GUJARAT TECHNOLOGICAL UNIVERSITY

Marine Engineering

B. E. SEMESTER: VI

Subject Name: **Marine Internal Combustion Engines-I**
Subject Code: **161803**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
3	0	2	5	70	30	50

Sr. No	Course Content	Total Hrs.
1.	**Practical Diesel Engine Cycle:** 4 stroke and 2-Stroke cycles; Deviation from ideal Condition in actual engines; Limitation in parameters, Timing Diagrams of 2-stroke and 4-stroke engines. General Description of I.C. Engines; Marine Diesel Engine of M.A.N., sulzer, Doxford, B & W makes etc. Comparative study of slow speed, medium speed and high speed diesel engines – suitability and requirements for various purposes.	10
2.	**Constructional Details of I.C. Engines:** Principal Components; Jackets and Liners, Cylinder heads. Pistons, Cross heads, Connecting rods, Bed plates. A-frames, Welded construction for Bed plates & frames, Tie rods.	10
3.	**Scavenging and Supercharging System:** Scavenging arrangements in 2-stroke engines; Air charging and exhausting in 4-stroke engines; Various types of Scavenging in 2-stroke engines; Uniflow, loop, cross loop and reverse loop scavenging, their merits and demerits, Scavenge pumps for normally aspirated engines; under piston scavenging, Scavenge manifolds. Turbocharger and its details.	06
4.	**Supercharging Arrangements :** pulse and constant pressure type; Their relative merits and demerits in highly rated marine propulsion engines. Air movements inside the cylinders.	04

5.	**Combustion of fuels in I.C. Engines:** Grades of suitable fuels, Preparation of fuels of efficient combustion. Fuel atomization and requirements of fuel injectors. Design aspects of combustion chamber.	06
6.	Compression pressure ratio and its effect on engines. Reasons for variation in compression pressure and peak pressure, ignition delay, after burning.	02
7.	**Cooling of I.C. Engines:** Various cooling media used; their merits and demerits, cooling of pistons, cylinder heads, coolant conveying mechanism and systems, maintenance of coolant and cooling system.	04
8.	**Safety and Prevention of Mishaps in I.C. Engines**: Causes and prevention of crank-case explosion, and Scavenge fires. Detection of same and safety fittings provided to prevent damage.	06
9.	**Special Features of I.C. Engines:** Development of long-stroke Engines, Implication of stroke-bore ratio, Development in materials in construction & heat treat in M.E. components.	06

Reference Books:

1. Marine Internal Combustion Engines; by A. B. Kane; Shroff Pub & Dist. Pvt. Ltd. 1999
2. Internal Combustion Engines; Ramalingam, K.K.; Scitech Publications (India) Pvt. Ltd.
3. Internal Combustion Engines, Ganesan, V., Tata McGraw Hill Book Co., 2003
4. Internal Combustion Engine Fundamentals, John B.Heywood, ; McGraw Hill Book, 1998
5. A Course in Internal Combustion Engines, Mathur,M.L., and Sharma,R.P. Dhanpat Rai Publications Pvt. New Delhi-2, 1993.
6. Internal Combustion Engine and Air Pollution, Obert,E.F.; International Text Book Publishers, 1983.
7. The Running and Maintenance of the Marine Diesel Engine; John Lamb; Charles Griffin and Company Ltd., U.K., (Sixth Edition), 1976.
8. Marine Diesel Engines, C.C. Pounder, Newnes – Butterworths, UK, (Fifth Edition), 1981.
9. Marine Internal Combustion Engines, N. Petrovsky; Translation from Russian by Horace E Isakson, MIR Publishers, Mascow, 1974.
10. Industrial and Marine Fuels Reference Book, George H.Clark,; Butterworth-and Company,(Publishers) Ltd. U.K., 1998.