

**2007
School-assessed
Coursework
Report**



**Systems Engineering GA 1: Unit 3
Systems Engineering GA 1: Unit 4**

UNIT 3

This report is provided for the first year of implementation of this study and is based on the coursework audit and VCAA statistical data.

GENERAL COMMENTS

Most tasks met the requirements of the study design. Assessment tasks were based on the task types specified in the *VCE Systems Engineering Study Design* (accreditation period 2007–2010). Tests were designed using an impressive variety of sources for test items. Past Systems and Technology examination papers, past support material sample questions, technical data sheets and diagrams and various Internet and computer software resources such as *Crocodile Technology* were used to deliver authentic contexts and provide diagrams to support questions. Tests featured many original questions highlighting situations and systems for analysis. There was a strong endorsement of the ‘integrated systems’ orientation of this study as evidenced by the test items reflecting elements of the key knowledge and skills associated with Outcome 1.

The tasks were designed to allow students to demonstrate key knowledge and skills associated with the outcomes. The assessment tasks were generally of a suitable length to be completed in two periods. It is advised that students should be aware of the assessment criteria in advance of completing the task. The practice of designing and cross-marking assessment tasks in network groups is to be encouraged. This activity can assist in clarifying understanding of both the design and assessment of School-assessed Coursework.

Teachers should be aware of the changes to marks allocated for Unit 3 and Unit 4 School-assessed Coursework. This was published as an amendment to study design on page 10 of the November 2006 *VCAA Bulletin VCE, VCAL and VET* No. 43 and appears on the Systems Engineering page of the VCAA website www.vcaa.vic.edu.au/vce/studies/systemseng/systemsengindex.html

Teachers nominated to provide material for coursework audits are reminded that they are not required to send any material for the coursework audit that relates to Outcome 2 – assessed as the School-assessed Task.

Coursework assessment instruments for both Units 3 and 4 should include a range of task types – for example, all tasks should not be tests. This approach caters for wider and more flexible learning and assessment styles.

SPECIFIC INFORMATION

Unit 3 Coursework

Outcome 1

Recognise, identify, represent, describe and explain the principles of controlled integrated technological systems.

2007 School-assessed Coursework Report

Task type options

Any one or a combination of:

- a test (short and/or extended responses)
- a short written report
- a report in multimedia format
- an oral presentation.

(30 marks)

Most commonly selected was the short-answer test, either open-book or closed-book, although a few teachers presented students with an option of a short written report. Where a test was chosen, a wide range of question styles was used. Rather than purely 'recall' questions, teachers also included questions that involved analysis, design, description, drawing, and calculation in both familiar and unfamiliar applications. This allowed students to demonstrate a wide range of skills.

Most tasks provided an opportunity for students to demonstrate an understanding of key knowledge and skills associated with the outcome. There was evidence of wide coverage of the mechanical and electrotechnology principles; and the function and operation of the relevant mechanisms and components. Understanding of the function and application of electrotechnology control devices was not as well covered. The symbolic representation of integrated systems and their operation was also an area that was not well represented.

Assessment

Generally, the proportion of questions relating to different elements of the key knowledge reflected the marks apportioned to those elements. Marks were also given that reflected the degree of difficulty of each question. Many teachers made use of the performance descriptors published in the *VCE Systems Engineering Assessment Handbook* as a guide to the standards expected when setting and marking the tasks. Care should be taken when setting the possible breakdown of marks for the task.

Outcome 3

Analyse and compare the environmental benefits and implications of using different energy sources (including alternative energy sources), and how specific energy sources affect the design, performance and use of technological systems.

Task type options

Any one or a combination of:

- a test (short and/or extended responses)
- a short written report
- a report in multimedia format
- a media analysis
- a case study
- an oral presentation.

(30 marks)

While the most popular assessment instrument was the short written report, a number of teachers provided the option of a multimedia report as the assessment task.

2007
School-assessed
Coursework
Report

Use was also made of oral presentations to present the information to class, although the breakdown of marks to assess the presentation was not specified. It was evident that teachers encouraged students to undertake a range of learning activities in class, in the school's resource centre and by accessing outside experts or hobbyists prior to the administration of this assessment task.

Students who were only provided with the assessment criteria alone to respond to struggled to demonstrate an understanding of the elements of the outcome. Teachers need to provide more specific guidelines about the content of the task. In some cases, teachers set a series of questions that resembled a test rather than giving direction that would result in a short written report. Students can be restricted in their response if they are limited by questions that have a narrow focus, or if the space provided for answers is inadequate. Equally of concern were the cases in which the only source of information and direction provided for students was word-processed or photocopied verbatim. The language used in the study design and the assessment handbook is not, by itself, easily understood by students. It is best interpreted by teachers and rewritten at a more appropriate level. Teachers should not issue students with a copy of the assessment handbook and expect them to write to the criteria. They are expected to develop a task, not simply present a copy of performance descriptors, or task setting guidelines verbatim from the assessment handbook.

Most teachers demonstrated a high level of skill in interpreting the study design and information provided in the assessment handbook under the heading Designing the assessment task (Section 2). They were able to define the parameters of the outcome and its related assessment task options, prepare students for the task with suitable teaching and learning activities and present the students with the resources needed to commence research and undertake class activities. Topics, timelines, worksheets, lists of resources and a description of how the task is to be assessed are common inclusions in the assessment task materials.

Common topics addressed in this outcome included electricity generation, transportation and heating systems. Hybrid powered cars, hydrogen powered cars, solar power and wind power generators featured in many reports. A wide range of energy sources were covered. These included coal, diesel, kerosene, petrol, ethanol, biodiesel, biogas, geothermal energy, ocean wave power and uranium. Tasks were occasionally prefaced by media reports or quotations from political or environmental leaders in order to set the context of the task.

The assessment criteria and the questions provided to students ensured coverage of the key knowledge and skills associated with this outcome.

Assessment

Many teachers made use of the performance descriptors as a guide to the standards expected when setting and marking the tasks. The marking schemes in most cases reflected the relevant aspects of the performance descriptors in the assessment handbook and should have been explained to students before starting the task. In many cases teachers used the suggested breakdown of marks published on page 29 of the assessment handbook.

2007
School-assessed
Coursework
Report

UNIT 4

This report is provided for the first year of implementation of this study and is based on the coursework audit and VCAA statistical data.

Unit 4 Coursework

Outcome 1

On completion of this unit the student should be able to recognise, identify, represent, describe and explain the principles and functioning of controlled integrated technological systems.

Task type options

Any one or a combination of:

- a report in multimedia format
- a test (short and/or extended responses)
- a short written report.

(40 marks)

Most commonly selected tasks were tests sourced on the sample examination questions or past Systems and Technology examinations. Questions included some used of concrete aids to illustrate contexts. Both open- and closed-book tests were evident.

Less commonly selected was a multimedia report presented to class, with notes submitted for assessment based on research.

There was also evidence that teachers requested students to select a (systems) product or everyday item and write a report based on key knowledge linked to Outcome 1 or specific criteria.

In instances where students are asked to consider a system and write a short written report, teachers are advised to provide students with examples of suitable systems to focus on. Often students, given a free rein, select unsuitable systems that are either too complex or too simple, consequently limiting their responses. Similarly, teachers should advise students not to write about the system they have designed and produced for their School-assessed Task. The production could be narrow in its scope and not allow students the opportunity to demonstrate an understanding of the wide range of systems' concepts and principles. Questions in an assessment task solely based on one system can also limit the degree and breadth of knowledge that is being tested.

The use of simulation software is under-represented in the assessment tasks presented in the audit. Students can demonstrate their knowledge and skills in an assessment task using this technology, building simple and/or complex systems to achieve authentic outcomes; analysing the results and presenting data, flowcharts and diagrams of the systems set up.

Teachers should ensure that across Unit 3 Outcome 1 and Unit 4 Outcome 1 students are provided with an opportunity to demonstrate their understanding of a range of principles, perform a range of related calculations and use a range of methods of symbolic representations; and show their knowledge of a range of applications of integrated systems. A teacher checklist developed from the key knowledge in the study design to ensure breadth of coverage would be beneficial.

**2007
School-assessed
Coursework
Report**

Assessment

Generally, the proportion of questions relating to different elements of the key knowledge reflected the marks apportioned to those elements. Marks were also given that reflected the degree of difficulty of each question. Many teachers made use of the performance descriptors in the *Systems Engineering Assessment Handbook* as a guide to the standards expected when setting and marking the tasks. Care should be taken when setting the possible breakdown of marks for the task. Tasks that include marks assigned to each section or question provide a useful guide for students by indicating the detail or depth of response required. In many cases teachers used the suggested breakdown of marks published on page 31 of the assessment handbook.