

GUJARAT TECHNOLOGICAL UNIVERSITY

Marine Engineering B. E. SEMESTER: VI

Subject Name: **Marine Electrical Technology and Machines**

Subject Code: **161802**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
3	0	1	4	70	30	50

Sr. No	Course Content	Total Hrs.
1.	Alternators: general arrangement of alternators, construction of salient pole and cylindrical-rotor types of stator windings, single and double layer windings, e.m.f. equation of an alternator, distribution and pitch factor, waveform of generated e.m.f., alternator on load, percentage regulation, internal voltage drop, production of rotating magnetic field, resultant magnetic field distribution, mathematical derivation of the rotating field condition, magneto-motive force or ampere-turn waveform distribution, reversal of direction of rotation of rotating field.	15
2.	Synchronous Alternator and Motor: Armature reaction in synchronous alternator, armature reactance, prediction of voltage regulation, open circuit test, short circuit test, synchronous impedance method, torque/angle characteristics, infinity busbar, synchronizing current, torque and power, hunting of phase swinging, parallel operation of alternators, a.c. generators in parallel excitation control, throttle control, load sharing –KW and KVA, principle of action of three-phase synchronous motor, effects of varying load and excitation, methods of starting, advantages and disadvantages of synchronous motor.	12
3.	Power Generation and Distribution: Selection of D.C. & A.C. generators for use on ships with reference to its prime mover, Merits & Demerits of A.C. & D. C. on ships; Rules and Regulations governing electrical machinery on ships, Location & Installation of Generator sets. Rating and Characteristics of main switch boards. Arrangements of preferential trips & Protective devices with wiring diagrams. Construction & Characteristics of brushless high speed A.C.	14

	generators with automatic Voltage Regulator of Magnetic amplifier type. Rapid Voltage response of A.C. Generators. A.C. distribution on ships, regulations regarding layout of distribution system on general cargo ships and on Oil Tanker Navigation Lights and running light Indicator panel. Special requirements for lighting of deck & pump house of oil tankers. Wiring appliances. Determination of Wire size for A.C. Power circuits. System earthing: Insulated Neutral systems. Resistance earthed system.	
4.	Motor & Control Equipments: Characteristics of continuous Maximum rated machines. Centralised control of Motors in machinery spaces. Classes of insulation-‘A’, ‘B’, & ‘E’ & temperature rise. Rotary generators.	05
5.	Starters for Miscellaneous electrical equipment for machinery space auxiliaries & centralized control of motors in machinery space. e.g. sequential starting and cut outs for an automatic fired boiler incorporating safety devices & combustion control equipment. Sequential starting for refrigerating plants, incorporating, safety devices like High Pressure cut out, Cooling water failure cut out Automatic defrosting with the help of timer. Special requirements of motors & starters for Anchor Windlass & Capstan, Wiring diagram, lowering & hoisting arrangements, Over load protection, magnetic disc, Brakes.	05

Reference Books:

1. Electrical Machines by B I Thareja
2. Electrical Machines by J.B. Gupta
3. Marine Electrical Equipment and Practice, Second Edition (Marine Engineering Series) by H D MCGEORGE
4. Electrical Engineers Reference Book by M.A Laughton and D.F Warne
5. A Textbook of Electrical Machines; R K Rajput; Laxmi
6. Electric Machines, 2/e (TMH Outline Series; Kothari, Nagrath D P, I ; Tata McGraw-Hill;