# GUJARAT TECHNOLOGICAL UNIVERSITY

## M.E Semester: 1

**Water Resources Management**

Subject Name Hydropower Engineering

| Sr.No | Course content |
|---|---|
| 1 | Introduction:<br>Sources and forms of energy, types of power plants, elements of hydropower scheme, hydropower development in India. Power house structures-substructure and superstructure Layout and dimensions, deign considerations. Hydropower plants classification: Surface and underground power stations, Low medium-high head plants-layout and components, pumped storage plants, tidal power plants, microtydal units. Load and power studies: load curve, load factor, load duration curve, firm capacity, reservoir capacity, capacity factor. |
| 2 | Penstocks and power canals:<br>Classification of penstocks, Design of Penstocks, economic diameter, bends, anchor blocks, surges in canals design criteria of power canals. Intake structures: Location function and types of intakes, energy losses at intake trash rock, design of intakes. |
| 3 | Water hammer and surge tanks:<br>Rigid and elastic water column theories, water hammer pressure. Behavior of surge tanks, types of surge tanks, hydraulic design, design of simple surge tank-stability |
| 4 | Hydraulic turbines and types and classification, constructional features, hydraulic analysis, selection, characteristic curves, governing of turbine, drafts tubes-types, hydraulic principles, and design. Gates and valves-types. Design of air vent. |

### List of Tutorials:

1. Sources and form of energy
2. Lay out of power hours and design consideration
3. Features of Hydro power plants
4. Detail of penstocks and power canal
5. Water hammer and surge tank problems
6. Hydraulic turbine and main types of governing of turbine

### Reference Books:


1. Water power Development : Mosonyi
2. Hydroelectric hand book: Creagar, W.P. and Justin, J.D., John Wiley & Sons, New York.
3. Davis' Handbook of applied hydraulics : Zipparro, V. J. and Hasen H., Mc-Graw Hill, Inc., New York
4. Hydropower structures : R.S.Varshiray, Nem Chand and Bros. Roorkee
5. Water Power Engineering: M.M.Desmukh, Dhanpat rai and Sons.
6. Water Power Engineering: M.M.Dandekar and K.N.Sharma, Vikas Pub.House