Engineering Program

Specialization	**Automotive Maintenance**
Course Number	20211211
Course Title	**Modern diesel engines fuel systems**
Credit Hours	**2**
Theoretical Hours	**2**
Practical Hours	**0**

Brief Course Description:
Fundamentals of diesel fuel injection system, in-line diesel fuel pump, distributor type diesel fuel pump, injectors, electronic diesel control system (EDC), common rail diesel fuel system (CRDI)

Course Objectives:
Upon the completion of this course, the student will be able to:
1. Identify the construction and components of diesel fuel injection systems.
2. Outline the operation of fuel injection systems.
3. Understand the advantages of electronic diesel control systems and common rail systems.
4.Interprise the wiring diagrams of electronic controlled systems.

Detailed Course Outline:

Unit Number	Unit Title	Unit Content	Time Needed(hr)
1.	**Fundamentals of diesel fuel injection system**	▪ Diesel engine properties ▪ Mixture preparation and air to fuel ratio ▪ Combustion ▪ Diesel fuel system components ▪ Injection types (direct and indirect fuel injection) ▪ Start assist systems	**3**
2.	**Inline diesel fuel pump**	▪ Design and construction ▪ Fuel injection techniques ▪ Methods of injection pump operation ▪ Pumps sizes ▪ Injection pump adjustment on test bench ▪ Injection pump timing on engine ▪ Bleeding fuel system	**4**
3.	**Nozzles and nozzles holders**	▪ Introduction ▪ Pintle nozzles ▪ Hole type nozzles ▪ Standard nozzle holders ▪ Tow spring nozzle holders ▪ Nozzle holder with needle motion sensor	**3**
4.	**Single plunger fuel injection pump**	▪ (PF) single plunger fuel injection pump construction and operation ▪ Solenoid valve controlled single plunger fuel injection pumps (PF-MV) construction and operation	**4**
5.	**Innovative fuel injection**	▪ Unit – injector system (UIS) ▪ Unit – pump system (UPS)	**2**
6.	**Distributor type diesel fuel pump**	▪ Construction and design ▪ Fuel injection techniques ▪ Methods of operation	**4**

7.	**Electronic diesel control system (EDC)**	▪ Construction and design ▪ (EDC) sensors ▪ Electronic control unit ▪ Actuators ▪ Fuel injection beginning timing regularity ▪ Injected fuel quantity regularity ▪ Fault diagnosis	**6**
8.	**Common rail diesel fuel system (CR)**	▪ Fundamentals of(CR)system ▪ Injection forms ▪ Harmful components in exhaust gases ▪ (CR) fuel system construction and forms (low and high pressure sections) ▪ Electronic control system (sensors , ECU , actuators) ▪ Fault diagnosis	**6**

Evaluation Strategies:

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 presentations

Text Book

1. Diesel engines management, BOSCH, Automotive technology, forth edition

References

1. Diesel engines management, BOSCH, Automotive technology, forth edition