

| <b>GANPAT UNIVERSITY</b>   |   |                        |                 |              |                                     |                      |         |           |       |
|--|---|------------------------|-----------------|--------------|-------------------------------------|----------------------|---------|-----------|-------|
| <b>FACULTY OF ENGINEERING &amp; TECHNOLOGY</b>   |   |                        |                 |              |                                     |                      |         |           |       |
| Programme  |   | Bachelor of Technology |                 |              | Branch/Spec.                        |                      | Civil   |           |       |
| Semester   |   | IV                     |                 |              | Version                             |                      | 2.0.0.0 |           |       |
| Effective from Academic Year   |   |                        | 2019-20         |              | Effective for the batch Admitted in |                      |         | July 2018 |       |
| Subject code   |   | 2CI405                 |                 | Subject Name |                                     | Fluid Mechanics – II |         |           |       |
| Teaching scheme  |   |                        |                 |              | Examination scheme (Marks)          |                      |         |           |       |
| (Per week)   | Lecture(DT)   |                        | Practical(Lab.) |              | Total                               |                      | CE      | SEE       | Total |
|  | L   | TU                     | P               | TW           |                                     |                      |         |           |       |
| Credit   | 03  | 00                     | 01              | 00           | 04                                  | Theory               | 40      | 60        | 100   |
| Hours  | 03  | 00                     | 02              | 00           | 05                                  | Practical            | 30      | 20        | 50    |
| Pre-requisites:  |   |                        |                 |              |                                     |                      |         |           |       |
| Learning Outcome:  |   |                        |                 |              |                                     |                      |         |           |       |
| After successful completion of the course, student will be able to:  |   |                        |                 |              |                                     |                      |         |           |       |
| <ul style="list-style-type: none"> <li>Understand the kinematics and dynamics of fluids, Viscous and Turbulent flow, design of pipe network.</li> <li>Plan and design of water supply systems and basic considerations on which the designs of the various hydraulic and hydrological structures.</li> </ul> |   |                        |                 |              |                                     |                      |         |           |       |
| <b>Theory syllabus</b>   |   |                        |                 |              |                                     |                      |         |           |       |
| Unit   | Content   |                        |                 |              |                                     |                      |         |           | Hrs   |
| 1.   | <b>Introduction:</b><br>Different Types of fluid and its thermodynamic properties, continuity equation in Cartesian coordinates.  |                        |                 |              |                                     |                      |         |           | 4     |
| 2.   | <b>Viscous Flow:</b><br>Flow of viscous fluid through circular pipe and two parallel plates, loss of head due to friction in viscous flow, methods of determination of coefficient of viscosity (capillary tube method, orifice type, falling sphere Resistance method, rotating cylinder method), network of pipes (Hardy-cross method). |                        |                 |              |                                     |                      |         |           | 9     |
| 3.   | <b>Turbulent Flow:</b><br>Reynolds's experiments, friction loss in pipe flow, velocity distribution in turbulent flow in pipe, shear stress in turbulent flow, Nikuradse work on artificially rough pipe, Cole brooks and white equations : Moody's diagram.  |                        |                 |              |                                     |                      |         |           | 9     |
| 4.   | <b>Boundary Layer Flow:</b><br>Definitions, growth, thicknesses, drag forces, laminar and turbulent boundary layer on a flat plate, and separation of boundary layer.   |                        |                 |              |                                     |                      |         |           | 5     |
| 5.   | <b>Dimensional and Model Analysis:</b><br>Concept of dimensions and dimensional homogeneity dimensionless parameters, methods of dimensional analysis, model analysis, types of similarities, types of forces acting on moving fluid, dimensionless numbers, model laws, classification of model.   |                        |                 |              |                                     |                      |         |           | 7     |
| 6.   | <b>Open Channels:</b><br>Classification of flow in channel, velocity distribution, discharge through open channel, most economical section, specific energy and specific energy curve, critical flow, standing wave flume and parshall flume, gradually varied flow, hydraulic jump and its application.                                  |                        |                 |              |                                     |                      |         |           | 11    |
| <b>TOTAL</b>   |   |                        |                 |              |                                     |                      |         | <b>45</b> |       |
| <b>Term Work</b>   |   |                        |                 |              |                                     |                      |         |           |       |
| Term work shall be based on the above mentioned course content.  |   |                        |                 |              |                                     |                      |         |           |       |
| <b>Field Visit</b>   |   |                        |                 |              |                                     |                      |         |           |       |
| Field visits based on course content are suggested.  |   |                        |                 |              |                                     |                      |         |           |       |
| <b>Text Books</b>  |   |                        |                 |              |                                     |                      |         |           |       |
| 1.   | Dr.P.N.Modi&Sheth ,Fluid mechanics & Hydraulic Machines   |                        |                 |              |                                     |                      |         |           |       |
| <b>Reference Books</b>   |   |                        |                 |              |                                     |                      |         |           |       |
| 1.   | Dr.R.K.Bansal ,Fluid mechanics & Hydraulic Machines   |                        |                 |              |                                     |                      |         |           |       |
| 2.   | Dr.D.S.Kumar ,Fluid mechanics   |                        |                 |              |                                     |                      |         |           |       |
| 3.   | Dr.A.K.Jain ,Fluid mechanics  |                        |                 |              |                                     |                      |         |           |       |

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| 4.               | S.Ramamurthan ,Hydraulic Fluid mechanics & Fluid Machines   |
| 5.               | R.J.Garde&A.C.Mirajgaoker ,Engineering Fluid Mechanic   |
| <b>ICT/MOOCs</b> |   |
| 1.               | <a href="http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/fluid_mechanics/index.htm">http://nptel.iitm.ac.in/courses/Webcourse-contents/IIT-%20Guwahati/fluid_mechanics/index.htm</a> |
| 2.               | <a href="http://nptel.iitm.ac.in/video.php?subjectId=105101082">http://nptel.iitm.ac.in/video.php?subjectId=105101082</a>   |
| 3.               | <a href="http://www.mvsengineering.com">http://www.mvsengineering.com</a>   |
| 4.               | <a href="http://nptel.iitm.ac.in/courses/IIT-MADRAS/Hydraulics/index.php">http://nptel.iitm.ac.in/courses/IIT-MADRAS/Hydraulics/index.php</a>   |
| 5.               | <a href="http://nptel.iitm.ac.in/video.php?subjectId=105103096">http://nptel.iitm.ac.in/video.php?subjectId=105103096</a>   |