# ME6016 ADVANCED I.C ENGINES

DETAILED SYLLABUS

## OBJECTIVES:

- To understand the underlying principles of operation of different IC Engines and components.
- To provide knowledge on pollutant formation, control, alternate fuel etc.

## UNIT I SPARK IGNITION ENGINES

Mixture requirements – Fuel injection systems – Monopoint, Multipoint & Direct injection - Stages of combustion – Normal and Abnormal combustion – Knock - Factors affecting knock – Combustion chambers.

## UNIT II COMPRESSION IGNITION ENGINES

Diesel Fuel Injection Systems - Stages of combustion – Knocking – Factors affecting knock – Direct and Indirect injection systems – Combustion chambers – Fuel Spray behaviour – Spray structure and spray penetration – Air motion - Introduction to Turbocharging.

## UNIT III POLLUTANT FORMATION AND CONTROL

Pollutant – Sources – Formation of Carbon Monoxide, Unburnt hydrocarbon, Oxides of Nitrogen, Smoke and Particulate matter – Methods of controlling Emissions – Catalytic converters, Selective Catalytic Reduction and Particulate Traps – Methods of measurement – Emission norms and Driving cycles.

## UNIT IV ALTERNATIVE FUELS

Alcohol, Hydrogen, Compressed Natural Gas, Liquefied Petroleum Gas and Bio Diesel - Properties, Suitability, Merits and Demerits - Engine Modifications.

## UNIT V RECENT TRENDS

Air assisted Combustion, Homogeneous charge compression ignition engines – Variable Geometry turbochargers – Common Rail Direct Injection Systems - Hybrid Electric Vehicles – NOx Adsorbers - Onboard Diagnostics.

## TEXT BOOKS:

1. Ramalingam. K.K., "Internal Combustion Engine Fundamentals", Scitech Publications, 2002.

2. Ganesan, "Internal Combustion Engines", II Edition, TMH, 2002.

## REFERENCES:

1. Mathur. R.B. and R.P. Sharma, "Internal Combustion Engines", Dhanpat Rai & Sons 2007.

2. Duffy Smith, "Auto Fuel Systems", The Good Heart Willcox Company, Inc., 1987.