

## **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.

### **TextBooks:**

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