



# **Automotive Engineering and Technology General Course Year 12**

## **Selected Unit 3 syllabus content for the Externally set task 2021**

This document is an extract from the *Automotive Engineering and Technology General Course Year 12 syllabus*, featuring all of the content for Unit 3. The content that has been highlighted in the document is the content on which the Externally set task (EST) for 2021 will be based.

All students enrolled in the course are required to complete an EST. The EST is an assessment task which is set by the Authority and distributed to schools for administering to students. The EST will be administered in schools during Term 2, 2021 under standard test conditions. The EST will take 50 minutes.

The EST will be marked by teachers in each school using a marking key provided by the Authority. The EST is included in the assessment table in the syllabus as a separate assessment type with a weighting of 15% for the pair of units.

# Unit 3

## Unit description

In this unit, students develop an understanding of automotive vehicles as complex inventions used to meet the needs of both the individual and society. They realise a whole industry has evolved around automotive vehicles and the manner in which we service, repair, maintain, refinish, customise and make use of other emerging techniques. Students use rules and regulations associated with the manufacture and use of automotive vehicles to develop, through practical tasks, a finer understanding of how automotive systems operate. They learn about historical and current changes in automotive technology, use of materials and automotive design, and the impact on communities and society.

## Unit content

An understanding of the Year 11 content is assumed knowledge for students in Year 12. It is recommended that students studying Unit 3 and Unit 4 have completed Unit 1 and Unit 2.

This unit includes the knowledge, understandings and skills described below.

### Automotive mechanics

#### Principles

- scientific principles
  - chemical and mechanical energy
  - energy conversion
  - power
  - motion
  - friction and lubrication
  - torque
  - pressure
  - their influence in selecting or modifying automotive technologies for improved performance

#### Maintenance and repair

- demonstrate maintenance, testing and repair/replacement of major components in motor vehicle systems
  - electrical system
  - cooling system
  - fuel and lubrication systems
- perform adjustment of bearings and removal and repair of motor vehicle components, including wheels, body and mechanical parts
- identify and use flow charts and problem-solving skills to diagnose faults in conjunction with the use of specialised tools and equipment
- perform servicing, repair and maintenance requirements of various types of engines
- identify materials and parts required for optimising the performance of various types of engines

- apply safety data information and workshop occupational safety and health (OSH) regulations to both individuals and small groups

### **Systems**

- relationships between 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

### **Automotive industry**

#### **Rules and regulations**

- traffic rules associated with the safe use of vehicles
- specific road traffic control for different types of vehicles

#### **Social, economic and environmental implications and consequences**

- relationships between changes in automotive technologies and impacts on communities and society
- current legislation and environmental regulations associated with engine designs and manufacture of automotive technologies
- local and global concerns for:
  - advancements in automotive technologies
  - demands for transport of materials and people
  - environmental sustainability

#### **Materials**

- historical perspectives of materials used in the automotive industry, and how they have evolved with changing values and needs of society
- service repair and maintenance of automotive vehicles using computer-assisted techniques and fabrication skills

#### **Design**

- elements of design and techniques for generating and communicating design ideas
- historical changes in design of automotive technologies, and their interaction with changing cultural values

#### **Managing production**

- prepare and use planning for, and management of small-scale production of prototypes, incorporating design elements underpinned by research and performance testing