

**SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH, BHUBANESWAR**

**SUBJECT: HYDRAULICS & IRRIGATION ENGINEERING**

**LESSON PLAN SESSION- 2024-25, SEMESTER - 4<sup>TH</sup>**

**DEPT:CIVILENGINEERING**

**NAME OF THE FACULTY: Smruti .Saswati DASH**

SL. NO.	WEEK	TOPICS PLANNED TO BE COVERED	TOTAL NO OF CLASSES	CUMULATIVE NO OF PERIODS
01	01	<b>HYDROSTATICS:</b> Properties of fluid: density, specific gravity, surface tension, capillarity, viscosity and their uses	1	1
		specific gravity, surface tension, capillarity, viscosity and their uses	1	2
		specific gravity, surface tension, capillarity, viscosity and their uses	1	3
		Pressure and its measurements: intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure.	1	4
		Pressure and its measurements: intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure.	1	5
02	02	Pressure and its measurements: intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure.	1	6
		relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges	1	7
		relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges	1	8
		relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges	1	9
		Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface.	1	10
03	03	Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface.	1	11
		Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface.	1	12
		<b>KINEMATICS OF FLUID FLOW:</b> Basic equation of fluid flow and their application: Rate of discharge, liquid in motion- potential,	1	13

	kinetic & pressure,	1	14
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		Basic equation of fluid flow and their application: Rate of discharge, liquid in motion- potential, kinetic & pressure,	1	15
		Basic equation of fluid flow and their application: Rate of discharge, liquid in motion- potential, kinetic & pressure,	1	16
04	04	Basic equation of fluid flow and their application: Rate of discharge, liquid in motion- potential, kinetic & pressure,	1	17
		Bernoulli's equation of continuity of liquid flow, total energy of a theorem and its limitations. Practical applications of Bernoulli's equation	1	18
		Bernoulli's equation of continuity of liquid flow, total energy of a theorem and its limitations. Practical applications of Bernoulli's equation	1	19
		Bernoulli's equation of continuity of liquid flow, total energy of a theorem and its limitations. Practical applications of Bernoulli's equation	1	20
		Flow over Notches and Weirs: Notches, Weirs, types of notches and weir	1	21
05	05	Discharge through different types of notches and weirs-their application (No Derivation)	1	22
		Discharge through different types of notches and weirs-their application (No Derivation)	1	23
		Types of flow through the pipes: uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application	1	24
06	06	<b>Losses of head of a liquid flowing through pipes:</b> Different types of major and minor losses.	1	25
		Simple numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only).	1	26
		Simple numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only).	1	27
		<b>Flow through the Open Channels:</b> Types of channel sections-rectangular, trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, Best economical section.	1	28
		trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, Best economical	1	29

		section.		
07	07	trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, Best economical section.	1	30
		<b>PUMPS:</b> Type of pumps	1	31

		Centrifugal pump: basic principles, operation, discharge, horse power & efficiency.	1	32
		Centrifugal pump: basic principles, operation, discharge, horse power & efficiency.	1	33
		Reciprocating pumps: types, operation, discharge, horse power & efficiency	1	34
		Reciprocating pumps: types, operation, discharge, horse power & efficiency	1	35
08	08	<b>Hydrology:</b> Hydrology Cycle	1	36
		Rainfall: types, intensity, hyetograph	1	37
		Estimation of rainfall, rain gauges, Its types(concept only)	1	38
		Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae	1	39
		<b>Water Requirement of Crops</b> Definition of irrigation, necessity, benefits of irrigation, types of irrigation	1	40
09	09	Crop season	1	41
		Duty, Delta and base period their relationship, overlap allowance, kharif and rabi crops	1	42
		Gross command area, culturable command area, Intensity of Irrigation, irrigable area, time factor, crop ratio	1	43
		<b>FLOW IRRIGATION</b> Canal irrigation, types of canals, loss of water in canals	1	44
		Perennial irrigation	1	45
10	10	Different components of irrigation canals and their functions	1	46
		Sketches of different canal cross-sections	1	47
		Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages	1	48
		<b>WATER LOGGING AND DRAINAGE :</b> Causes and effects of water logging, detection, prevention and remedies	1	49
		Causes and effects of water logging, detection, prevention and remedies	1	50

11	11	<b>DIVERSION HEAD WORKS AND REGULATORY STRUCTURES</b>	1	51
		Necessity and objectives of diversion head works, weirs and barrages		
		Necessity and objectives of diversion head works, weirs and barrages	1	52
		General layout, functions of different parts of barrage	1	53
		Silting and scouring	1	54
		Silting and scouring	1	55

12	12	Functions of regulatory structures	1	56
		Functions of regulatory structures	1	57
		<b>CROSS DRAINAGE WORKS :</b>	1	58
		Functions and necessity of Cross drainage works		
		- aqueduct, siphon, super passage, level crossing	1	59
		aqueduct, siphon, super passage, level crossing	1	60
13	13	Concept of each with help of neat sketch	1	61
		Concept of each with help of neat sketch	1	62
		Concept of each with help of neat sketch	1	63
		Concept of each with help of neat sketch	1	64
		<b>DAMS</b>	1	65
		Necessity of storage reservoirs, types of dams protection measures.,		
14	14	Earthen dams: types, description, causes of failure and protection measures.	1	66
		Gravity dam- types, description, Causes of failure and protection measures.	1	67
		Gravity dam- types, description, Causes of failure and protection measures	1	68
		Gravity dam- types, description, Causes of failure and protection measures.	1	69
		Gravity dam- types, description, Causes of failure and protection measures.	1	70
15	15	Gravity dam- types, description, Causes of failure and protection measures	1	71
		Spillways- Types (With Sketch) and necessity.	1	72
		Spillways- Types (With Sketch) and necessity.	1	73
		Spillways- Types (With Sketch) and necessity.	1	74
		Spillways- Types (With Sketch) and necessity.	1	75

### Reference Books:

1. Modi & Seth: FM&HM :Standard Book House
2. S.K Garg : Irrigation Engineering & Hydraulics Structures : Khanna Publishers