E289 AUTOMOTIVE WORKSHOP (YEAR 12) – 2008-2009

Rationale

Automotive Workshop is a practical subject designed to give students the opportunity to experience aspects of working within different automotive contexts. Many students are intensely interested in learning about engines, motors and vehicles. Automotive Workshop is a practical subject integrated with sufficient theory and safety practices to provide a good background for a career or for useful automotive skills.

The subject is linked to the automotive industry and has vocational relevance. Inclusion of Automotive Industry National Modules may give students advanced standing in TAFE subjects, and enhanced employment prospects in automotive trades.

The subject will focus on the application of current automotive technology in the automotive industry. Suggested areas include routine care and maintenance, tools and their uses, threads and fasteners, internal combustion engines, fuels and fuel systems, lubrication, cooling systems and electrical systems.

Subject Design

This subject stipulates a set of outcomes. These describe what the student can do as a result of studying the subject. On completion of the subject the student must have been provided with at least two opportunities to demonstrate achievement of each outcome.

A set of components is listed under each outcome. These components are specified for the development of each outcome and indicate how students will demonstrate achievement of the outcome in this subject. The teaching/learning program will give coverage to all components in order to ensure each outcome is appropriately addressed.

If schools wish to vary these components they may do so, provided it can be demonstrated that the outcomes are still able to be achieved and that the subject is still assessed through the common assessment framework described for the subject. Proposals for variations must be submitted to the Curriculum Council for approval.

The assessment framework, based on a series of generally defined common assessment tasks, has been stipulated for the subject. Each task measures student performance on a subset of subject outcomes. A generalised set of performance criteria supports the assessment framework.

A procedure for rating student performance on each outcome and allocating grades has also been stipulated.

Subject Outcomes

Within the context of Automotive Workshop the student is provided with opportunities to meet each of the following outcomes.

Outcome 1:	Applies the technology process to solve automotive design problems.
Outcome 2:	Describes and applies routines for care and maintenance of vehicles.
Outcome 3:	Describes and applies relevant technologies in the automotive industry.
Outcome 4:	Applies skills and techniques using a variety of automotive hand and power tools, workshop equipment, sealants and adhesives.
Outcome 5:	Analyses the parts and principles of operation of internal combustion engines and the associated systems.
Outcome 6:	Applies skills and techniques in working with a variety of automotive systems.
Outcome 7:	Applies automotive skills and techniques with a range of components, bearings and seals.

Components of Outcomes

Outcome 1: Applies the technology process to solve automotive design problems.

The following components amplify the context and meaning of the outcome. The student:

- applies the technology process to solve problems
- appraises design solutions
- applies various sketching techniques including pictorial sketches in oblique and orthographic sketches
- applies simple dimensions, sectioning and use of symbols
- locates and uses drawing and manual procedure information.

Outcome 2: Describes and applies routines for care and maintenance of vehicles.

The following components amplify the context and meaning of the outcome. The student:

- describes and applies appropriate occupational health and safety practices and procedures
- describes and performs routine maintenance inspection procedures
- describes and performs system operation checks
- investigates and retrieves information from various sources related to vehicle maintenance or repair
- applies the correct lubricant or fluid for given automotive applications.

Outcome 3: Describes and applies relevant technologies in the automotive industry.

The following components amplify the context and meaning of the outcome. The student:

- investigates and describes the principles and applications of relevant processes (e.g. fuel injection systems, computer management, body manufacture, vehicle finishes)
- describes and applies the underlying concepts (e.g. forces, forms of movement, mechanical transfer).

Outcome 4: Applies skills and techniques using a variety of automotive hand and power tools, workshop equipment, sealants and adhesives.

The following components amplify the context and meaning of the outcome. The student:

- applies appropriate occupational health and safety practices and procedures
- applies skills and techniques with automotive hand and power tools, workshop equipment, fastening devices, sealants and adhesives
- applies typical maintenance procedures for automotive hand and power tools and workshop equipment.

Outcome 5: Analyses the parts and principles of operation of internal combustion engines and the associated systems.

The following components amplify the context and meaning of the outcome. The student:

- analyses the operation of common two and four stroke internal combustion engines
- analyses and describes engine induction and exhaust systems
- identifies and describes basic troubleshooting procedures in order to solve problems with engine performance
- analyses the systems incorporated in and supporting an internal combustion engine.

Outcome 6: Applies skills and techniques in working with a variety of automotive systems.

The following components amplify the context and meaning of the outcome. The student:

- applies appropriate occupational health and safety practices and procedures
- identifies, describes, removes and replaces major electrical components in a motor vehicle electrical system
- identifies, dismantles, reclaims, services, adjusts and assembles the cooling system of a motor vehicle
- performs checks and adjusts the fuel system of a motor vehicle
- identifies, describes, dismantles, reclaims, services, adjusts and assembles the lubrication system of a motor vehicle.

Outcome 7: Applies automotive skills and techniques with a range of components, bearings and seals.

The following components amplify the context and meaning of the outcome. The student:

- applies appropriate occupational health and safety practices and procedures
- identifies, removes, inspects, services, replaces and adjusts bearings on a motor vehicle
- describes the procedures and repairs a leaking tube in a tyre
- identifies, removes, repairs and replaces various motor vehicle components including wheels, body and mechanical parts.

Common Assessment Framework

The framework outlined below specifies a series of common assessment tasks for this subject. The teacher has the flexibility to select from the Automotive Workshop outcomes those to be assessed in each task. On completion of the subject the student must have been provided with at least two opportunities to demonstrate achievement of each outcome.

Each common assessment task measures student performance on a subset of subject outcomes. For each outcome measured in a task, student performance will be rated as Very High (V), High (H), Satisfactory (S) or Not Demonstrated (ND).

Task and Task Description

The term task should not be confused with 'project'. Each task may not be a separate individual project but a broad description of the type of activity that the student is to complete to satisfy the specified outcomes within that task. The organisation and number of 'projects' is up to the individual school, as long as all tasks are covered during the subject.

AUTOMOTIVE WORKSHOP		
Task	**Outcomes**	**Task Description**
One	The teacher has the flexibility to select from the Automotive Workshop outcomes those to be assessed in each task.	**Maintenance** Complete a range of practical exercises in automotive care and maintenance, and demonstrate knowledge of automotive techniques and processes.
Two		**Engines** Complete a range of practical exercises in engine troubleshooting repair and servicing, and demonstrate knowledge of internal combustion engine operation and applications.
Three		**Systems** Complete a range of practical exercises in systems troubleshooting, repair and servicing and demonstrate knowledge of motor vehicle systems and their integration.
Four		**Personal Project** Manufacture, construct or repair a personal project, using appropriate automotive skills or techniques.

The above set of tasks represent assessable activities that would be undertaken within a range of projects defined by the teacher at the commencement of the subject.

Common Assessment Tasks Booklet

The *Common Assessment Tasks* booklet for this subject further describes each task, and defines parameters for its completion. Schools are free to determine specific assessment details within these parameters. Copies of the booklet are available from the Curriculum Council and are included with the syllabus, on the Curriculum Council website (http://www.curriculum.wa.edu.au).

Performance Criteria

Ratings for student performance of each outcome will be based on the following criteria:

Outcome 1: Applies the technology process to solve teacher initiated automotive design problems.

Satisfactory	High	Very High
The student applies elements of the technology process to solve design problems including sketching and dimensions.	The student applies the technology process to solve design problems showing sketching, dimensions, research and design development.	The student independently applies the technology process to a range of design problems from a range of contexts showing sketching, dimensions, research and design development and appraisal.

Outcome 2: Describes and applies routines for care and maintenance of vehicles.

Satisfactory	High	Very High
The student describes and applies routine maintenance inspection procedures, uses the correct fluid or lubricant for specific automotive applications and complies with appropriate occupational health and safety practices and procedures.	The student describes and applies routine maintenance inspection procedures, routine system operation checks, selects and uses the correct fluid or lubricant for specific automotive applications and complies with appropriate occupational health and safety practices and procedures.	The student independently investigates, describes and applies routine inspections and system checks, performs routine maintenance inspection procedures, system operation checks, selects and uses the correct fluid or lubricant for specific automotive applications and complies with appropriate occupational health and safety practices and procedures.

Outcome 3: Describes and applies relevant technologies in the automotive industry.

Satisfactory	High	Very High
The student describes and applies the principles and applications of processes relevant to the automotive industry.	The student describes and applies the principles and applications of processes relevant to the automotive industry and comments on their suitability for a particular purpose.	The student describes and applies the principles and applications of processes relevant to the automotive industry, and justifies recommendations concerning their suitability for particular purposes.

Outcome 4: Applies skills and techniques using a variety of automotive hand and power tools, workshop equipment, sealants and adhesives.

Satisfactory	High	Very High
The student applies skills and techniques with automotive hand and power tools, workshop equipment, fastening devices, sealants and adhesives and appropriate occupational health and safety procedures and practices.	The student applies skills and techniques with automotive hand and power tools, workshop equipment, fastening devices, sealants and adhesives, performs specified maintenance procedures, and applies appropriate occupational health and safety procedures and practices.	The student applies skills and techniques with automotive hand and power tools, workshop equipment, fastening devices, sealants and adhesives, independently performs specified maintenance procedures on components and systems, and applies appropriate occupational health and safety procedures and practices.

Outcome 5: Analyses the parts and principles of operation of internal combustion engines and the associated systems.

Satisfactory	High	Very High
The student analyses the parts and components of an internal combustion engine, the induction and exhaust systems and the other systems in an internal combustion engine.	The student analyses the parts and components of an internal combustion engine, basic troubleshooting procedures related to engine performance, the induction and exhaust systems and the other systems in an internal combustion engine.	The student analyses the parts and components of an internal combustion engine, troubleshooting procedures related to engine performance problems, the induction and exhaust systems and the other associated systems in and supporting an internal combustion engine.

Outcome 6: Applies skills and techniques in working with a variety of automotive systems.

Satisfactory	High	Very High
The student applies skills and techniques in removing and replacing major components in a motor vehicle electrical system and cooling system, checks and adjusts a fuel system and lubrication systems and applies occupational health and safety procedures and practices.	The student applies skills and techniques in removing and replacing major components in a motor vehicle electrical system, dismantles, reclaims and assembles a cooling system, checks and adjusts a fuel system and lubrication systems and applies occupational health and safety procedures and practices.	The student independently applies skills and techniques in removing and replacing major components in a motor vehicle electrical system, dismantles, reclaims, assembles, services and adjusts a cooling system, checks and adjusts a fuel system, dismantles, reclaims, assembles, services and adjusts lubrication systems and applies occupational health and safety procedures and practices.

Outcome 7: Applies automotive skills and techniques with a range of components, bearings and seals.

Satisfactory	High	Very High
The student applies automotive skills and techniques with repairs to a tube in a tyre, removes, inspects and replaces bearings, removes, repairs and replaces body components, wheels and major mechanical components on a motor vehicle and complies with appropriate occupational health and safety procedures and practices.	The student applies automotive skills and techniques with repairs to a tube in a tyre, removes, inspects, replaces and adjusts bearings, removes, repairs, replaces and adjusts body components, wheels and major mechanical components on a motor vehicle and complies with appropriate occupational health and safety procedures and practices.	The student independently applies automotive skills and techniques with repairs to a tube in a tyre, removes, inspects, replaces, services and adjusts bearings, removes, repairs, replaces, services and adjusts body components, wheels and major mechanical components on a motor vehicle and complies with appropriate occupational health and safety procedures and practices.

Rating Procedure

Before a final grade can be awarded, the final rating achieved for each outcome must be determined. This is done using the following process:

V is attained when at least 50% of ratings are at a Very High level, and at least 50% of the remainder are at a High level or better.

H is attained when at least 50% of ratings are at a High level or better, and at least 50% of the remainder are at a Satisfactory level or better.

S is attained when at least 50% of ratings are at a Satisfactory level or better.

ND is attained when more than 50% of ratings are at a Not Demonstrated level.

Where a student fails to achieve a final rating of S for an outcome, teachers are encouraged to provide the student with an additional opportunity to demonstrate S if:

- **the student has completed all the CATs incorporating that outcome; and**
- **the student has demonstrated S for that outcome in at least one task.**

The additional opportunity should not simply be a repetition of a task, but should be an equivalent task which reflects a change of context in which the task is done.

Professional judgement should then be used to determine whether a final rating of ND or S is appropriate in each situation.

Grading Procedure

At the completion of this subject grades will be awarded in the following manner:

A Very High in at least 50% of outcomes, and High or better in at least 50% of the remainder.

B High or better in 50% of outcomes, and Satisfactory or better in the remainder.

C Satisfactory or better in all outcomes.

D Satisfactory or better in at least 50% of the outcomes.

E Not Demonstrated in more than 50% of the outcomes.

A final rating of ND for any outcome will result in a grade of D being awarded.

Specific details giving examples of the combination of V, H and S resulting in different grades can be found in the *Common Assessment Tasks* booklet.

Time Allocation

The subject has been designed to be completed through a structured education program of approximately 110 hours in any suitable contexts and series of learning experiences. Typically the subject will be studied over the period of one school year. For administrative reasons schools wishing to vary this delivery pattern (e.g. over a shorter period or over a longer period up to two school years) are required to notify the Chief Executive Officer of the Curriculum Council.

Subject Completion

Students must complete the school's structured educational and assessment program for a subject in order to be eligible to receive a grade unless there are exceptional and justifiable circumstances. In situations where the school considers that insufficient information has been gathered to justify the award of a grade for the subject, a result of U (for unfinished) should be allocated. The Curriculum Council offers the flexibility for the U to be converted to a grade after the final grades have been submitted. Further details on assessment and grading are provided in Volume I of the Syllabus Manuals.

Resources

Support Material

Support material for this subject, including a resources list can be ordered through the Curriculum Council Publications Catalogue and is available on the Curriculum Council website (http://www.curriculum.wa.edu.au).