Course Number and Name

BCE304 - FLUID MECHANICS

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Ms.T.Aarthiharini

Text Books and References

TEXT BOOKS:

1. Kumar K.L "Engineering Fluid Mechanics", Eurasia Publishing House (P) Ltd., New Delhi.

REFERENCES :

1. Streeter, Victor, L, and Benjamin., "Fluid Mechanics", McGraw-Hill Ltd., 1998
2. Natarajan M.K. "Principles of Fluid Mechanics", Agencies, Vidayal Karuppur, Kumbakonam, 1995.
3. Fox Robert W. and McDonald. Man T., Introduction Fluid Mechanics", John Wiley & Sons,1995.

Course Description

- To understand the basic properties of the fluid, fluid kinematics, fluid dynamics and to analyze and appreciate the complexities involved in solving the fluid flow problems.
- To introduce the basics of hydrostatic forces involved in fluid mechanics and also to acquaint the students to learn about the theorems on Pascal's law and buoyancy
- To understand the various types of fluid flow and to practice the problems based on Bernoullis equations and its applications
- To provide basic ideas on the boundary layer theorem and its classification along with problems underlying the subjects.
- To develops similitude and model studies for the basics of fluid mechanics with buckinghum pi theorem as the basic concept.

Prerequisites	Co-requisites
Engineering Mechanics	NIL

required, elective, or selected elective (as per Table 5-1)

Course Outcomes (COs)

CO1	To learn about the basics of fluid mechanics and various properties of fluids
CO2	To learn about the various forces on plane and curved surfaces and the concepts of buoyancy
CO3	To have a clear understanding about fluid kinematics and dynamics
CO4	To study the basics of boundary layer flow and flow through pipes
CO5	To study about various models like distorted models and various dimensionless numbers

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k

CO1	H			M						L	
CO2						H		L			M
CO3				H					M		
CO4						M			H	L	
CO5					M						

List of Topics Covered

UNIT I DEFINITIONS &FLUID PROPERTIES 9

Definitions – Fluid and Fluid Mechanics – Dimensions and units – Fluid properties continuum Concept of system and control volume.

UNIT II FLUID STATICS 9

Pascal's law and hydrostatic equation – Forces on plane and curved surfaces – Buoyancy-Pressure measurement.

UNIT III FLUID DYNAMICS & KINEMATICS 9

Fluid Kinematics - Stream, steak and path lines, Classification of flows-continuity equation, Stream and Potential functions, Flow nets, Velocity measurement. Euler and Bernoulli's equations- Application of Bernoulli's equation-Discharge measurement-laminar flows through pipes and between plates – Hagen Poisuille equation – Turbulent flow, Dancy Weisbach formula - moody Diagram – Momentum Principle-Impact of jets on plane and curved plates.

UNIT IV BOUNDARY LAYER AND FLOW THROUGH PIPES 9

Definition of boundary layer – Thickness and classification - Displacement and momentum thickness. Development of laminar and Turbulent flows in circular pipes, Major and Minor losses of Flow in Pipes in series and in parallel pipe network.

UNIT V SIMILITUDE AND MODEL STUDY 9

Dimensional analysis – Rayleigh's method – Buckingham PI-Theorem- Similitude and Models – Scale effect and distorted models.