Nirma University
School of Technology, Institute of Technology
B. Tech (Instrumentation and Control Engineering)

Semester VII

L	T	P	C
3	0	0	3

Course Code	**2ICDE05**
Course Title	**Power Plant Automation**

Course Outcomes (CO):

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: **Teaching Hours**

UNIT 1: Introduction **04**

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,

UNIT 2: Power Plant Process Control **10**

Boiler process, Operation, Drum level control, Fuel-to-Air ratio control, Super-heated steam temperature control, Steam pressure control, Furnace pressure control, Flue gas temperature control, Sequential control operation

UNIT 3: Turbine Supervisory Control **06**

Overview of steam turbine operation, Health monitoring system of turbine, Speed controls of turbine

UNIT 4: Power Plant Subsystem Automation **10**

Coal handling system, Pulverizer and its control, Ash handling system, Electro Static Precipitator (ESP), Performance of ESP, Feed water treatment system

UNIT 5: Power Plant Instruments **10**

Flue gas monitoring instruments, Water and steam quality measurement instruments, Smoke detecting instruments

UNIT 6: Plant Optimization **05**

Performance measurement of power plant, Excess O_2 optimization, Water side optimization, Performance optimization with multivariable control.

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.

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

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