

COURSE TITLE : FUELS & COMBUSTION
COURSE CODE : 5053
COURSE CATEGORY : E
PERIODS/WEEK : 4
PERIODS/SEMESTER : 60
CREDITS : 4

TIME SCHEDULE

Module	Topic	Periods
1	Fuels and alternative energy options in automobile engineering	15
2	Theory of combustion in si engines	15
3	Theory of combustion ci engines	15
4	Supercharging, electric vehicles, fuel cell vehicles	15
TOTAL		60

GENERAL COURSE OUTCOME

Sl.No.	Sub	Student will be able to
1	1	Understand the different types of fossil and non fossil fuels
	2	Explain properties and performance of different fuels such as LPG, CNG & bio diesel, Petrol, diesel.
2	1	Understand combustion phenomenon in C.I engines
	2	Identify different air fuel ratios in diesel engine
	3	Define, diesel knock and delay period
3	1	Understand the principle of super charging
	2	Distinguish supercharging of turbo charging
	3	Identify compounds in electrical vehicles and fuel cell vehicles

SPECIFIC COURSE OUTCOME

MODULE I

1.1.0 Understand the different types of fossil and non fossil fuels

- 1.1.1 State the various properties of petrol and diesel
- 1.1.2 Explain the properties and performances of LPG,CNG & alcohol as automobile fuels.
- 1.1.3 Explain the principle of hydrogen and bio-diesel as automobile engine fuel
- 1.1.4 Explain the principle of Bi-fuel and Dual fuel systems

MODULE II

2.1.0 Understand the combustion phenomenon in SI engines

- 2.1.1 State the stages in combustion of SI engines
- 2.1.2 Explain the effects of engine variables in ignition lag and flame propagation

2.2.0 Understand the combustion abnormalities in SI engine

- 2.2.1 Explain the principle of abnormal combustion process such as detonation , pre-ignition and surface ignition in SI engines

MODULE III

3.1.0 Understand the combustion phenomenon in CI engines

- 3.1.1 Explain the stages in combustion of CI engines
- 3.1.2 Identify the various air fuel ratios in diesel engines

3.2.0 Understand the combustion abnormalities in CI engine

- 3.2.1 Distinguish the delay period and variables affecting the delay period
- 3.2.2 Define the Diesel knock and its control

MODULE IV

4.1.0 Understand the principle of Supercharging

- 4.1.1 State the objectives of supercharging
- 4.1.2 Explain super charging in SI and CI engines
- 4.1.3 Compare the performance of supercharged engines with conventional engine
- 4.1.4 Explain the methods of supercharging and turbo charging

4.2.0 Understand the constructional features of electrical vehicles, fuel cell vehicles.

- 4.2.1 Explain the working of electric cars and hybrid vehicles
- 4.2.2 Explain the working of fuel cell vehicles

CONTENT DETAILS

MODULE I

Properties of SI and CI engine fuels –Properties of Petrol and Diesel, Properties and performances of LPG,CNG, Alcohol, Hydrogen and Bio-diesel, Bi-fuel and Dual fuel systems.

MODULE II

Stages of combustion in SI engines, P-θ Diagram, the effects of engine variables- ignition lag - flame propagation, abnormal combustion -detonation , pre-ignition& surface ignition

MODULE III

Stages of combustion in CI engines, P-θ Diagram, various air fuel ratios, delay period and variables affecting the delay period, Diesel knock and its control

MODULE IV

Super charging, Effects of super charging, Methods of supercharging and turbo charging, Lean burn engines, Working of electric cars ,hybrid vehicles, fuel cell vehicles

TEXT BOOKS

1. M L Mathur & R P Sharma - A course in internal combustion engines – Dhanpat Rai

REFERENCE

1. Anil chikkara - Automobile Engg. Vol. 1 to 4 - Satyaprakasan
2. V Ganesan - Internal combustion engines - Tata McGraw-Hill
3. S P Sen- Internal combustion engines theory and practice – Khanna pub
4. Richard stone - Introduction to Internal combustion engines - Palgrave Mc millan
5. R B Guptha - Automobile engineering - Satyaprakasan
6. Barry Hollembeak - Automobile Electricity & Electronics – Delmar publications