MODULE MEC3050: ENGINE REPLACEMENT

Level: Advanced

Theme: Propulsion Systems

Prerequisite: MEC1040 Engine Fundamentals

Module Description: Students remove and install an engine in a chassis.

Module Parameters: Access to an engine lift, tools/equipment and supporting instructions and resources.

Supporting Modules: MEC3030 Engine Diagnosis
MEC3040 Engine Tune-up

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• use engine lifting equipment and related tools safely	• observed performance in: – application and use of lifting tools and equipment – safely removing and installing an engine – following established shop/lab routines. *Assessment Tool* *Assessment Checklist: Health and Safety, MECH&S* *Standard* *Performance rating of 3 on each criteria*	10
• identify steps involved to prepare a vehicle for engine removal	• determination of: – how engine will be removed – the order of steps to be taken to remove an engine. *Assessment Tool* *Task Assessment Checklist: Engine Replacement, Part 1, MEC3050–1* *Illustrative Example: Replacement, MEC3050–2* *Standard* *Performance rating of 3 on each criteria*	15
• apply mechanical skills to remove and replace engine accessories	• removing and replacing engine accessories and related components for a given a vehicle. *Assessment Tool* *Task Assessment Checklist: Engine Replacement, Part 2, MEC3050–1* *Standard* *Performance rating of 3 on each criteria*	20

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Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• apply mechanical skills to remove and install an engine in a chassis	• observed performance in removing and installing an engine. *Assessment Tool* *Task Assessment Checklist: Engine Replacement, Part 3, MEC3050–1* *Standard* *Performance rating of 3 on each criteria*	30
• perform post engine installation start-up and adjustment procedures	• observed performance in post-engine installation start-up and adjustments. *Assessment Tool* *Task Assessment Checklist: Engine Replacement, Part 4, MEC3050–1* *Standard* *Performance rating of 3 on each criteria*	25
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the instructional period. *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 types of lifting tools/equipment available for engines • demonstrate knowledge of where to attach devices • explain procedures to follow to remove and install an engine • describe and follow precautions when working with vehicle equipped with air conditioning.	Review hazards associated with lifting engines. Tool, bolt size, location and torque.

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Concept	Specific Learner Expectations	Notes
Identify/Analyze	*The student should:* • explain how to prepare a vehicle for engine removal • identify all wiring, hoses, cables, pipes that require disconnecting • identify units and special fasteners that will be removed.	Pay attention to paint protection; scribing/ marking components. Masking, labelling and photographic techniques. With or without transmission, motor mounts.
Inspect/Service	• disconnect and service battery • drain and dispose of lubricant and coolant • remove appropriate wires, hoses, cables, pipes, units • remove and/or install an engine • dismantle/assemble an engine • install lubricants/coolant • service and store battery • drain/store or dispose fluids • identify the most appropriate method and remove and replace the following: – wires – cables – hoses – pipes – accessories – cylinder head – cylinder block • adjust and service engine	Blocking fuel line; fasteners organized. Allow for rebuilt components to be used such as heads and short blocks assemblies. Have students be aware of gasoline removal and storage precautions. Organizing fasteners. Identification of disconnects for later connects. Depending on circumstance, engine may be removed as an assembly.

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MODULE MEC3050: ENGINE REPLACEMENT (continued)

Concept	Specific Learner Expectations	Notes
Inspect/Service (continued)	*The student should:* • start engine and check for proper performance • perform post-engine installation vehicle clean-up for customer pick-up.	Module maybe combined with MEC3030 Engine Diagnosis, MEC3040 Engine Tune-ups, MEC3060 Engine Reconditioning 1 MEC3070 Engine Reconditioning 2.
Careers	• identify further education and work opportunities related to engine removal and installation.	Consider trade related areas such as machinist and welder.

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