JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTER

Department of CIVIL ENGINEERING

**LECTURE PLAN**

**Subject: 4CE3A Hydraulics & Hydraulic Machine**

**No. of Lecture Req./(Avl.) : /(40)**

**Semester Starting: 08.02.16** **Semester Ending:**

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| --- | --- | --- | --- | --- | --- |
| **Unit No./ Total lec. Req.** | **Topics** | **Lect. Req.** | **Lect. No.** | **Date of Delivery** | **Remark/ Actual lect. Taken** |
| **Unit-1 (8)** | Dynamic similarity introduction | 1 | 1 |  |  |
| Dimension analysis. | 1 | 2 |  |  |
| Kinematic – Dynamic similarities. | 1 | 3 |  |  |
| Scale ratio | 1 | 4 |  |  |
| Rayleigh Method | 1 | 5 |  |  |
| Buckingham Method | 1 | 6 |  |  |
| Ship model experiment | 1 | 7 |  |  |
| Numerical | 1 | 8 |  |  |
| **Unit-2 (8)** | Introduction of laminar and turbulent flow | 1 | 9 |  |  |
| Shear gradient and pressure gradient | 1 | 10 |  |  |
| Pipe flow | 1 | 11 |  |  |
| Plate flow | 1 | 12 |  |  |
| Velocity Distribution in laminar flow | 1 | 13 |  |  |
| Nikuradse’s Experiment | 1 | 14 |  |  |
| Rough boundaries | 1 | 15 |  |  |
| Friction coefficient analysis | 1 | 16 |  |  |
| **Unit- 3(8)** | Differences between uniform and variable flow. | 1 | 17 |  |  |
| Chezy’s , manning’s , Bazin’s formula. | 1 | 18 |  |  |
| Most efficient rectangular channel | 1 | 19 |  |  |
| Most efficient triangular channel. | 1 | 20 |  |  |
| Most efficient Trapezoidal channel. | 1 | 21 |  |  |
| Specific force & critical energy concept | 1 | 22 |  |  |
| Gradually varied flow | 1 | 23 |  |  |
| Slopes in flow | 1 | 24 |  |  |

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| **Unit-4 (8)** | Hydraulic jump | 1 | 25 |  |  |
| Hydraulic jump | 1 | 26 |  |  |
| Conjugate depth & numericals | 1 | 27 |  |  |
| Broad crested weirs | 1 | 28 |  |  |
| Velocity distribution in open channels | 1 | 29 |  |  |
| Impact of jet | 1 | 30 |  |  |
| Moving & stationary vane | 1 | 31 |  |  |
| Flow over radial vanes | 1 | 32 |  |  |
| **Unit-5 (8)** | Vulute & whirlpool chamber | 1 | 33 |  |  |
| Hydraulic efficiencies | 1 | 34 |  |  |
| Single and multistage pumps | 1 | 35 |  |  |
| Specified speed | 1 | 36 |  |  |
| Reaction & impulse turbine | 1 | 37 |  |  |
| Pelton wheel & Francis turbine | 1 | 38 |  |  |
| Kaplon turbines & characteristics | 1 | 39 |  |  |
| Draft tube & slection of turbines | 1 | 40 |  |  |

**Recommended books:**

1.Fluid Mechanics & Hydraulics by Dr. K.R, Arora, Standard Publishers & Distributers, Delhi.

2.Fluid Mechanics & Hydraulics by John F.Douglas & Lynne B. Jack, Prentice Hall Inc.

3.Fluid Mechanics & Hydraulics by Dr. R.K. Bansal, Laxmi Publications (P) Ltd.

4.Fluid Mechanics & Hydraulics by Modi & Seth, Standard Publishers & Distributers, Delhi.

5. Fluid Mechanics & Machinery by C.S.P.Ojha, R.Berndtsson and P.N.Chandramauli, Oxford

Publishers, Delhi.