K L UNIVERSITY
FLUID MECHANICS (11 – ES 202)

SYLLABUS

L	T	P	Cr
3	0	2	4

Fluid properties: Definition of fluid, properties of fluid-density, specific weight, specific gravity, viscosity, classification of fluids, surface tension and capillarity, vapour pressure and cavitation.

Fluid statics: Introduction, pressure, Pascal's law, hydrostatic law, measurement of pressure-simple and differential manometers, Total pressure and centre of pressure on vertical, horizontal and Inclined surfaces.

Fluid statics-buoyancy and floatation: Buoyancy, centre of buoyancy, Meta-centre, Meta-centric height

Fluid kinematics: Introduction, types of fluid flow, Discharge, Continuity equation, Continuity equation in three dimensional flow, velocity potential function and stream function.

Fluid dynamics: Introduction, Euler's equation of motion,
Introduction to computational approaches for solving Euler's equation Finite Volume Method
Bernoulli's equation and applications, Venturimeter, Orificemeter, Pitot-tube, coefficient of discharge, Introduction to orifices and mouth pieces.

Momentum equation: Impulse-momentum equation, Force exerted by flowing fluid on pipe-bend.

Flow through pipes: Introduction, major and minor energy losses, hagen-poiseuille law, Hydraulic gradient and total energy line, pipes in series and parallel and Water hammer.

Turbulance: Introduction to Turbulance, Navier Strokes Equations,
Dimensional analysis & model similitude: Introduction, Buckingham's PI theorem, Model analysis, Types of similarities, Dimensionless numbers, Classification of models, Model laws-Reynolds and Froude model law

RECOMMENDED TEXT BOOKS:
1. Fluid Mechanics by John F. Douglas, Tata McGraw Hill publications
2. Fluid Mechanics by S.K.Som, G Biswas, Tata McGraw Hill publications

Recommended References:
1. Fluid Mechanics by Frank M white, Tata McGraw Hill publications
2. Fluid Mechanics by A. Cengel and John M. Cimbala, Tata McGraw Hill publications
3. Fluid Mechanics by G. S Sawhney, IK International Publishing house (P) Ltd. New Delhi

4. Fluid Mechanics by Edward J. Shaughnessy, Oxford University Press, USA

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LIST OF EXPERIMENTS

L	T	P	Cr
3	0	2	4

1. Determination of coefficient of discharge of rectangular notch

2. Determination of coefficient of discharge of V - notch

3. Determination of coefficient of discharge of orifice

4. Determination of coefficient of discharge of mouth piece

5. Determination of coefficient of discharge of orifice meter

6. Determination of coefficient of discharge of venturimeter

7. Determination of Darcy friction factor due to friction in a pipe flow

8. Determination of minor losses due to sudden expansion and contraction in a pipe flow

9. Verification of Bernoulli′s theorem

10. Fluid flow analogy using Reynolds apparatus

*NOTE***:** In addition to physical conduction of above experiment any simulation package / program will be used for simulating the same and further correlation with experimental results obtained.