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**AT8401 COMPRESSION IGNITION ENGINES**

DETAILED SYLLABUS

**OBJECTIVES:**

- To Understand the intake, exhaust, fuel injection system and combustion in diesel engines
- To impart knowledge on various alternative fuels for C.I Engines
- To identify the nature of pollutant formation and control in C I engines.

**UNIT I INTAKE AND EXHAUST MANIFOLDS**

Intake system components, Air filter, Intake manifold, Turbochargers, Exhaust manifold and exhaust pipe, Exhaust mufflers and Resonators.

**UNIT II DIESEL INJECTION SYSTEMS**

Direct and indirect injection systems, Inline injection pump, Rotary Pump and Injector– Construction and principle of operation, Electronic control, Common rail and unit injector systems – Construction and principle of operation.

**UNIT III COMBUSTION IN C.I. ENGINES**

Stages of combustion, vapourisation of fuel droplets and spray formation, air motion, swirl measurement, knock and engine variables, Features and design considerations of combustion chambers, delay period correlations, heat release correlations, Influence of the injection system on combustion.

**UNIT IV LIQUID AND GASEOUS FUELS FOR C.I. ENGINES**

Requirements, Utilisation techniques - Blends, Neat fuels, Reformed fuels, Emulsions, Dual fuelling, Ignition accelerators and Additives, Performance and emission characteristics. Utilisation techniques of gaseous Fuels-Hydrogen, Biogas, Liquefied Petroleum gas, Compressed Natural gas in CI engines. Dual fuelling.

**UNIT V EMISSIONS FORMATION AND CONTROL TECHNIQUES**

Carbon Monoxide, Unburnt Hydrocarbons, Oxides of Nitrogen, Particulate matter and smoke – sources. Emission control measures for CI engines. Effect of emissions on environment and human beings.

**TEXT BOOKS:**

1. Ramalingam, K.K., Internal Combustion Engines, SciTech Publications (India) Pvt. Ltd., 2004.
2. Ganesan, V, Internal Combustion Engines, Tata McGraw Hill Book Co., 2003.
3. Rajput R.K. Internal Combustion Engines, Laxmi Publications (P) Ltd, 2006.

**REFERENCES:**

1. John B. Heywood, Internal Combustion Engine Fundamentals, McGraw Hill Book, 1998.
2. B.P. Pundir Engine Combustion and Emission, 2011, Narosa Publishing House.
3. Mathur, M.L., and Sharma, R.P., A Course in Internal Combustion Engines, Dhanpat Rai Publications Pvt. New Delhi-2, 1993.
4. Willard W. Pulkrabek, Engineering Fundamentals of the Internal Combustion Engines, 2007, Second Edition, Pearson Prentice Hall.