



SWARNANDHRA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by NAAC with "A" Grade – 3.32 CGPA Recognized under 2(f) & 12(B) of UGC Act 1956. Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF CIVIL ENGINEERING

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement of Semester
20CE3T03	FLUID MECHANICS	III	Civil Engineering	5	2021 - 2022	25/10/21

COURSE OUTCOMES

1	Understand and Apply concepts of fluid statics, kinematics and dynamics for solving various fluid flow problems [K2], [K3].
2	Analyze various losses in pipe flow problems and understand the measurement of flow [K4].
3	Understand the concept of hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes[K2].
4	Explain the working and performance of various types of turbines and pumps and their characteristics. [K2].
5	Explain the working and performance of various types of turbines and pumps and their characteristics [K2].

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Cont act Hour	Deliv ery Meth od
I	Underst and and Apply concept s of fluid statics, kinemat ics and dynami cs for	1.1	FLUID STATICS: Dimensions and units	T1,T2	1	Chalk, Board, Ppt
		1.2	Physical properties of fluids	T1,T2	1	
		1.3	Specific gravity, Viscosity and Surface tension	T1,T2,R1	1	
		1.4	Vapour pressure and their influence on Fluid motion	T1,R1,R2	1	
		1.5	Atmospheric gauge and Vacuum pressure	T1,T2,R1	1	
		1.6	Measurement of pressure- Piezometer	T1,T2, R1,R2	1	
		1.7	U- Tube and Differential manometers	T1,R1	1	



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	solving various fluid flow problems [K2], [K3].	1.8	Problems on Surface Tension	T1,R1	1	
		1.9	Problems on Pressure and Piezometer	T1,T2	1	
		1.10	Problems on Differential Manometers	T1,T2	1	
Content beyond Syllabus (if needed)			Design of Channels and Canals	T1	1	
Total					11	
II	Analyze various losses in pipe flow problems and understand the measurement of flow [K4].	2.1	FLUID KINEMATICS: Stream line, path line, streak lines and stream tube	T1,T2	1	Chalk, Board, Ppt
		2.2	Classification of flows-steady & unsteady	T1,T2, R1	1	
		2.3	Uniform, Non-uniform, Laminar, Turbulent Flows	T1,T2, R1,R2	1	
		2.4	Rotational, and Irrotational flows	T1,R1	1	
		2.5	Equation of continuity for one dimensional flow.	T1,T2	1	
		2.6	FLUID DYNAMICS: Surface and body forces	T1,T2	1	
		2.7	Euler's and Bernoulli's equations for flow along a stream line	T1,T2	1	
		2.8	Momentum equation	T1,T2, R1	1	
		2.9	Momentum equation and its application on force on pipe bend.	T1,T2	1	
		2.10	Problems on Eulers and Bernaulies Equations	T1,T2	1	
		2.11	Problems on Eulers and Bernaulies Equations	T1,T2	1	
Content beyond Syllabus (if needed)			Standing Waves	T1,R1	1	
Total					12	
III	Underst and the concept	3.1	CLOSED CONDUIT FLOW: Reynold's experiment	T1,T2, T3	1	Chalk, Board, Ppt
		3.2	Darcy Weisbach equation	T1,T2	1	



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	of hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes [K2].	3.3	Minor losses in pipes	T1,T2	1	Chalk, Board, Ppt
		3.4	Pipes in series and pipes in parallel	T1,T2	1	
		3.5	Total energy line-hydraulic gradient line	T1,R1	1	
		3.6	MEASUREMENT OF FLOW: Pilot tube	T1,R1	1	
		3.7	Venture meter	T1,T2	1	
		3.8	Orifice meter	T1,T2	1	
		3.9	Problems on Total Energy	T1,T2	1	
		3.10	Problems on Venturimeter	T1,T2	1	
		3.11	Problems on Pipes in Series and Parallel.	T1,T2	1	
		Content beyond Syllabus (if needed)		Prototype and Model design	T1	
Total					12	
IV	Explain the working and performance of various types of turbines and pumps and their characteristics. [K2].	4.1	Basics of turbo machinery: Hydrodynamic force of jets on stationary and moving flat vanes	T1,T2	1	Chalk, Board, Ppt
		4.2	Hydrodynamic force of jets on inclined, and curved vanes	T1,R1	1	
		4.3	Jet striking centrally and at tip	T1	1	
		4.4	Velocity diagrams	T1,T2	1	
		4.5	Work done and efficiency, flow over radial vanes	T1,R1	1	
		4.6	Force exerted by jet of water on series of vanes	T1,T2	1	
		4.7	Centrifugal pumps: Classification, working, work done	T1,R1	1	
		4.8	Manometric head- losses and efficiencies specific speed	T1,T2	1	
		4.9	Pumps in series and parallel	T1,T2	1	
		4.10	Performance characteristic curves, NPSH	T1,T2	1	
		4.11	Reciprocating pumps: Working, Discharge, slip, indicator diagrams	T1,R2	1	
Content beyond Syllabus (if needed)		Keplan Turbines	T1,T2	1		
Total					12	
V	Explain	5.1	HYDRAULIC TURBINES:	T1,T2	1	Chalk,



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the working and performance of various types of turbines and pumps and their characteristics [K2].	Classification of turbines				Board, Ppt
	5.2	Impulse and Reaction turbines, Pelton wheel, Francis turbine	T1, T4	1	
	5.3	Kaplan turbine-working proportions, work done, efficiencies	T1, T2	1	
	5.4	Hydraulic design –draft tube theory	T1, R1	1	
	5.5	functions and efficiency	T1, T2	1	
	5.6	PERFORMANCE OF HYDRAULIC TURBINES: Geometric similarity, Unit and specific quantities	T1, T4	1	
	5.7	Characteristic curves, governing of turbines	T1	1	
	5.8	Selection of type of turbine	T1, T2, R3	1	
	5.9	Cavitation, surge tank	T1, T2	1	
	5.10	Water hammer	T1, T2	1	
	5.11	Problems on Turbines	T4, R3	1	
	5.12	Problems on Turbines	T2, R3		
	5.13	Problems on Turbines	T1, T2		
Content beyond Syllabus (if needed)	Efficiency Of Turbines		T1, T2	1	
Total				14	
CUMULATIVE PROPOSED PERIODS				61	
Text Books:					
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION				
1	K. Subramanya, Open Channel flow, 5 th Edition, Tata McGraw Hill Publishers, 2017				
2	Dr. R.K. Bansal, Fluid mechanics and hydraulic machines, 6 th Edition, Laxmi Publications (P) Ltd., New Delhi., 2017				
3	Modi and Seth, Fluid Mechanics, 5 th Edition, TEXT BOOKS house, 2017				
Reference Books:					
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION				
1	Rajput, S, Fluid mechanics and fluid machines, 7 th Edition, S. Chand & Co, 2017				
2	Banga & Sharma, Hydraulic Machines, 5 th Edition, Khanna Publishers, 2018				
3	D.S. Kumar Kataria & Sons, Fluid Mechanics & Fluid Power Engineering, 4 th Edition				
Web Details					
1	http://www.icoachmath.com/physics/definition-of-hydraulic-machine.html				
2	https://www.energy.gov/eere/water/types-hydropower-turbines				



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	Name	Signature with Date
i. Faculty	Mr. RAJIV . S . R	24/10/21
ii. Course Coordinator	Mr. RAJIV . S . R	24/10/21
iii. Module Coordinator	Mr. A. VENKATA KRISHNA	25/10/21
iv. Programme Coordinator	Mr. G.V.L.N MURTHY	25/10/21

Principal