



Indian Institute of Technology

Course Details Report

Course No: OE5045

Course Name: Ship Electrical and Electronic Systems

Course Type:

Theory

Description:

To give students an overview of different electrical systems, components, power generation, distribution and equipments onboard a ship

Course Content:

Components of electrical systems on board ships - AC and DC systems onboard. Standard voltages - difference between marine and industrial circumstances. Safety and quality of supply. Electrical power generation on board ships- comparison of diesel, thermal and Nuclear power plants as prime movers- shaft driven generators - Brushless generators, specification of generators. Specification of motors-speed based and torque based motors. Capacity calculation of main power plant -Diversity factor - single line layout of the DA set. Switchgear for electrical system - Fuses-Switches-relays- contactors- circuit breakers- protection for generators of main power plant - preferential tripping -Installation rules for main power plant emergency plant-layout of IC engine- driven & battery driven E.P.P- Location of emergency power source- Different emergency loads. Distribution systems:- Ring and radial system. AC single phase & 3-phase system- DC systems- Components of distribution system. MSB, SSB and DB -single line layout. Rules governing the distribution system. Regulations governing the installation of MSB. Special rules for tankers and fighting crafts – Special regulation for installation of electrical system in steering system -earthed and insulated AC systems. DOL starter. Transformers for power and lighting-. Specification of transformers. Cables- specification of cables- testing of cables –Megger - design and selection of cables. Installation rules. Cable drop in dc two wire distributors fed at one end- fed at both ends. Electric propulsion – advantages - applications - power flow schematic- single line layout –Control of propulsion motors. Light fittings- different sources of light - lighting arrangements in the engine room, accommodation place, weather deck etc. Navigation lights. Communication equipment - Internal and external communication equipment Practicals: 1. Prepare and draw the electrical system diagram for a typical cargo ship.

Text Books:

- 1) G.O.Watson, Marine Electrical Practice, Butterworth Heineman, 1990.
- 2) Harrington L.Roy, Marine Engineering, SNAME Publications, 1992.
- 3) Lavers, C and Kraal, EGR, Reed's Vol.7, Advanced Electrotechnology for marine engineers, 2014.
- 4) E. A. Fernandez, Marine Electrical Technology, 2014.

Reference Books:

Mukund R. Patel, Electrical Power Systems, 2012