



Indian Institute of Technology

Course Details Report

Course No: OE5035

Course Name: Design of Submarines and Submersibles

Course Type:

Theory

Description:

The course provides the students with a basic introduction into major aspects of design for both conventional and unconventional submarines and submersibles.

Course Content:

Introduction to submarine and submersible design include classification, role and capabilities of submarine and submersible, History and milestone in various submarine and submersible development Hydrostatics Buoyancy elements, weight elements, Types of equilibrium Stability on surface and dived condition, Longitudinal and transverse stability both in small angle and large angle, Trim polygon, surface unsinkability, free surface effect grounding and docking. Structure Pressure vessel, Failure of pressure vessel with internal and external pressure, shape of pressure hull, mode of failure, structural design of cylinder, cone and dome, shape imperfection and measurement Design approach and procedure. Resistance and propulsion Prediction of submerged, snorting and surface resistance, propulsive efficiency, type of propulsion and propeller design. General arrangement Typical layout, Factors influencing form and arrangement, factors governing the diameter of the hull internal arrangement Submarine system Hydraulic system, HP air system, water system, environmental control system, fire control system, escape and rescue and electrical system. Submarine Dynamics Equilibrium of forces and moments, Heavy and light submarine, Neutral point, critical point and critical speed, equation of motion in horizontal plane, vertical plane and safety envelope.

Text Books:

1. Concepts in Submarine Design; R. Burcher & L. Rydill, 1995
2. Submarine Design ;Ulrich Gabler; Bernard & Graefe Verlag, 1980
3. Theory of Submarine Design; Y N Kormilitsin & O K Khalizev.

Reference Books:

1. RINA Symposium on Naval Submarines, 1983
2. RINA Symposium on Naval Submarines, (Warship '88)
3. RINA Symposium on Naval Submarines, (Warship '91)
4. U90 Conference on Submarine Systems, 1990 (3 Volumes)
5. Warship Technology (supplement to Naval Architect)
6. Jane's Navy International
7. Jane's International Defence Review Proceedings
8. Naval Forces
9. Naval Engineering Journal
10. SP's Naval Forces