No	Information of every subject	
1	Unit name:	Fluid Mechanics I
2	Code:	ME-41016
3	Classification:	Engineering subject
4	Credit value:	2.5
5	Semester/ Year Offered:	1/2
6	Pre-requisite:	EM in Differentiate, Integrate, Basic Engineering Thermodynamics Engineering Mechanics (Statics)
7	Mode of delivery:	Lecture, Practical
8	Practical	20%
	Mid-term/ final Examination	70%
	Viva	5%
	Tutorial	5%
9	Academic staff teaching unit:	
10	Course outcome of unit: a. To solve the shear stress and various forces and various circumstances b. To apply manometery for measurements of pressure. c. To calculate the hydrostatic forces and moments on planar and curved submerged and floating surfaces. d. To solve the dynamic fluid forces using the linear momentum equation (Newton's second laws of motion)	
11	Synopsis of unit: This course is an introduction of fluid mechanics and emphasizes fundamental concepts a problems solving techniques. Topic to be covered includes fluids properties, fluid static, fluid kinematic, control volume analysis, dimensional analysis, internal flow (pipe flow) and differential analysis.	
12	Topics and Contact Hours: 1 **Properties of Properties of Fluids** 1.1 Development of Fluid Mechanics 1.2 Definition of Fluid 1.3 Dimensions and Units 1.4 Mass, Density, Specific Weight and Specific Gravity	

		1.5 Viscosity
		1.6 Bulk Modulus
		1.7 Gas Law
		1.8 Isothermal, Adiabatic and Polytropic Process
		1.9 Vapour Pressure
		1.10 Surface Tension Capillary Fluids
		1.11 Capillary
	2	**Pressure Measurement**
		2.1 Pressure
		2.2 Pascal's Law
		2.3 Pressure Variation with Depth of Liquid
		2.4 Pressure Variation with Depth in a Compressible Fluid
		2.5 Pressure Variation with Altitude in the atmosphere
		2.6 Hydraulic Jack
		2.7 Absolute, Gauge and Vacuum Pressure
		2.8 Measurement of Atmospheric Pressure
		2.9 Measurement of Gauge Pressure
		2.10 Other Types of Gauges
		2.11 Manometers
	3	**Hydrostatic Forces on Surfaces**
		3.1 Total Hydrostatic Pressure
		3.2 Center of Pressure
		3.3 Hydrostatic Pressure on Inclined Planes
		3.4 Lateral Position of the Center of Pressure
		3.5 Hydrostatic Pressure on Curved Surfaces
		3.6 Gravity Dams
		3.7 Lock Gates
		3.8 Total Pressure and Center of Pressure for Layered Liquids
	4	**Buoyancy and Flotation**
		4.1 Principle of Buoyancy
		4.2 Stability of Floating Bodies

	4.3 Analytical Method for Determination of Metacentric Height 4.4 Experimental Method for Determination of Metacentric Height 4.5 Floating Body Anchored at Base 4.6 Floating Body with Bilge Water (or) Liquid Ballast 4.7 Transverse oscillations of a floating body	
	7 Dynamics of Fluid Flow 7.1 Introduction 7.2 General Energy Equations 7.3 Euler's Equation 7.4 Derivation of Bernoulli's Equation from Euler's Equation 7.5 Bernoulli's Equation as Energy Equation 7.6 Bernoulli's Equation for Real Fluids 7.7 Application of the Bernoulli Equation 7.8 Impulse Momentum Equation 7.9 Application of Impulse Momentum Equation 7.10 Sudden Enlarge in a Pipe 7.11 Jet Propulsion 7.12 Jet Propulsion of Ships 7.13 Propellers 7.14 Vortex Motion 7.15 Forced Vortex Motion 7.16 Free Vortex Motion 7.17 Radial Flow of a Liquid 7.18 Spiral Votex Motion 7.19 Jet Trajectory	
	11 Fundamentals of Flow through Pipes 11.1 Introduction 11.2 Reynolds' Experiment on Flow through Pipes 11.3 Darcy- Weisbach Equation 11.4 Definition 11.5 Empirical Formulae	

	15.7 Pressure Conduit Models 15.8 Distorted Models 15.9 Models of River and Open Channels 15.10 Scale Effect 15.11 Uses and Limitations of Hydraulic Similitude **20 Uniform Flow in Open Channels** 20.1 Introduction 20.2 Definitions 20.3 Conveyance (K) 20.4 Non- Dimensional Forms of the Conveyance Curves 20.5 Problems of Uniform Flow Computation 20.6 Total Energy in Open Channels 20.7 Specific Energy 20.8 Criterion of Critical Depth 20.9 Critical Depth in Rectangular Channels 20.10 Section Factor for Critical Flow 20.11 Critical Depth in Non-Rectangular Channels 20.12 Computation of Critical Flow 20.13 Control Sections 20.14 Channel Transitions 20.15 Flow Measurement
14	Main references: Fluid Mechanics, Hydraulics and Hydraulic Machines by Dr. K.R.ARORA
15	Additional references: Fundamentals of Fluid Mechanics (6^{th} Edition) Bruce r. Munson Donald f. Young Fundamentals of Fluid Mechanics (Fundamentals and Applications) By YUNUS A.SENGEL JOHN M. CIMBALA