



Engineering Program

Specialization	Automotive Maintenance
Course Number	20211111
Course Title	Gasoline and lithe diesel engines
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

Four stroke – cycle engine operation ,physical and chemical fundamentals of four stroke – cycle engines , engines types and classification ,comparison between gasoline and diesel engines ,engine construction ,valves and valve train ,engine systems (cooling ,lubricating ,fuel ,ignition) ,engine measurement ,engine performance and drivability diagnosis

Course Objectives:

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

1. Describe the working principles of four-stroke internal combustion engines.
2. Explain and describe the valve timing in internal combustion engines.
3. Explain and describe engine systems' operation and construction.
4. Identify engine types and classification.
5. Identify the various engine performance diagrams.



Detailed Course Outline:

Unit Number	Unit Title	Unit Content	Time Needed (hr)
1.	Thermodynamic principles of Four stroke cycle engines	<ul style="list-style-type: none"> ▪ Ideal air standard cycle. *The ideal air standard Otto cycle. *The ideal air standard diesel cycle. ▪ Comparison between thermodynamic and mechanical cycles. 	2
2.	Physical and chemical fundamentals	<ul style="list-style-type: none"> ▪ Engine charging. ▪ Volumetric efficiency. ▪ Compression ratio. ▪ Combustion chemistry. ▪ Combustion in gasoline and diesel engines. 	3
3.	Engine design classification and operation	<ul style="list-style-type: none"> ▪ Engine measurements. ▪ Engine classifications. ▪ Four stroke and two stroke cycle engines. ▪ Alternative engines. ▪ Typical automotive engines. 	3
4.	Engine top end construction	<ul style="list-style-type: none"> ▪ Cylinder head construction. ▪ Valves and valve train construction. ▪ Intake manifold construction. ▪ Exhaust manifold construction. 	3
5.	Engine bottom end construction	<ul style="list-style-type: none"> ▪ Cylinder block construction. ▪ Piston construction. ▪ Connecting rod construction. ▪ Crankshaft construction. ▪ Balancer shafts. 	3
6.	Engine front end construction	<ul style="list-style-type: none"> ▪ Vibration damper construction. ▪ Camshaft drive construction. 	2
7.	Cooling system fundamentals	<ul style="list-style-type: none"> ▪ Cooling systems function. ▪ Cooling system types and operation. ▪ Cooling system instrumentation. ▪ Antifreeze. 	3

8.	Lubricating system fundamentals	<ul style="list-style-type: none"> ▪ Lubricating system functions. ▪ Lubricating system types and operation. ▪ Positive crankcase ventilation system ▪ oil pressure indicator. 	3
9.	Gasoline engine fuel systems	<ul style="list-style-type: none"> ▪ Fuel system functions. ▪ Fuel system components. ▪ Carburetor fundamentals. ▪ Basic carburetor systems. ▪ Carburetor devices. ▪ Variable venture carburetor. ▪ Gasoline injection fundamentals. 	3
10.	Ignition system fundamentals	<ul style="list-style-type: none"> ▪ Function of an ignition system. ▪ Basic ignition system. ▪ Contact point ignition system. 	3
11.	Diesel injection fundamentals	<ul style="list-style-type: none"> ▪ Basic diesel injection system ▪ Diesel injection system components 	2
12.	Engine mechanical problems	<ul style="list-style-type: none"> ▪ Symptoms of engine mechanical problems. ▪ Engine faults diagnosis tests. ▪ Decide what type of engine repair needing. ▪ Evaluating engine mechanical problems. 	2





Exams		Percentage	Date
Exams	First Exam	20%	
	Second Exam	20%	
	Final Exam	50%	
Homework and Projects Discussions and lecture Presentations		10%	

Teaching Methodology:

- ❖ Lectures and presentation.

References & Text Book

1. Automotive mechanics, William H. Course and Donald.
2. Vehicle and engine technology, Edwar Arnold, UK.

