GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology		Branch/Spec.	Marine Engineering	
Semester	IV		Version	2.0.0.0	
Effective from Academic Year	2015-16		Effective for the batch Admitted in		July 2014
Subject code	2MR406	Subject Name	Fluid Mechanics & Hydraulics		

	Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total			CE	SEE	Total
	L	TU	P	TW						
Credit	2	0	1	0	3	Theory		40	60	100
Hours	2	0	2	0	4	Practical		25	25	50

Pre-requisites:

Learning Outcome:

After successful completion of the course, student will be able to
- Comply with the TAR Book Competency number 4.5, 5.1 & 9.7

Theory syllabus

Unit	Content	Hrs
1.	**Properties of fluid:** • Types of fluid, law of continuum, properties of fluid-surface tension, cohesion & adhesion, viscosity & its measurement- rotating viscometer, capillarity, bulk modulus of elasticity, compressibility, vapor pressure and cavitations.	2
2.	**Fluid static:** • Pressure & its measurement, hydrostatic law, hydrostatic forces on submerged surfaces vertical, horizontal, inclined & curved surface, Variation of forces with depth, buoyancy and floatation, • Centre of pressure on a rectangular vertical plane surface or triangular plane surface, both with one edge parallel to the surface of the liquid, metacentric height, stability of immersed and floating body.	7
3.	**Fluid Kinematics:** • Types of fluid flow, velocity & acceleration of fluid flow, rate of flow & continuity equation, vortex flows. Full bore flow of liquid through pipes under constant head. • Flow through orifice. Flow through pipes, Flow through parallel concentric pipes, Flow through parallel plates, Coefficient of velocity, contraction of area and discharge. • Effects on (a) Sounding pipe (b) Air release pipes (c) Stand pipes when containing liquids	8
4.	**Fluid Dynamics:** • Prandtl No. Nussle No., Reynolds No., Stanton No., Grashof No, Graetz No, Natural and Forced Convection. Control volume & Control surface, Euler's equation, • Bernoulli's equation and its applications. Flow rate measurement-Venturimeter, Orificemeter&Pitot tube. - Compressible flow: - velocity of sound, mach no & mach cone.	8
5.	**Fluid Machines:** • Impulse momentum principal force exerted by a jet on flat plate, hinged flat plate, moving flat plate, curved and pipe bend. Surge Pressure and control • Blade diagram for centrifugal pump	4

6.	**Hydraulic Turbines:** • Impulse reaction turbine, pelton wheel, Francis, propeller& Kaplan turbine, effective head, available power & efficiencies for above turbines, draft tube, specific speed of turbine, cavitation, performance characteristics of turbines	7
	TOTAL	**36**

Practical content

- Buoyancy Experiment - Metacentric Height
- Measurement of flow using Pitot tube, flow meter, flow nozzle Bernoulli's equation-Venturimeter.
- To verify the Bernoulli's theorem with help of given apparatus.
- To determine coefficient of discharge of venturimeter and orificemeter.
- To determine friction losses through pipes.
- To determine coefficient of discharge of through notches and weirs.
- To study the performance characteristics of a constant speed centrifugal pump, specific speed. Performance characteristics of multistage pump.
- To study about the Positive discharge pumps
- To find the Characteristics of Impulse and Reaction Turbine Specific speed and unit quantities.
- Demonstrate of Hydraulic and Pneumatic system.
- Perform testing of pelton Wheel

Text Books

1	Fluid Mechanics & Machine	-by R.K. Bansal

Reference Books

1	Fluid Mechanics by	-YunusCengel.
2	Fluid Mechanics & Machine	-by K.R. Arora
3	Fluid Mechanics & Hydraulic Machines	- R.K. Rajputh