

## **OE5070: STATICS AND DYNAMICS OF FLOATING STRUCTURES**

### **Course content:**

Fluid pressure and centre of pressure – estimation of weight and centre of gravity – conditions of equilibrium – definition of meta-centre – hydrostatic particulars – stability at small angles of inclinations – problems of heel and trim-free surface effect – inclining experiment – stability at large angles – dynamic stability, allowable KG – stability criteria – capacity, stowage, trim, and stability booklet – freeboard – damaged stability. Free surface effects; Linear equations of motion – time and frequency domain; Oscillations of floating bodies –Uncoupled equation of motion for heave pitch and roll motions; added mass and moment of inertia, damping coefficients – exciting forces and moments due to waves on small bodies; strip theory – motion in regular waves and irregular/random waves – statistics - model tests of floating bodies.

### **Text Books**

1. **Chakrabarti, SK.** 1994. Hydrodynamics of Offshore Structures, WIT Press, Southampton, UK. ISBN: 978-0- 90545-166-4
2. **Bhattacharyya, R.** 1978. Dynamics of marine vehicles, John Wiley & Sons, NY, ISBN: 978-047-1072-065
3. **Tupper, EC.** 2013. Introduction to Naval Architecture, Butterworth-Heinemann, ISBN: 978-008-0982-724
4. **Rawson, KJ and Tupper, EC.** 2001. Basic ship theory- Vol. 1, 5th Ed., Butterworth-Heinemann, ISBN: 978- 075-0653-961
5. **Srinivasan Chandrasekaran, and R. Nagavinothini.** 2020. Offshore compliant platforms: Analysis, design and experimental studies, Wiley, UK, ISBN: 978-1-119-66977-7.

### **Reference books:**

1. **Srinivasan Chandrasekaran.** 2015. Dynamic analysis and design of ocean structures. Springer, INDIA, ISBN: 978-81-322-2276-7.
2. **Chakrabarti, SK.** 2005. Handbook of Offshore Engineering, Elsevier, ISBN: 978-008-05-2381-1
3. **Turget Sarpkaya and Michael Isaacson.** 1981. Mechanics of wave forces on offshore structures, Van Nostrand Reinhold Company, USA, ISBN: 978-044-22-5402-5

### **Prerequisite:**

Nil