

## LESSON PLAN (SUMMER-2022)

**SUBJECT - HYDRAULICS AND IRRIGATION ENGINEERING (Th.2)**

**SEMESTER - 4<sup>th</sup> , 2<sup>nd</sup> YEAR**

**FACULTY - SOUMYA SUCHARITA MAHARANA**

| DATE | NO OF CLASSES | TOPICS TO BE COVERED |
|------|---------------|----------------------|
|------|---------------|----------------------|

### PART: A (HYDRAULICS)

#### CHAPTER-1: HYDROSTATICS

|            |   |  |
|------------|---|--|
| 11.03.2022 | 2 | Properties of fluid: density, specific gravity, surface tension, capillarity, viscosity and their uses   |
| 14.03.2022 | 1 |  |
| 15.03.2022 | 2 | Problems related to properties of fluid  |
| 21.03.2022 | 1 | Pressure and its measurements: intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges |
| 22.03.2022 | 2 | Problems related to pressure   |
| 25.03.2022 | 2 | Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface  |
| 28.03.2022 | 1 | Problems related to pressure exerted on an immersed surface  |

#### CHAPTER-2: KINEMATICS OF FLUID FLOW:

|            |   |  |
|------------|---|--|
| 29.03.2022 | 2 | Basic equation of fluid flow and their application: Rate of discharge, equation of continuity of liquid flow, total energy of a liquid in motion- potential, kinetic & pressure, Bernoulli's theorem and its limitations. Practical applications of Bernoulli's equation |
| 04.04.2022 | 1 | Problems related to Bernoulli's equation, continuity equation  |
| 05.04.2022 | 2 |  |
| 08.04.2022 | 2 | Flow over Notches and Weirs: Notches, Weirs, types of notches and weirs, Discharge through different types of notches and weirs-their application  |
| 11.04.2022 | 1 | Problems on notches and weir   |
| 12.04.2022 | 2 | Types of flow through the pipes: uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application   |
| 18.04.2022 | 1 |  |
| 19.04.2022 | 2 | Losses of head of a liquid flowing through pipes: Different types of major and minor losses. Total energy lines & hydraulic gradient lines   |
| 22.04.2022 | 2 | Problems on head loss of liquid flowing through pipes  |
| 25.04.2022 | 1 | Flow through the Open Channels: Types of channel sections-rectangular, trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, Best economical section.  |
| 26.04.2022 | 2 | Problems on flow through open channel  |

#### CHAPTER-3: PUMPS:

|            |   |   |
|------------|---|---|
| 29.04.2022 | 2 | Type of pumps<br>Centrifugal pump: basic principles, operation, discharge, horse power & efficiency |
| 02.05.2022 | 1 | Reciprocating pumps: types, operation, discharge, horse power & efficiency                          |

### PART : B ( IRRIGATION ENGINEERING)

#### CHAPTER-1: HYDROLOGY

|            |   |   |
|------------|---|---|
| 06.05.2022 | 2 | Hydrology Cycle<br>Rainfall: types, intensity, hyetograph   |
| 09.05.2022 | 1 | Estimation of rainfall, rain gauges, its types,<br>Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae |

#### CHAPTER-2: WATER REQUIREMENT OF CROPS

|  |    |   |
|--|----|---|
| 10.05.2022   | 2  | Definition of irrigation, necessity, benefits of irrigation, types of irrigation, Gross command area, culturable command area, Intensity of Irrigation, irrigable area, time factor, crop ratio |
| 11.05.2022   | 2  | Crop season, Duty, Delta and base period their relationship, overlap allowance, kharif and rabi crops   |
| 17.05.2022   | 1  | Problems related to base, delta, duty   |
| <b>CHAPTER-3: FLOW IRRIGATION</b>                                |    |   |
| 18.05.2022   | 2  | Canal irrigation, types of canals, loss of water in canals, Perennial irrigation  |
| 21.05.2022   | 2  | Different components of irrigation canals and their functions, Sketches of different canal cross-sections   |
| 24.05.2022   | 1  | Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages   |
| <b>CHAPTER-4: WATER LOGGING AND DRAINAGE</b>                     |    |   |
| 25.05.2022   | 2  | Causes and effects of water logging, detection, prevention and remedies   |
| <b>CHAPTER-5: DIVERSION HEAD WORKS AND REGULATORY STRUCTURES</b> |    |   |
| 28.05.2022   | 2  | Necessity and objectives of diversion head works, weirs and barrages , General layout, functions of different parts of barrage  |
| 31.05.2022   | 1  | Silting and scouring, Functions of regulatory structures  |
| <b>CHAPTER-6: CROSS DRAINAGE WORKS</b>                           |    |   |
| 01.06.2022   | 2  | Functions and necessity of Cross drainage works - aqueduct, siphon, super passage, level crossing   |
| <b>CHAPTER-7: DAMS</b>   |    |   |
| 04.06.2022   | 2  | Necessity of storage reservoirs, types of dams<br>Earthen dams: types, description, causes of failure and protection measures.  |
| 07.06.2022   | 1  | Gravity dam- types, description, Causes of failure and protection measures.   |
| 08.06.2022   | 2  | Spillways- Types (With Sketch) and necessity.   |
| TOTAL  | 57 |   |

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