



Engineering Program

Specialization	Automobile Maintenance
Course Number	20211114
Course Title	Modern engines maintenance and repair workshop
Credit Hours	2
Theoretical Hours	0
Practical Hours	6



Brief Course Description:

Maintenance and repair of Electronic Fuel injection systems ,Electronic ignition systems ,Engine Management systems , Air induction systems ,Turbo charging system ,Emission control system

Course Objectives:

Upon the completion of this course, the student will be able to:

1. Removing and installing of electronic fuel injection system, electronic ignition system, and emission control system components.
2. Testing of electronic fuel injection system, electronic ignition system, and emission control system components.
3. Interpreting wiring diagrams of electronic fuel injection system, electronic ignition system, and emission control system.
4. Troubleshooting the problems of electronic fuel injection system, electronic ignition system, and emission control system.



Detailed Course Outline:

Unit Number	Unit Title	Unit Content	Time Needed(hr)
1.	Fuel system for Electronic Fuel Injection system (EFI)	<ul style="list-style-type: none"> ▪ Fuel pump and electrical circuit inspection and testing ▪ Fuel pump flow rate and fuel system pressure testing ▪ Fuel pressure regulator and fuel filter inspection and testing ▪ Fuel pipes inspection and repair ▪ Fuel injectors electrical testing (resistance, supply voltage signal) ▪ Fuel injectors cleaning and testing (atomizing , leak test , flow rate) 	16
2.	Air induction system for (EFI)	<ul style="list-style-type: none"> ▪ air filter disassembly cleaning , inspection , and reassembly ▪ throttle body disassembly ,cleaning ,inspection and reassembly ▪ ISC actuator disassembly ,cleaning , inspection and reassembly ▪ ISC actuator resistance , supply voltage and operation testing ▪ Throttle position sensor (TPS) disassembly and adjustment ▪ TPS resistance , supply voltage ,signal testing and TPS fully closed position switch testing ▪ Mass air flow (MAF) sensor disassembly , inspection , and reassembly ▪ MAF sensor supply voltage and signal checking ▪ Manifold absolute pressure sensor (MAP)supply voltage and signal checking 	16

		<ul style="list-style-type: none"> ▪ Intake air temperature (IAT) sensor operation checking ▪ ISC position sensor resistance , voltage and signal checking 	
3.	Engine sensors for (EFI)	<ul style="list-style-type: none"> ▪ Engine coolant temperature sensor operating and checking ▪ Crankshaft position sensor resistance and signal checking ▪ Camshaft position sensor resistance and signal checking ▪ Knocking sensor signal checking ▪ Vehicle speed sensor (VSS) resistance and signal checking 	4
4.	Electronic control model for (EFI)	<ul style="list-style-type: none"> ▪ Engine control model supply voltage checking ▪ ECM earth connectivity checking 	2
5.	Fault diagnosis for (EFI)	<ul style="list-style-type: none"> ▪ Fault diagnosis by using scan tools 	4
6.	Electronic ignition system	<ul style="list-style-type: none"> ▪ Different kinds of ignition coil primary and secondary winding resistance testing ▪ High tension leads resistance testing ▪ Induction type pulls generation testing ▪ Hall effect type testing ▪ Optical type pulls generator testing ▪ Ignition signal testing for different kinds of ignition systems ▪ Fault diagnosis by using oscilloscope 	18
7.	Variable intake manifold geometry	<ul style="list-style-type: none"> ▪ Intake manifold air control solenoid resistance and supply voltage checking ▪ Intake manifold disassembly and reassembly 	9

8.	Turbo charging system	<ul style="list-style-type: none"> ▪ Turbo charger disassembly and reassembly ▪ Turbocharger pressure regulator repair and maintenance ▪ Intercooler repair and maintenance 	9
9.	Emission control system	<ul style="list-style-type: none"> ▪ Exhaust gas recirculation system maintenance repair and testing ▪ Secondary air system maintenance and testing ▪ Evaporation emission control system maintenance and testing ▪ Oxygen sensor signal testing ▪ Heated oxygen sensor testing ▪ Positive crank case ventilation system testing ▪ Catalytic converter operation monitoring oxygen sensor testing ▪ Exhaust emission testing by using gases analyzer 	15

Evaluation Strategies:

Exams		Percentage	Date
Exams	First Exam	20%	
	Second Exam	20%	
	Final Exam	50%	
	Assignment	10%	

Teaching Methodology:

- ❖ Workshop

References & Text Book

1. Instructional workshop sheets.

