Government of **Western Australia**
School Curriculum and Standards Authority

SAMPLE COURSE OUTLINE

AUTOMOTIVE ENGINEERING AND TECHNOLOGY
GENERAL YEAR 11

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

Week	Key teaching points
	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**

Week	Key teaching points
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 9–12	**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** **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**