**Sample Course Outline**

Automotive Engineering and Technology

General Year 11

**Copyright**

© School Curriculum and Standards Authority, 2014

This document – apart from any third party copyright material contained in it – may be freely copied, or communicated on an intranet, for non-commercial purposes in educational institutions, provided that the School Curriculum and Standards Authority is acknowledged as the copyright owner, and that the Authority’s moral rights are not infringed.

Copying or communication for any other purpose can be done only within the terms of the *Copyright Act 1968* or with prior written permission of the School Curriculum and Standards Authority. Copying or communication of any third party copyright material can be done only within the terms of the *Copyright Act 1968* or with permission of the copyright owners.

Any content in this document that has been derived from the Australian Curriculum may be used under the terms of the [Creative Commons Attribution 4.0 International licence](http://creativecommons.org/licenses/by/4.0/).

**Disclaimer**

Any resources such as texts, websites and so on that may be referred to in this document are provided as examples of resources that teachers can use to support their learning programs. Their inclusion does not imply that they are mandatory or that they are the only resources relevant to the course.

Sample course outline

Automotive Engineering and Technology – General Year 11

Unit 1 and Unit 2

Semester 1

| **Week** | **Key teaching points** |
| --- | --- |
| 1–2 | Introduction to Unit 1, workshop and tasks**Rules and regulations** * storage, use and care of tools and machinery
* occupational safety and health (OSH) procedures, working safely in the workshop and safe use of prescribed machinery and technologies
* apply the rules associated with the use of vehicles when servicing/maintenance

**Task 1: Safety in the workshop** |
| 3–5 | **Systems** * the various systems that make up an automotive power plant or vehicle
	+ driveline
	+ wheels and tyres
	+ steering and suspension
	+ body and frame construction
	+ electrical systems
	+ cooling systems
	+ hydraulic braking systems

**Maintenance and repair*** apply testing techniques involved with daily/weekly checks and monitoring of the operation of single or multi-cylinder engines
* identify and use tools, equipment, parts and materials used in automotive industry

**Task 2 Part A: Motor vehicle safety inspection**Using the workshop cars and equipment, and in consultation with your teacher, complete a multiple-point safety vehicle inspection**Task 2 Part B: Motor vehicle component maintenance inspection**Using the workshop cars and equipment, and in consultation with your teacher, complete a component maintenance inspection |
| 6–8 | **Principles*** the scientific principles in relation to automotive functioning
	+ Otto cycle
	+ reciprocating and rotary motion
	+ hydraulics
	+ forces
	+ mechanical advantage
	+ alignment

**Task 3 Part A: Scientific principles of two and four stroke engine cycles** |
| 9–10 | **Social, economic and environmental implications** * different forms of transportation used in society
* categories of occupations and careers associated with the automotive and affiliated industries
* the impact of materials processing and the effects on the environment and society

**Design** * apply design skills, including:
	+ brainstorming
	+ investigating and generating ideas
	+ fundamentals of communicating design by graphics
	+ graphical representation

**Task 3 Part B: Different vehicular types and styles**List and categorise the different forms and designs of transportation used in society**Materials** * different types of component materials and their application to various design concepts
* identification and use of fasteners and methods of fitting and fixing materials and components
* understanding of fundamental methods of forming and machining materials for specific needs
* aesthetic and environmental properties of materials in prescribed context

**Task 4: Automotive materials identification**  |
| 11–15 | **Principles*** the scientific principles in relation to automotive functioning
	+ Otto cycle
	+ reciprocating and rotary motion
	+ hydraulics
	+ forces
	+ mechanical advantage
	+ alignment

**Maintenance and repair*** apply testing techniques involved with daily/weekly checks and monitoring of the operation of single or multi-cylinder engines
* identify and use tools, equipment, parts and materials used in automotive industry

**Managing production** * prepare and execute simple production plans, time planning, identification of resource needs, and evaluation of manufacturing processes

**Task 5: Engine build and components****Task 6: Complete engine dismantle and rebuild** |
| 15–16 | **Maintenance and repair*** apply testing techniques involved with daily/weekly checks and monitoring of the operation of single or multi-cylinder engines
* identify and use tools, equipment, parts and materials used in automotive industry

**Task 7: Engine test and tune** |

Semester 2

| **Week** | **Key teaching points** |
| --- | --- |
| 1–2 | Introduction to Unit 2, workshop and tasks**Rules and regulations** **Task 8: Revisit and reinforce safety in the workshop** |
| 3–5 | **Systems*** operating functions of the various systems that make up an automotive power plant or vehicle
	+ driveline
	+ wheels and tyres
	+ steering and suspension
	+ body and frame construction
	+ electrical systems
	+ cooling systems
	+ hydraulic braking systems

**Task 9: Report on the operation of an automotive mechanical system** |
| 6–7 | **Rules and regulations** * traffic rules associated with the safe use of vehicles
* road traffic control and different types of vehicles
* authorities responsible for rules and regulations, and legal implications of vehicle design and road use

**Task 10: Report on roadworthiness of a standard family vehicle** |
| 7–8 | **Social, economic and environmental implications** * categories of occupations and careers associated with the automotive and affiliated industries
* automotive design, size and capacity
* cost of operating different forms of vehicles
* environmental issues and considerations of materials used and automotive emissions

**Task 11: Report on costs associated with operating standard passenger vehicles** |
| 7–9 | **Design** * apply design skills, including:
	+ brainstorming
	+ investigating and generating ideas
	+ fundamentals of communicating design by graphics
	+ graphical representation
* consider Australian Design Rules in relation to vehicle design

**Task 12 Part A: Design a tool or device to be used during automotive workshop activities** |
| 9–12 | **Materials** * physical and mechanical properties of materials used in automotive technologies
* identification and use of methods of welding materials
* consider workshop-based, computer-assisted fabrication techniques

**Managing production** * prepare and use planning for, and management of, manufacturing processes
* compare strategies for automotive design and component design

**Task 12 Part B: Build the proposed tool or device to be used during automotive workshop activities** |
| 10–12 | **Principles*** the scientific principles in their relation to automotive functioning
	+ Otto cycle
	+ reciprocating and rotary motion
	+ hydraulics
	+ forces
	+ mechanical advantage
	+ alignment
	+ transmission of electrical and mechanical power
	+ conversion of heat energy into mechanical energy

**Task 13: Car maintenance techniques and investigations to understand processes** |
| 11–16 | **Systems*** operating functions of the various systems that make up an automotive power plant or vehicle
	+ driveline
	+ wheels and tyres
	+ steering and suspension
	+ body and frame construction
	+ electrical systems
	+ cooling systems
	+ hydraulic braking systems

**Maintenance and repair*** carry out tune-ups, oil changes and service schedules to maintain optimal performance
* identify and use tools, equipment, parts and materials used in repair and correction of mechanical faults
* maintain occupational safety and health (OSH) procedures, working safely in the workshop and safe use of prescribed machinery and technologies
* apply rules associated with the use of vehicles when servicing/maintenance

**Task 14**: **Car maintenance techniques** **Task 15: Basic car troubleshooting techniques** |