Course Number and Name
BME304 - FLUID MECHANICS AND MACHINERY

Credits and Contact Hours
4&60

Course Coordinator's Name
Mr.G.Anbazhagan

Text Books and References

TEXT BOOKS:

1. Modi and Seth-Fluid Mechanics and Hydraulic Machines, 2005.
2. R.K.Bansal- Fluid Mechanics and Hydraulic Machines-Laxmi Publications.

REFERENCES:

1. Agarwal.S.K.Fluid Mechanics and Machinery-McGraw Hill, 1999

2. Jain.A.K. Fluid Mechanics-Khanna Publishers, 2000

3. D.S.Kumar-Fluid Mechanics and Fluid power Engineering, S.K.Kataria&Sons, 1998

4. Mohanty, Fluid Mechanics, PHI, 2000

5.https://books.google.co.in/.../**Fluid_Mechanics_and_Machinery**.html?id.

Course Description

OBJECTIVES

To achieve a understanding of the properties of the fluids. The dynamics of fluids is introduced through the control volume approach which gives an integrated understanding of the transport of mass, momentum and energy.

The applications of the conservation laws to flow though pipes and hydraulics.

Prerequisites	Co-requisites
MATHEMATICS I & II	Nil

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

Course Outcomes (COs)	
CO1	Upon completion of this course, the students can able to apply mathematical knowledge to predict the properties and characteristics of a fluid
CO2	Can critically analyse the performance of pumps and turbines
CO3	Can understand different types of flow.
CO4	Learn Fluid Dynamics
CO5	Learn fluid kinematics
CO6	Understand dimensional analysis

Student Outcomes (SOs) from Criterion 3 covered by this Course												
COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H	H	L					M	M		H	H
CO2	H	H	L					M	M		H	H
CO3	H	H	L					M	M		H	H
CO4	H	H	L					M	M		H	H
CO5	H	H	L					M	M		H	H
CO6	H	H	L					M	M		H	H

List of Topics Covered

UNIT I   FLUID PROPERTIES AND FLUID STATICS   12

Fluid properties –continuity equation-Hydrostatic law-pressure variation in static fluid-hydrostatic force on a submerged plane and curved surface-location of hydrostatic force, manometry, single tube and differential manometers, Buoyancy-Metacentric height.

UNIT II FLUID KINEMATICS AND FLUID DYNAMICS   12

Classification of fluid flow, fluid flow lines, stream lines, streak line and path line, vortex flow, Euler's momentum equation, Bernoulli's equation-application of Bernoulli's equation-Flow measurement, pitot tube, venturimeter.

UNIT III FLOW OF A REAL FLUID &FLOW THROUGH PIPES   12

Laminar and turbulent flow, Laminar boundary conditions, Boundary layer thickness, Navier-Stokes equation(statement only),Flow through pipes, Reynolds experiments, Darcy Weisbach equation, pipes in series ,pipes in parallel, siphon losses-Power transmission, Water hammer.

UNIT IV   DIMENSIONAL ANALYSIS &PUMPS   12

Principle of dimensional Analysis-Buckingham's Π theorem-Important dimensionless numbers applicable to fluid mechanics-Centrifugal pumps, Pump outlet and efficiencies-Cavitations, pump characteristics, multistage pumps, axial flowpumps-characteristics, construction details,Non-dimesnsional parameters-Efficiencies-reciprocating pumps, Indicator diagram-Rotary pumps –Classifications, Working

UNIT V HYDRAULIC TURBINES   12

 Classification of hydraulic turbines-pelton turbines, velocity triangle-Efficiency, working, Principle of Pelton wheel, Francis and Kaplan turbines-velocity triangles-Hydraulic turbine characteristics.