# LESSON PLAN

## INTRODUCTION TO ELECTRIC GENERATION SYSTEM (TH 1)

3RD SEMESTER

ELECTRICAL ENGINEERING

PREPARED BY SMT. PRITEE P. MINZ

SR. LECTURER (ELECTRICAL)

## LEARNING OUTCOMES:

After completion of the course, the students will be able to

- Explain the optimized working of the thermal power plant
- Describe the efficient operation of large hydropower plants.
- Describe the efficient operation micro hydropower plants.
- Select the adequate mix of power generation based on economic operati

# DEPARTMENT OF ELECTRICAL ENGINEERING

## VISION:

To produce Electrical Engineer professionals who can contribute for socio-economic and technological development to meet global needs.

## MISSION:

**M1** - To strengthen academic infrastructure leading to quality professional by using modern technical tools and technologies.

**M2** - To impart innovative knowledge among the students and make more industry-institution programs to make them successful professionals for serving the society.

**M3** - To provide a learning environment to improve problem solving abilities, leadership abilities, ethical responsibilities and lifelong learning.

## PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

**PEO1:** Apply electrical engineering knowledge and practical skills to solve well-defined engineering problems using modern tools and techniques.

**PEO2:** Perform effectively in industry and society as competent junior engineer, supervisors, or entrepreneurs with ethical and sustainable engineering practices.

**PEO3:** Demonstrate teamwork, communication, leadership, and project management skills in professional engineering activities.

**PEO4:** Engage in lifelong learning and adapt to emerging technologies for career growth and higher education.

## PROGRAM SPECIFIC OUTCOMES

The electrical diploma engineers will be able to:

**PSO1:**-Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate engineering problems of electric circuits, analog and digital electronics, control system, electrical machines and power system.

**PSO2:-** Apply the appropriate techniques and modern engineering hardware and software tools in electrical engineering to engage in life-long learning and to successfully adapt in multidisciplinary environments.

**PSO3:**-Work professionally in power systems engineering, Electrical machinery and electrical circuit.

| DISCIPLINE: ELECTRICAL Engg. | SEMESTER: 3rd | NAME OF THE TEACHING FACULTY: Pritee Prava Minz, Sr. Lecturer (EE) |
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**SUBJECT: Introduction to Electric Generation Systems (TH 1)**
**NO. OF DAYS/ WEEK CLASS ALLOTTED – 45 Hrs**
**SEMESTER FROM DATE:14.07.2025 to 15.11.2025**

| WEEK | CLASS DAY | THEORY TOPICS<br>TOPIC COVERED |
|---|---|---|
| 1 | 1 | Thermal Power Plants: Coal, Gas/Diesel and Nuclear-based :Layout of a typical thermal power plant |
| | 2 | working of a typical thermal power plant with steam turbines and electric generators |
| | 3 | working of a typical thermal power plant with steam turbines and electric generators |
| 2 | 4 | working of a typical thermal power plant with steam turbines and electric generators |
| | 5 | Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Coal |
| | 6 | Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Gas |
| 3 | 7 | Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Diesel |
| | 8 | Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Nuclear fuels-fusion and fission action |
| | 9 | Safe Practices and working of various thermal power plants: coal- based |
| 4 | 10 | Safe Practices and working of various thermal power plants: gas- based |
| | 11 | Safe Practices and working of various thermal power plants: diesel-based |
| | 12 | Safe Practices and working of various thermal power plants: nuclear-based |
| 5 | 13 | Functions of Coal fired boilers: fire tube types of thermal power plants and their major auxiliaries |
| | 14 | Functions of the Coal fired boilers: water tube types of thermal power plants and their major auxiliaries |
| | 15 | Functions of the Gas/diesel based combustion engines types of thermal power plants and their major auxiliaries |
| 6 | 16 | Types of nuclear reactors :Disposal of nuclear waste and nuclear shielding |
| | 17 | Large Hydropower Plants: Energy conversion process of hydro power plant |
| | 18 | Classification of hydro power plant: High head |
| 7 | 19 | Classification of hydro power plant: medium and low head |
| | 20 | Classification of hydro power plant: low head |
| | 21 | Construction and working of High head-Pelton turbine used in different types of hydro power plant |
| 8 | 22 | Construction and working of Medium head-Francis turbine used in different types of hydro power plant |
| | 23 | Construction and working of Low head-Kaplan turbine used in different types of hydro power plant |
| | 24 | Safe Practices for hydro power plants |
| 9 | 25 | Locations of these different types of large hydro power plants in India |
| | 26 | Performance Test I |
| | 27 | Micro-Hydropower Plants: Layout of micro hydro power plants |
| 10 | 28 | Layout of micro hydro power plants |
| | 29 | Pelton turbines for different heads |

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| | 30 | Francis turbines for different heads |
| 11 | 31 | Kaplan turbines for different heads |
| | 32 | Locations of these different types of micro-Hydropower Plants |
| | 33 | Locations of these different types of micro-Hydropower Plants |
| 12 | 34 | Economics of Power Generation and Interconnected Power System: connected load, firm power, cold reserve, hot reserve, spinning reserve. |
| | 35 | Base load and peak load plants; Load curve |
| | 36 | Base load and peak load plants; load duration curve, integrated duration curve. |
| 13 | 37 | Cost of generation: Average demand, maximum demand, demand factor |
| | 38 | plant capacity factor, plant use factor |
| | 39 | diversity factor, load factor and plant load factor |
| 14 | 40 | Choice of size and number of generator units |
| | 41 | Choice of size and number of generator units |
| | 42 | Choice of size and number of generator units |
| 15 | 43 | Combined operation of power station Causes, Impact and reasons of Grid system fault: State grid, national grid, brownout and blackout; sample blackouts at national and international level. |
| | 44 | Combined operation of power station Causes, Impact and reasons of Grid system fault: State grid, national grid, brownout and blackout; sample blackouts at national and international level. |
| | 45 | Combined operation of power station Causes, Impact and reasons of Grid system fault: State grid, national grid, brownout and blackout; sample blackouts at national and international level. |
| 16 | 46 | Performance Test II |
| | 47 | Revision |

Signature of the Subject Teacher

Signature of the HOD

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