MODULE MEC3080: ALTERNATIVE ENERGY SYSTEMS

Level: Advanced

Theme: Propulsion Systems

Prerequisite: MEC2050 Alternative Fuel Engines

Module Description: Students describe why vehicle manufacturers continue to build the crank-piston internal combustion gasoline engine. Students also identify and describe future engine designs.

Module Parameters: Access to support resources.

Supporting Module: MEC1040 Engine Fundamentals

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• research and describe the historical development of piston engine designs from Nickolous Otto's engine to the present	• a report generated indicating: – historical development of internal combustion engines – engine manufacturing techniques. *Assessment Tool* *Task Assessment Checklist: Alternative Energy Systems, Part 1, MEC3080–1* *Standard* *Performance rating of 3 on each criteria*	20
• describe the use of different fuels and engine designs in modern day vehicles	• a report with the following: – engine design and how it relates to fuels (other than gasoline) – alternative engine designs (other than conventional piston engine) including electric power – state advantages and disadvantages of designs. *Assessment Tool* *Task Assessment Checklist: Alternative Energy Systems, Part 2, MEC3080–1* *Standard* *Performance rating of 3 on each criteria*	40
• identify and describe future developments in fuels and engine designs	• identified opportunities for future development of alternative energy systems. *Assessment Tool* *Task Assessment Checklist: Alternative Energy Systems, Part 3, MEC3080–1* *Standard* *Performance rating of 3 on each criteria*	40

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
Identify/Analyze	*The student should:* • prepare and present a report detailing the origin of the first working internal combustion engine, the major advances made in the design of internal combustion engines and the manufacturing process improvements that made those innovations possible over the history of engine design • describe the development of and compare the relative efficacy of alternative contemporary design engines to the large-scale manufacture of motor vehicles • identify the rationale for change in engine design considering environmental and fuel supply issues • prepare and present a study of initiatives for using alternative fuels in engines and the factors affecting these advancements • examine and report on the present initiatives to build electric-powered cars and batteries of sufficient capacity to power them • identify which direction of alternative energy systems development promises to be most successful at this time.	The engines examined might include the following: Wankel, Gas Turbine, New Concept Rotary, Kauertz Rotary Vane, Rotorcam, Split-Cycle Mighty-Mite, Bricklin Rotary Vee, Reg Technologies Rand Cam Selwood Orbital and Stirling.
Careers	• predict the opportunity for career opportunities related to emerging technological development.	