

| LESSON PLAN: TYPE 2: CIVIL ENGINEERING, SESSION -2023-2024 (SUMMER 2023) BATCH-2021-2024 (4th Semester) | | |
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| Discipline: Civil Engineering | Semester: 4th | Name of the Teaching Faculty: Gouranga Charan Pradhan, Sr. Lect. In Civil Engg. |
| Subject: Th.2- HYDRAULICS & IRRIGATION ENGINEERING | No. of days/ per week class allotted: 5 | Semester From Date: 14-02-2023 to Date: 31-05-2023 |
| | | No. of Weeks: 15 |
| Week | Class Day | Theory/ Practical Topics |
| | | PART: A (Hydraulics) |
| | | 1 HYDROSTATICS: |
| 1ST | 1 | 1.1 Properties of fluid: density, specific gravity, surface tension, capillarity, viscosity and their uses |
| | 2 | 1.1 Properties of fluid: density, specific gravity, surface tension, capillarity, viscosity and their uses |
| | 3 | 1.1 Properties of fluid: density, specific gravity, surface tension, capillarity, viscosity and their uses |
| | 4 | 1.1 Properties of fluid: density, specific gravity, surface tension, capillarity, viscosity and their uses |
| | 5 | 1.2 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. |
| 2ND | 1 | 1.2 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. |
| | 2 | 1.2 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. |
| | 3 | 1.2 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. |
| | 4 | 1.3 Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface. |
| | 5 | 1.3 Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface. |
| 3RD | 1 | 1.3 Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface. |
| | 2 | 1.3 Pressure exerted on an immersed surface: Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface. |
| | | 2 KINEMATICS OF FLUID FLOW: |
| | 3 | 2.1 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. |
| | 4 | 2.1 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. |
| | 5 | 2.1 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. |
| 4TH | 1 | 2.1 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. |
| | 2 | 2.2 Flow over Notches and Weirs: Notches, Weirs, types of notches and weirs, Discharge through different types of notches and weirs-their application (No Derivation) |
| | 3 | 2.2 Flow over Notches and Weirs: Notches, Weirs, types of notches and weirs, Discharge through different types of notches and weirs-their application (No Derivation) |
| | 4 | 2.2 Flow over Notches and Weirs: Notches, Weirs, types of notches and weirs, Discharge through different types of notches and weirs-their application (No Derivation) |
| | 5 | 2.3 Types of flow through the pipes: uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application |
| 5TH | 1 | 2.3 Types of flow through the pipes: uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application |

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| | 2 | 2.3 Types of flow through the pipes: uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application |
| | 3 | 2.4 Losses of head of a liquid flowing through pipes: Different types of major and minor losses. Simple numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only). |
| | 4 | 2.4 Losses of head of a liquid flowing through pipes: Different types of major and minor losses. Simple numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only). |
| | 5 | 2.4 Losses of head of a liquid flowing through pipes: Different types of major and minor losses. Simple numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only). |
| 6TH | 1 | 2.4 Losses of head of a liquid flowing through pipes: Different types of major and minor losses. Simple numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only). |
| | 2 | 2.5 Flow through the Open Channels: Types of channel sections-rectangular, trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, Best economical section. |
| | 3 | 2.5 Flow through the Open Channels: Types of channel sections-rectangular, trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, Best economical section. |
| | 4 | 2.5 Flow through the Open Channels: Types of channel sections-rectangular, trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, Best economical section. |
| | 5 | 2.5 Flow through the Open Channels: Types of channel sections-rectangular, trapezoidal and circular, discharge formulae- Chezy's and Manning's equation, Best economical section. |
| 7TH | | 3 PUMPS: |
| | 1 | 3.1 Type of pumps |
| | 2 | 3.2 Centrifugal pump: basic principles, operation, discharge, horse power & efficiency. |
| | 3 | 3.2 Centrifugal pump: basic principles, operation, discharge, horse power & efficiency. |
| | 4 | 3.3 Reciprocating pumps: types, operation, discharge, horse power & efficiency |
| | 5 | 3.3 Reciprocating pumps: types, operation, discharge, horse power & efficiency |
| | | PART: B (Irrigation Engineering) |
| 8TH | | 1 Hydrology |
| | 1 | 1.1 Hydrology Cycle |
| | 2 | 1.2 Rainfall: types, intensity, hyetograph |
| | 3 | 1.3 Estimation of rainfall, rain gauges, Its types(concept only). |
| | 4 | 1.4 Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae |
| | | 2 Water Requirement of Crops |
| | 5 | 2.1 Definition of irrigation, necessity, benefits of irrigation, types of irrigation |
| 9TH | 1 | 2.2 Crop season |
| | 2 | 2.3 Duty, Delta and base period their relationship, overlap allowance, kharif and rabi crops |
| | 3 | 2.4 Gross command area, culturable command area, Intensity of Irrigation, irrigable area, time factor, crop ratio |
| | | 3 FLOW IRRIGATION |
| | 4 | 3.1 Canal irrigation, types of canals, loss of water in canals |
| | 5 | 3.1 Canal irrigation, types of canals, loss of water in canals |
| 10TH | 1 | 3.2 Perennial irrigation |
| | 2 | 3.3 Different components of irrigation canals and their functions |
| | 3 | 3.4 Sketches of different canal cross-sections |
| | 4 | 3.5 Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages |
| | 5 | 3.5 Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages |
| | | 4 WATER LOGGING AND DRAINAGE : |
| 11TH | 1 | 4.1 Causes and effects of water logging, detection, prevention and remedies |
| | 2 | 4.1 Causes and effects of water logging, detection, prevention and remedies |
| | | 5 DIVERSION HEAD WORKS AND REGULATORY STRUCTURES |
| | 3 | 5.1 Necessity and objectives of diversion head works, weirs and barrages |
| | 4 | 5.1 Necessity and objectives of diversion head works, weirs and barrages |
| | 5 | 5.2 General layout, functions of different parts of barrage |
| 12TH | 1 | 5.2 General layout, functions of different parts of barrage |
| | 2 | 5.3 Silting and scouring |

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| | 3 | 5.3 Silting and scouring |
| | 4 | 5.4 Functions of regulatory structures |
| | 5 | 5.4 Functions of regulatory structures |
| | | 6 CROSS DRAINAGE WORKS : |
| 13TH | 1 | 6.1 Functions and necessity of Cross drainage works - aqueduct, siphon, super-passage, level crossing |
| | 2 | 6.1 Functions and necessity of Cross drainage works - aqueduct, siphon, super-passage, level crossing |
| | 3 | 6.1 Functions and necessity of Cross drainage works - aqueduct, siphon, super-passage, level crossing |
| | 4 | 6.1 Functions and necessity of Cross drainage works - aqueduct, siphon, super-passage, level crossing |
| | 5 | 6.2 Concept of each with help of neat sketch |
| 14TH | 1 | 6.2 Concept of each with help of neat sketch |
| | 2 | 6.2 Concept of each with help of neat sketch |
| | | 7 DAMS |
| | 3 | 7.1 Necessity of storage reservoirs, types of dams |
| | 4 | 7.1 Necessity of storage reservoirs, types of dams |
| | 5 | 7.2 Earthen dams: types, description, causes of failure and protection measures. |
| 15TH | 1 | 7.2 Earthen dams: types, description, causes of failure and protection measures. |
| | 2 | 7.3 Gravity dam- types, description, Causes of failure and protection measures. |
| | 3 | 7.3 Gravity dam- types, description, Causes of failure and protection measures. |
| | 4 | 7.4 Spillways- Types (With Sketch) and necessity. |
| | 5 | 7.4 Spillways- Types (With Sketch) and necessity. |

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in need in college
A. P. K. K.

[Signature]
14/02/2023.
H. O. D.
Dept. of Civil Engg
Govt. Polytechnic
Kandhamal