



GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering

Subject Code: 3721105

HIGH SPEED DIESEL ENGINE

SEMESTER: II

Type of course: Program Elective - IV

Prerequisite: -. Fundamentals of Internal combustion engines

Rationale: This subject is in continuation to fundamentals of internal combustion engines. The subject focuses at imparting knowledge and operations regarding diesel engines and its components, thorough knowledge in Supercharging and Turbo charging of diesel engine; and turbocharger selection. This course imparts on detailed study on Performance and maintenance of special featured diesel engine for agricultural and industrial applications.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
3	0	2	4	70	30	30	20	150

Sr. No.	Content	Total Hrs	% Weightage
1	Unit-I Introduction of diesel engine; basic operations; thermodynamic cycles (Ideal and actual); various losses; limitations; compression ratio; Combustion in diesel engine; various stages; Delay period and different factors affecting it; its influence on performance; Various performance parameters.	8	19
2	Unit-II Introduction of combustion chamber in diesel engine; combustion chamber requirements; necessity and types of air motion; Swirl flow; swirl ratio; selection of method of swirl; types of swirl; Types, design and constructional features and relative merits of open, pre-combustion, swirl, air cell and energy cell combustion chamber; M-combustion chamber; latest combustion chamber.	10	24
3	Unit-III Functions of components; Plunger and distributor pumps; pressure valves; Fuel injector; types of injection nozzle; spray characteristics; valve opening and closing pressures; quantity and duration of fuel injection; injection timing; nozzle cooling.	8	19
4	Unit-IV Supercharging and Turbo charging of diesel engine; necessity and limitations; supercharging methods; relative merits; turbo charging methods; turbocharger selection.	8	19
5	Unit-V Performance and maintenance of diesel engine; piston cooling; Engine with different types of combustion chamber; Multi fuel engines; pilot injection; special features of agricultural and industrial engines.	8	19



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Reference Books:

1. Diesel Engine Operation and Maintenance, V.L. Maleev,
2. Introduction to Internal Combustion Engines”, Richard Stone, McMillan, London
3. Internal Combustion Engines Fundamentals – John B. Heywood, McGrawHill
4. High Speed Diesel Engines, A.W. Judge,
5. High Speed Diesel Engines, P.M. Heldt,
6. Combustion engine processes, Lichty,
7. Supercharging, Vincent

Course Learning Outcome:

Sr. No.	CO statement	Marks % weightage
CO-1	Basic Understanding of diesel engine, basic, thermodynamic analysis and effect of Various performance parameters on engine performance.	18
CO-2	Understanding combustion chamber process its types constructional features in diesel engine	22
CO-3	Knowledge of various components of diesel engine	19
CO-4	Understand, selection phenomena of Supercharging and Turbo charging of diesel engine	21
CO-5	Performance analysis, maintenance of diesel engine and special features of agricultural and industrial engines	20

List of Experiments:

1. To Study delay period, factor affecting and its influence on performance.
2. To compare thermodynamically ideal and actual cycle.
3. To study and demonstrate different types of combustion chamber used in latest IC engine.
4. To study swirl in high speed diesel engine.
5. The detail study and demonstration of plunger and distributor pumps and nozzles.
6. To study turbo charging system used in GSRTC bus.
7. The detail study of multi fuel engine.
8. To study maintenance of high speed diesel engine by visiting any of automotive workshop.