GUJARAT TECHNOLOGICAL UNIVERSITY

MECHANICAL (I.C. ENGINE & AUTOMOBILE ENGINEERING) (11)

HIGH SPEED DIESEL ENGINE

SUBJECT CODE: 2721105

SEMESTER: II

Type of course: Advanced/ Application

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	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
3	2#	0	4	70	30	30	0	10	10	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**

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. Heyhood, McGraw Hill
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:

After successful completion of the course, student will be able to:

- Understand the basic of diesel engine.
- Understand the basic terms and various types of combustion chamber.
- Understand function of various components
- Understand concept of supercharging and turbo charging and its types
- Familiar with performance and maintenance of diesel engine

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website.