



**SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)**

Seetharamapuram, NARASAPUR – Pin: 534 280

DEPARTMENT OF CIVIL ENGINEERING

LESSON PLAN

Course Code	Course Title	Semester	Branches	Conduct Periods /Week	A.Y	Date of commencement of Semester
23CE3T03	FLUID MECHANICS	III	Civil Engineering	5	2024-25	30-07-2024

S.N	COURSE OUTCOMES					BTKL
CO1	Identify the various fluid properties.					K2
CO2	Apply the laws of fluid statics, measurement of pressure and buoyancy					K3
CO3	Illustrate the fundamentals of fluid kinematics and differentiate types of fluid flows					K2
CO4	Apply the Principle of conservation of energy for flow measurement.					K3
CO5	Analyze the losses in pipes and discharge through pipe network.					K4
UNIT	Out Comes/ BTKL	Topics No.	Topics/Activity	Text Book /Reference	Conduct Hour	Delivery Method
I	CO1. Identify the various fluid properties. (K2)	1. BASIC CONCEPTS AND DEFINITIONS				Chalk, Talk, PPT
		1.1	Distinction between a fluid and a solid; Density	T ₁ & T ₂	1	
		1.2	Specific weight, Specific gravity,	T ₁ &W ₁	2	
		1.3	Kinematic and dynamic viscosity	T ₁	1	
		1.4	Variation of viscosity with temperature	T ₁ & R ₁	1	
		1.5	Newton law of viscosity	T ₁ & R ₁	1	
		1.6	Vapor pressure, Boiling point	T ₂ & R ₂	1	
		1.7	Surface tension,	T ₂ & R ₂	1	
		1.8	Capillarity	T ₁	1	
		1.9	Bulk modulus of elasticity	R ₁	2	
		1.10	Compressibility	T ₁ & R ₁	1	
Total					12	



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II	CO2. Apply the laws of fluid statics, measurement of pressure and buoyancy. (K3)	2. FLUID STATICS				Chalk, Talk & PPT
		2.1	Fluid Pressure	$T_1 \& T_2$	1	
		2.2	Pressure at a point	$T_1 \& R_1$	1	
		2.3	Pascal's law, pressure variation with temperature	$T_1 \& R_1$	1	
		2.4	density and altitude	$T_1 \& R_1$	1	
		2.5	Piezometer, U-Tube Manometer	$T_1 \& T_3$	1	
		2.6	Single Column Manometer	$T_1 \& T_2$	1	
		2.7	U Tube Differential Manometer	$T_1 \& R_1$	2	
		2.8	Pressure gauges,	$T_1 \& R_1$	1	
		2.9	Hydrostatic pressure and force	$T_1 \& R_1$	1	
		2.10	horizontal, vertical and inclined surfaces.	$T_1 \& R_1$	1	
		2.11	Buoyancy and stability of floating bodies	$T_1 \& R_1$	1	
Total				12		

III	CO3. Illustrate the fundamentals of fluid kinematics and differentiate types of fluid flows. (K2)	3. FLUID KINEMATICS				Chalk, Talk & PPT
		3.1	steady and unsteady flow	$T_1 \& T_2$	1	
		3.2	uniform and non-uniform flow	$T_1 \& R_1$	1	
		3.3	laminar and turbulent flow	$T_1 \& R_1$	1	
		3.4	rotational and irrotational flow	$T_1 \& R_1$	1	
		3.5	compressible and incompressible flow	$T_1 \& T_3$	1	
		3.6	ideal and real fluid flow;	$T_1 \& T_3$	1	
		3.7	one, two and three dimensional flows	$T_1 \& T_2$	2	
		3.8	Stream line, path	$T_1 \& R_1$	1	
		3.9	linestreak line and stream tube	$T_1 \& R_1$	1	
		3.10	stream function	$T_1 \& R_1$	1	
		3.11	velocity potential function	$T_1 \& R_1$	1	
Total				12		



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IV	CO4: Apply the Principle of conservation of energy for flow measurement. [K3]	4. FLUID DYNAMICS				Chalk, Talk, &PPT, Experimental.
		4.1	Fluid Dynamics: Surface and body forces	T ₁ & T ₂	1	
		4.2	Equations of motion - Euler's equation	T ₁ & T ₂	1	
		4.3	Bernoulli's equation – Derivation	T ₁ & T ₂	1	
		4.4	Energy Principle; Practical applications of Bernoulli's equation	T ₂ & R ₁	2	
		4.5	Venturimeter, orifice meter and Pitot tube	T ₁ & R ₁	2	
		4.6	Momentum principle. Forces exertedby fluid flow on pipe bend	T ₁ & R ₁	2	
		4.7	Vortex Flow – Free and Forced	T ₁ & R ₁	2	
		4.8	Definitions of Reynolds Number	R ₁	1	
		4.9	Froude Number, Mach Number	T ₁ & R ₁	1	
4.10				Weber Number and Euler Number	T ₁ & R ₁	1
Total					14	
V	CO5: Analyze the losses in pipes and discharge through pipe network. (K4)	5. ANALYSIS OF PIPE FLOW				Chalk, Talk & PPT
		5.1	Energy losses in pipelines	T ₁ & T ₂	1	
		5.2	Darcy – Weisbach equation	T ₁ & T ₂	2	
		5.3	Minor losses in pipelines	T ₁ & T ₂	2	
		5.4	Hydraulic Grade Line and	T ₁ & T ₂	2	
		5.5	Total Energy Line	T ₁ & T ₂	1	
		5.6	Concept of equivalent length	T ₁ & T ₂	2	
5.7				Pipes in Parallel and Series.	T ₁ & T ₂	2
Total					12	
Cumulative Proposed Periods					62	

Text Books:

S.No	Authors, Book Title, Edition, Publisher, Year of Publication
T1	P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House, 2019.
T2	K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2 nd edition 2018

Reference Books:

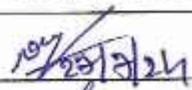
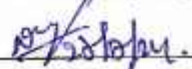
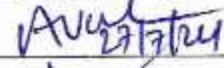
S.No.	Authors, Book Title, Edition, Publisher, Year of Publication
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R1	R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi 11 th edition, 2024.
R2	Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
R3	Fluid Mechanics by Frank M. White, Henry Xue, Tata McGraw Hill, 9 th edition, 2022.
Web-ref	https://archive.nptel.ac.in/courses/112/105/112105269/ https://nptel.ac.in/courses/112104118 - NPTEL :: Mechanical Engineering - NOC: Introduction to Fluid Mechanics https://nptel.ac.in/courses/105103192

S.NO.	Details	Name	Signature with Date
i.	Faculty	Mr. N. BULLI RAJU	 29/7/24
ii.	Course Coordinator	Mr. N. BULLI RAJU	 29/7/24
iii.	Module Coordinator	Dr. A. VENKATA KRISHNA	 29/7/24
iv.	Program Coordinator	Mr. G.V.L.N MURTHY	 29/7/24


Principal