INTEGRAL UNIVERSITY LUCKNOW

FLUID MECHANICS LAB

Fluid mechanics is studied both theoretically and experimentally, and the results are described both mathematically and physically. The phenomena of fluid motion are governed by known laws of physics--conservation of mass, the laws of classical mechanics (Newton's laws of motion), and the laws of thermodynamics. These can be formulated as a set of nonlinear partial differential equations, and in principle one might hope to infer all the phenomena from these. In practice, this has not been possible; the mathematical theory is often difficult, and sometimes the equations have more than one solution, so that subtle considerations arise in deciding which one will actually apply.

S.NO.	APPARATUS NAME	IMAGE	DISCRIPTION
1.	**META-CENTRIC HEIGHT OF A SHIP MODEL**		The metacentric height (GM) is a measurement of the initial static stability of a floating body. It is calculated as the distance between the centre of gravity of a ship and its metacentre. A larger metacentric height implies greater initial stability against overturning

2.	**HELE SHAW APPARATUS**		Hele-Shaw flow (named after Henry Selby Hele-Shaw) is defined as Stokes flow between two parallel flat plates separated by an infinitesimally small gap. Various problems in fluid mechanics can be approximated to Hele-Shaw flows and thus the research of these flows is of importance. Approximation to Hele-Shaw flow is specifically important to micro-flows

4	**ORIFICE METER APPARATUS**		An orifice plate is a device used for measuring flow rate, for reducing pressure or for restricting flow (in the latter two cases it is often called a *restriction plate*). Either a volumetric or mass flow rate may be determined, depending on the calculation associated with the orifice plate. When the velocity increases, the pressure decreases and vice versa

5	**REYNOLDS NUMBER APPARATUS**		The Reynolds number (Re) is a dimensionless number that gives a measure of the ratio of inertial forces to viscous forces for given flow conditions. The Reynolds number is an important parameter that describes whether flow conditions lead to laminar or turbulent flow

6	**VENTURI METER APPARATUS**		fluid's velocity must *increase* as it passes through a constriction in accord with the principle of continuity, while its static pressure must *decrease* in accord with the principle of conservation of mechanical energy. Thus any gain in kinetic energy a fluid may accrue due to its increased velocity through a constriction is balanced by a drop in pressure.

7	**NOTCH APPARATUS**		Notch Apparatus which is widely known as Discharge Over Notches Apparatus. Our Notch Apparatus setup consists of a channel having sufficient length and width in which water is supplied from the bottom. Required Notch is fitted at one end of this channel .A hook gauge with vernier scale is fitted to measure the height of fluid in flow channel

8	**IMPACT OF JET APPARATUS**		The experimentally measured force is compare with the theoretical calculated force A jet of water is produced when water is fed to a vertical pipe terminating in a tapered nozzle. The jet will impinge on a vane, of different shapes. Vanes usually used are flat plate, inclined plate, curved plate and hemispherical cup

9	**PIPE FRICTION APPARATUS**		Friction head losses in straight pipes of different sizes can be investigated over a range of Reynolds' numbers from 10_3 to nearly 10_5, thereby covering the laminar, transitional and turbulent flow regimes in smooth pipes. A further test pipe is artificially roughened and, at the higher Reynolds' numbers, shows a clear departure from typical smooth bore pipe characteristics