

**Course Name:**  
Environmental Hydrodynamics

**Course Number:**  
20702

**Credit:**  
3

**Course Content (outline):**

- Introduction to hydrodynamics of stratified flows; applications in estuaries, oceans, lakes, and reservoirs
- Equations of motion for incompressible fluids: Euler equations, conservation of mass and energy
- Approximation of governing equations for special cases.
- Perturbation method in engineering analysis
- Internal waves in bounded and unbounded stratified fluids
- Internal and surface dynamics of lakes
- Selective withdrawal in reservoirs
- Instability in two-layer fluid
- Mixing in rivers

**References:**

- “Environmental Fluid Dynamics”, J. Imberger, Academic Press, 2013.
- “Mixing in Inland and Coastal Waters”, H. Fischer et al., Academic Press, 1978.
- “Buoyancy Effects in Fluids”, J.S. Taylor, Cambridge University Press, 1973.
- “Principles of Ideal-fluid Aerodynamics”, K. Karamcheti, John Wiley, 1966.
- “Stratified Flows”, Lawrence et al., Proceeding of the Fifth Int. Symposium on Stratified Flows, 2000.