19BSM504 - Fluid Mechanics										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		TotalMarks
					MS	ES	IA	LW	LE/Viva	
3	1	--	4	4	25	50	25	--	--	100

OBJECTIVES

1. A foundation in the fundamentals of fluid dynamics
2. Practicing the analytical formulation of fluid mechanics problems using Newton's Laws of motion and thermodynamics

SYLLABUS

Unit-I	**10**

Equations of motion for ideal fluid, Bernoulli's theorem & its applications, Equations of motion for viscous fluid, similarity of flows, Reynolds number, Flow between parallel flat plates, steady flow in pipes, Flow between two concentric cylinders

UNIT II	**10**

Application of parallel flow theory, Unsteady flow over a flat plate, Boundary layer concept, Boundary layer equations in two-dimensional flow

UNIT III	**10**

Boundary layer flow along the flat plates: Blasius solution, Shearing stress and Boundary layer thickness, Boundary layer on a surface with pressure gradient, Momentum integral theorems for Boundary layer

UNIT IV	**9**

The Von Karman integral relation, Application of Momentum integral equation to Boundary layers: Von Karman-Pohlhansen method, Separation of boundary layer flow, Boundary layer control, Methods of Boundary layer control, Introduction to turbulent flow.

APPROXIMATE TOTAL	**39 Hours**

OUTCOMES

1. Know the definitions of basic terms of fluid mechanics

2. Apply the basic equation of fluid statics to determine forces on planar and curved surfaces that are submerged in a static fluid; to manometers; to the determination of buoyancy and stability; and to fluids in rigid-body motion.

3. Use of conservation laws in integral form and apply them to determine forces and moments on surfaces of various shapes and simple machines.

4. Use of conservation laws in differential forms and apply them to determine velocities, pressures and acceleration in a moving fluid. Understand the kinematics of fluid particles, including the concepts of substantive derivatives, local and convective accelerations.

5. Use Euler's and Bernoulli's equations and the conservation of mass to determine velocities, pressures, and accelerations for incompressible and inviscid fluids.

TEXTS AND REFERENCES

1. Fluid Dynamics, Shanti Swarup, Krishna Prakashan Media (2015)
2. Fluid Dynamics, M D Raisinghania, S Chand Publication (2003)
3. Text book of Fluid Mechanics, Suparna Mukhopadhaya CBS Publishers (2014)
4. Fluid Mechanics: An Introduction to the theory of fluid flows, Durst, Springer India Private Limited (2008)
5. Introduction to Fluid Mechanics, Pritchard, Fox and McDonald, John Wiley & Sons, current edition.
6. Vectors, Tensors and the basic equations of fluid mechanics by Rutherford Aris, Dover publications (1990)