effectively store, communicate and dispose of data and information. The organisation's legal obligations and ethical considerations also influence the nature of the procedures and techniques.

This area of study will include:

- how information systems can be used to help achieve organisational goals;
- ways in which organisations and individuals use information;
- procedures and equipment for managing the storage, communication and disposal of data and information;
- procedures and equipment for protecting the integrity of data and the security of information;
- criteria for evaluating the effectiveness of file management strategies;
- threats to the security of data and information stored, communicated and disposed of by organisations;
- possible consequences of the violation of, or failure to follow, security measures;
- an overview of the legal obligations of organisations and individuals to monitor and control the flow and access of information;
- ethical considerations relating to the use of information systems by organisations and individuals;
- types, roles and functions of equipment used to assist in the protection of files produced and received by organisations.

3. Information systems

This area of study focuses on how information systems achieve their objectives and contribute to meeting organisational goals. An information system comprises people, equipment, procedures and data. This unit focuses on equipment, procedures and data.

This area of study will include:

- types of information system goals and objectives;
- components of information systems, including people, equipment, procedures and data;
- roles and functions of hardware and software components in an information system;
- capabilities and limitations of hardware and software components.

OUTCOMES

For this unit students are required to demonstrate achievement of three outcomes. As a set these outcomes encompass all areas of study for the unit.

Outcome 1

On completion of this unit the student should be able to demonstrate and explain the main capabilities of a specific software tool and a related hardware component through the production of output, and evaluate the usefulness of these capabilities.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1 and 3.

To achieve this outcome the student should demonstrate knowledge of

- capabilities and limitations of hardware and software components used to produce output, including functionality, speed of operation, capacity of components;
- the roles of hardware and software components in an information system;
- the interdependence between the hardware and software, and how this affects the ability to manipulate data; for example, an image captured by a digital camera can be cropped using photo editing software, a scanned text document can only be manipulated with optical character recognition (OCR) software;
- the major steps associated with information processing: acquisition, input, validation, manipulation, storage, output, communication, retrieval and disposal;
- characteristics of data;
- characteristics of information, including structure (for example, detailed, aggregated, summarised), form (for example, text, sound, moving and still images), layout and meaning of text and symbols (for example, linear and non-linear, placement of icons, and presentation);
- techniques for manipulating data to produce output;
- criteria for evaluating the usefulness of software functions for particular purposes.

Key skills

To achieve this outcome the student should demonstrate the ability to

- manipulate data by applying the appropriate software functions, and formats and conventions to produce output that demonstrates capabilities of the software;
- operate related hardware and rectify simple difficulties as they arise;

- explain how the capabilities of the software and hardware components enable the output to be produced;
- evaluate the usefulness of these hardware and software capabilities for print and electronic output.

Outcome 2

On completion of this unit the student should be able to solve an information problem, taking into account the goals and information needs of an organisation.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1, 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- characteristics of information, including structure (for example, detailed, summarised), form (for example, text, sound, images, statistics), layout and meaning of text and symbols (for example, order of text, placement of icons, formality and tone of text);
- formats, and mandatory, preferred and optional conventions, applied to information to meet different needs;
- factors affecting the value and suitability of information produced, including its clarity, timeliness, relevance, completeness, accuracy, appropriateness for the intended audience;
- capabilities and limitations of hardware and software components used to produce solutions and output, including functionality, speed of operation, capacity of components;
- how information systems can be used to help achieve organisational goals;
- ways in which organisations and individuals use information; for example, information can be used to support strategic, tactical or operational decisions, and to inform, persuade, educate or entertain users;
- reasons why information problems occur;
- a problem-solving methodology: analyse, design, develop, test, document, implement and evaluate;
- problem analysis methods including identification of the input data and the output needed to solve a problem, and listing constraints on the solution;
- techniques for representing the design of solutions and output, including Input–Process–Output charts, hierarchy charts, screen/hard copy layout mock-ups, flow charts, storyboards;
- techniques for validating data;
- solution attributes to be tested: functionality, presentation, usability, accessibility, communication of message;
- techniques for navigating complex documents such as hyperlinks, buttons, icons, table of contents, index, page numbering;
- testing techniques including development and implementation, of test plans, and observation and surveys of a sample of users;
- factors affecting the effectiveness of solutions and output including functionality, presentation, usability, accessibility, communication of message;
- characteristics of audiences, including gender, special needs, culture, age, education, status, location;

- the major steps associated with information processing: acquisition, input, validation, manipulation, storage, output, communication, retrieval and disposal;
- techniques and procedures for manipulating data and information;
- procedures used to effectively manage the production and handling of data and information, including regular backups, applying virus-detection software, file naming.

Key skills

To achieve this outcome the student should demonstrate the ability to

- identify a problem and the audience;
- describe the input and output requirements, and the constraints;
- apply appropriate techniques to represent the design of the solution and output;
- apply suitable functions, formats, conventions, validation and testing techniques to manipulate data;
- manage the production and handling of files;
- justify the solution and output in terms of their ability to meet the organisation's goals and information needs.

Outcome 3

On completion of this unit the student should be able to evaluate the effectiveness of the strategies used by an organisation to manage the storage, communication and disposal of data and information.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- how information systems can be used to help achieve organisational goals;
- types of information system goals and objectives;
- components of information systems, including people, equipment, procedures and data;
- the legal obligations of organisations and individuals to monitor and control the flow and access of information, including key provisions of the *Privacy Act 1988* and the *Privacy Amendment (Private Sector) Act 2000*; the *Information Privacy Act* (Vic.) (IPA); the *Health Records Act 2001* (Vic.); *Copyright Amendment (Digital Agenda) Act 2000*;
- ethical considerations relating to the use of information systems by organisations and individuals;
- procedures for managing the storage, communication and disposal of information including the naming and classification systems for directories/folders and files, backup and archiving procedures, file transfer procedures;
- threats to the security of data and information stored, communicated and disposed of by organisations, including viruses, unauthorised access, tampering with files, failure to follow file management procedures (deliberate or accidental), equipment failure/damage;
- procedures and equipment for protecting the integrity of data and the security of information;
- possible consequences of the violation of, or failure to follow, security measures (equipment and procedures); for example, breach of privacy of information, loss of intellectual property, loss of income due to unavailability of information or services;

- types, roles and functions of equipment used to assist in the protection of files produced and received by organisations, including virus protection software, encryption software, biometrics, backup media, firewalls, surveillance technology to protect the security of information;
- criteria for evaluating the effectiveness of file management strategies, including integrity of data, security, ease of retrieval, currency of files.

Key skills

To achieve this outcome the student should demonstrate the ability to

- describe the goals and objectives of a specific information system;
- identify the procedures and equipment used by an organisation to manage the storage, communication and disposal of files;
- develop the criteria used to evaluate the effectiveness of the procedures and equipment;
- explain the strengths and weaknesses of the procedures and equipment used for storing, communicating and disposing of files;
- evaluate the extent to which the procedures meet legal obligations;
- describe consequences for the organisation and/or individuals if security measures are violated or ignored;
- make recommendations to improve the storage, communication or disposal of files produced by the organisation.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment of levels of achievement

The student's level of achievement in Unit 3 will be determined by school-assessed coursework and an end-of-year examination.

Contribution to final assessment

School-assessed coursework for Unit 3 will contribute 25 per cent to the study score.

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 50 per cent to the study score.

School-assessed coursework

Teachers will provide to the Victorian Curriculum and Assessment Authority a score representing an assessment of the student's level of achievement.

The score must be based on the teacher's rating of performance of each student on the tasks set out in the following table and in accordance with an assessment guide published annually by the

Victorian Curriculum and Assessment Authority. The assessment guide will also include advice on the scope of the task and the criteria for assessment.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Where optional assessment tasks are used, teachers must ensure that the tasks are comparable in scope and demand.

Outcomes	Assessment tasks	Marks allocated*
Outcome 1 Demonstrate and explain the main capabilities of a specific software tool and a related hardware component through the production of output, and evaluate the usefulness of these capabilities.	A short, practical test, including a written response.	20
Outcome 2 Solve an information problem, taking into account the goals and information needs of an organisation.	Information technology solution in response to a design brief and a report in one of the following modes: • a written report or • a visual presentation (presentation file, poster)	50
Outcome 3 Evaluate the effectiveness of the strategies used by an organisation to manage the storage, communication and disposal of data and information.	• a written report or • a test	30
	Total marks	**100**

* School-assessed coursework for Unit 3 contributes 25 per cent to the study score.

Unit 4: Information Processing and Management

This unit focuses on a range of techniques, procedures and strategies to solve information problems efficiently and effectively, and to manage the development, implementation and evaluation of a new or modified information system.

In this unit students are required to demonstrate all of the information processing steps when solving an information problem. Students use a software tool to produce solutions and output that enhance decision making. The software tool should be selected from these types of software: databases, spreadsheets. When producing solutions and output, students apply all of the problem-solving steps: analysis, design, development, testing, documentation, implemention and evaluation.

Students explore the main principles of project management when managing their time and resources to create a solution to an information problem. They also apply these principles by recommending strategies to manage the development, implementation and evaluation of a new or modified information system.

In this unit students explore the concept of the systems development life cycle and its use as a problem-solving methodology, and examine in detail the phases of development, implementation and evaluation.

AREAS OF STUDY

1. Problem solving

This area of study focuses on how information is used in organisations and some procedures and techniques to produce and manage information. Students will study a software tool that enables the creation of solutions and output that will enhance decision making. This area of study includes the main principles of project management as they apply to solving information-processing problems.

This area of study will include:

- characteristics of information used in organisations;
- types of decisions made in organisations;
- a problem-solving methodology: analyse, design, develop, test, document, implement, evaluate;
- project management strategies for coordinating the development of a solution;

- problem analysis methods;
- techniques for representing the design of solutions and output;
- techniques for validating data;
- techniques for efficiently processing data;
- procedures for effectively managing the production and handling of data and information;
- formats and conventions applied to information to meet different needs;
- solution and output attributes to be tested;
- techniques for testing solutions and output;
- techniques for testing user acceptance;
- types of user documentation to support the ongoing use of solutions;
- criteria for evaluating the efficiency of solutions and effectiveness of output.

2. Managing change

This area of study focuses on strategies and techniques for efficiently and effectively managing changes to information systems. Students explore the concept of the systems development life cycle and its use as a problem-solving methodology, and study in particular how the life cycle phases of development, implementation and evaluation can be managed.

This area of study will include:

- the systems development life cycle: analysis, design, development, implementation, evaluation;
- social, economic and technological impetus for change;
- social, economic and technological factors affecting the feasibility of alternative hardware, software and procedural designs;
- human, technical and procedural requirements to be considered when implementing changes;
- methods of changing over to the new or modified information system;
- project management tools and techniques;
- criteria and methods for evaluating the proposed changes to information systems.

3. Information systems (networks)

This area of study focuses on the types and characteristics of networked information systems, and how they are used to achieve organisational goals.

This area of study will include:

- how information systems can be used to help achieve organisational goals;
- types of networks and data communications systems and their specifications;
- network topologies;
- network operating systems, and network architecture and components.

OUTCOMES

For this unit students are required to demonstrate achievement of two outcomes. As a set these outcomes encompass all areas of study for the unit.

Outcome 1

On completion of this unit the student should be able to propose and apply organisational and processing strategies to produce an ongoing solution that meets the decision-making needs of an organisation.

Key knowledge

In achieving this outcome the student will draw on knowledge described in area of study 1.

To achieve this outcome the student should demonstrate knowledge of

- the characteristics of information used in organisations, including structure (for example, detailed, summarised), form (for example text, statistics, still images);
- types of decisions made in organisations, including strategic, tactical and operational;
- a problem-solving methodology to develop solutions that meet current and ongoing needs: analyse, design, develop, test, document, implement, evaluate;
- problem analysis methods, including identifying the input data and the output needed to solve a problem, and listing constraints on the solution;
- project management strategies for coordinating the development of a solution and output: identify tasks, develop timelines, determine indicators and methods to monitor the progress of plans;
- techniques for representing the design of solutions and output, including the hardware and software requirements, input requirements (for example, data structure diagram), steps involved to produce the required information (for example, structure chart), output requirements (for example, sketches);
- techniques for validating data;
- techniques for efficiently processing data;
- procedures for effectively managing the production and handling of data and information, including regular backups, applying virus-detection software, classifying files into appropriate directories/folders;
- formats and conventions applied to information to meet different needs;
- solution and output attributes to be tested: functionality, presentation, usability, accessibility;
- types of user documentation to support the ongoing use of solutions;
- techniques for testing the solution and output, including comparing the expected output with the actual output, checking the relevance and completeness of the output, performing manual calculations to check results of formulae;
- techniques for testing user acceptance; for example, observation and surveys of a sample of users;
- criteria for evaluating the efficiency of the solution and the effectiveness of the output.

Key skills

To achieve this outcome the student should demonstrate the ability to

- identify a problem;
- describe the input and output requirements, and constraints;
- apply techniques to represent the solution;
- prepare a project management plan that identifies tasks, timelines, indicators for monitoring progress;
- apply suitable functions, formats, conventions, data validation and testing techniques to efficiently process data and produce effective output;
- record the progress of creating the solution (and output, where appropriate), including an error log;
- prepare user documentation that explains how to use the solution and output;
- manage the production and handling of files;
- evaluate the solution and output in terms of ability to meet the decision-making needs of the organisation.

Outcome 2

On completion of this unit the student should be able to formulate and justify strategies for developing, implementing and evaluating a networked information system in response to a social, economic or technological impetus for change.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- how information systems can be used to help achieve organisational goals;
- types of networks and data communications systems and their specifications, including local area networks (LANs) and wide area networks (WANs), and cabling and bandwidth;
- types of network topologies, including star, bus;
- network operating systems and network architecture and components, such as network cards, switches, routers, servers, together with protocols such as TCP/IP;
- the systems development life cycle: analysis, design, development, implementation, evaluation;
- social, economic and technological impetus for change, including government policy, community values, privacy of information (social); desire for competitive edge, telecommuting, downsizing (economic); availability of new equipment, planned obsolescence (technological);
- social, economic and technological factors affecting the feasibility of alternative hardware, software and procedures designs, such as cost, user-friendliness of procedures or equipment, compatibility of components, inclusiveness;
- human, technical and procedural requirements to be considered when implementing changes to an information system, including staff training, ongoing technical support, acceptance by users, health and safety of users;
- methods of changing over to the new or modified information system, including direct, parallel, phased, pilot;

- project management tools and techniques to schedule and monitor tasks, to assign resources, identify milestones, determine contingency plans including the development and interpretation of Gantt charts and PERT charts;
- criteria for evaluating the proposed changes to information systems; including efficiency, effectiveness, cost, maintainability;
- methods for evaluating the success of the proposed changes to information systems; for example, recording equipment breakdowns, monitoring absentee rates, logging help desk inquiries, surveying customers.

Key skills

To achieve this outcome the student should demonstrate the ability to

- state the objectives of a new information system and how they relate to the social, economic or technological impetus for change;
- develop criteria for selecting the computer system hardware and software;
- develop criteria for selecting the network hardware and software;
- propose any changes to existing procedures;
- explain the human, technical and procedural issues to be considered when implementing change;
- justify a method for changing over to the new or modified system, taking into account the human and technical issues and any changes to procedures;
- identify the key tasks associated with the implementation of the new or modified system, such as training, documentation, evaluation criteria, ergonomic requirements;
- develop a project management plan to coordinate the implementation of the new or modified system, which includes tasks, timelines, allocation of resources;
- explain methods for evaluating the success of managing the implementation of the new or modified system;
- evaluate the success of the information system in achieving its objectives.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment of levels of achievement

The student's level of achievement in Unit 4 will be determined by school-assessed coursework and an end-of-year examination.

Contribution to final assessment

School-assessed coursework for Unit 4 will contribute 25 per cent to the study score.

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 50 per cent to the study score.

School-assessed coursework

Teachers will provide to the Victorian Curriculum and Assessment Authority a score representing an assessment of the student's level of achievement.

The score must be based on the teacher's rating of performance of each student on the tasks set out in the following table and in accordance with an assessment guide published annually by the Victorian Curriculum and Assessment Authority. The assessment guide will also include advice on the scope of the task and the criteria for assessment.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Where optional assessment tasks are used, teachers must ensure that they are comparable in scope and demand.

Outcomes	Assessment tasks	Marks allocated*
Outcome 1 Propose and apply organisational and processing strategies to produce an ongoing solution that meets the decision-making needs of an organisation.	Information technology solution (including user documentation) in response to a design brief. Students annotate the solution to indicate how it meets the decision-making needs of the organisation. and A project management report that includes the management plan, record of progress and an error log	40 20
Outcome 2 Formulate and justify strategies for developing, implementing and evaluating a networked information system in response to a social, economic or technological impetus for change.	• a written report or • a test or • a visual presentation (presentation file, poster)	40
	Total marks	**100**

* School-assessed coursework for Unit 4 contributes 25 per cent to the study score.

End-of-year examination (Units 3 and 4)

Description

All outcomes in Units 3 and 4 will be examined. Aspects of some outcomes that require the use of computers will not be examined, however the underpinning key knowledge associated with these practical aspects is examinable.

Both Units 3 and 4 will contribute approximately equally to the examination. The following table identifies the approximate contribution of each outcome and unit to the examination.

Unit	Outcome	Approximate mark allocation (per cent)
3	1	8–12%
	2	12–18%
	3	20–30%
4	1	16–24%
	2	24–36%

Format

Students will answer a series of questions in a question and answer booklet. Questions may require students to respond to stimulus material such as design briefs, case studies and visual images.

All questions are compulsory.

The examination will be set by a panel appointed by the Victorian Curriculum and Assessment Authority.

Conditions

The examination will be completed under the following conditions:

- Duration: two hours.
- Date: end-of-year, on a date to be published annually by the Victorian Curriculum and Assessment Authority.
- Victorian Curriculum and Assessment Authority examination rules will apply. Details of these rules are published annually in the *VCE Administrative Handbook.*
- The examination will be marked by a panel appointed by the Victorian Curriculum and Assessment Authority.

Contribution to final assessment

The examination contributes 50 per cent to the study score.

Unit 3: Information Systems

Units 3 and 4 are designed to be undertaken as a sequence. This unit focuses on techniques and procedures to analyse and design information systems and to partially develop a software design specification through the use of a programming language. Students explore the roles and functions of information systems, types of networks, and they apply three of the systems development life cycle phases; analysis, design and development. The use of this concept as a problem-solving methodology is also covered in this unit.

Students acquire and apply knowledge and skills to represent the components, and the relationship between the components, of a networked information system. They analyse the operation of an information system, and explore design options in order to develop the physical design specifications for a modified or new networked information system.

In this unit students are expected to undertake the design and coding of a software module, using a programming language. Students also explore how the development of programs is influenced by legal obligations and ethical responsibilities. Students are not expected to fulfil an entire software design specification for Outcome 3; only a module needs to be developed. Typically, the stages of software development involve analysing, designing, developing, testing, documenting and evaluating. For Outcome 3 students are only required to engage in the phases of designing, developing and testing. In Unit 4 students are required to undertake all stages of software development.

The programming language selected will be studied for both Unit 3 and Unit 4. The language must be a general-purpose, information-processing language: a list of suggested suitable languages will be published by the Victorian Curriculum and Assessment Authority in the *VCE Bulletin*.

AREAS OF STUDY

1. Information systems and networks

This area of study focuses on the types, purposes and components of information systems used in a range of settings. Types of networks, network topologies and data communications form part of this area of study.

This area of study will include:

- types of information systems used by individuals and organisations;
- purposes of using information systems in a range of settings;
- information system goals and objectives;
- roles and functions of the components of an information system, including people, equipment, procedures, data;

- computer architecture;
- types of networks and the types and capabilities of network topologies;
- network operating systems, network architecture and components;
- tools to represent the components, and relationship between the components, of a networked information system.

2. Information systems engineering (analysis and design)

This area of study focuses on the main phases associated with the systems development life cycle; analysis, design, development, implementation and evaluation. Within this context students study in depth the analysis, design and development phases in Unit 3. In Unit 4 students study the development phase, together with an in-depth study of the implementation and evaluation phases. In both units, students explore the use of the systems development life cycle as a problem-solving methodology.

This area of study will include:

- the systems development life cycle, including analysis, design, development, implementation and evaluation;
- economic, social and technical factors prompting change within organisations;
- information system goals and objectives;
- roles and functions of the components of information systems;
- primary and secondary data sources and data acquisition methods to conduct an analysis;
- types of data and a range of equipment appropriate for inputting, processing, storing, accessing and outputting data and information;
- existing information system context, processes and data structures;
- logical design techniques for documenting the results of an analysis;
- input, processing and output specifications to meet information system goals and objectives;
- functions and characteristics of hardware and software components options and procedures available to meet the required specifications;
- technical, operational and economic criteria for evaluating the feasibility of alternative design options to achieve the information system goals and objectives;
- physical design specifications;
- tools to represent the relationships between information system components;
- criteria for evaluating the performance of proposed information systems.

3. Software development

This area of study focuses on a range of tools and techniques for implementing the software and hardware specifications of information systems. Students are expected to have an overview of the stages of software development; analysing, designing, developing, testing, documenting and evaluating. In Unit 3 students study in depth the stages of designing, developing and testing. The solution developed by the students should be one module that partially meets a software design specification. In Unit 4, students study all stages of software development.

This area of study will include:

- stages of software development, including analysis, design, development, testing, documentation and evaluation;
- file management considerations;

- naming conventions for files and objects;
- data types to meet particular needs within software designs;
- data representation methods and factors that determine the representation methods selected;
- approaches to designing software and methods of expressing their design;
- legal obligations of programmers, and ethical considerations regarding the development of programming solutions;
- criteria for evaluating software;
- high-level programming languages as methods for implementing software design;
- techniques for checking that coded programs meet design specifications;
- principles of hardware operation essential to the development of software modules;
- purpose and characteristics of internal documentation.

OUTCOMES

For this unit students are required to demonstrate achievement of three outcomes. As a set these outcomes encompass all areas of study for the unit.

Outcome 1

On completion of this unit the student should be able to explain the functions of, and the relationships between, the components of a networked information system used in an organisation.

Key knowledge

In achieving this outcome the student will draw on knowledge described in area of study 1.

To achieve this outcome the student should demonstrate knowledge of

- types of information systems used by individuals and organisations, including transaction processing, decision support, expert system;
- purposes of using information systems in a range of settings such as business, medicine, manufacturing, education, banking for repetitive processing, performance monitoring, information transferral, data searching and manipulation;
- roles and functions of the components of an information system, including people, equipment, procedures, data;
- computer architecture, including the functions of the main components and how the components are connected;
- types of networks including local area networks (LAN) and wide area networks (WAN), and an overview of types and capabilities of network topologies, including star, bus; and supporting technology and properties, including cabling and bandwidth;
- network operating systems, network architecture and components, such as network cards, switches, routers, servers, together with protocols, such as TCP/IP;
- tools to represent the components of a networked information system and their relationship, such as network diagrams.

Key skills

To achieve this outcome the student should demonstrate the ability to

- identify the purpose of an information system and the type of network described in a given written scenario;

- represent visually the following components of a networked information system and their relationships: the equipment, key sources of data used in the system and the people involved with the system;
- annotate the components to indicate the roles of the people and the functions of the equipment in an information system;
- analyse the operations of an information system in order to explain why the identified topology was chosen and comment on its appropriateness.

Outcome 2

On completion of this unit the student should be able to analyse an information system and explain and justify a detailed design for a new or modified networked information system.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1 and 2.

To achieve this outcome the student should demonstrate knowledge of

- the systems development life cycle, including analysis, design, development, implementation and evaluation;
- economic, social and technical factors prompting change within organisations;
- role and functions of the components of an information system, including people, equipment, procedures, data;
- primary and secondary data sources and data acquisition methods to conduct the analysis, including direct observation, surveys, interviews, system and program documentation, logs;
- existing information system context, processes and data structures, including the input and output requirements of the system, details of each process, data stores and data structures;
- information system goals and objectives;
- logical design techniques for documenting the results of the analysis, including context diagrams, data flow diagrams and data dictionaries;
- input, processing and output specifications to meet information system goals and objectives;
- types of data and a range of equipment appropriate for inputting, processing, storing, accessing, and outputting data and information;
- functions and characteristics of hardware and software component options and procedures available to meet the requirement specifications;
- technical, operational and economic criteria for evaluating the feasibility of alternative design options to achieve the information system goals and objectives;
- physical design specifications, including the output and input devices, format, size and use of files, software capabilities, control procedures, backup procedures, security procedures, virus protection;
- tools to represent the relationships between information system components, including data flow diagrams (level 1), hierarchy charts, and an overview of structure charts, system flow charts;
- criteria for evaluating the performance of proposed information systems, including efficiency, effectiveness, cost, maintainability.

Key skills

To achieve this outcome the student should demonstrate the ability to

- analyse an existing information system to identify why it needs to change;
- propose a range of methods to collect data;
- formulate the goals and objectives for the new or modified information system;
- document the logical design of the new or modified information system;
- describe the hardware and software specifications of the new or modified information system;
- select a system objective and identify two hardware and/or software alternatives;
- evaluate the hardware and/or software alternatives on the basis of their technical, operational or economic feasibility;
- recommend the hardware and/or software components for the new or modified system and state criteria to evaluate the performance of the system.

Outcome 3

On completion of this unit the student should be able to produce a software module, in response to a system design, and verify its performance against the design specifications.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- the systems development life cycle, including analysis, design, development, implementation and evaluation;
- the stages of software development, including analysis, design, development, testing, documentation and evaluation;
- file management considerations, including security, archive, backup, disposal;
- naming conventions for files and objects;
- data types to meet particular needs within software designs;
- data representation methods and factors that determine the representation methods selected, such as units of storage and character codes;
- approaches to designing software;
- methods of expressing software design using algorithms, including an overview of flow charts, pseudocode, Nassi-Schneidermann diagrams, and a detailed understanding of one of these;
- purpose and characteristics of internal documentation;
- legal obligations of programmers, including adherence to amendments made to the Copyright Act with respect to digital content, (*Copyright Amendment (Digital Agenda) Act 2000*), and ethical considerations regarding the development of programming solutions;
- criteria for evaluating software, including effectiveness, efficiency, stability, reliability, useability, maintainability;
- a high-level programming language as a method for implementing software design;
- techniques for checking that coded programs meet design specifications, including construction of test data;
- principles of hardware operation essential to the development of software modules.

Key skills

To achieve this outcome the student should demonstrate the ability to

- interpret the design specifications by representing processes in the form of algorithms and data structures in the form of a data table;
- use a programming language from the list published annually by the Victorian Curriculum and Assessment Authority;
- apply relevant constructs of the programming language to produce a working module;
- prepare internal documentation for the module;
- compare the intended with the actual module capabilities;
- explain how the program has taken into account an ethical consideration or a legal obligation.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment of levels of achievement

The student's level of achievement in Unit 3 will be determined by school-assessed coursework and an end-of-year examination.

Contribution to final assessment

School-assessed coursework for Unit 3 will contribute 25 per cent to the final assessment.

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 50 per cent to the study score.

School-assessed coursework

Teachers will provide to the Victorian Curriculum and Assessment Authority a score representing an assessment of the student's level of achievement.

The score must be based on the teacher's rating of performance of each student on the tasks set out in the following table and in accordance with an assessment guide published annually by the Victorian Curriculum and Assessment Authority. The assessment guide will also include advice on the scope of the task and the criteria for assessment.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Where optional assessment tasks are used, teachers must ensure that they are comparable in scope and demand.

Outcomes	Assessment tasks	Marks allocated*
Outcome 1 Explain the functions of, and the relationships between, the components of a networked information system used in an organisation.	Response to a given written scenario • a visual presentation (presentation file, poster)	20
Outcome 2 Analyse an information system and explain and justify a detailed design for a new or modified networked information system.	• a written report (including documentation of analysis and design techniques) or • a poster (including documentation of analysis and design techniques)	50
Outcome 3 Produce a software module, in response to a system design, and verify its performance against the design specifications.	An information technology solution in response to a system design, including a written report.	30
	Total marks	**100**

* School-assessed coursework for Unit 3 contributes 25 per cent to the study score.

Unit 4: Information Systems

This unit focuses on techniques, procedures and strategies to develop, implement and evaluate a proposed networked information system. Students explore the technical, human, procedural, economic and management factors that need to be considered when undertaking the development, implementation and evaluation phases of the systems development life cycle.

In Unit 3 students explored the development phase of this life cycle by partially developing a software specification. In Unit 4 students are expected to study all of the stages of software development associated with the production of purpose-designed software. Students continue to study the programming language selected in Unit 3.

AREAS OF STUDY

1. Software engineering

This area of study focuses on the nature and purposes of a range of tools and methods to produce purpose-designed software. All stages of software development are studied; analysis, design, development, testing, documentation and evaluation. Students continue to use the programming language studied in Unit 3.

This area of study will include:

- stages of software development;
- methods of organising files to suit particular software needs;
- factors affecting access of data;
- factors affecting software design;
- high-level programming languages as methods for implementing software design;
- forms and uses of data structures to organise similar and dissimilar pieces of data;
- types and purposes of algorithms;
- methods for designing, developing and testing algorithms;
- applications and purposes of system programs;
- nature and types of user documentation;
- causes of conflict between developers of purpose-designed software and end-users.

2. Information systems engineering (development, implementation and evaluation)

This area of study focuses on the systems development life cycle phases of development, implementation and evaluation. In Outcome 1, students explore the development phase through the creation of purpose-designed software in response to a design specification. In Outcome 2 the focus is on those technical, human, procedural, economic and management factors that need to be considered when undertaking the phases of development, implementation and evaluation.

This area of study will include:

- the systems development life cycle;
- factors influencing the acquisition of specific hardware and software components;
- testing techniques to ensure that the components operate as intended and to gain acceptance of an information system;
- methods for implementing a proposed information system;
- types of system support documentation to assist with the implementation of a proposed information system;
- training requirements for the users of a proposed information system;
- procedures to govern the relationships between the components of information systems;
- project management tools and techniques;
- criteria for evaluating the performance of a proposed information system;
- strategies for evaluating the performance of a proposed information system.

3. Information systems: networks

This area of study focuses on the components of networked information systems, and how the application of these systems in a global environment result in advantages and disadvantages for different stakeholders.

This area of study will include:

- types and capabilities of networks and network topologies;
- network operating systems;
- purposes for organisations using networked information systems in a global environment;
- types of problems associated with using networked information systems in a global environment;
- advantages and disadvantages for organisations and society in using information systems in a global environment.

OUTCOMES

For this unit students are required to demonstrate achievement of two outcomes. As a set these outcomes encompass all areas of study for the unit.

Outcome 1

On completion of this unit the student should be able to apply the principles of software development to produce purpose-designed software that takes into account the information system objectives and the needs of end-users.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 1 and 2.

To achieve this outcome the student should demonstrate knowledge of

- the systems development life cycle, including analysis, design, development, implementation and evaluation;
- stages of software development: analysis, design, development, testing, implementation, documentation and evaluation;

- methods of organising files to suit particular software needs, including serial, sequential and random access;
- factors affecting access of data; for example, size of files, storage medium, organisation of files;
- a high-level programming language as a method of implementing software design;
- factors affecting software design, including user interface, audience needs, processing efficiency, development time;
- forms and uses of data structures to organise similar and dissimilar pieces of data, including sets, lists and tables, records and fields, strings and stacks;
- types and purposes of algorithms, including pseudocode, data flow diagrams (DFDs), flow charts to describe methods of accessing, updating, sorting and searching files, processing data;
- methods for designing, developing and testing algorithms;
- applications and purposes of system programs, such as loaders to combine subroutines, debugging tools to facilitate error detection;
- nature and types of user documentation;
- causes of conflict between the developers of purpose-designed software and end-users, such as the use of programs for purposes that they are not intended; piracy of programs so that end-users incur no economic expense, but the developer receives no economic benefit; corporate piracy; security loopholes in a program may result in unauthorised tampering of end-users' information.

Key skills

To achieve this outcome the student should demonstrate the ability to

- identify factors affecting the design and implementation of a software solution;
- define the requirements of the software solution;
- represent specifications in the form of algorithms and data tables;
- develop and justify data-validation techniques;
- develop testing procedures;
- write the program, including appropriate internal documentation;
- write appropriate user documentation;
- run and debug the program so that it produces output that is well organised and readable and that meets user needs;
- explain how purpose-designed software may cause possible conflict between the person or organisation responsible for developing it and an end-user.

Outcome 2

On completion of this unit the student should be able to propose and justify development, implementation and evaluation strategies for introducing to an organisation an information system that will operate in a global environment.

Key knowledge

In achieving this outcome the student will draw on knowledge described in areas of study 2 and 3.

To achieve this outcome the student should demonstrate knowledge of

- the systems development life cycle, including analysis, design, development, implementation and evaluation;
- purposes for organisations using networked information systems in a global environment; for example, increasing the competitive edge by tapping into global markets, conducting business transactions online regardless of geographic location of partners and consumers;
- types of problems associated with using networked information systems in a global environment; for example, data theft, viruses, sabotage, incompatible file formats, English as the main language, low bandwidth;
- types and capabilities of networks and network topologies;
- network operating systems;
- technical, human, procedural, economic and management factors influencing the acquisition of specific hardware and software components to fulfil design specifications, such as availability of components, geographic location of suppliers, compatibility of all components, establishment and ongoing costs, reliability and robustness of equipment, ergonomic requirements, reliability of suppliers, training of operators;
- testing techniques to ensure that the components operate as intended and to gain acceptance of the information system, including equipment testing, processing and system management testing, acceptance testing;
- methods for implementing the proposed information system, including direct, phased, pilot and parallel conversions;
- types of system support documentation to assist with the implementation of the proposed information system;
- training requirements for the users of the proposed information system, including location of training and nature of training;
- procedures to govern the relationships between the components of the information system, including protection and security of data in storage and during transfer;
- project management tools and techniques, including Gantt charts and PERT charts, to schedule and monitor tasks, to assign resources, to identify milestones, to determine contingency plans;
- criteria for evaluating the performance of the proposed information system, including usability, effectiveness, efficiency, costs, maintainability;
- strategies for evaluating the performance of the proposed information system, such as logging equipment breakdowns, checking staff absentee rates, random and controlled testing of specific functions, recording customer complaints;
- advantages and disadvantages for organisations and society in using information systems in a global environment; for example, organisations reduce their cash flow problems because of lower transaction costs and faster payment systems, customer support can be diminished due to geographic locality, online fraudulent practices can affect both customers and organisations.

Key skills

To achieve this outcome the student should demonstrate the ability to

- identify the purpose of the information system;
- select and justify the hardware and software components to fulfil the physical specifications;
- devise appropriate testing techniques;
- propose an implementation strategy that includes a description of the changeover method, types of documentation, training and procedural requirements;
- formulate strategies to evaluate the performance of the proposed information system;
- propose project management strategies to coordinate the development, implementation and evaluation of the proposed information system;
- explain one way in which the organisation and its end-users will be affected by the implementation of the proposed information system.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and skills should not be assessed separately.

Assessment of levels of achievement

The student's level of achievement in Unit 4 will be determined by school-assessed coursework and an end-of-year examination.

Contribution to final assessment

School-assessed coursework for Unit 4 will contribute 25 per cent to the study score.

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 50 per cent to the study score.

School-assessed coursework

Teachers will provide to the Victorian Curriculum and Assessment Authority a score representing an assessment of the student's level of achievement.

The score must be based on the teacher's rating of performance of each student on the tasks set out in the following table and in accordance with an assessment guide published annually by the Victorian Curriculum and Assessment Authority. The assessment guide will also include advice on the scope of the task and the criteria for assessment.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Where optional assessment tasks are used, teachers must ensure that they are comparable in scope and demand.

Outcomes	Assessment tasks	Marks allocated*
Outcome 1 Apply the principles of software development to produce purpose-designed software that takes into account the information system objectives and the needs of end-users.	Information technology solution (excluding user documentation, but including internal documentation) in response to a design brief and User documentation and an explanation of how purpose-designed software may cause conflict between program developers and end-users in one of the following modes: • a test • a written report	45 15
Outcome 2 Propose and justify development, implementation and evaluation strategies for introducing to an organisation an information system that will operate in a global environment.	One of the following: • a written report • a test	40
	Total marks	**100**

* School-assessed coursework for Unit 4 contributes 25 per cent to the study score.

End-of-year examination (Units 3 and 4)

Description

All outcomes in Units 3 and 4 will be examined. Aspects of some outcomes that require the use of computers will not be examined, however underpinning key knowledge associated with the practical aspects is examinable.

Students will not be expected to write code in a programming language.

Both Unit 3 and Unit 4 will contribute approximately equally to the examination. The following table identifies the approximate contribution of each outcome and unit to the examination.

Unit	Outcome	Approximate mark allocation (per cent)
3	1	8–12%
	2	24–36%
	3	8–12%
4	1	16–24%
	2	24–36%

Format

Students will answer a series of questions in a question and answer booklet. The order of the questions follows the phases of the systems development life cycle, namely analysis through to evaluation. For some questions students will respond to stimulus material such as design briefs, case studies and visual images.

All questions are compulsory.

The examination will be set by a panel appointed by the Victorian Curriculum and Assessment Authority.

Conditions

The examination will be completed under the following conditions:

- Duration: two hours.
- Date: end-of-year, on a date to be published annually by the Victorian Curriculum and Assessment Authority.
- Victorian Curriculum and Assessment Authority examination rules will apply. Details of these rules are published annually in the *VCE Administrative Handbook*.
- The examination will be marked by a panel appointed by the Victorian Curriculum and Assessment Authority.

Contribution to final assessment

The examination contributes 50 per cent to the study score.

Advice for teachers

DEVELOPING A COURSE

The study design describes the knowledge and skills students must acquire and apply in order to demonstrate achievement of the set of outcomes for a unit. Each unit is structured as shown in table 1.

Unit structure	Description	Examples from Unit 1, Outcome 3
Areas of study	The knowledge and skills to be learned	Information technology: components of computer systems (area of study 3)
Outcome	What the student must know and be able to do to demonstrate the learning	Assess the extent to which the quality of information acquired via the Internet influences personal opinions or decisions
Key knowledge	What should be known to demonstrate a specific outcome	• factors affecting the quality of information; for example, suitability, reliability, meaning, accuracy, accessibility, completeness, timeliness and bias
Key skills	What the student should be able to do	• construct and perform an Internet search strategy to access information relating to an identified need
Assessment task	The instrument for demonstrating achievement of an outcome	An oral report supported by a visual presentation

Table 1. Structure of each unit of VCE Information Technology

Teachers must develop courses that include appropriate teaching and learning activities to enable students to develop the knowledge and skills to demonstrate the outcomes.

For Units 1 and 2 teachers must select assessment tasks from the list provided for each unit. Tasks should provide variety and the set of assessment tasks should reflect the fact that different types of tasks suit different outcomes. For some outcomes, an appropriate approach would be to ask students a series of questions. These questions stem from the key knowledge and key skills. For example, one of the key skills for Unit 1, Outcome 3 is ‘compare the approach taken by different search engines to locate information’. An appropriate structure for the related question is: Which search engine was more useful and why?

In Units 3 and 4, assessment is more structured. For school-assessed coursework, assessment tasks for each outcome are prescribed. Teachers must select tasks from the assessment table provided for each unit. Advice on the scope of the task and criteria for assessment to assist teachers in their decision on the students' levels of achievement will be published annually by the Victorian Curriculum and Assessment Authority in an assessment guide.

Assessment tasks must be completed mainly in class and within a limited timeframe. Tasks do not have to be lengthy to make a decision about student demonstration of achievement of an outcome.

Flexibility in course design

The order in which the outcomes are addressed (sequenced) may vary from school to school. In some units, there is a developmental relationship between outcomes that suggests a logical sequence. For example, in Unit 3 of Information Systems, Outcome 1 should be addressed prior to students attempting Outcome 2. There is knowledge associated with Outcome 1 that is needed before students can confidently tackle Outcome 2. In some units, the order in which outcomes are addressed is not important. Sometimes it may be appropriate for students to engage concurrently in learning activities related to two or more outcomes.

The sequence of outcomes in Information Processing and Management (IPM) and Information Systems (IS) may also be influenced by the final examination. In both pairs of units all of the outcomes are examinable except for those aspects that require the use of computers or program coding. In Unit 4 of both IPM and IS, teachers may wish to structure their courses so that Outcome 1, which requires the use of computers or program coding, is dealt with earlier in the unit. This means Outcome 2 can be studied closer to the examination, providing an opportunity to revise examinable aspects of earlier outcomes at the same time since the last outcome builds on earlier outcomes.

Factors such as software tools, items of hardware, solutions developed, organisational contexts and types of information systems can be varied according to the availability of resources, teacher and student preferences, and teacher and student expertise. The learning activities undertaken by students may be varied in type and pace to allow for individual differences in learning styles, expertise with the equipment, interest and experience.

Some outcomes require students to create an information solution. Students must represent the design of the solution and any output where appropriate. For example, the design of a website is best represented in a storyboard. The output from the website, the information displayed, is appropriately represented in layout diagrams. The design of a game could be represented in an Input–Process–Output chart or structure chart. A game may have no output or the output may be so simple as to not justify the time required to draw a design. Consider a game in which the object is to destroy enemy spaceships. The only output might be a message 'You lost 10 ships. I win!'. If the output is more substantial, say a list of the types of ships lost and their relative value, then the way this information is formatted is important to the user. In this case the design of the output should be represented in a layout diagram.

USE OF INFORMATION TECHNOLOGY

Students must use information technology (IT) to demonstrate their IT knowledge and skills and/or to demonstrate achievement of most outcomes. For example, in Unit 1, students must use IT for all outcomes. However, in Unit 2, Outcome 1 students must create a solution with IT then write an evaluation. In the absence of any IT requirement, students could hand write this evaluation, but given the nature of the study, it would be more appropriate if they used a word processor.

Teachers are also encouraged to incorporate IT with teaching and learning activities; for example, use of computer-based learning and multimedia, submission of work via the school intranet, and PowerPoint presentations for student delivered lessons. Students can practice file management skills by organising their own files of learning activities, outcomes, and reference material. In managing their own directories/folders, students will learn the importance of regular file maintenance procedures such as using appropriate file naming conventions, deleting outdated files, backing up, and archiving.

LEARNING ACTIVITIES

Examples of learning activities for each unit are provided in the following sections. Examples highlighted by a shaded box are explained in detail in accompanying boxes. This icon identifies the examples that make use of IT.

Unit 1: Information Technology

Unit 1 recognises the importance of IT in the daily life of individuals and focuses on developing the knowledge and skills to enable students to become competent, creative, and critical users of IT.

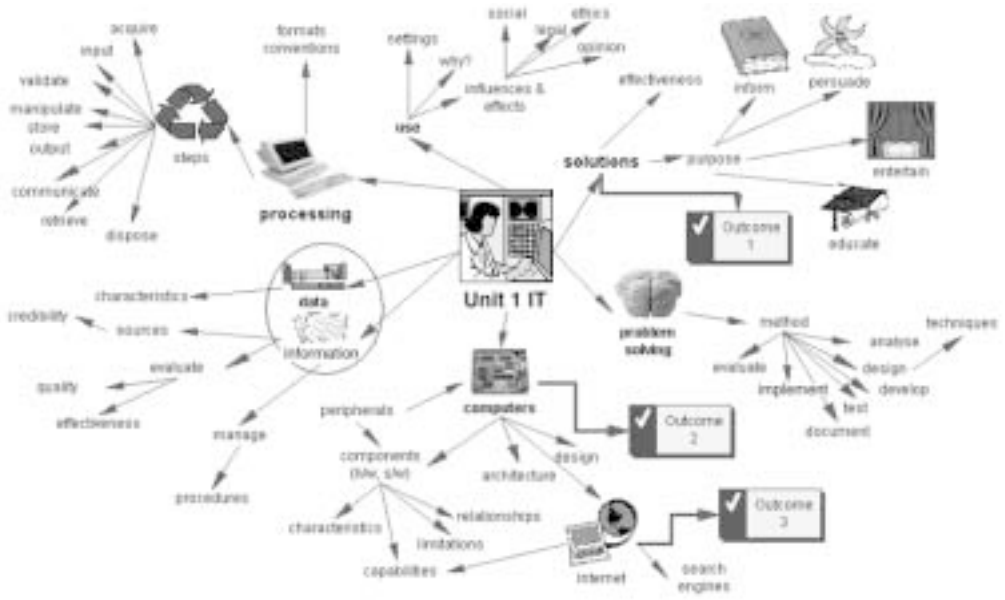


Diagram 1. Overview of VCE Information Technology Unit 1

There are three outcomes in Unit 1 and sequencing of the outcomes is flexible. Outcome 1 requires students to create a solution and describe a social effect of its use. For Outcome 2 students design a personal computer system, while for Outcome 3 they undertake research using the Internet and then assess how the quality of the information influences their conclusions.

For Outcome 1 students must create a solution that informs, persuades, educates or entertains. There are no restrictions on software tool selection. Students might undertake learning activities in which they create a variety of solutions (to meet different purposes) using different software types. Or they might create several solutions to meet different purposes using one software type. If, however, students create solutions to meet only one type of purpose (inform, persuade, educate or entertain), they should during the learning stage experience the other purpose types; for example, read an educational tutorial, play a computer game.

Purpose of solution	Examples of solutions and output
Inform (report about a current event)	factual reports essays minutes of meetings biographies literature, film reviews newspaper reports
Persuade (assist in making decisions about a course of action)	advertising brochure political policy statement job applications websites jingles letters of praise
Educate (increase level of understanding of a concept)	computer-based tutorial CD-ROM a ‘how to’ manual
Entertain (amuse)	computer games films theatrical/drama scripts lyrics stories

Table 2. Examples of solutions and output to meet particular purposes

For Outcome 1, students also explore how the use of IT affects the behaviour, attitudes and relationships of individuals. Examples of effects include the opportunities provided by online learning for the geographically isolated or physically impaired; the psychological effects of violent computer games; the availability of offensive material on the Internet; effects on relationships of the ability to electronically inform known and unknown people about personal viewpoints.

Outcome 1

Use information technology to create a solution that informs, persuades, educates or entertains, and describe how behaviour, attitudes and relationships are affected by the use of information technology for this purpose.

Examples of learning activities

collect samples of solutions and output that inform or persuade and evaluate their effectiveness

make a list of two solutions you have used in each purpose category (inform, persuade, educate or entertain) and make notes about how the solutions have benefited you


produce a folio of samples showing the development in skill acquisition and applications associated with the software tool and equipment

interview a range of users to ascertain what they like and dislike about a solution (and output) and how the use of the solution has affected them


acquire or use a range of solutions and output that are intended to inform, persuade, educate or entertain and evaluate their effectiveness in meeting their purposes

write an essay explaining why you use email, a mobile phone, or text messaging and comment about how it has affected your relationships with the recipients


create a solution in accordance with a given design brief

Detailed example

CREATING A SOLUTION

The brief

Your school library is concerned at the lack of readable information on a number of topics students need to know about. The librarian wonders whether a PowerPoint slide show about a topic/issue might be a good way of informing students. Students could select those aspects of a topic they want information about and the last slide would display a list of further resources on the topic. The slide show will be available for student use in the library. Depending on availability of storage the slide show will be either stored on the hard disk of a library computer or on floppy disks that can be borrowed and used in the library or taken home.

The audience

The audience is your peers or younger students. Being of their generation you will have the best idea of what topics/issues interest them.

Some ideas may be homelessness, Austudy, getting a job, handling conflict/parents.

The procedure

Brainstorm some ideas about what information should be included in the slide show.

Gather the content. Are there any pictures or diagrams you want to insert?

Prepare a storyboard of the slide show using the organisation chart function of PowerPoint.

Prepare layout diagrams for three slides or a template.

Develop your slide show on the computer.

Keep copies of your first draft and the final show.

Test it.

Write a short report evaluating how well your solution meets the need of the library; and describe how a student's behaviour or attitudes might be affected by using your solution.

Outcome 2

Propose and justify the components and configuration of a computer system to meet a personal need.

Examples of learning activities

label the parts on a diagram of a computer system and explain their functions

compare the characteristics and capabilities of classmates' home computer systems

explain why every peripheral must have a piece of software if it is to be useful

collect some technical manuals and user manuals for computer systems and find out how useful they are in explaining the characteristics and functions of the system components

identify some functions of a word processing package that you cannot use because of limitations of the hardware

recommend a computer system configuration to a friend

Detailed example

CONFIGURING A COMPUTER SYSTEM

Pat is about to start secondary college. Pat's parents have decided to buy Pat a computer on which to do homework assignments. Bill, a friend of the parents, has a P11 computer with 4Mg RAM, 80Mg Hard drive, 1.44Mg 3.5" floppy drive, VGA colour monitor, and a 9 pin dot matrix printer. Bills says this is a good system and Pat's parents should buy a similar one. Pat's school has several rooms of computers equipped with both iMac Performa and Pentium III computers. Pat wants to surf the Internet but Pat's parents don't see why this would be useful for schoolwork.

What would you recommend Pat's parents buy? The budget is $2000. Write a recommendation for Pat's parents that:

- defines the following terms
  - 4Mg RAM
  - 80Mg Hard drive
  - 1.44Mg 3.5" floppy drive
  - VGA colour monitor
  - 9 pin dot matrix printer
  - iMac Performa
  - Pentium III
  - Internet
- states the main purpose(s) of the system (i.e. what it will be used for)
- explains the type of hardware and software needed to meet this purpose
- includes a diagram of the specific hardware and software that explains the function of each item and their relationships
- describes the capabilities of each item (what it can do).

Outcome 3

Assess the extent to which the quality of information acquired via the Internet influences personal opinions or decisions.

Examples of learning activities

- access two newspaper websites and compare the quality of information in articles they present about a current issue
- access two of these sites: a motor car retailer, Amnesty International, ippyonline, McDonald's, Victorian Education Channel and compare the way they present their information
- access four websites and make notes about how long it takes to access each site, how well the information is presented on the page, how easy/difficult it is to navigate the site
- compare the effectiveness of two multimedia encyclopaedias
- search the Internet for information about an issue and assess the quality of information

Detailed example

RESEARCHING ON THE INTERNET

Choose an issue, carry out an Internet search to find websites containing information about this issue, assess the quality of the information that you find, and present your findings in an oral report accompanied by a visual presentation.

The issue you choose needs be one which attracts several different points of view; involves some conflict between these points of view, and for which there is no particular 'right' or 'wrong'.

Some suitable issues include: unrestricted availability of energy drinks, government funding for education, 'asylum seekers' or 'illegal immigrants'.

Note that the task requires you to assess how the quality of the information obtained via the Internet assists in shaping opinions or decisions. You do not have to summarise the information you collect, nor do you have to express a point of view on the issue. You do have to assess how the presentation of the site contributes to the information contained in it, and how reliable the information is.

Steps to take

Choose a suitable issue and state it clearly. You should express it in the form of a debating topic – 'That energy drinks do more harm than good', for instance.

Explain an information need in relation to this topic – what sort of information is required to help you form an opinion on the issue?

Identify some keywords, synonyms, phrases or concepts relating to the issue.

Using these keyword and phrases, construct several different search strings for use in an Internet search engine.

Perform an Internet search using different search engines. Include at least one 'metasearch' engine such as DogPile.

Compare the results from each of your searches. How many of the top ten sites are common to all sets of results? How many of the top ten sites are directly relevant to your issue?

Look at several sites in the lists produced by your searches until you have collected several sites for each point of view on the issue.

Unit 2: Information Technology

Unit 2 focuses on how individuals and organisations use information systems and involves using two software tools.

Diagram 2. Overview of VCE Information Technology Unit 2

There are three outcomes in Unit 2. Sequencing of the outcomes is flexible. For Outcome 1 students use spreadsheet or database software or a programming language to create a solution capable of controlling systems or managing information. For Outcome 2 students acquire the knowledge and skills to plan and monitor a project to develop an electronic publication. For this outcome they use web authoring, multimedia, or presentation software. For Outcome 3 students design a small network. Students who have completed Unit 1 may continue with the software tool studied in that unit.

The project plan for Outcome 2 is developed by a team and the assessment task set should require task sharing and enable students to discover the value in managing project resources. Students jointly determine a point of view that they will publish, then each student prepares a design option. The team selects the best design option or a modification of it and allocates tasks and responsibilities. Each team member must prepare aspects of a project plan that identifies the tasks, responsibilities and timelines. Each student should record regularly the team's progress in implementing the plan. Each student evaluates both the publication and the project plan. The basis for evaluating the publication is the extent to which it fulfils social, legal or ethical responsibilities. Indicators such as the ability to coordinate the tasks and responsibilities of the team members and to respond to situations that had not been anticipated measure the effectiveness of the project plan. It is important that teachers review the project plan prior to its implementation to ensure that allocation of tasks and responsibilities are fair and that it will enable all team members to demonstrate the outcome.

For Outcome 3, students need an overview of network configurations and data communications systems to design a small local area network (LAN) for home or business use. A small LAN has two to four linked computer systems.

Outcome 1

Use information technology to create a solution that controls a system or manages information, and evaluate the efficiency of processing and the effectiveness of the solution.

Examples of learning activities

find examples of different types of solutions (and output) and outline their purpose

list the characteristics of an item of hardware, describe its capabilities and explain the limitations the item places on the quality of the solution (and output) you can create

list the characteristics of an item of software, describe its capabilities and explain the limitations the item places on the quality of the solution (and output) you can create

use spreadsheet software to design a booking system for the local community theatre company

design a membership database for a local club

Ace Blinds Co. wants a program to calculate the price of sun blinds given the window measurements; design a program to meet this purpose

Detailed example

PRODUCT PRICE CALCULATOR

Ace Blinds Co. discovered its sales staff can measure windows correctly but they make errors in calculating the price to quote to customers. You have been employed by Ace Blinds Co. to write a program that will calculate the price of custom-made sun blinds given the window measurements.

Your problem analysis reveals this:

Ace wants an interactive program a salesperson can use on a laptop computer.

Given the width and height of a window and the price per square metre of window, the program must calculate the price of a blind to fit.

The window measurements and the price must be displayed on the screen.

You are to:

- write an algorithm to solve the problem
- design a layout diagram for the input screen and output screen (they may be one screen)
- develop your design and document the code
- format the code according to accepted conventions
- save your files using appropriate file naming conventions
- test your program
- write a comment about how well your program processes the data and how well it meets its purpose.

Outcome 2

Individually and as a team member, develop a project plan, create an electronic publication that promotes a point of view, and evaluate the project plan and the publication.

Examples of learning activities


access and explore a website, commenting on the ease of navigating the website

explain why you should always add an ALT tag to images on web pages

explain why you should state the download time of video images on web pages


view another student's PowerPoint slide show and evaluate its quality


write an essay that argues the case for or against computer hacking for publication on the school intranet and use hyperlinks to display screen tips that define any IT terms you use


develop and implement a plan to create a website; evaluate the plan and the website

given a design for a website, write a plan to develop the design that includes a list of tasks, resources required, and time required for each task assuming you would work full time on the development

Detailed example

EVALUATE A PROJECT PLAN

As President of a rock band fan club (you choose the name of the band) that plays to a young adult audience, you can see enormous potential in developing a website to reduce the currently unmanageable level of written requests and correspondence to process, which is excessively time consuming and inefficient.

Possible web pages may cover:

- Profiles on each of the four members
- Tour dates, cities and venues
- Snippets of gossip about members
- Competition details to gain autographed CDs and free tickets to a future concert
- Reviews on songs and/or CDs produced
- Merchandising and promotional details.

You may not plagiarise material produced for existing bands or produce a website for an existing band.

Create the site and submit it to a network dump folder.

Provide a written report that:

- describes the agreed image to be projected in the creation of the website
- summarises the key factors considered in deciding on the preferred design option, clearly explaining why your design was/was not selected
- evaluates the effectiveness of the project plan in terms of its ability to coordinate the tasks and responsibilities of each team member
- explains how well the group worked together
- evaluates the website in terms of its ability to fulfil social, legal or ethical responsibilities
- evaluates the effectiveness of the website.

Attach to your report:

- individual design layouts showing the major headings and blocks to indicate the contents of each web page plus a clear plan of how your website will be linked (a storyboard is appropriate)
- a test table and supporting annotated printouts to demonstrate aspects such as:
  - effective communication of the message
  - appropriateness of graphics
  - suitability of fonts and their sizing
  - that all hyperlinks (both text and graphics) work
  - evidence that manual and electronic validation tools have been used.

Outcome 3

Design a small local area network (LAN) and describe the potential economic effect for an individual or an organisation resulting from the implementation of the network.

Examples of learning activities

invite a member of the school office staff to address the class and explain the economic (time, cost, effort) benefits and frustrations of the office network

draw a diagram of the school office network, identifying the main components and their functions

create a poster or an animation that explains how a modem transmits data

interview the Computer Coordinator to find out whether the school has an ISDN line or modem access to the Internet; discuss their relative merits

investigate how to protect program files and data files once they are stored on a network

find out how it is possible to design a network that includes both Macintosh and Windows PCs when they have different operating systems

design a two station network for a small business

Detailed example

DESIGN A SMALL NETWORK

Case study

Parktite Car Park has established a parking ticketing system with a computer terminal at the entrance/exit of the car park. On entering the car park a ticketing computer gives the customer a ticket stating the date and time of entry. This data is stored in the customer file. On exiting, the ticket computer reads the ticket identification number and the current time. It retrieves the customer record and calculates the amount owing. Business has picked up in the last few months and the firm is opening a second exit gate so they need a second computer. The owner has been advised to network the two computers.

What are some advantages of networking the computers?

What hardware and software will be needed to network the computers?

What is the function of this hardware and software?

Will it be necessary to password protect the network? Why, or why not?

Units 3 and 4: Information Processing and Management

Information Processing and Management focuses on how organisations use and develop information systems to process, manage and protect information.

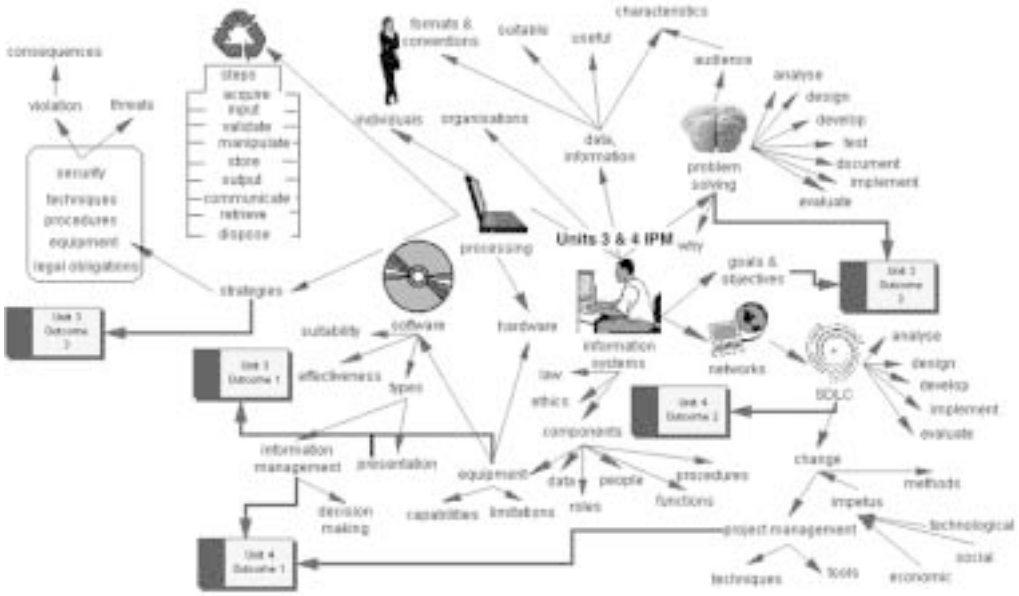


Diagram 3. Overview of VCE Information Processing and Management

In Unit 3 students create solutions (and output) with a software tool that enhances the presentation of information to meet an organisation's needs. Outcome 1 requires students to demonstrate the main capabilities of a software tool and its associated hardware; for example, optical character recognition (OCR) software and scanner. The assessment task is a short, practical test such as a demonstration of the capabilities, and a written response that evaluates the usefulness of the demonstrated capabilities for print and electronic output. The software tool must be selected from the types listed in the study design. The same software tool must be used for both Outcomes 1 and 2. For Outcome 2 another software tool may also be used. For example, a student might use photo-editing software for Outcome 1 and for Outcome 2 add a web authoring tool to create a website that displays images.

When solving problems using software tools, students apply a range of software functions. The Victorian Curriculum and Assessment Authority will provide annually a list of minimum software capabilities or equivalents. For Unit 3, Outcome 2 students must create a solution (and output) by using the information processing steps, except documentation, to respond to a given design brief. The design brief should focus on a problem with the presentation of information to an audience. The design brief does not direct the student in how to respond but it should include a description of the organisation's goals and information and identify the audience for the product. Students are expected to consider the end-user when designing a solution (and output) to ensure accessibility and usability for the intended audience. The assessment task for this outcome requires creation of a solution to a problem and a written report that justifies the solution (and output).

Unit 3, Outcome 3 requires students to evaluate the file management procedures used by an organisation including security procedures. The assessment task for this outcome is a test or written report. In responding to the task, students evaluate the effectiveness of the procedures

and equipment. The evaluation includes the extent to which the procedures meet the legal and ethical obligations of the organisation as described in the key knowledge. Students are required to have an overview of four Acts of Parliament related to legal obligations over the monitoring and controlling of information. An overview means knowledge of the purpose of each Act and knowledge of the main provisions. A paraphrased summary of the main provisions is adequate. Students do not need to know every clause.

There is no particular sequence for the outcomes. However, Outcomes 1 and 2 are interrelated and the weighting given to the assessment task for Outcome 1 suggests this should be undertaken first. This task is relatively small yet provides a useful introduction to the VCE assessment process for the students. Outcome 3 may follow Outcome 2 or it could be introduced early on and progressively developed throughout the unit.

In Unit 4, Outcome 1 students use all the information processing steps, including documentation, to create a solution that meets the ongoing needs of an organisation. This means that the solution must be capable of accepting and processing variables and can be used on an ongoing basis. Database or spreadsheet software must be used to create the solution.

There are two assessment tasks for this outcome. The first task is an information technology solution that is created in response to a design brief supplied by the teacher. This solution also includes user documentation and a version of the solution that is annotated to indicate how it meets current decision-making needs of the organisation and enables its ongoing use. Students are required to prepare and implement a management plan and monitor its progress during the creation of the information technology solution; the plan itself forming part of the second task. The other component of the second task is an error log.

During the development of the information technology solution, students must document in an error log any technical difficulties experienced and the remedies applied. Typical hardware problems include file server crash, mouse failure, network card failure. Typical software problems include virus problems, data file incompatibility, wrong security privileges set. Entries can be recorded under the following headings: date, description (of problem), cause, remedy. This does not have to be extensive, and for some students there may be minimal entries. This outcome contributes 60 marks to school-assessed coursework for the unit, but students score a mark for each task. The information technology solution is worth 40 marks and the report is valued at 20 marks.

Unit 4, Outcome 2 addresses change management and networked information systems. The assessment task for this outcome is a written report or a test that requires students to identify the impetus for change. This leads to the development, using project management principles, of a strategy for developing, implementing and evaluating a new networked information system. When learning about managing projects students can acquire and apply the relevant knowledge and skills by working individually or in teams to develop project plans. Project plans should include schedules, task allocation, resource allocation, timelines and milestones to monitor progress. Project plans can be created using a word processor, a spreadsheet, or project management tools. Students are not expected to develop skills in creating PERT charts or Gantt charts. They are, however, expected to be able to interpret these and explain why they might be used. Students must be assessed individually on the task set out in the assessment section of the study design.

While assessment is based on the student's ability to demonstrate each outcome for the school-assessed coursework, the aspects of Outcomes 1 and 2 in Unit 3 and Outcome 1 in Unit 4 that require creation of a solution and/or output are not examinable in the final examination.

Outcome 1

Demonstrate and explain the main capabilities of a specific software tool and a related hardware component through the production of output, and evaluate the usefulness of these capabilities.

Examples of learning activities

- use word processing software to write a description of the capabilities of the school scanner; include coloured headings and an image of the scanner then print your description; explain why the printed version is different from or the same as the version that appears on the computer screen
- take some photographs with a digital camera then edit them by adding special effects or cropping
- record portions of three music tracks on a CD and mix them; add special effects; describe some benefits and limitations of these capabilities
- scan a text document, import it into a word processing file and edit it; explain why you can or can't edit it

Detailed example

MUSIC EDITING SOFTWARE

Use music editing software to record five seconds of three of your favourite soundtracks.

Join the tracks to make one new soundtrack and save the file in your folder. Add special effects if you can.

Use the microphone to record your oral introduction to the tracks that explains why you chose those tracks.

Place your introduction at the beginning of the music compilation file.

Play your compilation track.

How clear is the recorded speech?

How does the music sound quality compare with the CD?

Describe any problems you had in completing the task. To what extent were the problems caused by limitations or defects with the software or hardware?

Explain the usefulness of the music editing software functions.

How could a soundtrack be used on a web page to enhance the quality of information on the page?

How would you deal with the problem that a user would have if they wanted to print a copy of the page?

Outcome 2

Solve an information problem, taking into account the goals and information needs of an organisation.

Examples of learning activities


use a given layout diagram to create a brochure


edit the given PowerPoint slide show that introduces parents to the school to make it suitable for Year 6 students


view the video titled 'Multimedia Design' and record the steps the designers took to develop the CD for Bendigo Goldfields

investigate the goals of a local sporting club and a local business; what information does each need in order to achieve their goals?


access three sites on the Internet that provide information about diets; assess the validity of the information on each site, the accessibility of the site, and ease of navigation of the site


design a website for a sports store

Detailed example

DESIGN A WEBSITE

Eagle Sports is in a main strip-shopping centre in town. Although the store is a retail outlet, most of the revenue comes from bulk sales to schools and sporting clubs. Bob, the owner, and three sales representatives regularly visit all major metropolitan and country schools. The expense of keeping the travelling sales staff on the road is becoming too high. Bob produces a catalogue only twice a year because of the high cost of producing printed booklets. Bob posts the catalogue to regular customers and to others on request.

A friend suggested Bob try Internet trading. She said that Bob could set up a home page on the web that would contain a catalogue, updated monthly, of Eagle Sports products and an order form that customers could send to Bob by email. Bob wouldn't need sales representatives and would save all the travelling costs too. Bob thought this sounded like a great idea.

Bob decided to have online three linked pages: a home page showing the Eagle Sports store logo (he hasn't designed this yet), address and phone and fax numbers; another page with the catalogue, which shows pictures of Eagle Sports products along with brief descriptions of each; a page with an order form or form to receive a hard copy of the catalogue that could be emailed to Bob at this email address: eaglesport@ozemail.com.au
Create a website for Eagle Sports.

Comply with accepted formats and conventions when designing navigation functions, displaying information, and naming files.

Validate the data and test the site functions.

Submit:

- a statement identifying Eagle Sports' problem and the expected users of the website
- a storyboard showing your plan for the site
- a layout diagram for the catalogue and form pages
- a list of input data, processing requirements, and information to be displayed on each page
- a test table, complete with test data and results
- an explanation of how the data was validated
- a short report justifying the ability of your solution and its output to meet Eagle Sports' goals and information needs
- the website submitted to the dump folder on the school network. Submit only necessary files!

Outcome 3

Evaluate the effectiveness of the strategies used by an organisation to manage the storage, communication and disposal of data and information.

Examples of learning activities

collect newspaper and magazine articles reporting information system security breaches, summarise the main points and identify the weaknesses in the systems

draw a map of network users at your school, identify their level of access privileges to programs and data files and explain why there are different levels of access

describe the type of email messages that should be encrypted

interview some company employees to find out their organisation's policy regarding sending and storing emails, using the network for private emails, and discipline procedures for breach of policy

explain why permission marketing is the norm in organisation websites

determine the implications of the *Health Records Act 2001* (Vic.) for data storage and archiving

Detailed example

INTERNET DATA SECURITY

Access five websites on the Internet that contain forms requiring users to include their postal and/or email address. Suitable sites are shareware sites that provide download facilities, retailers, and sites that offer online clubs such as the ABC.

Prepare a short report that states:

- whether the web page advised you that it was sending a cookie
- the purpose of cookies
- how a user can remove cookies from their computer system
- whether the web page contains a checkbox for the user to click if they give permission for the page owner to:
  - give the user information updates
  - pass on information about the user to other organisations
- whether a user must supply their email address to submit the form, even if they don't give permission for the organisation to contact then in the future
- why some sites ask permission of the user to send them information in the future
- what protection a user has against the website owner sending them junk mail in the future, or selling or giving away their contact details.

Unit 4: Information Processing and Management

Outcome 1

Propose and apply organisational and processing strategies to produce an ongoing solution that meets the decision-making needs of an organisation.

Examples of learning activities

examine different types of user documentation, identifying the content of each and the intended audience


produce a folio of samples showing the development of skill acquisition with the software tool

keep an error log during software development

collect samples of output and apply a set of criteria to evaluate their effectiveness


execute a segment of another student's user documentation to test the accuracy and clarity of instructions


create a solution that meets the ongoing needs of an organisation

Detailed example

CREATING A SOLUTION

Suntown Security Systems is a small family business that sells three models of electronic home security systems. The address is 15A O'Shannessy Street, Sunbury, 3429; phone: 9744 3456; fax: 9744 3457. The firm has recently gained access to the Internet and can be emailed on: sunsec@world.net

House style

The managers prefer all business documents to contain the company name, address and contact numbers. You may design a logo for the company to include in your spreadsheet.

Business operations

The business employs five sales staff that gain sales by door-to-door selling. They also have a shop front in O'Shannessy Street with one salesperson.

Current practice

Milly records by hand all the business records in accounting books. The sales staff wages are calculated by hand each month. This takes Milly quite a long time as she only has a calculator to help her work out the commission and bonus. She then has to deduct the income tax to get the net income to be paid to the employee.

Sales staff are paid a retainer of $675 a month plus 10% commission on their total sales for the month. If a person's sales exceed $10 000 they get a bonus of $300. Income tax must be paid to the government but the employer takes this out of the employees' pay and pays it on their behalf.

At the end of each month each employee receives a pay advice slip that gives these details: total sales made, commission earned, bonus (if any), retainer amount, gross salary (commission + bonus + retainer), income tax deducted, net salary (gross salary – income tax). Milly produces two reports: total income tax owing and total wages paid.

The problem

The current system is too slow and messy and so results in inaccurate information that causes errors. This, of course, upsets the employees who don't appreciate getting the wrong pay!

(continued)

Problem-solving steps

1. Define the problem (single statement outlining the goal to be achieved).
2. Analyse problem (IPO chart; any rules, constraints).
3. Alternative solutions (tables, graphs, reports, softcopy, hardcopy; select most appropriate for firm's needs).
4. Prepare a project plan that identifies tasks, timelines, milestones.
5. Design a solution by:
   - determining data structure
   - identifying data validation tests
   - identifying a set of test data to test validation procedures
   - describing procedures: pseudocode or flow chart
   - designing input screen layout
   - designing and justifying report layout
6. Develop solution and monitor progress, including an error log.
7. Write user documentation.
8. Evaluate your solution and output, in writing, in terms of how well it meets the decision-making needs of the organisation.

Outcome 2

Formulate and justify strategies for developing, implementing and evaluating a networked information system in response to a social, economic or technological impetus for change.

Examples of learning activities

evaluate the effectiveness of two data gathering techniques to acquire facts about the performance of an information system

select a software and hardware component, collect data on its capabilities and recommend a set of strategies to test these capabilities

select a human, technical or procedural issue associated with changing information systems; in groups of three allocate the roles of information systems manager, system operator, and customer of a business; discuss how the selected issue affects each one

recommend appropriate hardware and software to a small business that wants to provide Internet access to its four employees who currently use a LAN with bus topology and four PCs

compare the direct, parallel and phased conversion methods of changing over to a new information system

evaluate the likely success of a given project plan

Detailed example

EVALUATE A PROJECT PLAN

Kids TV Productions has decided to establish an online kids club for child viewers of its TV shows. It will need a membership database, an additional PC terminal on its LAN and a new employee, Su, to manage the database and run the club. Dom, the network manager, has prepared this plan to manage the change to the information system.

Schedule	Start	End	Who
design database	1 Oct	3 Oct	Will
develop database	5 Oct	7 Oct	Jack
test database	8 Oct	8 Oct	Jack
acquire hardware	8 Oct	9 Oct	Dom
connect new hardware	9 Oct	9 Oct	Dom
test equipment	9 Oct	10 Oct	Dom
write documentation			
technical doc.	10 Oct	20 Oct	Taylor
user doc.	10 Oct	13 Oct	Taylor
train operators	15 Oct	15 Oct	Taylor
implement system	30 Oct	2 Dec	Su
evaluate system	1 Feb	1 Feb	Dom

How realistic is the time allocated to creating the database?

Why are there no tasks on October 4 and 5?

Comment about the time allocated for testing the database.

Why should someone other than Jack test the database?

What tests must be performed on the equipment?

Why should both the database and hardware be tested together?

Which tasks can be done concurrently and why?

Which tasks have to be completed before other tasks can be started?

Is it reasonable to expect the user documentation will take less time to write than the technical documentation?

Would the user documentation need testing? If so, when should this be done and by whom? Why hasn't this been built into the plan?

Which human resource appears to be overloaded? How would you solve this problem?

What tasks have been omitted from the plan?

Will the plan succeed?

Units 3 and 4: Information Systems

Information Systems focuses on the design of information systems, the development of software from given design specifications and the interaction of individuals, organisations and society with both systems and software.

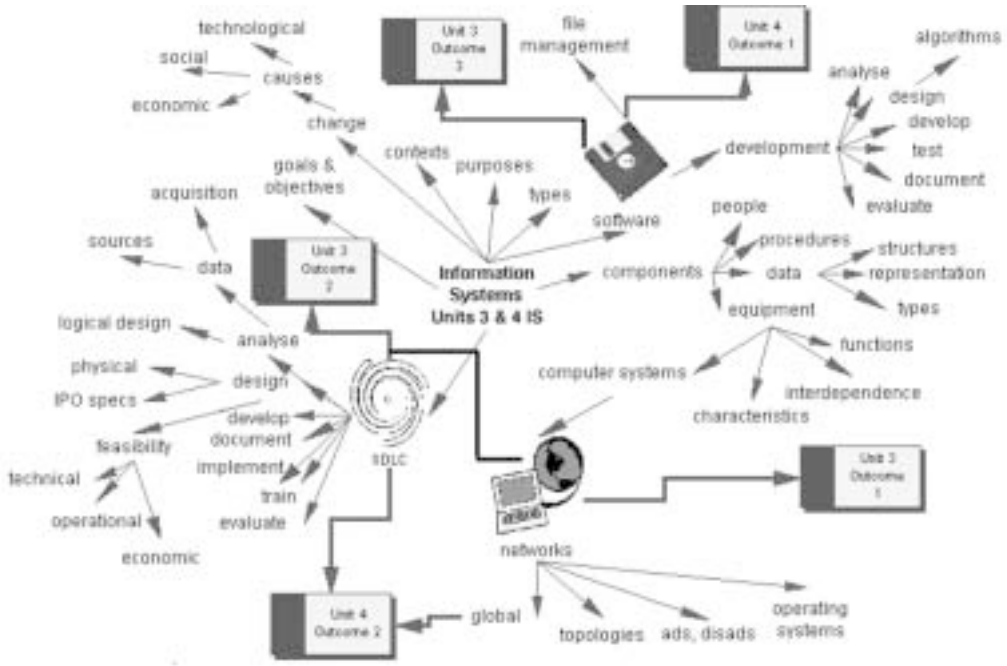


Diagram 4. Overview of VCE Information Systems

For Outcome 1 students create a poster or presentation file that visually represents the relationships between components of a networked information system; that is, the people, equipment and key data sources. The components must be annotated to indicate the roles of the people and the functions of the equipment. Analysis of the operations of the system is required, including the purpose and functions of the network topology, the network operating system, hardware such as network cards, cabling types and bandwidth, and communications protocols.

Outcome 2 requires students to analyse an existing information system and justify the design of a new or modified networked information system focusing on the analysis, design and development phases of the systems development life cycle (SDLC). Students must demonstrate knowledge of some system design tools to represent both the logical and physical models of an information system.

The logical design describes the functions required of a system. It identifies *what* is to be done; not how it will be done. This design is not concerned with hardware and software requirements but rather with what processes need to be performed. Context diagrams and data flow diagrams (DFDs, level 0 and 1) and data dictionaries are useful tools in representing the logical design of a system. Students must be able to create DFDs and interpret data dictionaries.

A physical design describes *how* the processing will be performed; for example, whether data is input by a person or read by a bar code reader, whether a file is electronic or print. Tools to represent the physical design include system flow charts and structure charts. For the assessment task, students document only the logical design of the new system. However, the outcome requires they also be able to interpret structure charts and system flow charts.

For Outcome 3 students develop a software module. They do not develop a whole software application but one module only. To achieve this outcome, students interpret flow charts, pseudocode, and Nassi-Schneidermann (N-S) diagrams. They write algorithms using one of those three methods. For this outcome and Outcome 1, Unit 4 students use a programming language to create a software application. The software application need not be as sophisticated as would be required in actual use in an organisation. The purpose of each response is to serve as a model of a real situation. The programming language must be selected from a list provided annually by the Victorian Curriculum and Assessment Authority in the *VCE Bulletin*. When appropriate, this list will be updated to include new programming languages.

Outcome 3, Unit 3 requires students to explain how their program takes into account a legal obligation or an ethical responsibility. To do this, students will need an overview of legal obligations of programmers including relevant amendments to the Copyright Act *Copyright Amendment (Digital Agenda) Act 2000*. A paraphrased summary of the main provisions is adequate. Students do not need to know every clause.

For Outcome 1, Unit 4 students apply a problem-solving methodology to produce purpose-designed software in response to a design brief, and a written report. The scenario described in the design brief should include a statement of the information system objectives and the needs of end-users. It should take into account the outcome requirement that students explain in writing how the software they developed may cause conflict between the organisation and an end-user.

This outcome has two assessment tasks. The first task is an information technology solution that includes internal documentation but not user documentation. The second task comprises user documentation and an explanation of how purposed-designed software may cause conflict between the programmers who develop the solution and the people who use the solution. This task can be undertaken as a test or a written report. This outcome contributes 60 marks to school-assessed coursework for the unit, but students score a separate mark for each task. The information technology solution is worth 45 marks and the user documentation and explanation is worth 15 marks.

Outcome 2, Unit 4 explores information systems that operate in a global environment. For the purposes of the study design this relates to organisations that use the Internet to make e-commerce transactions or to communicate with remote parties (for example, suppliers, customers, branches of a business). The outcome requires the study of a change in an information system that addresses one of these global factors. Students' responses to the associated assessment task (a written report or test) address the development, implementation and evaluation phases of the SDLC and strategies to coordinate these. Project management tools and techniques are useful strategies. Students are not expected to develop skills in creating PERT charts or Gantt charts. They are, however, expected to be able to interpret these and explain why they might be used.

When developing a course, a thematic approach can be taken, whereby all outcomes focus on the one information system. Another option is for each outcome to have a different information system setting or students might study one information system in Unit 3 and another in Unit 4. In Unit 3, the mark contribution of Outcome 1 (20 marks) to school assessment suggests this outcome should be undertaken first. This task is relatively small yet provides a useful introduction to the VCE assessment process for the students.

While assessment is based on the student's ability to demonstrate each outcome for the school-assessed coursework, the aspects of Outcome 3 in Unit 3 and Outcome 1 in Unit 4 that require creation of a solution and/or output are not examinable in the final examination.

Unit 3 Information Systems

Outcome 1

Explain the functions of, and the relationships between, the components of a networked information system used in an organisation.

Examples of learning activities

explain the relationship between RAM, processor speed, and bus width

comment on the notion that transaction processing, management information systems, and decision support systems are not separate entities but are integrated

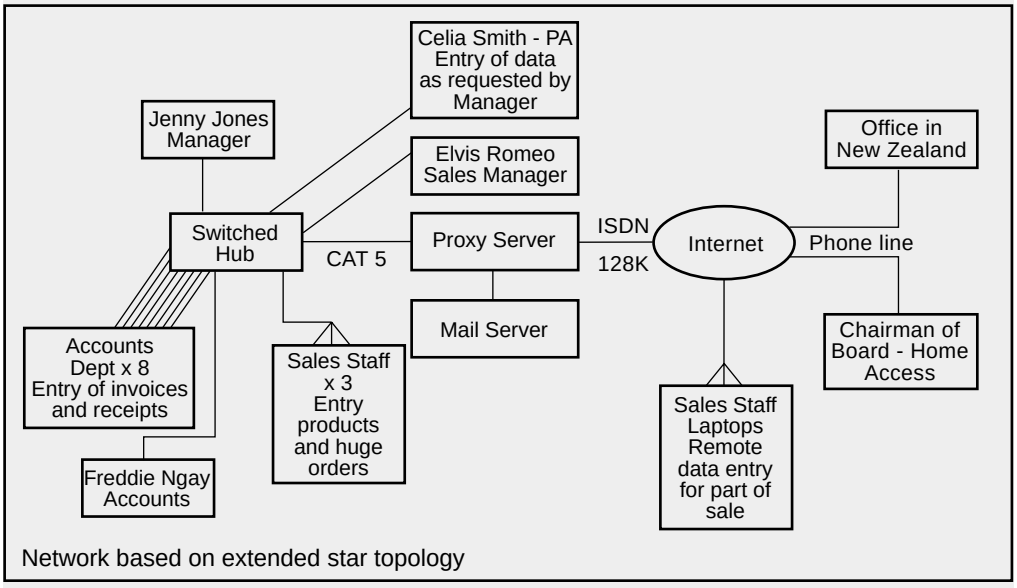
investigate the functions and skills required of the people involved with information systems

investigate the school network, identify whether it has a star or bus topology, comment on the merits and problems with this topology

annotate the diagram of a networked information system with the roles and functions of its components

Detailed example

REPRESENT A NETWORK



Network based on extended star topology

Dressed Floors Co. sells carpets. For residential sales, staff measure and quote on-site and record their orders through laptops. Industrial carpets are measured on-site then the order is processed at the office. The diagram represents the company information system. Annotate the diagram to:

- suggest why Jenny and Elvis need to be involved with the system
- state the functions of the equipment components
- explain the purpose of the Extended Star topology and why it is suitable for this network
- explain the suitability of the coaxial cable and the ISDN access used in this network
- explain why the system needs Windows NT and TCP/IP.

Outcome 2

Analyse an information system and explain and justify a detailed design for a new or modified networked information system.

Examples of learning activities

investigate how information systems are used in a range of organisational settings using methods such as observation (visits), guest speakers, videos, case studies in print and on the Internet

discuss concepts such as organisational aims and system goals and objectives with a view to understanding the relationship between them

investigate user needs using a range of methods such as surveys (paper-based, electronic), interviews, email, mailing lists, video conferencing

assess the feasibility of a proposed new information system for the school canteen

complete an incomplete data flow diagram, which has a list of processes

a legal firm has all their archive files stored on a 200Gb tape array; a new goal for the firm's information system is quick access to the archives; explain whether and how a 300Gb disk drive could assist in meeting the system objectives

design an information system for a medical practice

Detailed example

DESIGN AN INFORMATION SYSTEM

Dr Johnson has been in practice over thirty years. Dr Albright graduated in 1990 and recently joined the practice. On an average day each doctor sees about 25–30 patients. There are about 5000 patients with the clinic. The gross income of the practice is $75,000 a month. This income must cover office expenses and staff salaries: office manager, receptionist, and two nurses. Other expenses include: rent, electricity, supplies, malpractice insurance, conferences, etc. The doctors think the practice information system is efficient but this is only because the two staff work much unpaid overtime.

Current practices

Mrs Long, the practice manager, writes up a patient invoice while the patient waits. If the patient pays on the spot Long writes out a receipt. If the patient pays by credit card, Long writes the credit form out and transfers the credit card details to the form by using a hand-operated credit card machine. If a patient doesn't pay on the day, Long gives them an invoice and places a copy of the invoice in the patient's file. If the patient then pays by mail, Long writes a receipt and posts it to them. If the patient calls in, the normal procedure applies. At the end of each month Long prepares a profit report for the doctors. The profit report is often late as Long can't keep up with the paperwork.

Ms Carr, the receptionist, finds patient files in the filing cabinets and places them in the doctors' pigeonholes ready for the doctors to collect before seeing each patient. She collects about six patient files in advance for each doctor. When patients have been seen, the doctors leave the patient files on the front desk and Carr returns them to the filing cabinet. Sometimes files mount up on the desk if the surgery is busy and Carr stays back after work to file them all.

(continued)

Business concerns

Long is about to retire. Carr doesn't want Long's job. Albright doesn't want to do the paperwork either as it will take her away from her patients. She is also worried about the salary costs of the practice and wants to cut overtime so suggests a computerised information system.

Albright wants the doctors to be able to update patient records (medical history and fees) on PC terminals in their examination rooms.

Design a new information system. Steps include:

- identifying two problems with the current system
- identifying three data sources and two methods of acquiring data about the current system
- stating a goal and two objectives of the new system
- drawing a context diagram and a data flow diagram for the new system
- describing the hardware and software specifications for the new system
- for one of the system objectives, describing two hardware or software alternatives and evaluating their operational feasibility
- listing the criteria you will use to evaluate the performance of the system.

Outcome 3

Produce a software module, in response to a system design, and verify its performance against the design specifications.

Examples of learning activities

desk check a given piece of pseudocode and find the errors

discuss concepts such as debugging, testing, validation and evaluation

compare two representation techniques for program design such as a flow chart and N-S diagram

give examples of the programming control structures of sequence, decision, loops in a flow chart and in pseudocode

discuss the purpose of internal documentation and where the remarks/comments should be placed in the program code


design a test table and test data to check a program module designed to calculate a theatre ticket price for adult customers but giving 15% discount to those over 60

discuss the ethics of borrowing a program module from another programmer's code such as copying some JavaScript from a web page on the Internet


produce a software module for a new car park ticketing system

Detailed example

PRODUCE A SOFTWARE MODULE

Parkiteer Car Park opens from 6:00 am till midnight, has 150 spaces and charges $8.00 per hour with a maximum charge of $20.00. Ten per cent GST must be added. Fees are calculated to the next hour; no part hours are allowed. On entering the car park, a customer gets a ticket with a unique number from a time clock that stamps the entry time on the ticket. When the customer returns for their car, a clerk inserts the ticket into the time clock to get the current time, then calculates the fee with a calculator. The clerk keeps the ticket. At the end of each week the tickets are used to produce a weekly revenue report that states total revenue earned and total GST payable to the government.

A new system will be introduced. On entering the car park the customer's ticket will be printed by a computer controlled system that includes the time, date, and a unique ID on the ticket. When the customer returns, their ticket will be inserted into a card reader and a computer will calculate the parking fee including GST, display the fee on a screen and print a receipt.

There are four processes: calculation of parking fee, printing of the receipt, updating of revenue file, printing of revenue report. Your task is to design a prototype module that calculates the parking fee. A friend advises you that he has code for a similar system that was written by Frank Ferrari.

You will:

- write an algorithm as pseudocode or flow chart
- draw up a data table that shows: data item, description, format, data type
- produce a documented working module
- test the module
- compare the module you developed with the algorithm; explain how the actual capabilities of the program compare with the intended capabilities
- if your friend had offered you Ferrari's code would you have accepted? Explain your response.

Modification: design the module using the keyboard for data input. Your code will be used in the final system. Only the input method will be different in the real system.

Unit 4

Outcome 1

Apply the principles of software development to produce purpose-designed software that takes into account the information system objectives and the needs of the end-users.

Examples of learning activities

debate the comparative value of online help, multimedia tutorials, printed manuals, and onscreen help files as forms of user documentation

read short case studies and identify appropriate test data


compare and contrast software developed to the same design specifications


write user documentation and incorporate screen dumps where appropriate

discuss the structure and merits of serial, sequential and random (direct) access files


design, develop and test software to enable a business to conduct its sales by e-commerce

Detailed example

DESIGN, DEVELOP AND TEST SOFTWARE

Anklebyters Videos is a retailer of children's videos. The firm has their product catalogue displayed on a website. Potential customers can download an order form that they fill in and fax back to Anklebyters Videos. The stock clerk fills the order, calculates the total cost and posts it to the customer with an invoice. Invoices are often miscalculated so the firm is losing revenue.

Anklebyters Videos wants to make the process more accurate and more efficient by ending the fax service and selling only online and automatically calculating the price due. This new system must collect the customer's order data, delivery and contact details, and credit card details. It should calculate the total price of the order, save the order in a file and print out an invoice.

You are to create a prototype of the software application required to achieve the system objectives. For the prototype, assume the firm has a catalogue of five products and will accept VISA and Bankcard.

Sample product data:
Catalogue: Wrigglies $25, Chewy Onyer Boot $35, Ice Drops $30, Bung It On $28, Tooleybuck $25.

The firm's contact details:
Anklebyters Videos Co. Ltd, GPO Box 456, Melbourne, Vic 8000. Phone: 9344 7891.

Constraints

In practice, a firm will check a customer's credit card PIN against the credit card company's database to validate it. For the prototype create a customer record file of five customers. The file will contain the customer name and credit card PIN. Assume the PIN is four digits.

Your tasks

- Write an algorithm to represent your prototype design. Include representation of the processes, a screen layout diagram, an invoice layout diagram.
- Complete the data table pro forma.
- Determine the data structure.
- Determine validation techniques.
- Design a test table to test your software application.
- Code and document your program.
- Write appropriate user documentation.
- Prepare a written report that explains how your software application could cause conflict between Anklebyters Videos and a customer.

Outcome 2

Propose and justify development, implementation and evaluation strategies for introducing to an organisation an information system that will operate in a global environment.

Examples of learning activities

discuss which email messages should be encrypted and whether all emails should be filed

use the Internet to investigate the validity of customer fears about the safety of credit card data transmitted over the Internet

debate the proposition that introducing software to a network requires more planning than introducing hardware to a network

compare two strategies for managing change and debate their appropriateness in different situations

read a short case study describing proposed changes to an information system; design a plan to manage the implementation of the system

discuss ways of protecting data stored on a network from unauthorised access and theft

discuss how staff absentee rates can be an indicator of system performance

Detailed example

IMPLEMENTING A NEW SYSTEM

The Victoria Hospital (VH) wants to develop a new information system to overcome a nursing shortage because a recent survey found a 30 per cent shortfall of nurses. VH held focus discussion groups and discovered that nurses wanted better rosters, more communication with management, changes to work practices, and education opportunities.

VH will provide ten computers and four Internet kiosks for exclusive nursing staff use. The kiosks will give staff free Internet access and the computers will give updates from hospital management through the hospital's intranet system. All nurses will have email accounts and nurses on night duty can sort out problems such as payroll from the ward computer instead of coming in during office hours. Nurses can also apply for jobs at a hospital over the Internet and study VH sponsored courses over the Internet.

VH employs 800 nurses and has vacancies for 150 nurses. It currently has a network with a PIII 800Mh 128Mg RAM PC file server running Windows 2000, Windows NT, SGA monitor, 2 x80Gb HDD mirrored disks and 16 similar configuration PCs attached each with 64Mg RAM. This network is run by a Network Manager and is currently used for processing and managing financial data, patient data, and document processing.

VH provided these specifications for the new system to be installed in the hospital:

- file server similar to current one but with 2 x 60 Gb mirrored disks
- five PCs to be similar to current network computers attached to the file server
- four Internet kiosks with Windows keyboards, joystick, SGA monitor, 20Gb HDD, ISDN access

(continued)

- two additional 60 GbHDDs, mirrored disks
- Windows NT, IE7, MS Office with Outlook
- dedicated phone line.

You are to:

- state the purpose of the new system
- evaluate the appropriateness of the components suggested by MGH
- describe the techniques you will use to test the system components and the whole system
- select a changeover method and justify your choice
- describe the documentation needed to support this new system and explain its purpose
- identify who will need training, what type of training they will need and when
- state what procedures must be developed to ensure only nurses can use the network
- describe the procedures required to ensure records are kept of all emails sent to management
- explain how you will evaluate the performance of the system and when you will do this
- explain how you will coordinate the development, implementation and evaluation of the system
- explain one way the hospital and the nurses will be affected by the new system.

IT GLOSSARY

For the purposes of this study, the following terms are defined.

Term	Definition
algorithm	Method of representing the processing, or control structures, required in a software solution. Common methods are pseudocode, Nassi-Schneidermann (N-S) diagrams, flow charts, Input–Process–Output (IPO) charts.
analyse	(1) Determine how an information system works by gathering data about the system, identifying data inputs, documenting the flow of information through the system, identifying problems, suggesting alternative solutions, and assessing their feasibility, selecting one alternative and documenting a logical design for the new system. (2) Determine how the current software processes information, identifying problems, suggesting alternative solutions, selecting the most feasible solution, identifying data to be input and processed, determining the output requirements of the solution and documenting this process.
annotated diagram	A diagram to which is added text that describes the purpose or explains the role and/or function of selected elements in the diagram.
application	An application is a solution to an information technology problem. It has ongoing use. The solution may be the customising of application software for a particular purpose, for example, spreadsheet or it may be a purpose-designed program; for example, a Visual Basic or Java project.
application software	Software designed for a particular application but that can be customised, within limits, to suit a user's particular needs; for example, database, spreadsheet, desktop publishing, accounting software.
capabilities	How well a piece of hardware or software can perform its function(s); for example, a modem may transmit data at 33bps; a digital camera may capture images with 1200 x 800 pixel resolution.
characteristics	The identifying elements of a piece of hardware or software; for example, MS Word can process words, format documents for online use, produce diagrams; Realplayer can play mpeg files.
communications device	Equipment used to transmit data and information such as mobile phone, modem, satellite.
computer	In pure terms a computer is the microprocessor that processes data. In fact, a computer is not useful unless it has peripherals attached to it including input, output, and auxiliary storage devices.
computer architecture	The type and characteristics of the processing components (for example, RAM, microprocessor, clock, motherboard, interface ports, buses), the peripherals (input, output, storage devices; for example, monitor, keyboard, disk drives) and how they are connected.
computer system	A combination of components designed to process data and store files. It comprises an input device, a processing unit, an output device, and a storage device.
convention	A commonly understood and accepted way of doing something; for example, displaying file size and download time required for video links in a web page, using a common format for naming objects of the same class, saving similar type files with the same extension.
data	Unprocessed, unorganised and discrete facts or ideas.
design	(1) Identify the components (people, procedures, data, equipment) required for a new information system, converting the logical design of the information system into a physical design, designing test specifications for the system. (2) Determine the specific inputs, processes, and outputs required of a solution.
design representation	A method of explaining a design to others; for example, a DFD, flow chart, pseudocode, IPO chart, structure chart.

develop	(1) Convert an information system design into a working information system ready for implementation. (2) Convert a software design into a working application ready for implementation. A design is not properly developed until it has been tested.
dispose	To delete files.
document	Noun: a document is output produced by an information system. It may be an electronic document as in an email or a web page or it may be a printed document as in a letter or report. Verb: to document is to record instructions about how to operate an information system or use a software application. See also, system documentation, user documentation.
economic effects	The efficiency of an information system depends on the time, cost and effort required to process information. The economic effects of a change to an information system are those that impact on time, cost or effort for an individual, an organisation, or society.
economic impetus	The motivation to change an information system may be stimulated by economic factors. The need to establish or maintain the competitive edge, or to just remain competitive, is the paramount economic factor. The competitive edge may be achieved through providing better customer service, cheaper or better quality products. Change to an information system that reduces the cost of producing information (improves efficiency), or that produces better information for decision-making (improves effectiveness) will assist an organisation to become more competitive.
effective	An information system or a software application is effective when it achieves its purpose. It is measured in terms of completeness, attractiveness, clarity, accuracy, relevance and ease of use.
efficient	An information system or a software application is efficient when it achieves its purpose with the least time, cost, or effort.
electronic file	A file stored in digital form; for example, on a CD, magnetic tape, DVD, HDD.
end-users	People who use a computer directly or who use the information provided by a computer.
equipment	The hardware and software components of an information system.
ethics	Moral principles or guidelines that govern practices associated with the use of information and information systems. In this study students need to consider the moral standards or ethics applied when creating electronic publications, (Unit 2), when storing, communicating and disposing of data and information, (IPM, Unit 3) and when developing purpose-designed software (IS, Unit 3). The Australian Computer Society has a Code of Ethics for its members, which is available from its website at www.acs.org.au An example of a decision-making framework to resolve ethical dilemmas is found in the Revised VCE Studies 2000 Implementation Resource Kit, Technology, page 33, published by the Board of Studies.
evaluate	To assess the value of an IT solution or an information system against pre-determined criteria or system goals.
external documentation	Instructions for technical operators and end-users of software. Technical documentation includes: specifications and capabilities of the equipment, instructions about how to maintain and update software functions, disaster recovery, and a trouble shooting guide. End-user documentation may include a training manual and/or tutorial, quick help guide, 'how to' manual, trouble shooting guide. The instructions may be in one or a combination of forms such as hard copy printed material, computer tutorials, on-screen help screens, Internet links to help sites. See also system support documentation.
flow chart	A diagrammatic description of an algorithm for a software solution or of the processing performed by an information system.
format	(1) The layout or setting out of a document. (2) To define the tracks and sectors on a floppy disk so that it can store data processed by a particular operating system.

function	The tasks performed by information system components.
global environment	Organisations that use the Internet to make e-commerce transactions or to communicate with remote parties (for example, suppliers, customers, branches of a business) are operating in a global environment. These organisations are participating in the global economy. This means an economy in which potential suppliers, customers, employees, or branches may be located anywhere around the globe.
hard copy	Information printed on paper.
hardware	Input, processing, and output devices, and their components.
information	Refined, organised and value-added facts or ideas.
information and communications technology (ICT)	The use of computer-based information systems and communications systems to process, transmit and store data and information. Since communications systems are dependent on microprocessors the term is abbreviated to information technology in this study design.
information problem	(1) Identified weakness in data processing; for example, customer accounts not processed on time. (2) Identified need to improve the efficiency or effectiveness of data processing; for example, ageing club members now need their newsletters printed in larger size font.
information processing steps	Processing new data involves a number of steps: acquire, input, validate, manipulate, store, output, communicate, retrieve, dispose. Future accessing and updating of files involves one or more of these steps.
information system	The combination of people, procedures, equipment, and data that process data and information.
information technology	The use of computer-based information systems to process, store and transmit data and information.
input	Noun: the data that is to be processed. Verb: to enter data into a computer either manually; for example, by keyboard, microphone or automatically; for example, by heat sensor, bar code reader.
input screen	The screen display through which a user interacts with a computer. Well-designed (user-friendly) input screens make the user's tasks easier to perform.
internal documentation	Comments written into program code to explain variables, procedures, methods. Well-documented code assists future programmers to update the program.
Internet	An **Inter**national **net**work of computers, or more correctly networks of computers. The networks use a common protocol (e.g. TCP/IP) for transmitting data such as email messages and files. See also WWW.
Intranet	Provides access to an organisation's computers only.
LAN (local area network)	A network of computers usually within a building or on one site that share resources; for example, a printer and applications software and files stored on the file server. The computers are linked by cable or wireless technology.
layout diagram	A method of representing the layout of a word processed, DTP, or multimedia page, or screen design. The diagram shows the location of all main elements on the page; for example, headings, diagrams, text boxes, images, fields, and white space.
legal effect	Impact of the law on application design, information system design, and on users.
logical design	Describes the functions required of a system, that is, **what** is to be done, not how it will be done. Logical design is not concerned with hardware and software requirements but rather with the processes to be performed. Context diagrams, data flow diagrams and data dictionaries are useful tools in representing the logical design of a system.
manipulate	Processing data into useful information or processing data to invoke an action; for example, temperature sensor turns on air conditioner.
network	Two or more computers linked via cables or wireless technology so that they can share files and applications, send and receive email and share resources; for example, printers.

network architecture	The types and characteristics of the network components; for example, routers, switches, cables, and how they are connected.
network operating system	Software that controls the operations of a network; controls the attached computer systems, peripherals, and communication between them.
network topologies	Ways of configuring or structuring a network. Common topologies are bus and star.
networked information system	An information system (people, procedures, data, equipment) in which the computer systems are networked.
new/modified information system	Any change to any component (people, procedures, equipment, data) of an information system may result in a new (or modified) system. Usually, changes to equipment or data have a more significant impact on an information system than changes to people or procedures.
operational criteria	One of the sets of criteria used to assess the feasibility of a new information system. Operational criteria are those that relate to whether the new system can work in the organisation. The system itself may be sound but if staff are not motivated to accept it or there are logistical constraints the system may not be implemented.
organisation	A group of people who work together toward a common goal; for example, a sporting club, business, government department, professional body.
output	The end product resulting from running an application. It may be a flier, or online document or it may be the raising of a boom gate from a control application.
peripherals	The input, output and auxiliary storage devices attached to a computer processor.
physical design	Describes **how** the processing will be performed; for example, whether data is input by a person or read by a bar code reader, whether a file is electronic or print. Tools to represent the physical design include a system flow charts and structure charts.
problem-solving methodology	A method for solving problems with applications or whole information systems. In this study the method chosen has these steps: analyse, design, develop, test, document, implement, evaluate.
procedural factors	Any proposal to change an information system must include consideration of the impact of the proposed change on procedures for controlling data flow through the system.
publication	Document intended to be read by known or unknown recipients outside the organisation; for example, a publicity brochure, a web page.
purpose-designed software	Software written by a programmer for a specific purpose.
purposes of information	(1) To inform – to report about a current issue. (2) To persuade – to assist in making decisions about a course of action or to change a person's point of view on an issue. (3) To educate – to increase a user's level of understanding of a concept. (4) To entertain – to amuse.
retrieve	To access, or open, a file of stored data or information.
role	The part played by an information system component; for example, the role of a network administrator is to keep the system functioning; the role of a scanner is to read documents and convert them into digital form that the computer can process.
social effect	The impact on people of developments in information technology. These developments may affect individuals, organisations or society. They are usually described in terms of how the behaviour, attitudes and/or relationships are affected.
social impetus	Change to an information system caused by the needs of people as individuals, as a group, or as society.
soft copy	Information stored on a computer disk or displayed on screen.
software	Computer programs. System software is the operating system and utilities programs that control a computer system. Application software is programs that enable users to process data.
software engineering	Application of software design principles to the process of creating software.

software module	A small section of a program that carries out a clearly defined task. It has one entry point and one exit point.
solution	An application developed to solve an IT problem. The solution may produce output (as in managing information) or it may produce an action (as in controlling systems).
specifications	The characteristics and capabilities of hardware and software items.
stakeholders	Those who have an interest in the development of an information system. Stakeholders include those who will benefit or suffer from the introduction of the information system.
store	To save a file. Files are now routinely saved electronically. In some organisations files may also be saved in hard copy form.
storyboard	A method of representing the design of a multimedia solution. Not to be confused with a film storyboard, multimedia storyboarding refers to drawing a structure chart identifying each page and indicating the links between pages (whether one-way or two-way). A layout diagram may accompany this.
system software	The software that controls the operations of a computer system. It is a group of programs rather than one program. The operating system controls the hardware in the computer and peripherals, manages memory and files, and multi-tasking functions, and is the interface between applications programs and the computer. Utilities programs format, check and defragment disks.
system support documentation	(1) Manuals and instructions that enable technical users of an information system to maintain and update the system. They may include hardware and software specifications and capabilities stored in system information files, file management, backup and disaster recovery procedures. (2) User guides/instruction manuals to enable operational users to use the system. They may include instructions for accessing and using programs, accessing, naming, and saving files, and protocols; for example, for using email, troubleshooting.
systems development life cycle	A method for developing information systems. It has five main stages: analysis, design, development, implementation, evaluation. Each stage has several components; for example, the development stage includes programming: coding including internal documentation, de-bugging, testing, documenting; and acquiring equipment: selection, acquisition (purchase or lease), testing.
technique	The way a process is performed; for example, whether a word processing function is invoked by mouse selection or keyboard shortcut; whether data is gathered by a survey or online questionnaire.
test	(1) Testing an information system involves checking that procedures, equipment, and staff process data as expected. Each component may be tested and then the whole system tested. (2) Test data should be developed to ensure the procedures and formulas of a program/application operate and process data as expected a) in the algorithm then b) in the program code. This test is normally performed during and immediately after a program/application development. It is called debugging. Once debugged, someone not involved in the program development tests it.
tools	In IT the term refers to methods of representing designs; for example, storyboards, flow charts or managing projects; for example, Gannt charts.
user documentation	Instructions to assist users of programs/applications and information systems.
user interface	The way a user interacts with a computer system; for example, a screen and keyboard as in a desktop computer or ATM, a keypad as in an ID security system.
validate	To check that data input to a computer system is of an appropriate form type for processing and within acceptable boundaries.
WAN (wide area network)	A network in which the computers are usually located in different cities or countries and are connected by telephone lines, microwave links or satellite.
WWW	The World Wide Web operates within the Internet. It enables transmission of multimedia; that is, graphics, audio, video, and text through use of the **h**yper **t**ext **t**ransport **p**rotocol (http).

SCHOOL-ASSESSED COURSEWORK

Units 3 and 4: Information Processing and Management

In Units 3 and 4 teachers must select appropriate tasks from the assessment table provided for each unit. To assist teachers in their decision on the student's levels of achievement, the Victorian Curriculum and Assessment Authority will publish advice on the scope of the task and criteria for assessment in an assessment guide. The following are two examples of assessment programs using the selection of the tasks from the Unit 3 and Unit 4 assessment tables. The text highlighted by a shaded box indicates the assessment task selected for each outcome.

Program A

Outcome	Assessment task options	Comments	Marks allocated
Unit 3			
Outcome 1 Demonstrate and explain the main capabilities of a specific software tool and a related hardware component through the production of output, and evaluate the usefulness of these capabilities.	A short, practical test, including a written response.	*No assessment task options exist for this outcome.*	20
Outcome 2 Solve an information problem, taking into account the goals and information needs of an organisation.	Information technology solution AND • a written report, or • a visual presentation (presentation file, poster)	*Students can select the format in which they present their reports. This provides students with the opportunity to undertake their assessment task in a format that best suits their needs.*	50
Outcome 3 Evaluate the effectiveness of the strategies used by an organisation to manage the storage, communication and disposal of data and information.	• a written report, or • a test	*This option has been chosen in order to provide a range of assessment tasks for the unit.*	30
Unit 4			
Outcome 1 Propose and apply organisational and processing strategies to produce an ongoing solution that meets the decision-making needs of an organisation.	Information technology solution AND A project management report	*No assessment task options exist for this outcome.*	40 20
Outcome 2 Formulate and justify strategies for developing, implementing and evaluating a networked information system in response to a social, economic or technological impetus for change.	• a written report, or • a test, or • a visual presentation (presentation file, poster)	*This option has been chosen on the basis of preparation for end-of-year examination.*	40

Program B

Outcome	Assessment task options	Comments	Marks allocated
Unit 3			
Outcome 1 Demonstrate and explain the main capabilities of a specific software tool and a related hardware component through the production of output, and evaluate the usefulness of these capabilities.	A short, practical test, including a written response.	*No assessment task options exist for this outcome.*	20
Outcome 2 Solve an information problem, taking into account the goals and information needs of an organisation.	Information technology solution AND • a written report, or • a visual presentation (presentation file, poster)	*This option has been selected as students can prepare the visual presentation using the software tool used to create the solution.*	50
Outcome 3 Evaluate the effectiveness of the strategies used by an organisation to manage the storage, communication and disposal of data and information.	• a written report, or • a test	*This option has been chosen in order to provide a range of assessment tasks for the unit.*	30
Unit 4			
Outcome 1 Propose and apply organisational and processing strategies to produce an ongoing solution that meets the decision-making needs of an organisation.	Information technology solution AND Project management report	*No assessment task options exist for this outcome.*	40 20
Outcome 2 Formulate and justify strategies for developing, implementing and evaluating a networked information system in response to a social, economic or technological impetus for change.	• a written report, or • a test, or • a visual presentation (presentation file, poster)	*This option has been chosen in order to provide a range of assessment tasks for the unit.*	40

Units 3 and 4: Information Systems

In Units 3 and 4 teachers must select appropriate tasks from the assessment table provided for each unit. To assist teachers in their decision on the student's levels of achievement, the Victorian Curriculum and Assessment Authority will publish advice on the scope of the task and criteria for assessment in an assessment guide. The following are two examples of assessment programs using the selection of the tasks from the Unit 3 and Unit 4 assessment tables.The text highlighted by a shaded box indicates the assessment task selected for each outcome.

Program A

Outcome	Assessment task options	Comments	Marks allocated
Unit 3			
Outcome 1 Explain the functions of, and the relationships between, the components of a networked information system used in an organisation.	Response to a given written scenario in the mode of a visual presentation (presentation file, poster)	*No assessment task options exist for this outcome.*	20
Outcome 2 Analyse an information system and explain and justify a detailed design for a new or modified networked information system.	• a written report (including documentation of analysis and design techniques), or • a poster (including documentation of analysis and design techniques)	*This option has been chosen in order to provide a range of assessment tasks for the unit.*	50
Outcome 3 Produce a software module, in response to a system design, and verify its performance against the design specifications.	An information technology solution in response to a system design, including a written report.	*No assessment task options exist for this outcome.*	30
Unit 4			
Outcome 1 Apply the principles of software development to produce purpose-designed software that takes into account the information system objectives and the needs of end-users.	Information technology solution AND User documentation and an explanation of possible causes of conflict between programmers and end-users in one of the following: • a test, or • a written report	*This option has been chosen in order to provide a range of assessment tasks for the unit.*	45 15
Outcome 2 Propose and justify development, implementation and evaluation strategies for introducing to an organisation an information system that will operate in a global environment.	One of the following: • a written report • a test	*This option has been chosen on the basis of preparation for end-of-year examination.*	40

Program B

Outcome	Assessment task options	Comments	Marks allocated
Unit 3			
Outcome 1 Explain the functions of, and the relationships between, the components of a networked information system used in an organisation.	Response to a given written scenario in the mode of a visual presentation (presentation file, poster)	*No assessment task options exist for this outcome.*	20
Outcome 2 Analyse an information system and explain and justify a detailed design for a new or modified networked information system.	• a written report (including documentation of analysis and design techniques), or • a poster (including documentation of analysis and design techniques)	*Students can select the format in which they present their reports. This provides students with the opportunity to undertake their assessment task in a format that best suits their needs.*	50
Outcome 3 Produce a software module, in response to a system design, and verify its performance against the design specifications.	An information technology solution in response to a system design, including a written report.	*No assessment task options exist for this outcome.*	30
Unit 4			
Outcome 1 Apply the principles of software development to produce purpose-designed software that takes into account the information system objectives and the needs of end-users.	Information technology solution AND User documentation and an explanation of possible causes of conflict between programmers and end-users in one of the following: • a test, or • a written report	*This option has been chosen in order to provide a range of assessment tasks for the unit.*	45 15
Outcome 2 Propose and justify development, implementation and evaluation strategies for introducing to an organisation an information system that will operate in a global environment.	One of the following: • a written report • a test	*This option has been chosen in order to provide a range of assessment tasks for the unit.*	40

SUITABLE RESOURCES

Courses must be developed within the framework of the study design: the areas of study, outcome statements, and key knowledge and skills.

Some of the print resources listed in this section may be out of print. They have been included because they may still be available from libraries, bookshops and private collections.

BOOKS

Teacher and library references

Bowyer, K, 1996, *Ethics and Computing*, 818671300

De Marco, T, 1979, *Structured Analysis and System Specification*, 0917072073

Deitel, H & Deitel, P, 2000, *Internet and the World Wide Web: how to program*, 0130161438

Evans, T, 1995, *10 Minute Guide to HTML*, 0789705419

Fisher, J, 1994, *Data Transmission and Privacy*, 0792327136

Greenlaw, R, 2001, *Inline/Online: Fundamentals of the Internet & the World Wide Web*, McGraw Hill

Grochow, J M, 1997, *Information overload*, 0135276314

Gutzman, A, 2000, *FrontPage 2000 answers*, 0072121017

Halberg, B, 2000, *Networking: A Beginner's Guide*, McGraw Hill

Juliff, P, 1990, *Program Design*, 3rd edn, Prentice Hall

Kerman, M & Brown, R, 2000, *FrontPage 2000*, 0201612682

KT Solutions, 1998, *Beginning FrontPage 98*, 1892375397

KT Solutions, 1998, *Beginning MS project 98*, 1892375389

Langford, D, 2000, *Internet Ethics*, 0312232799

Lowery, J W, 2000, *Dreamweaver 3 bible*, 0764534580

McManus, J, 1999, *Database Access with Visual Basic 6.0*, 0672314223

Marshall, G R, *Systems Analysis and Design: alternative structured approaches*, 0835974456

Messing, J, 1989, *The Programming Process – Analysis and Algorithms* (available from J Messing, 9 Atherton Crescent, Wagga Wagga, NSW 2650)

Negrino, T & Smith, D, 1999, *JavaScript for the World Wide Web*

Olekalns, J, *1999, Systems Development Analysis Feasibility and Implementation*, Tertiary Press. Tertiary Press has a range of other useful information technology titles including *Introduction to User Documentation, Essentials of IT and Network Administration*, and application and programming specific texts

Palmer, S, 2000, *Fundamentals of Visual Basic 6 programming*, 1582640858

Plotkin, D, 2000, *How to do Everything with FrontPage 2000*, 0072125756

Shelly, G, Cashman,T & Pratt, P, *Microsoft Access 2000 Complete Concepts and Techniques*, 078954671X

Shelly, Cashman & Waggoner, 1990, *Computer Concepts*, Boyd & Fraser Publishing

Slade, Bolton, Dale & Thatcher, *Information Technology*, Macmillan Education Australia

Stoll, C, 1999, *Silicon Snake Oil: 2nd thoughts on the information highway*, 0785794948

Ware, et al., 1999, *Introducing Computing Studies 7–10*, Jacaranda Wiley

Webster, F, 2000, *Understanding Contemporary Society*, 0761959262

Whitten, J L & Bentley, L D, 2001, *Systems Analysis and Design Methods*, 025619906X

Williams, R, 2000, *Robin Williams Design Workshop*, 0201700883

Wilton, P, 2000, *Beginning JavaScript*, 1861004060

Wolfe, R J, 2000, *3D Graphics: a visual approach*, 0195113950

Zeff, R & Aronson, B, 1999, *Advertising on the Internet*, 0471344044

Student and library references

Chatfield, C & Johnson, D, *Microsoft Project 2000 Step by Step*, 0735609209

Collins, H, 2000, *Corporate Portals*, 0814405932

Currucan, Crew & Mathews, 1998, *The Internet Manual for Students*, Macmillan Education Australia

Forester, T & Morrison, P, 1994, *Computer Ethics: cautionary tales and ethical dilemmas*, 0262560739

Fortenberry, T, 2001, *Windows 2000 Virtual Private Networking*, 1578702461

Halvorson, M, 1999, *Microsoft Visual Basic 6: step by step professional*, 1572318090

Knowlton, T, 2001, *C++: Basics*, 0538694947

Kallman, E & Grillo, J, 1996, *Ethical Decision Making with IT – An introduction with cases*, 0070338841

Pattison, T, 2000, *Programming Distributed Applications: visual basic 6*, 073561010X

Quin, V, 2000, *Teach Yourself Microsoft Project*, 0764534009

Singh, S, 2000, *Science of Secrecy: History of code breaking*, 1841154350

Course-based textbooks

Andersen, Christophersen & Timmer-Arends, 1999, *IT@work*, Macmillan Education, Australia

Baker, G & Bowen, T, 1999, *Doing IT: Information Technology 1 & 2*, Oxford University Press

Byrt & Kerr, 1999, *Information Technology: A Case Study Approach*, Heinemann

De Figuieredo, McIllree, Brookes & Timmer-Arends, 1999, *Study Dictionary: Information Technology*, Oxford University Press

Ferguson et al., *Information Technology VCE Units 1 and 2*, Heinemann

Fitzpatrick, Keane & Montgomery, 2000, *Building Information Systems*, Social Science Press

McIllree et al., 2000, *Information Technology, Units 1 and 2*, Jacaranda Wiley

Meyenn, Graham & Thatcher, 2000, *Information Processing and Management*, 2nd edn, Jacaranda Wiley, 071633832

Potts et al., 1999, *IT: Information Technology Units 1 and 2*, Nelson

Potts & Little, 2000, *Information Processing and Management*, CAT 3, Cambridge University Press

Potts & Little, 2001, *Checkpoints: VCE Information Processing and Management*, Cambridge University Press

Scott, et al., 1999, *Information Processing and Management*, McGraw-Hill

Working with an organisation, Warringal Publications

Problems, Solutions and Management of Change, Edassist

VIDEOS

The following videos are available from Video Education Australasia (www.vea.com.au).

GreenGrocer.com.au
Email etiquette
Jobs at the cutting edge,
Transistorised
Technology & the Workplace of the Future
Reality Bytes
Computers Warships
Virtual Wasteland
Information Technology in Business

INTERNET

www.iee.org.uk/Library
(Institute of electrical engineers)

www.ieee.org
(Institute of electronic and electrical engineers)

www.vic.gov.au
(Government departments, including education)

www.pcuser.com.au
(Australian PC User)

www.computeruser.com
(Computer User)

www.howstuffworks.com
(How Stuff Works)

www.webopedia.com
Webopedia

www.privacy.gov.au/act
(Australian Privacy Commissioner)

www.bf.rmit.edu.au/Aben/links.html
(Aben: links Australian Ethics Organisation)

www.austlii.edu.au
(Australian Legal Information Institute: information about Australian laws)

www.thestandard.com.au
(Industry Standard: provides current information about the IT industry, including ecommerce)

www.aiia.com.au
(Australian Information Industry: provides information about industry initiatives such as privacy tools and effects of IT on society)

JOURNALS, PERIODICALS AND NEWSPAPERS

Australian PC (monthly).

Byte (bimonthly).

New Scientist, *Time*, *Newsweek* (weekly).

Scientific American (monthly).

Wired (monthly).

Computer sections in *The Age* and *The Australian* newspapers.

ORGANISATIONS

Victorian Information Technology Teachers Association (VITTA) at: www.vitta.org.au