Semester:	3				
Course Code:	CE2020				
Course Name:	Fluid Mechanics				
Credit Value:	3 (Notional hours:150)				
Prerequisites:	CE1120 Elementary Fluid Mechanics and Thermodynamics				
Core/Optional	Core				
Hourly Breakdown	Lecture hrs.	Tutorial hrs.	Practical class hrs.	Assignment hrs.	Independent Learning & Assessment hrs.
	33	12	-	-	105

Course Aim: To introduce the fundamentals of the behaviour and analysis of the motion of fluids, and selected applications.

Intended Learning Outcomes:
On successful completion of the course, the students should be able to;

- **solve** complex fluid flow problems through the application of conservation laws of mass, momentum and energy.
- **describe** laminar and turbulent pipe flows, determine energy losses in pipelines and **compute** flow and pressure in pipe systems and pipe networks.
- **compute** transient pressure fluctuations in pipelines, mass oscillations in surge tanks caused by sudden changes of discharges and introduce appropriate surge control devices
- **apply** dimensional analysis of problems and physical model testing in fluid mechanics.
- **develop** performance characteristics of positive displacement and rotodynamic machines and **select** them for a specific application.

Course Content:

- **Dynamics of fluid flow:** Design applications of force-momentum equation, torque-angular momentum, energy equation, flow measurements, frictionless flow in pipes, cavitation
- **Laminar flow and turbulent flow in pipes:** Flow classification, laminar and turbulent flow velocity profiles, friction losses, Moody diagram, local losses, pipe flow computations, pipe systems; Pipe networks, Pipe network modelling using

computer software

- **Hydraulic transients in pipes:** Governing equations of unsteady flow, rigid column theory, mass oscillation in surge tanks, elastic theory, water hammer, Surge control
- **Dimensional methods:** Dimensional analysis, Pi Theorem Similitude, Dynamic similarity, Physical model studies
- **Hydraulic machines:** Positive displacement machines, Rotodynamic machines, performance characteristics, cavitation and NPSH, selection of pumps and turbines.

Teaching /Learning Methods:
Classroom lectures, tutorial discussions

Assessment Strategy:

Continuous Assessment	Final Assessment		
50%	50%		
Details:	Theory (%)	Practical (%)	Other (%)
Assignments/Quizzes/Tutorials 30%	50	-	-
Mid Semester Examination 20%			

Recommended Reading:

- Cengel, Y.A. & Cimbala, R.J.M. (2014). *Fluid Mechanics: Fundamentals and Applications*, 3rd edn, McGraw-Hill Education Ltd, India.
- Douglas, F.M., Gasoriek, J.M., Swaffield, J.A., & Jack, L.B. (2011). *Fluid Mechanics*, 6th edn, Prentice Hall.
- White, F.M. (2003). *Fluid Mechanics*, 5th edn, McGraw-Hill, New York.
- Massey, B.S. (1994). *Mechanics of Fluids*, Taylor& Francis, London.
- Streeter, V.L., & Wylie, E. (1983). *Fluid Mechanics*, McGraw-Hill, New York.