
Program	Engineering
Specialization	Energy Technology
Course Number	020304241
Course Title	Instrumentation technology in electrical power plants
Credit Hours	2
Theoretical Hours	2
Practical Hours	0

Brief Course Description:

Instrumentation and process control technicians install, maintain, repair, and adjust the measuring and controlling instruments that make plants run safely.

Course Objectives:

This course is designed to ability to understand and analyze Instrumentation systems and their applications to various industries. Upon completion of this course the student should achieve the following goals:

1. To provide an overview on power generation through various methods.
2. To educate on the important power plant measurements and devices.
3. To educate on basic Boiler control techniques.
4. To educate on advanced Boiler control techniques.
5. To educate on the turbine control techniques.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1	Overview of Power Generation	Survey of methods of power generation :- hydro, thermal, nuclear, solar and wind power – Importance of instrumentation in power generation – Thermal power plant – Building blocks – Combined Cycle System – Combined Heat and Power System – sub critical and supercritical boilers.	
2	Measurements In Power Plants	Measurement of feed water flow, air flow, steam flow and coal flow – Drum level measurement – Steam pressure and temperature measurement – Turbine speed and vibration measurement – Flue gas analyzer – Fuel composition analyzer.	
3	Boiler Control – I	Combustion of fuel and excess air – Firing rate demand – Steam temperature control – Control of deaerator – Drum level control – Single, two and three element control – Furnace draft control – implosion – flue gas dew point control – Trimming of combustion air – Soot blowing.	

4	Boiler Control – II	Burners for liquid and solid fuels – Burner management – Furnace safety interlocks – Coal pulverize control – Combustion control for liquid and solid fuel fired boilers – air)fuel ratio control – fluidized bed boiler – Cyclone furnace.	
5	Control Of Turbine	Types of steam turbines – impulse and reaction turbines – compounding – Turbine governing system – Speed and Load control – Transient speed rise – Free governor mode operation – Automatic Load & Frequency Control – Turbine oil system – Oil pressure drop relay – Oil cooling system – Turbine run up system.	

Evaluation Strategies:

Exams		Percentage	Date
1. Exams	Med- Term Exam	40%	
	Final Exam	50%	
2. Homework and Projects		10%	

Teaching Methodology:

1. Lecture

Text Books & References:

Textbook:

1. Overett Woodruff , Herbert Lammers, Thomas Lammers, Steam Plant Operation, 9 th Edition McGraw Hill, 2012.
2. Rajput R.K., AText book of power plant Engineering. 5th Edition, Lakshmi Publications,2013.

References:

1. Liptak B.G., Instrumentation in Process Industries, Chilton Book Company, 2005.
2. P.K. Nag, Power plant Engineering, Tata McGraw; Hill Education, 3rd edition, 2007.