

# Systems and Technology GA 1: Unit 3 and 4 Coursework

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## GENERAL COMMENTS

The tasks to be undertaken by students for school-assessed coursework in Systems and Technology Unit 3 are specified on page 25 of the Systems and Technology Study Design. These tasks must be a part of the regular teaching and learning program, and completed mainly in class, under teacher supervision. In addition to the study design, the VCAA has provided advice to assist teachers in implementing coursework assessment in the 'Advice for teachers' section of the Systems and Technology Study Design, the *Technology Assessment Guide VCE 2002* the *VCE Implementation Resource Kit* distributed to schools in May 2001 and the *Systems and Technology Study Advice* (February 2002).

The Technology Assessment Guide provides advice on the scope of the assessment tasks and criteria for assessment. Most teachers used the criteria in the assessment guide. They produced clearly set out assessment sheets using the criteria mark allocations to assess student responses. In some situations, teachers developed their own assessment criteria, which in general, were appropriate to the task. Where teachers used structured questions, a marking scheme was preferred for assessment rather than criteria. Teachers need to be confident that they are able to discriminate between different levels of student performance.

Most tasks met the requirements of the study design. Assessment tasks included details taken from the scope of the task such as task duration, recommended word limits, the allocation of marks and the nature of any materials that could be utilised by students when completing the task.

Teachers must ensure that the assessment tasks are designed to allow students to demonstrate key knowledge and skills associated with the outcomes. The assessment tasks should be able to be completed by students in the timeframe outlined in the assessment guide. Students should be aware of the assessment criteria and this is best provided to students in advance.

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.

The standard of student work was quite impressive, particularly given that the work was done in class under time constraints. The work suggested students were well prepared with a good understanding of both the content of material and the requirements of the task.

## SPECIFIC INFORMATION

### Unit 3 Coursework

#### Outcome 1

**Students should be able to explain concepts and principles associated with integrated systems.**

The options for the nature of the task were:

- a report in multimedia format
- a short-answer, open-book test
- a short written report.

While the most popular assessment instrument was the short-answer, open-book test, alternatively, a number of teachers set a multimedia report as the assessment task.

Where a test was chosen as the preferred assessment instrument, 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. This allowed students to demonstrate a wide range of skills.

Generally, the proportion of questions relating to different elements of the key knowledge reflected the marks apportioned to those elements. Marks were given that reflected the degree of difficulty of each question. Teachers used an impressive variety of sources for test items. Past Systems and Technology examination papers, the sample questions published in Supplement 1 to the December 2000 *VCE Bulletin*, technical data sheets, journals such as *Popular Mechanics* and *Silicon Chip*, and various Internet and computer software resources such as *Crocodile Technology* were used to deliver authentic contexts and provide diagrams to support questions. There was a strong endorsement of the 'integrated systems' orientation of the revised study as evidenced by the test items reflecting all elements of the key knowledge associated with Outcome 1. Very rarely did the test consist only of questions relating solely to mechanical systems, or to electronic/electrical systems.

Generally, students performed well in this task. They demonstrated sound knowledge of the concepts, principles, and components associated with integrated systems. However, it was evident that some students were better able to respond to questions related to their preferred area of systems. Symbolic representation related to the operation of integrated systems using block or flow diagrams tended to be an aspect of the key knowledge that was not adequately represented in the assessment task. Many tests did not provide an opportunity for students to demonstrate an understanding of this component of the required knowledge.

In a few cases, teachers set the task with broad parameters such as 'Select a system of your own choice and write a report on it.' This approach does not provide students with adequate guidelines to respond to the aspects of key knowledge within the outcome. Even the use of headings does not always guarantee the focus or depth required. Students are best directed more specifically to the knowledge they need to demonstrate.

Where a report in multimedia format was chosen as the preferred assessment instrument, there remains some confusion as to whether the support material and formatting is part of the assessment. This is a teacher decision; however, it is the content of the report completed in class time that should be the focus of the assessment. Typically, in approaching this task, a system, such as an electric motor, was selected and the key elements related to the system investigated, including concepts, principles, and components. The information gained from the investigation was then used to prepare the multimedia report. Generally, this took the form of a PowerPoint presentation and was submitted with notes expanding the content of the slides. These notes may have been used if the student presented their report to the class.

### **Linking assessment to curriculum**

The use of a grid that links the test items to the particular key knowledge and skills bullet points provides a useful method to establish a balanced treatment of the elements of the key knowledge and skills and to ensure there is coverage of electrical and mechanical concepts, principles and components of integrated systems.

### **Outcome 3**

#### **Students should be able to explain the relationship between technological systems and the natural environment**

The assessment instrument for this assessment task was a short written report. Most teachers utilised the VCAA assessment criteria in the assessment guide and there was a high level of compliance to the task. In setting this task, many teachers referred to the guidelines outlined in the *Technology Education Association of Victoria VCE Support Material for Systems and Technology*.

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 to write to struggled to demonstrate understanding of the key elements of the outcome. Teachers need to provide more specific guidelines about the content of the task.

The task requires that students produce a short report on the interactions between technological systems and the natural environment, the environmental implications of the selected system and the range of options for system design and management.

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 Systems and Technology Study Design and Technology Assessment Guide 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 guide and expect them to write to the criteria. They are expected to develop a task, not simply present copied assessment guides. Teachers can influence the success of their students through topic selection. This process begins during student/teacher discussion at the start of the investigation. Appropriate and sufficient sources of information for student use should be identified before a final topic selection is made.

#### **Current technological systems should be the focus when choosing a topic, not technology that has plateaued or reached its use-by date**

Well-known, recently developed, or evolving technological systems are easier to investigate because information may be more readily available. If current, readily available and specific information for a particular topic cannot be identified, then another topic should be chosen.

Students are more likely to score highly when investigating topics of their own choice. Topics need sufficient depth and accessible information to enable access to the highest grades. Topics that are popular and allow for sufficient exploration include four wheel drive and recreational vehicles, watercraft and mobile phones.

## **Unit 4 Coursework**

### **Outcome 1**

#### **Students should be able to explain the concepts and principles of integrated systems with control devices**

The options for the nature of the task were:

- a report in multimedia format
- a short-answer, open-book test
- a short written report.

Most commonly selected was the short-answer, open-book test, although a few teachers set a multimedia 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. This allowed students to demonstrate a wide range of skills.

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.

Teachers used an impressive variety of sources for test items. Past Systems and Technology examination papers, the sample questions published in Supplement 1 to the December 2000 *VCE Bulletin*, technical data sheets, Systems and Technology textbooks, journals such as *Popular Mechanics* and *Silicon Chip*, and various web and computer software resources such as *Crocodile Technology* were used to deliver authentic contexts and provided diagrams to support questions. There was a strong endorsement of the 'integrated systems' orientation of the revised study as evidenced by the test items reflecting all elements of the key knowledge associated with Outcome 1. Very rarely did the test consist only of questions relating solely to mechanical systems, or to electronic/electrical systems.

Generally, students performed well in this task. They demonstrated sound knowledge of the concepts, principles, and components associated with integrated systems with control devices. However, it was evident that some students were better able to respond to questions related to their preferred area of systems. Symbolic representation related to the operation of integrated controlled systems using block or flow diagrams tended to be an aspect of the key knowledge that was not adequately represented in the assessment task. Many tests did not provide an opportunity for students to demonstrate an understanding of this component of the required knowledge. On occasions teachers used the Unit 3 sample activity provided in the *Implementation Resource Kit* to assess student's understanding of Unit 4 systems. This sample does not have any assessment for systems with control devices and consequently is inappropriate for this outcome.

In a few cases, teachers set the task with broad parameters such as, 'Select a system of your own choice, research it then write a report on it,' or 'With reference to your Unit 3 and 4 production, write a report responding in terms of the assessment criteria.' This approach does not provide the students with adequate guidelines to respond to the aspects of key knowledge associated with the outcome. Even the use of headings does not always guarantee the focus or depth required. Students are best directed more specifically to the knowledge they need to demonstrate. Teachers should not issue students with only a copy of the assessment guide and expect them to respond to the criteria. Teachers are expected to develop a task, not simply present copied assessment guides.

Where a report in multimedia format was chosen there was some confusion as to whether the support material and formatting was part of the assessment. It is the content of the report completed in class time that is assessed. In approaching this task, a system was selected and the key elements related to the system were investigated, including concepts, principles, and components. The information gained from the investigation was used to prepare the multimedia report. Generally, this took the form of a PowerPoint presentation and accompanying notes expanding on the content of the slides. These notes may have been used if the student presented their report to the class.

### **Linking assessment to curriculum**

The use of a grid that links the test items to the particular key knowledge and skills bullet points provides a useful method to establish a balanced treatment of the elements of the key knowledge and skills and to ensure there is coverage of electrical and mechanical concepts, principles and components of integrated systems.

### **Outcome 3**

**Students should be able to explain the concepts of diagnosis, evaluation, adjustment, and repair as they relate to an integrated system and its control devices.**

#### **Short written report**

There was a high level of compliance to the task and most teachers followed the VCAA's criteria in the Assessment Guide. In setting this task, many teachers referred to the information provided in the *Technology Education Association of Victoria VCE Support Material for Systems and Technology*. In a few rare instances, assessment criteria taken from the assessment guide were presented to students as the only instructions for this outcome and consequently students experienced difficulty in understanding the requirements of the task. Teachers need to consider how they can provide an accurate student-focused interpretation of the task. It is essential that teachers provide students with clear tasks and guidelines using appropriate language.

It was evident that most teachers encouraged students to undertake a range of learning activities in class, in the school's resource centre and by accessing outside experts, hobbyists or commercial repair establishments prior to the administration of the assessment task to address Outcome 3. Students generally based their reports on the integrated system and control devices designed and produced as part of their production. This provided the opportunity to demonstrate an understanding of the related knowledge and skills they developed when undertaking the diagnostic testing, evaluation, adjustment and repair of their own product.

#### **Providing feedback to students**

It is helpful to students if teachers provide written feedback on their performance in the assessment tasks. In addition, the criteria for marking each question or section should be evident. When a marking scheme for Very High to Low, is provided students find this very useful. Where the criteria from the assessment guide are used, the allocation of marks needs to be clearly linked to those recommended for each criterion.

### Coursework task tallies

<b>GA_type</b>	<b>Component</b>	<b>Task ID</b>	<b>Count</b>	<b>%</b>	<b>Description</b>
Coursework Unit 3/4	1	1	85	6.3	Multimedia report
Coursework Unit 3/4	1	2	1050	78.0	Test (short answer, open-book)
Coursework Unit 3/4	1	3	211	15.7	Short written report
Coursework Unit 3/4	2	1	1341	ALL	Short written report
Coursework Unit 3/4	3	1	48	3.8	Multimedia report
Coursework Unit 3/4	3	2	856	68.4	Test (short answer, open-book)
Coursework Unit 3/4	3	3	348	27.8	Short written report
Coursework Unit 3/4	4	1	1231	ALL	Short written report