OE5310: GUIDANCE & CONTROL OF MARINE VEHICLES

Course Content:

Controllability, elements of ship motion control system, ship motions, coordinate transformation, basic equations of motion, hydrodynamic forces during a maneuver, force derivatives, model tests, linearised equations of motion, types of stability, ship maneuvering mathematical models – linear, nonlinear coupled and uncoupled, standard maneuvering tests, free-running model tests, IMO maneuvering criteria, numerical and experimental determination of hydrodynamic derivatives, ship motion control. Control surface and devices, rudder design, automatic control of ships – open and closed loop systems, dynamic positioning of ships, roll and pitch stabilization, control of high-speed vessels, Remotely operated vehicles, autonomous underwater vehicles, equations of motion of underwater vehicles, stability and control of underwater vehicles.

Text Books:

1. **T.I.Fossen**, "Guidance and Control of Marine Vehicles", John Wiley & Sons, 1994.
2. **E,V.Lewis**, "Principles of Naval Architecture", Vol.3, SNAME, 1989
3. **Lewis,E.U**, Principles of Naval Architecture, SNAME, New Jersey, U.S.A, 2010.
4. **E.M.Lewandowski**, "The Dynamics of Marine Crafts – Manoeuvring and Seakeeping", World Scientific, 2004

Reference Books:

1. **A.F.Molland and S.R.Turnock**, "Marine Rudders and Control Surfaces", Elsevier, 2007
2. **O.M.Faltinsen**, "Hydrodynamics of High Speed Marine Vehicles", Cambridge University Press, 2005.
3. **T.Perez**, "Ship Motion Control", Springer, 2005
4. **T.I.Fossen**, "Handbook on Marine Craft Hydrodynamics and Motion Control", Wiley, 2011

Prerequisite:

B.Tech/DD /M.Tech/MS/PhD in Naval Architecture & O