Program : **Diploma in Civil Engineering**	
Course Code : **4017**	Course Title: **Hydraulics and Irrigation Engineering Lab**
Semester : **4**	Credits: **1.5**
Course Category: **Program Core**	
Periods per week: **3 (L:0, T:0, P:3)**	Periods per semester: **45**

Course Objectives:

- To develop understanding of the fundamental principles of fluid mechanics through experimentation
- To familiarize the students with irrigation structures

Course Prerequisites:

Topic	Course code	Course name	Semester
Elementary Mathematics		Engineering Mathematics	1
Basics of Engineering Mechanics		Engineering Mechanics	2

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive level
CO1	Verify Bernoulli's Theorem	3	Applying
CO2	Determine coefficients for venturimeter, orifice and notch.	12	Applying
CO3	Sketch irrigation structures and culverts	14	Applying
CO4	Familiarize with local irrigation structures and practices	12	Applying
	Lab Test	4	

CO-PO Mapping:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3			3			
CO2	3			3			
CO3	3						
CO4							3

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline:

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Verify Bernoulli's Theorem**		
M1.01	Use Bernoulli's apparatus to apply Bernoulli's theorem to get total energy line for a flow in a closed conduit of varying cross sections	3	Applying
CO2	**Determine coefficients for venturimeter, orifice and notch**		
M2.01	Calibrate Venturimeter to find out the discharge in a pipe.	3	Applying
M2.02	Calibrate the Orifice to find out the discharge through a tank	3	Applying
M2.03	Use triangular notch to measure the discharge through open channel.	3	Applying
M2.04	Use Rectangular notch to measure the discharge through open channel	3	Applying
	Lab Test I	2	
CO3	**Sketch irrigation structures and culvert**		
M3.01	Sketch the cross section of earth dam and masonry showing component parts	1	Applying
M3.02	Sketch the views of a canal drop showing component parts	1	Applying
M3.03	Sketch the views of aqueduct showing component parts	2	Applying
M3.04	Sketch the views of surplus escape, showing all components	2	Applying

M3.05	Sketch the views of a weir showing component parts	2	Applying
M3.06	Sketch the views of a Tank sluice with tower head	2	Applying
M3.07	Sketch the given canal section and estimate the quantity of material required for lining.	2	Applying
M3.08	Draw a labeled sketch of the given culvert (without splayed wing wall)	2	Applying
CO4	**Familiarize with local irrigation structures and practices**		
M4.01	Open ended Project	12	Applying
	Lab Test II	2	

Text / Reference:

T/R	Book Title/Author
T1	Dr. R.K.Bansal : Fluid Mechanics & Hydraulic Machine ; Laxmi Publishers
R2	R.S.Khurmi : Hydraulics, Fluid Mechanics & Hydraulic Machines; S. Chand & Co.
R3	Modi &Sethi : Hydraulics & Hydraulic Machines ; Standard Publishers
R4	R.K.Rajput : Hydraulics ; S.Chand& Co.
R5	Jagdish lal : Hydraulics ; Dhanpat Rai & Sons
R6	C. Punmia : Irrigation Engineering ; Laxmi Publishing Co:
R7	Modi &Sethi : Irrigation Engineering ; Standard Publishing House
R8	S.K.Garg : Irrigation Engineering ; Khanna Publishers.
R9	B S Birdie : Irrigation Engineering & Water Power Engg ; Standard Publishing House
R10	N.N. Basak : Irrigation Engineering ; McGraw Hill Publishing

Online resources:

Sl.No	Website Link
1	https://nptel.ac.in/
2	http://egyankosh.ac.in/ https://www.coursera.org › learn › construction-cost-estimating
3	https://swayam.gov.in/