

VCE Systems Engineering: 2021 School-assessed Task (SAT)

Unpacking the assessment criteria



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Unit 3

Integrated and controlled system

Outcome 1

On completion of this unit the student should be able to investigate, analyse and apply concepts and principles, and use components to design, plan and commence production of an integrated and controlled mechanical and electrotechnological system using the systems engineering process.

Nature of task

A record of investigation, design, planning and production.

and

Preliminary production work to create a mechanical and electrotechnological integrated and controlled system.

Unit 4

Systems control

Outcome 1

On completion of this unit the student should be able to finalise production, test and diagnose a mechanical and electrotechnological integrated and controlled system using the systems engineering process, and manage, document and evaluate the system and processes, as well as their use of it.

Nature of task

Completion of production work accompanied by a record of progress and modifications (images and text material).

And

A record of diagnostic testing and performance data.

And

A report that evaluates and suggests improvements to the system with reference to the factors that influenced its creation and to the student's use of the systems engineering process.

Scope of task

The record of investigation, design, planning and production should reflect the systems engineering process within the cross-study specification on pages 9 and 10 of the *VCE Systems Engineering Study Design (2019–2023)* and the factors that may influence the design, planning, production and use of an integrated and controlled system.

1. Investigation of a problem/situation/opportunity/need and develop a design brief for an integrated controlled system including evaluation criteria

- identifies problem/situation/opportunity/need
- develops design brief for an integrated controlled system
- responds to design brief
- develops evaluation criteria
- references factors that influence the creation and use of system

VCE Systems Engineering: School-assessed Task Assessment Sheet 2021

Identifies a problem/
situation/opportunity/need
and develops a design
brief for an integrated
controlled system,
explains its context,
constraints and
considerations

Develops evaluation
criteria and justifies how
the evaluation criteria
relate to the requirements
of the design brief and
factors that influence the
creation and use of the
system

**2. Researching,
devising, designing
and modelling design
options**

- conducts research including modeling of components, subsystems, systems
- generates design ideas
- produces feasible design options
- selects preferred option

Undertakes research, including modeling, of components, subsystems and processes to generate design ideas, using diagrams and technical data to justify feasible options and the preferred option

3. Planning the creation of the system

- devises workplan (timeline, sequence of steps and associated equipment, components, materials, and processes)
- references materials, components and processes
- describes safety and risk assessment for materials, components and processes

Develops a work plan by identifying a sequence of steps and timeline, and analysing how materials, components, processes and tools will be used for the creation of the preferred option, as well as describing safety and risk assessment.

4. Use of tools,
equipment and
machines to make
the system

- implements work plan
- complies with OH&S requirements

Implements a work plan independently using production processes, and tools, equipment, components and materials with precision and technical skills, compliant with OH&S requirements to produce preferred option

5. Realisation of
an integrated
controlled system

- produces
integrated,
controlled system

Independently produces an operational, integrated, controlled system that addresses the context, considerations and constraints of the design brief and as described in the work plan with documented modifications.

6. Use of diagnostic test procedures and interpreting test data

- identifies diagnostic tests
- provides reason for diagnostic tests
- explains how to set up diagnostic tests
- conducts tests
- generates and uses test data

Identifies reasons for diagnostic tests and conducts these tests to generate, analyse and interpret test data.

**7. Project management
to realise the
preferred option**

- manages production of system
- documents decision-making, modifications and justifications

Independently demonstrates skills in time management and organisation to produce the preferred option independently, describes evidence of progress and risk assessments for production work and diagnostic testing and justifies decision-making and modifications if required

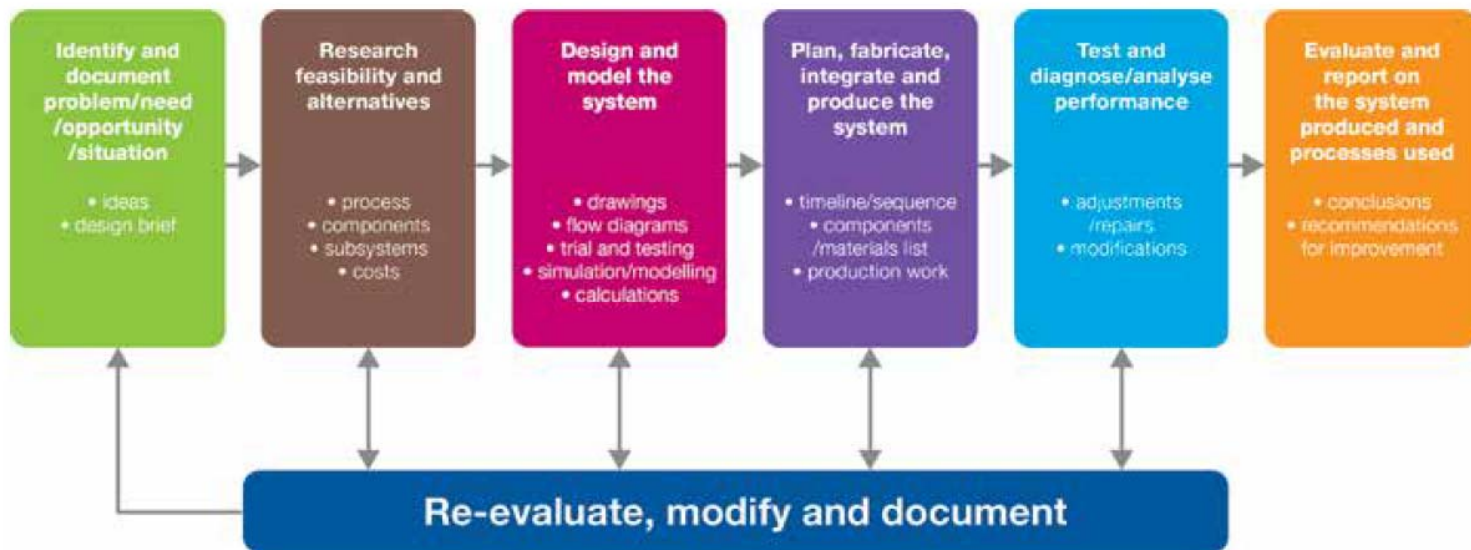
8. Evaluating the use of the systems engineering process, including finished, integrated controlled system

- evaluates design
- evaluates production (materials, tools, processes)
- tests and evaluates system

Uses the systems engineering process including diagnostic testing and the pre-determined criteria to evaluate the performance of the system and explain recommendations to the design and production of the system

Systems engineering process

The systems engineering process, illustrated below, represents the stages in creating a system. The process is iterative. Students must continuously re-evaluate their progress and make necessary modifications after having revisited an earlier stage or activity. The goal of the application of the systems engineering process is to achieve an efficient, optimised, quality system.



For further information

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