

**GOPAL KRISHNA COLLEGE OF
ENGINEERING AND TECHNOLOGY
GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764 005**

LESSON PLAN

Name of the Subject: FLUID MECHANICS AND HYDRAULIC MACHINES

Name of the Faculty: Er. ASHUTOSH BADATYA

Subject Code:MEPC2003

Course Structure:3-0-0

Semester: 4th Semester

Branch:Mechanical

Semester From: JANUARY to APRIL

No. of Weeks: 16

Week	Day	Theory / Practical Topics	Classes
		Unit 1 – Properties of Fluids and Fluid Statics	12
1	1	Introduction to fluid mechanics and its scope	1
	2	Properties of fluids: density, specific gravity, viscosity	1
	3	Surface tension, capillarity, compressibility	1
2	4	Fluid classification	1
	5	Pressure and Pascal's law	1
	6	Pressure variation in fluids	1
3	7	Atmospheric, gauge and absolute pressure	1
	8	Manometers	1
	9	Hydrostatic forces on submerged surfaces	1
4	10	Forces on horizontal and vertical planes	1

Week	Day	Theory / Practical Topics	Classes
	11	Buoyancy and Archimedes' principle	1
	12	Stability of floating bodies and metacentric height	1
		Unit 2 – Fluid Kinematics and Dynamics	12
5	13	Fluid kinematics: introduction	1
	14	Types of fluid flow and Reynolds number	1
	15	Continuity equation	1
6	16	Acceleration and flow rate	1
	17	Rotational and irrotational flow	1
	18	Stream function and flow net	1
7	19	Fluid dynamics: introduction	1
	20	Euler's equation	1
	21	Bernoulli's equation	1
8	22	Applications: venturimeter and orificemeter	1
	23	Pitot tube and siphon	1
	24	Flow through pipes	1
		Unit 3 – Flow Through Pipes and Impact of Jets	9
9	25	Hydraulic gradient line (HGL) and total energy line (TEL)	1
	26	Flow in pipes in series and parallel	1

Week	Day	Theory / Practical Topics	Classes
	27	Power transmission through pipes	1
10	28	Impact of jets on flat plates	1
	29	Impact on inclined and curved plates	1
	30	Moving vanes	1
11	31	Numerical/problem-solving (Module-III)	1
	32	Revision session	1
	33	Tutorial/problem-solving	1
		Unit 4 – Hydraulic Turbines	9
12	34	Hydraulic turbines: classification	1
	35	Impulse and reaction turbines	1
	36	Efficiency and performance curves	1
13	37	Francis turbine: working and velocity triangles	1
	38	Kaplan turbine	1
	39	Cavitation and draft tube	1
		Unit 5 – Hydraulic Pumps	9
14	40	Centrifugal pumps: construction and working	1
	41	Velocity triangles and efficiencies	1
	42	Multistage pumps	1

Week	Day	Theory / Practical Topics	Classes
15	43	Pump characteristics	1
	44	NPSH and cavitation	1
	45	Reciprocating pumps: working principle	1
16	46	Discharge, slip and indicator diagram	1
	47	Power requirements	1
	48	Revision, problem-solving, doubt clearing and exam preparation	1

Books Recommended

1. *Fluid Mechanics and Hydraulic Machines* by R.K. Rajput
2. *Fluid Mechanics* by Frank M. White
3. *Fluid Mechanics and Hydraulic Machines* by R.K. Bansal
4. *Hydraulics and Fluid Mechanics* by P.N. Modi and S.M. Seth

NPTEL Lectures

1. <https://nptel.ac.in/courses/112105183>
2. <https://nptel.ac.in/courses/112104118>