

19CE4601D -HYDROPOWER ENGINEERING

Course Category:	Program Elective	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	2-1-0
Prerequisites:	19CE3302 - Fluid mechanics 19CE3301 - Engineering mechanics 19CE4501D - Hydraulic machines 19BS1204 - Applied physics	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	Differentiate various power plants	K4
CO2	Calculate the efficiency of hydro power plants	K3
CO3	Understand the requirements and components of power plants	K2
CO4	Understand the problems involved in the water supply to the plants	K2
CO5	Know the advantages and components of the power house	K2

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3			2							1	2	2
CO2	1	2			2							2	1	2
CO3	2	2			1							1	2	2
CO4	2	2			2							2	1	2
CO5	2	2			2							2	1	2

1- Low

2-Medium

3-High

Course Content

UNIT-1	PUMPED STORAGE POWER PLANT: Classification of Hydropower Plants – Advantages of Pumped storage plants – Reversible Pump turbines – Power duration curves – Problems of operation – Numerical Problems.	CO1
UNIT-2	ELECTRICAL LOAD ON HYDRAULIC TURBINES: Load curve – Load factor – Power factor – Capacity factor– Utilization factor - Load duration curve – Firm power and Secondary power – Numerical Problems.	CO2
UNIT-3	PENSTOCKS AND ACCESSORIES: Classification of Penstocks – Design criteria for Penstocks – Economical Diameter of Penstocks – Anchor Blocks – Conduit Valves.	CO3
UNIT-4	WATER HAMMER AND SURGE: Water Hammer – Resonance in Penstocks – Channel Surges – Surge Tanks.	CO4
UNIT-5	PLANNING OF POWER HOUSES: Power house Structure – Types of Underground Power Stations – Advantages and Components of Underground Power house – Types of Layouts.	CO5

Learning Resources

Text Books	1. M.M.Dandekar and K.N.Sharma, Water Power Engineering, Vikas Publications, New Delhi. 2. P.N. Modi and S.M. Seth, Hydraulics and Fluid Mechanics and Hydraulic Machines, Standard Book House, Delhi
Reference Books	1. A.K. Jain, Fluid Mechanics, 12/e, Khanna publishers, Delhi 2. Rajput .R.K, “Fluid Mechanics and Hydraulic Machines”, S.Chand and Company Ltd 3. M. Franck White, Fluid Mechanics, Tata McGraw Hill, 2017. 4. K. Subramanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2001.

**e-Resources &
other digital
material**

1. <http://www.digimat.in/nptel/courses/video/108105058/L10.html>
https://nptel.ac.in/content/storage2/courses/108108078/pdf/chap5/teach_slides05.pdf