

GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF CIVIL ENGINEERING

LESSON PLAN

SESSION 2023-24

SUBJECT: TECHNOLOGY: HYDRAULICS & IRRIGATION	BRANCH: CIVIL ENGINEERING
NAME OF THE FACULTY: SOURAV KUMAR BEHERA & DOLESWARI CHHATRIA	SEMESTER: 4th

PART: A (HYDRAULICS)

SL NO.	CHAPTER	HOURS	LECTURE NO.	TOPIC TO BE COVERED
1	CHAPTER 01	12		HYDROSTATICS
			1	Properties of fluid: density, specific gravity,
			2	surface tension, capillarity, viscosity and their uses
			3	Pressure and its measurements: intensity of pressure
			4	atmospheric pressure
			5	gauge pressure
			6	absolute pressure and vacuum pressure
			7	relationship between atmospheric pressure
			8	absolute pressure and gauge pressure
			9	pressure head, pressure gauges
			10	Pressure exerted on an immersed surface
			11	Total pressure, resultant pressure,
			12	expression for total pressure exerted on horizontal & vertical surface
2	CHAPTER 02	18		KINEMATICS OF FLUID FLOW
			1	Basic equation of fluid flow and their application:
			2	Rate of discharge, equation of continuity of liquid flow
			3	Total energy of a liquid in motion- potential, kinetic & pressure.
			4	Bernoulli's theorem, limitations Practical applications of Bernoulli's equation
			5	Practical applications of Bernoulli's equation
			6	Flow over Notches and Weirs, Notches, Weirs, types of notches and weirs
			7	Flow over Notches and Weirs, Notches, Weirs, types of notches and weirs
			8	Discharge through different types of notches, weirs-their application

			9	Discharge through different types of notches, weirs-their application
			10	Types of flow through the pipes, uniform and non-uniform, laminar and turbulent
			11	Steady, unsteady, Reynold's number and its application
			12	Reynold's number and its application
			13	Losses of head of a liquid flowing through pipes,
			14	Different types of major and minor losses, Simple numerical problems on losses due to friction using Darcy's equation
			15	Simple numerical problems on losses due to friction using Darcy's equation
			16	Total energy lines & hydraulic gradient lines
			17	Flow through the Open Channels: Types of channel sections rectangular, trapezoidal and circular,
			18	discharge formulae- Chazy's and Manning's equation, best economical section
3	CHAPTER 03	05		PUMPS
			1	Type of pumps
			2	Centrifugal pump: basic principles, operation, discharge, horse power & efficiency
			3	Centrifugal pump: basic principles, operation, discharge, horse power & efficiency
			4	Reciprocating pumps: types, operation, discharge, horse power & efficiency
			5	Reciprocating pumps: types, operation, discharge, horse power & efficiency

PART-2 (IRRIGATION ENGINEERING)

1	CHAPTER 01	04		HYDOLOGY
			1	Hydrology Cycle, Rainfall: types, intensity, hyetograph
			2	Estimation of rainfall, rain gauges, Its types
			3	Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae
			4	Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae
2	CHAPTER 02	04		WATER REQUIRMENT OF CROPS
			1	Definition of irrigation, necessity, benefits of irrigation, types of irrigation
			2	Crop season
			3	Duty, Delta, base period their relationship, overlap allowance, kharif, rabi crops
			4	Gross command area, culturable command area, Intensity of Irrigation, irrigable area, time factor, crop ratio

3	CHAPTER 3	07		FLOW IRRIGATION
			1	Canal irrigation, types of canals, loss of water in canals
			2	Perennial irrigation
			3	Different components of irrigation canals and their functions
			4	Different components of irrigation canals and their functions
			5	Sketches of different canal cross-sections Classification of canals according to their alignment
			6	Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages
			7	Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages
4	CHAPTER 04	02		WATER LOGGING AND DRAINAGE
			1	Causes and effects of water logging, detection, prevention and remedies
			2	Causes and effects of water logging, detection, prevention and remedies
5	CHAPTER 05	08		DIVERSION HEAD WORKS AND REGULATORY STRUCTURES
			1	Necessity and objectives of diversion head works, weirs and barrages
			2	Necessity and objectives of diversion head works, weirs and barrages
			3	General layout, functions of different parts of barrage
			4	General layout, functions of different parts of barrage
			4	Silting and scouring
			6	Silting and scouring
			7	Functions of regulatory structures
			8	Functions of regulatory structures
6	CHAPTER 06	07		CROSS DRAINAGE WORKS
			1	Functions and necessity of Cross drainage works
			2	Functions and necessity of Cross drainage works, aqueduct
			3	Aqueduct, siphon, super passage
			4	siphon, super passage, level crossing
			5	siphon, super passage, level crossing
			6	Concept of each with help of neat sketch
			7	Concept of each with help of neat sketch

7	CHAPTER 07	08		DAMS
			1	Necessity of storage reservoirs, types of dams
			2	Necessity of storage reservoirs, types of dams
			3	Earthen dams, types, description
			4	causes of failure and protection measures
			5	Gravity dam- types, description
			6	Causes of failure and protection measures.
			7	Gravity dam- types, description
			8	Causes of failure and protection measures.

