चौधरी रणबीर सिंह राजकीय अभियांत्रिकी एवं तकनीकी संस्थान, झज्जर
Ch. Ranbir Singh State Institute of Engineering and Technology
Silani Kesho, Jhajjar, Haryana 124103

Department of Civil Engineering

II Yr. IV Semester (2024-25) (Civil Engineering)

LESSON PLAN

Program	:	**B.Tech**
Year & Sem.	:	**II & IV**
Course No/code	:	**PCC-CE-202-G**
Course Title	:	**Hydraulic Engineering**
Max Marks	:	**75**
No. of Total Lecture	:	**44 Lecture/ 11week Plan**
Schedule	:	**04 Lecture per week** (As per Guidelines of Head of Deptt.)
Name of Faculty	:	**Er.Varsha Rani**

Recommended Books:

1. Hydraulics and Fluid Mechanics, P.M. Modi and S.M. Seth,
2. Theory and Applications of Fluid Mechanics, K.Subramanya, Tata McGraw Hill.
3. Open channel Flow, K. Subramanya, Tata McGraw Hill.
4. Open Channel Hydraulics, Ven Te Chow, Tata McGraw Hill.
5. Burnside, C.D., "Electromagnetic Distance 6.Measurement," Beekman Publishers, 1971
6. Fluid Mechanic and Hydraulic machines R.K. BANSAL

Lesson Plan:

LESSON PLAN (As per Guidelines of Head of Deptt.)		
Deptt.: Civil Engg. (2022-23)		**Name of Faculty: Er.Varsha Rani**
Semester : 4th (2022-23)		**Subject: Hydraulic Engineering (PCC-CE-202-G)**
Total Duration:11week		**Workload of subject: 04 Lecture per week** (As per Guidelines of Head of Deptt.)
Week	**Lecture Day**	**Name of Topic**
1st	1st	Introduction to Subject, **Laminar Flow**
	2nd	Laminar flow through: circular pipes
	3rd	annulus and parallel plates. Stoke's law,

	4th	Measurement of viscosity
2nd	5th	Numerical and Revision
	6th	Problems of Module- I
	7th	**Turbulent Flow** Reynolds experiment, Transition from laminar to turbulent flow,
	8th	Definition of turbulence, scale and intensity, Causes of turbulence,
3rd	9th	instability, mechanism of turbulence and effect of turbulent flow in pipes. Reynolds stresses, semi-empirical theories of turbulence,,
	10th	Prandtl's mixing length theory, universal velocity distribution equation. Resistance to flow of fluid in smooth and rough pipes .
	11th	Numerical and Revision
	12th	Problems of Module- II/ UNIT-I/Section-A,
4th	13th	**Flow through Pipes** Loss of head through pipes,
	14th	Darcy-Wiesbatch equation, minor losses, total energy equation,
	15th	Numerical,
	16th	hydraulic gradient line, Pipes in series, equivalent pipes, pipes in parallel,
5th	17th	Numerical
	18th	siphon, power transmission through pipes,
	19th	Analysis of pipe networks: water hammer in pipes and control measures, branching of pipes.
	20th	Problems of Module- III/UNIT-II/Section-B
6th	21st	**Open Channel Flow: Uniform flow** Definition, Comparison between open channel flow and pipe flow,
	22nd	geometrical parameters of a channel, classification of open channel flow.
	23rd	Uniform Flow- Continuity Equation
	24th	Energy Equation and Momentum Equation,
7th	25th	Characteristics of uniform flow, Chezy's formula, Manning's formula
	26th	Numerical
	27th	Factors affecting Manning's Roughness Coefficient 'n',.
	28th	,Most economical section of channel, Computation of Uniform flow, Normal depth
8th	29th	Numerical and Revision
	30th	Problems of Module- IV/UNIT-III/Section-C
	31st	**Open Channel Flow: Non-Uniform Flow** Specific energy, Specific energy curve, critical flow, discharge curve,
	32nd	Specific force, Specific depth, and Critical depth. Channel Transitions, Gradually Varied Flow- Dynamic Equation of Gradually Varied Flow,

9th	33rd	Classification of channel bottom slopes, Classification of surface profile
	34th	Problems of Module- V
	35th	**Hydraulic Jump** Theory of hydraulic jump, Elements and characteristics of hydraulic jump in a rectangular Channel, length and height of jump, location of jump,
	36th	Types, applications and location of hydraulic jump.
10th	37th	Energy dissipation and other uses, surge as a moving hydraulic jump,
	38th	Problems of Module- VI
	39th	Surges, Positive and negative surges,
	40th	Dynamics of Fluid Flow- Momentum principle,
11th	41st	applications: Force on plates, pipe bends, moments of momentum equation,
	42nd	Revision and Doubts
	43rd	Revision and Doubts
	44th	Problems of Module- VII/UNIT-IV/Section-D