

**BHUBANANANDA ODISHA SCHOOL OF ENGINEERING, CUTTACK**  
**DEPARTMENT OF CIVIL ENGINEERING**



**LESSON PLAN**

**SUBJECT: HYDRAULICS & IRRIGATION ENGINEERING**  
**(TH-2)**

**FACULTY: MRS. JASHASWINI BEHERA**

**ACADEMIC SESSION: 2023-24**

**SEMESTER: 4<sup>TH</sup>**

**SEC: C**

**Sd/-**  
**HOD (Civil Engg.)**

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|                                                         |                                                                                                                         |                               |                                                                                                                                                            |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Discipline: Civil Engineering</b>                    | <b>Semester: 4<sup>th</sup></b>                                                                                         |                               | <b>Name of the teaching faculty: Mrs. JASHASWINI BEHERA</b>                                                                                                |
| <b>Subject: Hydraulics &amp; Irrigation Engineering</b> | <b>No. of Days/ per week class allotted: 05 periods per week. (Tue-1, wed-1 period, Thu-1 period and Fri-2 periods)</b> |                               | <b>Semester From Date: 16-01-2024</b><br><b>To Date: 26-04-2024</b><br><b>No. of weeks: 15 weeks</b>                                                       |
| <b>Week</b>                                             | <b>Class Day</b>                                                                                                        | <b>No of period available</b> | <b>Theory Topics</b>                                                                                                                                       |
| 1ST                                                     | 16/01/2024                                                                                                              | 1P                            | <b>PART :A (Hydraulics)</b><br><b>1.HYDROSTATICS:</b><br>1.1 Properties of fluid: Density, specific gravity                                                |
|                                                         | 17/01/2024                                                                                                              | 1P                            | 1.1 Properties of fluid: surface tension, Capillarity, Viscosity and their uses                                                                            |
|                                                         | 18/01/2024                                                                                                              | 1P                            | 1.2 Pressure head and pressure gauges                                                                                                                      |
|                                                         | 19/01/2024                                                                                                              | 2P                            | 1.3 Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal and vertical surfaces |
| 2ND                                                     | 24/01/2024                                                                                                              | 1P                            | <b>2. KINEMATICS OF FLUID FLOW:</b><br>2.1 Basic equation of fluid flow and their applications: Rate of discharge                                          |
|                                                         | 25/01/2024                                                                                                              | 1P                            | 2.1 Equation of continuity of liquid flow                                                                                                                  |
| 3RD                                                     | 30/01/2024                                                                                                              | 1P                            | 2.1 Total energy of a liquid in motion –Potential, kinetic and pressure                                                                                    |
|                                                         | 31/01/2024                                                                                                              | 1P                            | 2.1 Bernoulli's theorem and its limitations practical application of Bernoulli's equation.                                                                 |
|                                                         | 01/02/2024                                                                                                              | 1P                            | 2.2 Flow over notches and weirs: notches, weirs, types of notches and weirs                                                                                |
|                                                         | 02/02/2024                                                                                                              | 2P                            | 2.2 Discharge through different types of notches and weirs –their applications.                                                                            |

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|-----|------------|----|-----------------------------------------------------------------------------------------------------------------------------------|
| 4TH | 06/02/2024 | 1P | 2.3Types of flow through pipes: Uniform and non uniform; laminar and turbulent                                                    |
|     | 07/02/2024 | 1P | 2.3 Steady and unsteady; Reynolds number and its applications                                                                     |
|     | 08/02/2024 | 1P | 2.4 Losses of heads of liquid flowing throw pipes: Different types of major and minor losses                                      |
|     | 09/02/2024 | 2P | 2.4 Simple numerical problems on losses due to friction using Darcy's equation<br>Total energy lines and hydraulic gradient lines |
| 5TH | 13/02/2024 | 1P | 2.5 Flow through open channels: Types of channel cross sections-Rectangular trapezoidal and circular                              |
|     | 15/02/2024 | 1P | 2.5 Discharge formula - Chezy's and manning's equation                                                                            |
|     | 16/02/2024 | 2P | 2.5 Best economical section<br><b>PART- B(Irrigation engineering)</b><br><b>1 HYDROLOGY-Introduction</b>                          |
| 6TH | 20/02/2024 | 1P | 1.1Hydrology cycle                                                                                                                |
|     | 21/02/2024 | 1P | 1.2 Rainfall: Types,intensity,hytograph                                                                                           |
|     | 22/02/2024 | 1P | 1.3 Estimation of rainfall, rain gauges, its types                                                                                |
|     | 23/02/2024 | 2P | 1.4 Concept of catchment area, types, runoff, estimation of flood discharge by dickens and Ryve's formula                         |
| 7TH | 27/02/2024 | 1P | <b>2. WATER REQUIREMENT OF CROPS:</b><br>2.1Defination of irrigation, Necessity                                                   |
|     | 28/02/2024 | 1P | Monthly Class Test-1                                                                                                              |
|     | 29/02/2024 | 1P | 2.1 Benefits of irrigation, types of irrigation                                                                                   |

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|      | 01/03/2024 | 2P | 2.2 Crop season<br>2.3 Duty, delta and base period and their relationship, overlap allowances                       |
| 8TH  | 06/03/2024 | 1P | 2.3 . Kharif and Rabi crops<br>2..4 Gross command area                                                              |
|      | 07/03/2024 | 1P | 2.4 Culturable command area, intensity of irrigation, Irrigable area, Time factor, crop ratio                       |
| 9TH  | 12/03/2024 | 1P | <b>3. FLOW IRRIGATION:</b><br>3.1 Canal irrigation, types of canals, loss of water in canals                        |
|      | 13/03/2024 | 1P | 3.2 Perennial irrigation                                                                                            |
|      | 14/03/2024 | 1P | 3.3 Different components of irrigation canal and their functions                                                    |
|      | 15/03/2024 | 2P | 3.4 Sketches of different canal cross sections<br>3.5 Classifications of canals according to their alignment,       |
| 10TH | 19/03/2024 | 1P | 3.5 various types of canal lining-advantages and disadvantages                                                      |
|      | 20/03/2024 | 1P | <b>4. WATER LOGGING AND DRAINAGE:</b><br>4.1 Causes and effect of Water logging, detection, prevention and remedies |
|      | 21/03/2024 | 1P | <b>5. DIVERSION HEAD WORK AND REGULATORY STRUCTURE:</b><br>5.1 Necessity and objective of diversion head work       |
|      | 22/03/2024 | 2P | 5.1 Weirs and barrages                                                                                              |
| 11TH | 27/03/2024 | 1P | Monthly Class Test-2                                                                                                |
|      | 28/03/2024 | 1P | 5.2 General layout, function different part of barrage                                                              |

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| 12TH | 02/04/2024 | 1P | Internal Assessment                                                                                                                                        |
|      | 03/04/2024 | 1P | Internal Assessment                                                                                                                                        |
|      | 04/04/2024 | 1P | 5.3 Silting and scouring<br>5.4 Function of regulatory structures                                                                                          |
|      | 05/04/2024 | 2P | <b>6 .CROSS DRAINAGE WORK:</b><br>6.1 Function and necessity of Cross drainage works-aqueduct, Siphon, super passage, level crossing                       |
| 13TH | 09/04/2024 | 1P | 6.2 Concept of each with help of neat sketch                                                                                                               |
|      | 10/04/2024 | 1P | <b>7. DAMS:</b><br>7.1Necssity of storage reservoirs, types of dams                                                                                        |
|      | 12/04/2024 | 2P | 7.2 Earthen dams: Types description, causes failure and protection measures<br>7.3 Gravity dams: Types description, causes failure and protection measures |
| 14TH | 16/04/2024 | 1P | 7.4 Spill ways-types (with sketches) and necessity<br><b>PART-A</b><br><b>3. PUMPS:</b><br>3.1 Types of pumps                                              |
|      | 18/04/2024 | 1P | 3.2 Centrifugal pumps: Basic principles,operation                                                                                                          |
|      | 19/04/2024 | 2P | 3.2 Centrifugal pumps: discharge, horse power and efficiency                                                                                               |
| 15TH | 23/04/2024 | 1P | 3.3Reciprocating pumps: types, operation, discharge, horse power and efficiency                                                                            |
|      | 24/04/2023 | 1P | 3.3 Discharge, horse power and efficiency                                                                                                                  |
|      | 25/04/2024 | 1P | REVISION                                                                                                                                                   |
|      | 26/04/2024 | 2P | PREVIOUS YEAR QUESTIONS                                                                                                                                    |