MODULE MEC1110: PNEUMATICS & HYDRAULICS

Level: Introductory

Theme: Guidance and Control Systems

Prerequisite: None

Module Description: Students identify and describe the operating principles and applications of pneumatic and hydraulic systems.

Module Parameters: Access to related pneumatic/hydraulic units and resources.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• demonstrate the safe use of pneumatic and hydraulic tools and equipment, and follow established lab procedures	• observed performance related to: – recognition of dangers involved when working with pressurized pneumatic and hydraulic systems – selection and safe use of tools – clean-up of hydraulic fluids. *Assessment Tool* *Task Assessment Checklist: Pneumatic and Hydraulic Systems, Part 1, MEC1110–1* *Standard* *Performance rating of 2 on each criteria*	10
• compare operating principles of pneumatic and hydraulic systems	• comparing operating principles of pneumatic and hydraulic systems indicating: – identification and description of components – application of systems on vehicles. *Assessment Tool* *Task Assessment Checklist: Pneumatic and Hydraulic Systems, Part 2, MEC1110–1* *Standard* *Performance rating of 1 or more on each criteria*	30
• apply principles and concepts of pneumatics and hydraulics to test and operate a pneumatic and/or hydraulic system	• observed performance in operating and testing one pneumatic and one hydraulic system. *Assessment Tool* *Task Assessment Checklist: Pneumatic and Hydraulic Systems, Part 3, MEC1110–1* *Standard* *Performance rating of 1 or more on each criteria*	60

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 exploration during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
Health/Safety Hazards	*The student should:* • demonstrate knowledge of and follow laboratory safety procedures • list hazards related to working with fluids and gases under pressure and related equipment.	Serious injury results from inappropriate handling of high pressures in both hydraulic and pneumatics.
Identification/ Function	• state why fluid systems are widely used in transportation and power application • contrast hydraulic and pneumatic systems • demonstrate how pressure affects a liquid and a gas in an enclosed space • describe what units are used to measure pressure in a fluid • describe what units are used to calculate the flow of fluid past a point • demonstrate the relationship between flow rate and pressure in a fluid system • describe how a small force can be multiplied in a fluid system • contrast the action of common pumps and compressors such as: – impeller – gear – piston – diaphragm – vane type • locate examples of these pumps and compressors in a motor vehicle or some other power system	Dismantle shop units to identify components and operating principles.

Concept	Specific Learner Expectations	Notes
Identification/ Function (continued)	*The student should:* • observe and demonstrate the use of valves to control: – direction of flow – pressure of fluids – flow rate of fluids • locate valves on a given vehicle • demonstrate how fluids under pressure can be used to move a: – motor – cylinder – diaphragm • identify and operate pneumatic and hydraulic units on a given vehicle • describe the principles in a fluid system such as: – hydraulic hoist – hydraulic brakes.	Create demonstration units.
Inspect/Repair	• demonstrate how to check and adjust fluid levels • demonstrate how to double and single flare a steel line and indicate when each flare type should be used.	
Careers	• identify further education and work opportunities related to the use and service of pneumatic and hydraulic systems.	