| Course Code | Course/Subject Name | Credits |
|---|---|---|
| **MEDLO8041** | **Power Plant Engineering** | **4** |

**Objectives**

1. Study basic working principles of different power plants
2. Study power plant economics

**Outcomes:** Learner will be able to…

1. Comprehend various equipment/systems utilized in power plants
2. Demonstrate site selection methodology, construction and operation of Hydro Electric Power Plants
3. Discuss working, site selection, advantages, disadvantages of steam power plants
4. Discuss operation of Combined Cycle Power Plants
5. Discuss types of reactors, waste disposal issues in nuclear power plants
6. Illustrate power plant economics

| Module | Detailed Contents | Hrs. |
|---|---|---|
| **01** | Introduction: Energy resources and their availability, types of power plants, selection of the plants, review of basic thermodynamic cycles used in power plants | 06 |
| **02** | Hydro Electric Power Plants : Rainfall and run-off measurements and plotting of various curves for estimating stream flow and size of reservoir, power plants design, construction and operation of different components of hydro-electric power plants, site selection, comparison with other types of power plants | 10 |
| **03** | Steam Power Plants: Flow sheet and working of modern-thermal power plants, super critical pressure steam stations, site selection, coal storage, preparation, coal handling systems, feeding and burning of pulverized fuel, ash handling systems, dust collection-mechanical dust collector and electrostatic precipitator | 08 |
| **04** | Combined Cycles: Constant pressure gas turbine power plants, Arrangements of combined plants (steam & gas turbine power plants), re-powering systems with gas production from coal,<br>using PFBC systems, with organic fluids, parameters affecting thermodynamic efficien cy of combined cycles, Problems | 08 |
| **05** | Nuclear Power Plants: Principles of nuclear energy, basic nuclear reactions, nuclear reactors-<br>PWR, BWR, CANDU, Sodium graphite, fast breeder, homogeneous; gas cooled, Advantages and limitations, nuclear power station, waste disposal. | 08 |
| **06** | Power Plant Economics: Load curve, different terms and definitions, cost of electrical energy, tariffs methods of electrical energy, performance & operating characteristics o f power plants- incremental rate theory, input-output curves, efficiency, heat rate, economic load sharing, Problems. | 08 |

**Assessment:**

**Internal Assessment for 20 marks:**

Consisting **Two Compulsory Class Tests**

First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in Test I)

**End Semester Examination:**

Weightage of each module in end semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total **six questions**, **each carrying 20 marks**
2. **Question 1** will be **compulsory** and should **cover maximum contents of the curriculum**
3. **Remaining questions will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only **Four questions need to be solved**

**References**


1. Power Plant Engineering, A K Raja, Amit Praksh Shrivastava, Manish Dwivedi, New Age International Publishers
2. Power Plant Familiarization, Manual of Central Training Resources Unit of NTPC India, 1991
3. Power Plant Engineering, P.K. Nag, 2nd Edition, TMH, New Delhi
4. A Text Book of Power Plant Engineering, R.K. Rajput, Laxmi Publications
5. Hydro-Electric and Pumped Storage Plants, M G Jog, New Age International Publishers
6. A Course in Power Plant Engineering, Arora, Domkundwar, DhanpatRai & Co
7. Power Plant Engineering, P.C. Sharma, S.K. Kataria& Sons
8. Power Plant Engineering, G.R. Nagpal, Khanna Publishers
9. Power station Engineering and Economy by Bernhardt G.A. Skrotzki and William A. Vopat, TMH
10. Power Plant Engineering, Manoj Kumar Gupta, PHI Learning
11. Nuclear Power Plant Engineering, James Rust, Haralson Publishing Company
12. Nuclear Power Plants, Edited by Soon Heung Chang, InTech Publishers