Bangladesh Sweden Polytechnic Institute Kaptai, Rangamati Hill Tracts Automobile Technology 6th Semester Semester Plan (2016 Probidan) T P C Fluid Mechanics and Machinery (67165) 3 3 4

Theory Class

Teacher's Name: - Engr. Rahamat Ullah, Chief Instructor (Power)

No. of Week	No. of Class	Theory Class Content	Remarks
01	01	1.1 Define fluid mechanics and fluid machinery.	
		1.2 Outline the importance of fluid mechanics and machinery	
		1.3 Mention the branches of fluid mechanics.	
		1.4 Identify different application of fluid mechanics and fluid	
		machinery in engineering field.	
	02	2.1 Define fluid.	
		2.2 Mention the classification of fluids.	
		2.3 Compare the liquid, vapor and gas.	
		2.4 Describe various properties of fluids.	
	0.0	2.5 Solve problems on properties of fluids.	
	03	3.1 Define pressure and intensity of pressure.	
		3.2 State the formula for finding pressure and pressure head of fluids.	
02	01	3.3 Mention the significance of fluid pressure	
02	01	3.4 State Pascal's law of fluid pressure.	
		5.5 Define autospheric pressure, gage pressure and absolute	
		3.6 Mention the relation among atmospheric pressure gage pressure	
		and absolute pressure	
	02	3.7 Express the derivation of the formulae for finding total pressure	
		on immersed surface at horizontal, inclined and vertical position.	
		3.8 Calculate the total pressure on the bottom and walls of a tank	
		filled with liquid.	
		3.9 Solve problems on the static fluid pressure.	
	03	4.1 State the meaning of pressure gage.	
		4.2 Mention the classification of pressure gages.	
		4.3 Define manometer.	
		4.4 Distinguish between simple manometer and differential	
		manometer.	
		4.5 Mention the working principle of different types of pressure	
0.2	01	gages.	
03	01	4.6 Mention the specific application of different pressure gages.	
		4.7 Solve problems relating to the measurement of fluid pressure by	
	02	5.1 Identify different types of flow of fluid in pipe	
	02	5.2 Mention different types of flow lines	
		5.3 Express the mathematical deduction of stream function	
		5.4 State the equation of continuity of flow.	
	03	5.5 State what is meant by flow rate or discharge.	
		5.6 Compute the formula of flow through pipes.	
		1 st Quiz Test	
04	01	5.7 Describe the operation of Rota meter to measure flow rate of	
		liquid.	
		5.8 State the equation of continuity of flow.	
		5.9 Solve problems on flow of fluid through pipes.	-
	02	6.1 Define head, pressure head, velocity head, datum head and total	
		head.	
		6.2 Identify the form of energy existence of liquid in motion.	
		6.3 Mention the total energy of a liquid in motion.	
	02	0.4 State the Bernoulli's equation for flowing liquid.	
	03	0.5 Express the proof of Bernoulli's equation.	
		6.7 Solve problems on Pernovili's equation.	
05	01	7.1 Mention the functions of venturimeter orifice mater and nitet tube	
05	01	7.2 Describe the construction of venturimeter, orifice meter and pitot tube.	
		7.3 Describe the operations of venturimeter, orificemeter and pitot tube.	

	02	7.4 Express the derivation of formula to measure the quantity of	
		liquid flowing through venturemeter.	
		7.5 Express the derivation of formula to measure the quantity of	
		liquid flowing through orifice meter.	
		7.6 Compare venturimeter and orificemeter.	
		7.7 Express the derivation of formula to measure the velocity of	
		flowing liquid through the pitot tube.	
	03	7.8 Solve the problems on venturimeter, orifice meter and pitot tube.	
0.6	01	1 st Class Test	
06	01	8.1 Define orifice.	
		8.2 Mention the classification of orifices.	
		8.5 State what is meant by hydraulic coefficient.	
		(C_{c}) coefficient of velocity (C_{v}) coefficient of discharge (C_{d}) and	
		coefficient of resistance	
	02	8 5 Relate the Co. Cy and Cd	
	02	8.6 Calculate the coefficient of velocity from laboratory data	
		8.7 Express the deduction of formulae for finding the discharge of	
		liquid through various orifices	
		8.8 Express the deduction of formulae to calculate the time of	
		emptying rectangular and hemispherical tanks.	
	03	8.9 Solve problems relating orifices.	
07	01	9.1 State what is meant by mouthpiece.	
		9.2 Mention the classification of mouthpieces.	
		9.3 Express the deduction of formulae to calculate discharge through	
		different types of mouthpieces.	
		9.4 State what is meant by head loss of flowing liquid.	
		9.5 List the causes of head loss of flowing liquid.	
		9.6 Express the deduction of formulae to calculate loss of head due to	
		sudden enlargement, sudden contraction and obstruction in pipe.	
		9.7 State what is meant by friction loss of flowing liquid.	
		9.8 Express the deduction of formulae to calculate loss of head due to	
	02	triction (Darcy's and Cheay's formulae).	
	02	9.9 Solve problems relating head losses and discharge through	
	02	10.1 Define viscosity	
	05	10.1 Define viscosity.	
		10.3 Define ideal fluid real fluid Newtonian fluid and non-	
		Newtonian fluids	
		2 nd Ouiz Test	
08	01	10.4 Distinguish between the laminar flow and turbulent flow.	
		10.5 State what is meant by Reynolds number.	
		10.6 Describe Reynolds experiment of viscous flow.	
		10.7 Solve problems relating viscous flow.	
	02	11.1 State what is meant by impact of jet.	
		11.2 Express the deduction of formulae to calculate the force of a jet	
		impinging on a fixed vertical flat plate and an inclined flat plate.	
		11.3 Express the deduction of formula to calculate the force of a jet	
		impinging on a fixed curve vane.	
		11.4 Express the deduction of formula to calculate the force of a jet	
	02	impinging on the moving curve vane.	
	03	11.5 Solve problems on impact of jets.	
00	01	12.1 State the meaning of water turbing	
09	01	12.1 State the meaning of water turbine.	
		12.2 Mention the elassification of water turbine.	
	02	12.4 Compare the impulse and reaction turbines	
	02	12.5 Describe the components of impulse and reaction turbines	
		12.6 Describe the construction of Pelton. Kaplan and Francis water	
		turbine.	
	03	12.7 Describe the operation of Pelton, Kaplan and Francis water	
		turbine.	
		12.8 State what is meant by specific speed of turbine.	
		12.9 Describe the governing system of impulse and reaction turbines.	
10	01	13.1 Define pumps.	
		13.2 Mention the classification of pumps.	
		13.3 States what is meant by positive displacement and Rotodynamic	

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		pumps 13.4 Describe the construction and operation of different types of positive displacement and Rotodynamic pumps	
	02	13.5 Compare centrifugal and reciprocating pumps	
	02	13.6 Mention the function of air vessel in single acting reciprocating	
		nump	
		13.7 Express the deduction of formulae to calculate the discharge.	
		Manometric head. specific speed. Net Positive Suction Head	
		(NPSH), efficiency, and power required to drive the centrifugal	
		pump.	
	03	13.8 Express the deduction of formulae to calculate the discharge, C_d ,	
		Slip and power required to drive the centrifugal pump.	
		13.9 Mention specific application of different types of pumps.	
11	01	13.10 Solve problems relating to centrifugal .	
		13.11 Solve problems relating to reciprocating pumps.	
	02	Test on Pump and Water Turbine	
		2 nd Class Test	
	03	14.1 State what is meant by hydraulic devices.	
		14.2 Mention the function of hydraulic devices viz. hydraulic press,	
		hydraulic accumulator, hydraulic intensifier, hydraulic crane,	
		hydraulic lift, fluid coupling, etc.	
		14.3 Describe the constructions of various hydraulic devices.	
		14.4 Describe the operation of different types of hydraulic devices.	
12	01	14.5 Solve problems on hydraulic devices.	
	02	15.1 State what is meant by air compressor.	
		15.2 Mention the classification of air compressor.	
		15.3 Describe working principle of single stage reciprocating air	
	02	compressor.	
	03	15.4 Mention the advantages of multistage air compressor.	
		15.5 Mention the function of inter cooler and after cooler of a	
12	01	In in the second	
15	01	16.1 State what is meant by rotary air compressor.	
		16.2 Montion types of rotory air compressors	
	02	16.4 Describe the operation of different types of rotary air	
	02	compressor	
		16.5 Distinguish between centrifugal and axial flow air compressor	
		16.6 State what is meant by efficiency of air compressor	
	03	16.7 Solve problem related to efficiency of air compressor	
14		Final Describe the Fluid Mechanics and Machineries on the week	
1		and Review questions.	
		una no non questions.	1

REFERENCE BOOKS

- 1. A text book of fluid mechanics and Hydraulic Machinery - R.K RAJPUT
- 2. Fluid mechanics and Machinery - K. AGRAWAL
- 3. A Text Book of Hydraulics, Fluid Mechanics and Hydraulic Machines - R. S. Khurmi
- 4. Fluid Mechanics Hydraulics and Hydraulic Machines - K. R. Arora
- 5. Hydraulics, Fluid Mechanics, and Fluid Machines - S. Ramamrutham
- Fluid Mechanics including Hydraulics Machines

 K. Subramanya

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Practical Class

Teacher's Name: - Engr. Rahamat Ullah, Chief Instructor (Power) No. of Week Practical Class Contents Ren

No. of Week	Practical Class Contents	Remarks
01	01. Calibrate a bourdon tube pressure gage with a dead weight gage.	
02	02. Verify Bernoulli's equation by Bernoulli's apparatus equipped with hydraulic test bench.	
03	03. Determine Cc, C_v , and C_d by orifice apparatus equipped with hydraulic test bench.	
04	04. Determine the discharge of water through a pipe by the venturimeter or orifice meter equipped with hydraulic test bench.	
05	05. Determine the loss of head due to sudden enlargement of pipe by the manometer.	
06	06. Determine the loss of head due to friction by fluid friction apparatus.	
07	07. Determine the loss of fluid energy loss through various fittings (elbows, bends and valves).	
08	08. Test the performance of a reciprocating pump with the reciprocating pump test rig.	
09	09. Test the performance of a centrifugal pump with the centrifugal pump test rig.	
10	10. Test the performance of an impulse turbine with the impulse (Pelton wheel) turbine test rig.	
11	12. Determine the leverage and mechanical advantage of a hydraulic press.	
12	13. Identify the components of hydraulic crane and operate a hydraulic crane.	
13	14. Identify the different components of a two stage reciprocating air compressor and operate the compressor.	
14	Final Test of the Subject problems	