



GOVT. POLYTECHNIC KORAPUT

ACADEMIC SESSION 2020-2021

SEMESTER- 4th

BRANCH - CIVIL ENGINEERING

SUBJECT – HYDRAULICS AND IRRIGATION ENGINEERING

FACULTY NAME – RABINARAYAN HOTA

Period	Module/ Number	Topic to be covered
	UNIT-1	HYDROSTATICS:
1		Properties of fluid: Density, Specific weight, Specific gravity, Compressibility & Units of these properties
2		Capillarity(capillary height, effect of capillarity on meniscus of water and mercury)
3		Surface Tension(definition, unit)
4		Viscosity(definition, mathematical expression, unit) and uses of viscosity
5		Pressure and its measurements: Definition of intensity of pressure, its variation with height
6		Atmospheric pressure, gauge pressure
7		Absolute pressure and vacuum pressure
8		Relationship between atmospheric pressure, absolute pressure and gauge pressure
9		pressure head and pressure gauges
10		Pressure exerted on an immersed surface: Total pressure and Resultant pressure
11		Expression for total pressure & Pressure Exerted on horizontal & vertical surface
12		OMR Test
	UNIT-2	KINEMATICS OF FLUID FLOW:
13		Basic equation of fluid flow and their application: Rate of discharge
14		Equation of continuity of liquid flow
15		Total energy of a liquid
16		Potential, kinetic & pressure Energy
17		Bernoulli's theorem and its limitations
18		Practical applications of Bernoulli's equation
19		Flow over Notches and Weirs: Notches, Weirs
20		Types of notches and weirs
21		Discharge through different types of notches & weirs and application of notches & weirs
22		OMR Test
23		Types of flow through the pipes: Uniform and non uniform flow & examples of uniform & non uniform flow
24		Laminar and Turbulent flow, rotational & irrotational flow, examples
25		Steady and unsteady flow; Reynolds's number and its application
26		Losses of head of a liquid flowing through pipes: Different types of major losses.
27		Simple numerical problems on losses due to friction using Darcy's equation
28		Different types of minor losses ,Total energy lines & hydraulic gradient lines (Concept Only)
29		Flow through the Open Channels: Definition of open channel flow, difference between ocf & pipe flow,
30		Types of channel sections-Rectangular sections, Trapezoidal and Circular sections
31		Reynolds number, velocity distribution for open channel flow, Discharge formulae-Chezy's Formula, Manning's equation
32		Best economical section. & expressions for economical section
33		OMR Test
	UNIT-3	PUMPS: TYPES OF PUMPS:
34		Centrifugal Pump: Basic principles, operation, discharge,Horse power & efficiency of Centrifugal Pump
35		Reciprocating pumps: types, operation, discharge, Horse power & efficiency of Reciprocating pumps,
36		Discussion for internal exam
37		Internal Exam
	UNIT-4	HYDROLOGY:
38		Hydrology Cycle
39		Rainfall: Types and intensity of Rainfall, Hyetograph

40		Estimation of rainfall data
41		Rain gauges, Its types(concept only)
42		Concept of catchment area, Types, run-off, Estimation of flood discharge by Dickens's and Reeve's formula
43		Discussion on internal exam questions & distribution of evaluated answer sheet
44		OMR Test
	UNIT-5	WATER REQUIREMENT OF CROPS:
45		Definition of irrigation, necessity of irrigation,benefits of irrigation
46		Crop seasons, Duty, types of irrigation of irrigation
47		Delta and base period their relationships
48		Overlap allowance, Kharif and Rabi crops
49		Gross command area, culturable command area
50		Intensity of Irrigation, Irrigable area, Time factor, Crop ratio
51		Discussion on units learned
	UNIT-6	FLOW IRRIGATION:
52		Canal irrigation, Types of canals
53		Loss of water in canals, Perennial irrigation
54		Different components of irrigation canals and their functions
55		OMR Test
56		Sketches of different canal cross-sections, Classification of canals according to their alignment
57		Various types of canal lining
58		Advantages and disadvantages of canal lining
	UNIT-7	WATER LOGGING AND DRAINAGE :
59		Causes and effects of water logging
60		Detection, prevention and remedies of water logging
	UNIT-8	DIVERSION HEAD WORKS AND REGULATORY STRUCTURES:
61		Necessity and objectives of diversion head works
62		Weirs and Barrages
63		Functions of different parts of barrage
64		Silting and scouring
65		Functions of regulatory structures
	UNIT-9	CROSS DRAINAGE WORKS :
66		Functions and necessity of Cross drainage works
67		Aqueduct, Siphon
68		Superpassage, level crossing,
69		Concept of each with help of neat sketch
	UNIT-10	DAMS:
70		Necessity of storage reservoirs, types of dams
71		Earthen dams: Types and description
72		Causes of failure and protection measures
73		Gravity dam- types and description
74		Causes of failure and protection measures, Spillways- Types (With Sketch) and necessity
75		Revision