

NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	B. Tech in Electronics and Instrumentation Engineering
Course Code:	2EIDE05
Course Title:	Power Plant Automation
Course Type:	(<input type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course/ <input checked="" type="checkbox"/> Departmental Elective / <input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/ <input type="checkbox"/> Any other)
Year of introduction:	2023-2024

Credit Scheme

L	T	Practical component			C
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Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. assess various operational aspects of power plant and compare thermal, nuclear and hydro power plant
2. evaluate various control systems of thermal power plant
3. examine various subsystems and health monitoring system of thermal power plant
4. optimize thermal power plant operation.

Syllabus:

Total Teaching hours: 45

Unit	Syllabus	Teaching hours
Unit-I	Introduction: Overview of Power Generation and Distribution, Types of power plants - thermal, hydro, combined cycle, nuclear and other non-conventional power generation, Indian and Global Power generation scenario, Overview of super critical thermal power plant, Economics of Power generation,	04
Unit-II	Power Plant Process Control Boiler process, Operation, Drum level control, Fuel-to-Air ratio control, Super-heated steam temperature control, Steam pressure control, Furnace pressure	10



control, Flue gas temperature control, Sequential control operation

Unit-III	Turbine Supervisory Control Overview of steam turbine operation, Health monitoring system of turbine, Speed controls of turbine	06
Unit-IV	Power Plant Subsystem Automation Coal handling system, Pulverizer and its control, Ash handling system, Electro Static Precipitator (ESP), Performance of ESP, Feed water treatment system	10
Unit-V	Power Plant Instruments Flue gas monitoring instruments, Water and steam quality measurement instruments, Smoke detecting instruments	10
Unit-VI	Plant Optimization Performance measurement of power plant, Excess O ₂ optimization, Water side optimization, Performance optimization with multivariable control.	05

Industrial visits will be arranged to demonstrate the operation of thermal power plant.

Self-Study: The self study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self study contents.

Suggested List of Experiments: --

Suggested Readings/References:

1. Arora and Domkundwar, Power Plant Engineering, Dhanpatrai and Sons Publication
2. Bela G. Liptak, Instrumentation Engg's Handbook on Process Control, CRC Press
3. Krishnaswamy K, Bala M, Power Plant Instrumentation, PHI Publication
4. Max Jervis, Power Station Instrumentation, Butterworth-Heinemann Publication
5. P. K. Nag, Power Plant Engineering, Tata McGraw Hill Publication

Suggested Case List: --

L= Lecture, T=Tutorial, P= Practical, C= Credit

w.e.f. academic year 2023-24 and onwards.