

GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Department of civil Engineering

Academic Year: **2016-17**

Semester: **EVEN**

COURSE PLAN

Semester: **IV**

Subject Code& Name: **15CV43 & APPLIED HYDRAULICS**

Name of Subject Teacher: **SHREYAS H C**

Name of Subject Expert (Reviewer): **KALYANI**

For the Period: From: **1-02-17 to 19-05-17**

Details of Book to be referred:

Text Books	<p>T1: P N Modi and S M Seth, “Hydraulics and Fluid Mechanics, including Hydraulic Machines”, 20th edition, 2015, Standard Book House, New Delhi.</p> <p>T2: R.K. Bansal, “A Text book of Fluid Mechanics and Hydraulic Machines”, Laxmi Publications, New Delhi</p> <p>T3: S K SOM and G Biswas, “Introduction to Fluid Mechanics and Fluid Machines”, Tata McGraw Hill, New Delhi.</p>
Reference Books	<p>R1: K Subramanya, “Fluid Mechanics and Hydraulic Machines”, Tata McGraw Hill Publishing Co. Ltd.</p> <p>R2: J.B. Evett, and C. Liu, “<i>Fluid Mechanics and Hydraulics</i>”, McGraw-Hill Book Company.</p>

Lecture NO	Topic Planned	Practical Applications & Brief objectives	Book referred with Pg No.	Planned Date	Executed Date	Deviation Reasons thereof	How Made Good / Reciprocate arrangement	Remarks by HOD
1.	Introduction to the subject	<p>Objective: To study the basics on Dimensions and Model analysis</p> <p>Application: Used in experiments conducting on models of Hydraulic machines.</p> <p>OUTCOME: Students will be able to know the concept of Dimension and model analysis</p>		7/2/17				
2.	MODULE-1 Dimensional analysis Dimensional homogeneity, Non Dimensional parameter		T1: 559-561	9/2/17				
3.	Rayleigh methods and Buckingham π theorem		T1: 561-567	9/2/17				
4.	Problems		T1: 562	14/2/17				
5.	Problems		T1: 567-578	16/2/17				
6.	dimensional analysis, choice of variable		T1: 578	16/2/17				
7.	Problems		T1: 578	21/2/17				
8.	Model analysis Model analysis, similitude		T1: 579-581	22/2/17				
9.	types of similarities, force ratios, similarity laws		T1: 581-583	23/2/17				
10.	model classification, Reynolds model, Froude's model, Euler's Model, Webber's model, Mach model		T1: 584	23/2/17				
11.	Problems		T1: 584-589	1/3/17				
12.	scale effects, Distorted model		T1: 590	2/3/17				
13.	Problem		T1: 592	2/3/17				
14.	Buoyancy and Flotation Buoyancy, Force and Centre		T1: 611	3/3/17				

	of Buoyancy, Metacentre and Metacentric height							
15.	Stability of submerged and floating bodies, Determination of Metacentric height		T1: 613	4/3/17				
16.	Experimental and theoretical method		T1: 618	7/3/17				
17.	Problems		T1: 620	8/3/17				
18.	MODULE 2 Open Channel Flow Hydraulics Introduction, Classification of flow through channels	<p>Objective: To study the various geometrical aspects of a Open channel flow. To study various energies occurs and flow analysis.</p> <p>Application: Water supply projects</p> <p>OUTCOME: Students will be able to calculate required dimensions for channels based on the purposes.</p>	T1: 737	14/3/17				
19.	Chezy's and Manning's equation for flow through open channel		T1: 740	15/3/17				
20.	Problems		T1: 742	16/3/17				
21.	Most economical channel sections		T1: 746	16/3/17				
22.	Most economical channel sections		T1: 746	17/3/17				
23.	Problems		T1: 755	21/3/17				
24.	Problems		T1: 759	22/3/17				
25.	Uniform flow through Open channels		T1: 761	23/3/17				
26.	Specific Energy and Specific energy curve		T1: 763	23/3/17				
27.	Critical flow and		T1: 767	28/3/17				

	corresponding critical parameters							
28.	Metering flumes, Numerical Problems		T1: 769	30/3/17				
29.	Problem		T1: 774	30/3/17				
30.	Module 3: Non-Uniform Flow Hydraulic Jump	<p>Objective: Study of various tunneling methods Study of tunnel ventilation</p> <p>Application: Transferring centre line and gradient from surface, Weisbach triangle</p> <p>OUTCOME: Able to understand Surveying- Transferring centre line and gradient from surface to inside the tunnel working face, Weisbach triangle</p>	T1: 777	31/3/17				
31.	Expressions for conjugate depths and Energy loss		T1: 780	1/4/17				
32.	Problems		T1: 782	4/4/17				
33.	Gradually varied flow, Equation		T1: 785	5/4/17				
34.	Problems		T1: 787	6/4/17				
35.	Back water curve and afflux, Description of water curves or profiles		T1: 793	6/4/17				
36.	Mild, steep, critical profiles		T1: 794	7/4/17				
37.	horizontal and adverse slope profiles		T1: 795	11/4/17				

38.	Problems	<p>Objective: Study of various Hydraulic machines, impacts of jets on various vanes, types working principles of various machines and their applications.</p> <p>Application: Hydroelectric power plants, Irrigations and all other water resources projects.</p> <p>OUTCOME: Able to understand various components ,working principles of various hydraulic machines.</p>	T1: 797	12/4/17				
39.	Problems		T1: 799	13/4/17				
40.	Control sections		T1: 800	13/4/17				
41.	Module 4 Hydraulic Machines Introduction, Impulse-Momentum equation		T1: 803	20/4/17				
42.	Direct impact of a jet on a stationary		T1: 804	20/4/17				
43.	Direct impact of a jet on a stationary		T1: 805	21/4/17				
44.	Problems		T1: 807	25/4/17				
45.	moving curved vanes		T1: 810	26/4/17				
46.	Problems		T1: 812	27/4/17				
47.	Problems		T1: 814	27/4/17				
48.	Introduction to concept of velocity triangles		T1: 817	28/4/17				
49.	impact of jet on a series of curved vanes		T1: 820	2/5/17				
50.	Problems		T1: 822	3/5/17				
51.	Introduction to turbines, General lay out of a hydro-electric plant	T1: 824	4/5/17					
52.	Heads and Efficiencies, classification of turbines	T1: 827	4/5/17					
53.	Pelton wheel-components, working principle and velocity triangles	T1: 834	5/5/17					

54.	Problems	<p>Objective: Study on various turbines and pumps along with their working functions and applications.</p> <p>Application: Lift irrigations and hydroelectric power plants</p> <p>OUTCOME: Able to understand Applications and working principles of pumps and turbines.</p>	T1: 838	6/5/17				
55.	Maximum power, efficiency, working proportions		T1: 842	9/5/17				
56.	Module 5 Reaction Turbines and Pumps Francis turbine- Descriptions,		T1: 853	10/5/17				
57.	working proportions and design		T1: 867	11/5/17				
58.	Problems		T1:868	11/5/17				
59.	Kaplan turbine- Descriptions, working proportions and design		T1: 870	12/5/17				
60.	Problems		T1: 873	18/5/17				
61.	Draft tube theory and unit quantities		T1: 875	18/5/17				
62.	Centrifugal pumps: Components and Working of centrifugal pumps		T1: 878	19/5/17				
63.	Types of centrifugal pumps, Work done by the impeller		T1: 881	20/5/17				
64.	Heads and Efficiencies, Minimum starting speed of centrifugal pump	T1: 883	23/5/17					
65.	Problems	T1:885	24/5/17					

66.	Multi-stage pumps		T1: 559	25/5/17				
67.	Revision			25/5/17				
68.	Revision			26/5/17				

Prepared By: _____
 (Faculty)
 Date & Sign _____

Reviewed by: _____
 (Sub. expert)
 Date & Sign _____

Approved by: _____
 (HOD)
 Date & Sign _____

Approved by: _____
 (Principal/ Acad. Co)
 Date & Sign _____