

LESSON PLAN (SUMMER-2026)

VENUS GROUP OF EDUCATIONAL & RESEARCH INSTITUTE,BAHANAGA,BALASORE-756042

Discipline: Civil Engg.	Semester: 4th	Name of the Teaching Faculty: Er.Mousumi Pandia
Subject: Hydraulics & Irrigation Engg.	No. of days per week class allotted: 5 nos	Semester From date :22/12/2025 To 18/04/2026
Week No.	Class Day	Theory/Practical Topic
1st	1st	Technical terms used in Hydraulics –fluid, fluid mechanics, hydraulics. hydrostatics and hydrodynamics - ideal and real fluid, application of
	2nd	Physical properties of fluid – density-specific volume, specific gravity, surface tension, capillarity, viscosity-Newton’s law of viscosity.
	3rd	Various types of pressure – Atmospheric Pressure, Gauge Pressure, Absolute Pressure, Vacuum Pressure. Concept of Pressure head and its unit, Pascal’s law of fluid pressure and its uses.
	4th	Measurement of differential Pressure by different methods.
	5th	Variation of pressure with depth, Pressure diagram, hydrostatic pressure and center of pressure on immersed surfaces and on tank walls.
2nd	1st	Determination of total pressure and center of pressure on sides and bottom of water tanks, sides and bottom of tanks containing two liquids, vertical surface in contact with liquid on either side.
	2nd	Types of flow – Gravity and pressure flow, Laminar, Turbulent, Uniform, Non-uniform, Steady, Unsteady flow. Reynolds number.
	3rd	Discharge and its unit, continuity equation of flow.
	4th	Energy of flowing liquid: potential, kinetic and pressure energy.
	5th	Bernoulli’s theorem: statement, assumptions, equation.
3rd	1st	Major head loss in pipe: Frictional loss and its computation by Darcy’s Weisbach equation.
	2nd	Minor losses in pipe: loss at entrance, exit, sudden contraction, sudden enlargement and fittings.
	3rd	Flow through pipes in series, pipes in parallel and Dupuit’s equation for equivalent pipe.
	4th	Hydraulic gradient line and total energy line.
	5th	Discharge measuring device for pipe flow: Venturi meter - construction and working.
4th	1st	Discharge measurement-using Orifice.
	2nd	Geometrical properties of channel section: Wetted area, wetted perimeter,hydraulic radius for rectangular and trapezoidal channel section.
	3rd	Determination of discharge by Chzy’s equation and Manning’s equation.
	4th	Hydraulic Coefficients of Orifice.

4th	5th	Conditions for most economical rectangular and trapezoidal channel section.
5th	1st	Discharge measuring devices: Triangular and rectangular Notches.
	2nd	Velocity measurement devices: current meter, floats and Pitot's tube.
	3rd	Specific energy diagram.
	4th	Froude's Number.
	5th	Concept of pump, Types of pump- centrifugal, reciprocating, submersible.
6th	1st	Centrifugal pump: components and working.
	2nd	Reciprocating pump: single acting .
	3rd	Reciprocating pump: double acting.
	4th	Suction head, delivery head, static head, Manometric head.
	5th	Power of centrifugal pump. & Selection and choice of pump.
7th	1st	Hydrology: Definition and Hydrological cycle.
	2nd	Rain Gauge: Symons rain gauge, automatic rain gauge,
	3rd	Methods of calculating average rainfall: Arithmetic mean, Iso hyetal, and Thiessen polygon method.
	4th	Runoff, Factors affecting Run off, Computation of run-off.
	5th	Maximum Flood Discharge measurement: Rational and empirical methods, Simple numerical problems.
8th	1st	Yield and Dependable yield of a catchment, determination of dependable yield.
	2nd	Irrigation and its classification.
	3rd	Crop Water requirement: Cropping seasons, Crop period, base period, Duty, Delta, CCA, GCA, intensity of irrigation, factors affecting duty, Problems on water requirement and capacity of canal.
	4th	Methods of application of irrigation water and its assessment.
	5th	Area capacity curve.
9th	1st	Silting of reservoir, Rate of silting, factors affecting silting and control measures.
	2nd	Control levels in reservoir, Simple numerical problems on Fixing Control levels.
	3rd	Dams and its classification: Earthen dams and Gravity dams.
	4th	Earthen Dams – Components with function, typical cross section, seepage through embankment and foundation and its control.
	5th	Methods of construction of earthen dam, types of failure of earthen dam and preventive measures.
10th	1st	Gravity Dams – Forces acting on dam, Theoretical and practical profile, typical cross section.
	2nd	Drainage gallery, joints in gravity dam, concept of high dam and low dam.
	3rd	Drainage gallery, joints in gravity dam, concept of high dam and low dam.

10th	3rd	Spillways-Definition, function, location, types and components, Energy dissipaters.
	4th	Weirs – components, parts, types, K.T. weir – components and construction.
11th	1st	Diversion head works – Layout, components and their function.
	2nd	Barrages – components and their functions. Difference between weir and Barrage.
	3rd	Canals – Classification according to alignment and position in the canal network, Cross section of canal in embankment and cutting.
	4th	Partial embankment and cutting.
	5th	Material used and its properties.
12th	1st	Canal lining - Purpose.
	2nd	Balancing depth, advantages.
	3rd	Cross Drainage works- Aqueduct.
	4th	Super passage.
	5th	Siphon aqueduct.
13th	1st	Level crossing.
	2nd	Canal regulators.
	3rd	Falls and Outlets.
	4th	Cross regulator.
	5th	Head regulator Escape.