C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF: Technology & Engineering
DEPARTMENT OF: Instrumentation & Control Engineering
SEMESTER: VIII
CODE: - 4TE08PPI1
NAME: - Elective – II - Power Plant Instrumentation

Teaching & Evaluation Scheme

Subject Code	Subject Name	Teaching Hours/Week				Credits	Evaluation Scheme/Semester							
							Theory				Practical			Total Marks
							Sessional Exam		University Exam		Internal		University	
		Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE08PPI1	Power Plant Instrumentation	4	0	2	6	5	30	1.5	70	3	--	20	30	**150**

OBJECTIVES:

1. To provide an overview of different methods of power generation with a particular stress on thermal power generation.
2. To bring out the various measurements involved in power generation plants.
3. To provide knowledge about the different types of devices used for analysis.
4. To impart knowledge about the different types of controls and control loops.
5. To familiarize the student with the methods of monitoring different parameters like speed, vibration of turbines and their control

PREREQUISITES:

1. Basics of various measurement devices & control system components.
2. Basics of instrumentation systems.

COURSE OUTLINES:

Sr. No.	Course Contents	No Of Hours
1	**OVERVIEW OF POWER GENERATION:** Brief survey of methods of power generation (hydro, thermal, nuclear, solar and wind), importance of instrumentation in power generation, thermal power plants, building blocks , details of boiler processes, UP&I diagram of boiler, cogeneration.	10
2	**MEASUREMENTS IN POWER PLANTS :** Electrical measurements (current, voltage, power, frequency, power factor etc.), non-electrical parameters: flow of feed water, fuel, air and steam with correction factor for temperature, steam pressure and steam temperature, drum level measurement, radiation detector, smoke density measurement, dust monitor.	12

3	**ANALYZERS IN POWER PLANTS** Flue gas oxygen analyzer, analysis of impurities in feed water and steam, dissolved oxygen analyzer, chromatography, PH meter, fuel analyzer, pollution monitoring instruments.	10
4	**CONTROL LOOPS IN BOILER**: Combustion control, air/fuel ratio control, furnace draft control, drum level control, main stem and reheat steam temperature control, super heater control, attemperator, deaerator control, distributed control system in power plants, interlocks in boiler operation.	12
5	**TURBINE – MONITORING AND CONTROL:** Speed, vibration, shell temperature monitoring and control, steam pressure control, lubricant oil temperature control, cooling system	12

Learning Outcomes:

1. The students will be familiarized with the functions and instrumentation available in a modern power generation plant.

BOOKS RECOMMENDED:

1. Sam G. Dukelow, The control of Boilers, instrument Society of America, 1991.
2. Modern Power Station Practice, Vol.6, Instrumentation, Controls and Testing, Pergamon Press, Oxford, 1971.
3. Elonka,S.M.and Kohal A.L.Standard Boiler Operations, McGraw-Hill, New Delhi, 1994.
4. R.K.Jain, Mechanical and industrial Measurements, Khanna Publishers, New Delhi, 1995.
5. Instrument Engineers' Handbook by B. G. Liptak