

B.Tech 3rd Semester (Mechanical Engineering)

Lesson Plan: Fluid Mechanics & Machines (PCC-ME-303/21)

| S.N. | Content to be Covered | Lect. No. |
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| | UNIT-1 | |
| 1 | Introduction and Fluid Statics: Definition of fluid, Newton's law of viscosity, | 1 |
| 2 | properties of fluids, mass density, specific volume, specific gravity, viscosity and surface tension, | 2 |
| 3 | Stability of floating Bodies | 3 |
| 4 | Stability of Submerged bodies, | 4 |
| 5 | Determination of metacentric height | 5 |
| 6 | Numerical Problems | 6 |
| | UNIT-2 | |
| 7 | Fluid Kinematics and Fluid Dynamics: Different types of flows | 7 |
| 8 | Continuity equation, applications of continuity equation, | 8 |
| 9 | momentum equation and its applications, | 9 |
| 10 | Euler's equation, Bernoulli's equation and its applications, | 10 |
| 11 | Venturimeter, Orificemeter | 11 |
| 12 | Rotameter, | 12 |
| 13 | Numerical Problems | 13 |
| | UNIT-3 | |
| 14 | Laminar flow through pipes and Boundary Layer: | 14 |
| 15 | Exact flow solutions in channels and ducts, | 15 |
| 16 | Couette flow | 16 |
| 17 | Poiseuille flow, | 17 |
| 18 | laminar flow through circular conduits, | 18 |
| 19 | concept of boundary layer, measurement of boundary layer thickness, | 19 |
| 20 | Von-Karman integral Momentum equation for boundary layer,. | 20 |
| 21 | Darcy Weisbach equation, | 21 |
| 22 | friction factor, Numerical Problems | 22 |
| | UNIT-4 | |
| 23 | Dimensional Analysis: Need for dimensional analysis, | 23 |
| 24 | methods of dimension analysis, | 24 |
| 25 | Similitude, types of similitude, | 25 |
| 26 | Dimensionless parameters, application of dimensionless parameters, | 26 |

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| 27 | similitude laws, Model testing, | 27 |
| 28 | Model testing of turbines , Numerical Problems | 28 |
| 29 | Model testing of pumps, Numerical Problems | 29 |
| | UNIT-5 | |
| 30 | Hydraulic Turbines: Euler's equation, | 30 |
| 31 | theory of Rotodynamic machines, Introduction to hydro power plant | 31 |
| 32 | Classification of water turbines, heads and efficiencies, velocity triangles, | 32 |
| 33 | heads and efficiencies, velocity triangles, | 33 |
| 34 | Pelton turbine, working principles | 34 |
| 35 | Francis turbine, working principles | 35 |
| 36 | Kaplan turbines and their, working principles | 36 |
| 37 | draft tube, Specific speed, unit quantities, | 37 |
| 38 | performance curves for turbines, | 38 |
| 39 | governing of turbines, Numerical Problems | 39 |
| 40 | Numerical Problems | 40 |
| | UNIT-6 | |
| 41 | Pumps: Centrifugal pumps: working principle | 41 |
| 42 | Various heads and efficiencies, | 42 |
| 43 | velocity components at entry and exit of the rotor, | 43 |
| 44 | velocity triangles, work done by the impeller, | 44 |
| 45 | velocity triangles, work done by the impeller, | 45 |
| 46 | Performance curves. | 46 |
| 47 | Reciprocating pump: Classifications, | 47 |
| 48 | working principle, | 48 |
| 49 | Indicator Diagram, Numerical Problems | 49 |
| 50 | Numerical Problems | 50 |