

# **UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA**



## **DEPARTMENT OF CHEMICAL ENGINEERING**

### **LESSON PLAN**

**Semester – 3<sup>rd</sup>**

**SUBJECT- MOMENTUM TRANSFER (CHEPC207)**

**PREPARED BY- SUBASINI JENA**

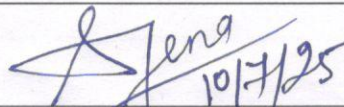
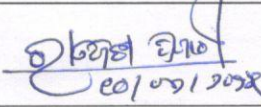
<b>WEEK</b>	<b>TOPICS COVERED</b>
WEEK 1	Basic concept of Fluid
	Difference between Solids and Fluids
	Properties of Fluid
WEEK 2	Surface Tension, Viscosity
	Dynamic Viscosity and Kinematic Viscosity
	Newton's Law of Viscosity
WEEK 3	Solve simple numerical problems
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	Type of Fluid: Ideal and Real Fluid, Newtonian and Non-Newtonian Fluid
WEEK 4	Concept of Fluid Pressure and its measurement
	Pascals Law, Hydrostatic Equilibrium, Manometer
	Piezometer, U-Tube, Differential, Barometer,
WEEK 5	Concept of buoyancy and Archimedes' Principle
	Steady vs. Unsteady, Uniform vs. Non-Uniform, Compressible vs. Incompressible, Rotational vs. Irrotational
	Equation of Continuity, Mass Flow Rate, Volumetric Flow rate
WEEK 6	Solve simple numerical problems
	Reynolds Experiment and its significance, Laminar, Transition and Turbulent Flows, Critical Velocity
	Bernoulli's Theorem and its practical applications, Derivation of Bernoulli's equation for ideal fluid and real fluid,
WEEK 7	Solve simple numerical problems



	Pressure drop and Frictional losses in pipes: Skin and Form Friction Effect of Roughness, Friction Factor, Fanning Equation, Hagen-Poiseuille Equation,
WEEK 8	Solve simple numerical problems Venturimeter - Principle, Construction, Working, Co-efficient, Formula for flow rate measurement Solve simple numerical problems on flow rate measurement
WEEK 9	Orificemeter - Principle, Construction, Working, Co-efficient, Formula for flow rate measurement Solve simple numerical problems on flow rate measurement Working Principle and diagram of Pitot Tube
WEEK 10	Working Principle and diagram of Rotameter Simple numerical problems on flow rate measurement Solve simple numerical problems on flow rate measurement
WEEK 11	Concepts of Pipe, Fitting and Valves and difference between pipe and tube Standard sizes of pipes, Wall Thickness, Schedule Number, Nominal Diameter, BWG Number Different types of Joints and Fittings
WEEK 12	Concepts of Valves and their applications Gate Valve, Globe Valve, Ball Valve, Needle Valve, Non-return Valve, Butterfly Valve, Diaphragm Valve, Pressure Relief Valve Concepts of Pumps, Classification of Pumps
WEEK 13	Centrifugal Pump - Definition, Construction, Working, Advantages & Disadvantages, Characteristic Curves Priming, NPSH Cavitation and losses encountered
WEEK 14	Applications of Reciprocating Pump Applications of Piston Pump, Plunger Pump Applications of Diaphragm Pump and Gear Pump
WEEK 15	Concept of Fluidization, Conditions for fluidization Types of Fluidization Application of Fluidization

#### BOOKS FOR REFERENCE:

- M. Narayanan & B. C Bhattacharya, „Unit operations and Processes“ Vol-I, CBS Publishers & Distributors
- K A Gavhane, “Unit Operation-I” Nirali Prakashan,

	<b>Prepared by</b>	<b>Approved by</b>
<b>Signature</b>		
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<b>SESSION</b>	2025-2026 (Semester from Date: 14.07.2025 to Date : 15.11.2025)	