

# LESSON PLAN

| Discipline :<br><b>MECHANICAL<br/>ENGG</b> | Semester :<br><b>4<sup>TH</sup></b>               | Name of the Teaching Faculty: <b>SUBHRANSHU SEKHAR BARIK</b>                                                                                             |
|--------------------------------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subject: <b>FLUID MECHANICS<br/>(Th-3)</b> | No. of days/per week class<br>allotted: <b>04</b> | Semester From Date: <b>04.02.2025</b> To Date: <b>17.05.2025</b><br>No. of Weeks: <b>15</b>                                                              |
| Week                                       | Class Day                                         | Theory Topics                                                                                                                                            |
| <b>1<sup>ST</sup></b>                      | <b>1<sup>ST</sup></b>                             | <b>1.0 Properties of Fluid</b><br>Introduction about fluid mechanics and hydraulic Machines.                                                             |
|                                            | <b>2<sup>ND</sup></b>                             | Define Fluid, Examples of fluid, and Properties of fluid.                                                                                                |
|                                            | <b>3<sup>RD</sup></b>                             | Definitions and Units of Density, Specific weight, specific gravity                                                                                      |
|                                            | <b>4<sup>TH</sup></b>                             | Simple problem solved                                                                                                                                    |
| <b>2<sup>ND</sup></b>                      | <b>1<sup>ST</sup></b>                             | Definitions and Units of specific gravity, specific Volume, solving of simple problems.                                                                  |
|                                            | <b>2<sup>ND</sup></b>                             | Definitions and Units of Dynamic viscosity, kinematic Viscosity.                                                                                         |
|                                            | <b>3<sup>RD</sup></b>                             | Definitions and Units of surface tension, Capillary Phenomenon, Examples of capillary action                                                             |
|                                            | <b>4<sup>TH</sup></b>                             | Application of capillary action and simple problem solved                                                                                                |
| <b>3<sup>RD</sup></b>                      | <b>1<sup>ST</sup></b>                             | <b>2.0 Fluid Pressure and its Measurements</b><br>Definitions and units of fluid pressure, pressure intensity and pressure head, Statement of Pascal Law |
|                                            | <b>2<sup>ND</sup></b>                             | Concept of atmospheric pressure, gauge pressure<br>Concept of vacuum pressure and absolute pressure, and their relationship                              |
|                                            | <b>3<sup>RD</sup></b>                             | Describe about various Pressure measuring instruments and their application.                                                                             |
|                                            | <b>4<sup>TH</sup></b>                             | Describe about Manometers: Simple and differential type                                                                                                  |
| <b>4<sup>TH</sup></b>                      | <b>1<sup>ST</sup></b>                             | Describe about Bourdon tube pressure gauge                                                                                                               |
|                                            | <b>2<sup>ND</sup></b>                             | Simple problems of Simple and differential manometer                                                                                                     |
|                                            | <b>3<sup>RD</sup></b>                             | Simple problems of Bourdon tube pressure gauge, Simple Numerical problems.                                                                               |
|                                            | <b>4<sup>TH</sup></b>                             | Solving of Simple problems on Manometer, SCTE&VT Questions Solved                                                                                        |
| <b>5<sup>TH</sup></b>                      | <b>1<sup>ST</sup></b>                             | <b>3.0 Hydrostatics</b><br>Definition of hydrostatic pressure                                                                                            |
|                                            | <b>2<sup>ND</sup></b>                             | Discuss about Total pressure and center of pressure on immersed bodies (Horizontal and Vertical Bodies)                                                  |
|                                            | <b>3<sup>RD</sup></b>                             | Simple Numerical problem solved of Total pressure and center of pressure on immersed bodies.                                                             |
|                                            | <b>4<sup>TH</sup></b>                             | Discuss about Archimedes' principle, 1 <sup>st</sup> Monthly Test                                                                                        |
| <b>6<sup>TH</sup></b>                      | <b>1<sup>ST</sup></b>                             | Discuss about concept of buoyancy.                                                                                                                       |
|                                            | <b>2<sup>ND</sup></b>                             | discuss about metacenter, Discuss about metacentric height                                                                                               |
|                                            | <b>3<sup>RD</sup></b>                             | Discuss about the Concept of floatation                                                                                                                  |
|                                            | <b>4<sup>TH</sup></b>                             | Concept of floatation, Flotation of Bodies Examples, simple Problems solved. Q & A discussion As per SCTE&VT Exam                                        |

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| 7 <sup>TH</sup>  | 1 <sup>ST</sup> | <b>4.0 Kinematics of Flow</b><br>Define fluid flow and Types of fluid flow                |
|                  | 2 <sup>ND</sup> | Discuss about Continuity equation (Statement and proof for one dimensional flow)          |
|                  | 3 <sup>RD</sup> | State & proof Bernoulli's theorem                                                         |
|                  | 4 <sup>TH</sup> | Applications and limitations of Bernoulli's theorem                                       |
| 8 <sup>TH</sup>  | 1 <sup>ST</sup> | Discuss about Venturi meter, Application and limitations                                  |
|                  | 2 <sup>ND</sup> | Simple numerical solved                                                                   |
|                  | 3 <sup>RD</sup> | Discuss about pitot tube and its application                                              |
|                  | 4 <sup>TH</sup> | Simple numerical solved                                                                   |
| 9 <sup>TH</sup>  | 1 <sup>ST</sup> | <b>5.0 Orifices, Notches &amp; Weirs</b><br>Definition of orifices, Flow through orifices |
|                  | 2 <sup>ND</sup> | Orifice coefficients                                                                      |
|                  | 3 <sup>RD</sup> | Discuss C <sub>c</sub> , C <sub>v</sub> , C <sub>d</sub> and relation among them          |
|                  | 4 <sup>TH</sup> | Classification of notches and weirs, 2 <sup>nd</sup> Monthly Test                         |
| 10 <sup>TH</sup> | 1 <sup>ST</sup> | Discharge over a rectangular notch or weir                                                |
|                  | 2 <sup>ND</sup> | Discharge over a triangular notch or weir                                                 |
|                  | 3 <sup>RD</sup> | Simple problem solved on rectangular notch                                                |
|                  | 4 <sup>TH</sup> | Simple problem solved on triangular notch                                                 |
| 11 <sup>TH</sup> | 1 <sup>ST</sup> | <b>6.0 Flow through Pipes</b><br>Definition of pipe, Discuss Flow through pipe            |
|                  | 2 <sup>ND</sup> | Loss of Energy in pipes                                                                   |
|                  | 3 <sup>RD</sup> | Define laws of fluid friction                                                             |
|                  | 4 <sup>TH</sup> | Head loss due to friction: Darcy's formula                                                |
| 12 <sup>TH</sup> | 1 <sup>ST</sup> | Continued...                                                                              |
|                  | 2 <sup>ND</sup> | Head loss due to friction: Chezy's formula                                                |
|                  | 3 <sup>RD</sup> | Continued                                                                                 |
|                  | 4 <sup>TH</sup> | Problem solved using Darcy's Formula                                                      |
| 13 <sup>TH</sup> | 1 <sup>ST</sup> | Problem solved using Chezy's Formula                                                      |
|                  | 2 <sup>ND</sup> | Define Hydraulic gradient, Define total gradient line                                     |
|                  | 3 <sup>RD</sup> | <b>7.0 Impact of Jets</b><br>Define impact of jets                                        |
|                  | 4 <sup>TH</sup> | Discuss about various types of impact of jets                                             |
| 14 <sup>TH</sup> | 1 <sup>ST</sup> | Discuss about Impact of jet on fixed and moving vertical flat plates                      |
|                  | 2 <sup>ND</sup> | Discuss about derivation of work done on series of vanes                                  |
|                  | 3 <sup>RD</sup> | Discuss about condition for maximum efficiency                                            |
|                  | 4 <sup>TH</sup> | Discuss about Impact of jet on moving curved vanes                                        |
| 15 <sup>TH</sup> | 1 <sup>ST</sup> | Discuss about illustration using velocity triangles                                       |
|                  | 2 <sup>ND</sup> | Discuss about derivation of work done, efficiency                                         |
|                  | 3 <sup>RD</sup> | Problem solved as per SCTE & VT question paper, 3 <sup>rd</sup> Monthly Test              |
|                  | 4 <sup>TH</sup> | Problem solved, Revision of previous chapter taught                                       |

#### Learning Resources:

| Text | Title of Book | Author |
|------|---------------|--------|
|------|---------------|--------|

Books:

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|------------------------------------------|--------------|
| ➤ Fluid Mechanics and Hydraulic Machines | R. K. Bansal |
| ➤ Text Book of Fluid Mechanics           | R.S. Khurmi  |
| ➤ Text Book of Fluid Mechanics           | R.K. Rajput  |

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