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| Course Number and Name | | | | | | | | | | | | |
| BCE502 - APPLIED HYDRAULIC ENGINEERING | | | | | | | | | | | | |
| Credits and Contact Hours | | | | | | | | | | | | |
| 3 & 45 | | | | | | | | | | | | |
| Course Coordinator's Name | | | | | | | | | | | | |
| Mr.S.Rajesh | | | | | | | | | | | | |
| Text Books and References | | | | | | | | | | | | |
| TEXT BOOK: | | | | | | | | | | | | |
| 1. Bansal R K., A Text Book of Fluid Mechanics & Hydraulic Machines – Laxmi Publications 2010 | | | | | | | | | | | | |
| REFERENCE: | | | | | | | | | | | | |
| 1. Subramanya K., "Flow in Open channels ", Tata McGraw Hill Publishing Company 1986 | | | | | | | | | | | | |
| 2. Kumar K.L., "Engineering Fluid Mechanics ", Eurasia Publishing House (P) Ltd. New Delhi, 1992. | | | | | | | | | | | | |
| 3. Rajput R.K, A Text of Fluid Mechanics & Hydraulic machines – S.Chand & Co.P.Ltd, 2009 | | | | | | | | | | | | |
| Course Description | | | | | | | | | | | | |
| <ul style="list-style-type: none"> To introduce the students to various hydraulic engineering problems like open channel flows and hydraulic machines. At the completion of the course, the student should be able to relate the theory and practice of problems in hydraulic engineering. | | | | | | | | | | | | |
| Prerequisites | | | | | | Co-requisites | | | | | | |
| Fluid Mechanics | | | | | | NIL | | | | | | |
| required, elective, or selected elective (as per Table 5-1) | | | | | | | | | | | | |
| Course Outcomes (COs) | | | | | | | | | | | | |
| CO1 | Be able to apply their knowledge of fluid mechanics in addressing problems in open channels. | | | | | | | | | | | |
| CO2 | They will possess the skills to solve problems in uniform, gradually and rapidly varied flows in steady state conditions. | | | | | | | | | | | |
| CO3 | They will have knowledge in hydraulic machineries (Turbines) | | | | | | | | | | | |
| CO4 | Acquire skills in rotodynamic machineries that will help in their day-to-day-life. | | | | | | | | | | | |
| CO5 | Acquire skills in Reciprocal pumps. | | | | | | | | | | | |
| Student Outcomes (SOs) from Criterion 3 covered by this Course | | | | | | | | | | | | |
| | COs/SOs | a | b | c | d | e | f | g | h | i | j | k |
| | CO1 | H | M | L | H | H | | | | | | |
| | CO2 | H | M | L | H | H | | | | | | |
| | CO3 | H | M | L | H | H | | | | | | |
| | CO4 | H | M | L | H | H | | | | | | |

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| | CO5 | H | M | L | H | H | | | | | | | |
| List of Topics Covered | | | | | | | | | | | | | |
| UNIT I | OPEN CHANNEL FLOW | | | | | | | | | | | 9 | |
| Types of flow – State of Flow - Velocity distribution - Specific energy, specific force, critical flow computation - flow measurement. Chezy's and Manning's equation, Computation Uniform flow – Normal depth – Hydraulically best section. | | | | | | | | | | | | | |
| UNIT II | VARIED FLOW | | | | | | | | | | | 9 | |
| Varied Flow- Rapid & Gradual - Dynamic equation characteristic of flow profiles – Classification of flow – Computation of the flow profiles – Direct step method - Canal transitions – Hydraulic Jump – Type of Jump, Location of Jumps – Energy losses in Jumps – Surges in Canal – Types of Surges. | | | | | | | | | | | | | |
| UNIT III | TURBINES | | | | | | | | | | | 9 | |
| Rotodynamics Machinery Turbines: Classification of turbines -Work done - Efficiency of Turbines, Pelton Wheel, Francis turbine, Kaplan and propeller turbines. Similarity laws and specific speed. Performance of turbines - impact of free jets. | | | | | | | | | | | | | |
| UNIT IV | PUMPS | | | | | | | | | | | 9 | |
| Rotodynamic Machinery Pumps: Classification of pumps –Centrifugal Pumps – Casing – Impellor – Work done and Efficiency – Cavitations. | | | | | | | | | | | | | |
| UNIT V | RECIPROCATING PUMPS | | | | | | | | | | | 9 | |
| Reciprocating pump – Work done – Air Vessel – Indicator Diagram. | | | | | | | | | | | | | |