

# Basics of Power Plant Operations - Steam

102 Total Lessons

## Module 1 – Power Plant Basics (4)

### Energy Conversion

501-02	Steam Turbine Basics
501-03	Combustion System Component Overview
501-04	Boiler Water and Steam Cycle Overview
501-05	Generator Overview

## Module 2 – Basic Electricity (6)

401-01	Electron Theory
401-02	Magnetism and Electromagnetism Explained
402-01	Introduction to Alternating Current (AC)
409-01	AC Induction Motors
409-02	AC Generators
415-01	Transformer Basic Operation and Theory

## Module 3 – Plant Instrumentation and Control Theory (6)

603-01	Instrumentation and Control Overview
603-06	Temperature Instruments
603-07	Pressure Measuring Devices
603-08	Level Measuring Devices
603-09	Flow Measuring Devices
613-01	Introduction to Automated Control

## Module 4 – Introduction to Plant Equipment (6)

219-01	Introduction to Centrifugal Pumps
215-01	Introduction to Valves and Their Components
223-01	Heat Exchanger Theory
223-02	Open Heat Exchanger Design and Operation
231-01	Introduction to Positive Displacement Pumps
243-01	Introduction to Hydraulics

## Module 5 – Plant Drawings (2)

611-01	P&ID Basics
611-02	Reading a P&ID

## Module 6 – Plant Systems (5)

521-01	Introduction to Combustion Air and Flue Gas Systems
521-02	Combustion Air and Flue Gas Flow Paths and Components
551-01	Introduction to the Circulating Water System
553-01	Introduction to the Condensate System
553-02	Introduction to the Feedwater System

## Module 7 – Turbines (3)

505-01	Steam Turbine Design
505-02	Steam Turbine Valves and Controls
505-03	Steam Turbine Auxiliaries

## Module 8 – Boilers & Boiler Fuel Systems (16)

522-01	Coal Handling System
523-01	Boiler Fuel System Function
523-02	Process and Methods of Control for the Boiler Fuel System
523-03	Boiler Fuel System Start-up
523-04	Normal Operation of the Boiler Fuel Systems
523-05	Shutdown for the Boiler Fuel System
531-01	Combustion Theory
531-02	Basic Boiler Design
531-03	Boiler Valves and Fittings
531-04	Boiler Fuel and Air Systems
531-05	Boiler Water and Steam Cycle
531-06	Boiler Heat Recovery Systems
531-07	Boiler Environmental Controls
531-08	Boiler Operator Roles and Responsibilities
533-01	Fuel Combustion and Controls
533-02	Boiler Burner Controls and Management



## Module 9 – Power Generation (6)

507-01	Generator and Auxiliary Systems' Functions
507-02	Generator and Auxiliary Systems' Flow Paths and Major Components
507-03	Generator Construction and Process Control
507-04	Generator and Auxiliary Systems' Start-up
507-05	Generator and Auxiliary Systems' Normal Operations
507-06	Generator and Auxiliary Systems' Shutdown

## Module 10 – Environmental Protection (6)

535-01	Flue Gas Desulfurization System
535-02	Flue Gas Desulfurization System (FGDS) Open Spray Design, Part 1
535-03	Flue Gas Desulfurization System (FGDS) Open Spray Design, Part 2
535-04	Dry Scrubber Operation
535-05	Selective Catalytic Reduction (SCR)
563-15	Environmentally Sensitive Operations

## Module 11 – Electrical Systems and Equipment (16)

411-04	Motor Control Centers
417-01	Switchgear
417-02	Low Voltage Breakers
417-03	Medium and High Voltage Switchgear
417-04	General Switchgear Maintenance
417-05	Switchgear Specific Maintenance Procedures
417-06	Circuit Breaker Time Travel
418-03	Protection Relays
418-04	Generator, Transformer, and Motor Protection
418-05	Grounding and Bonding
427-01	Electrical Freeze Protection Components and Application
560-01	Main Transformers
560-02	Station Service System
560-03	Fuses and Circuit Breakers
560-04	Protective Relays and Instrument Transformers
560-05	Equipment Disconnects and Grounding

## Module 12 – Plant Controls (4)

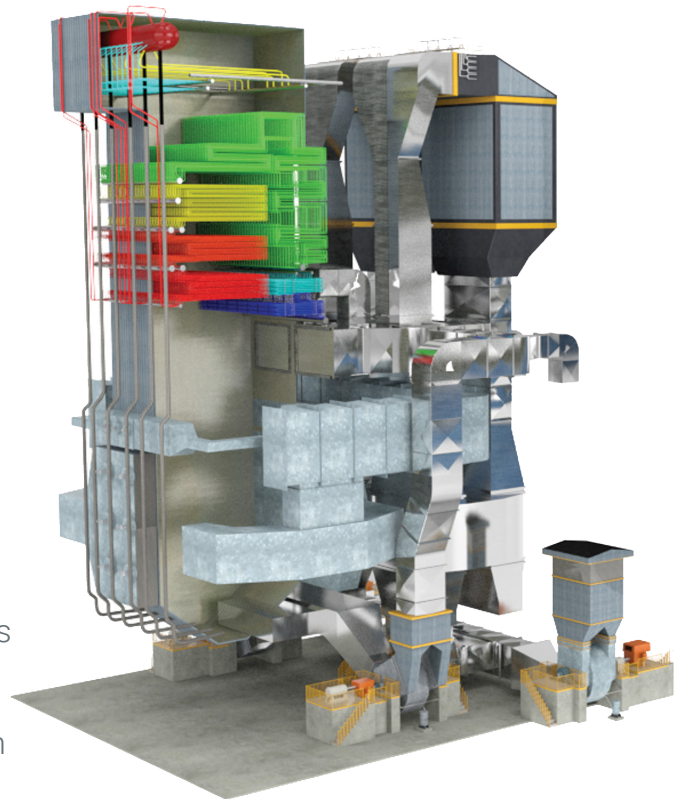
565-01	Distributed Control System Fundamentals
565-02	Distributed Control System Components
565-03	Using Distributed Control System Diagrams
565-04	Power Plant Unit Control

## Module 13 – Steam Table (3)

567-01	Understanding the Basic Properties of Water and Steam
567-02	Saturated Steam Tables
567-03	Superheated Steam Tables

## Module 14 – Basic Water Chemistry and Treatment (11)

559-01	Molecular Chemistry of Water
559-02	Elements and the Periodic Table of Elements
559-03	Chemical Compounds
559-04	Corrosion Causes and Effects
559-05	Corrosion Control in a Power Plant
559-06	Steam Chemistry Control and Guidelines
559-07	Power Plant Water Treatment Systems
559-08	Introduction to Desalination
559-09	Desalination: Pre- and Post-treatment of Water
559-10	Reverse Osmosis
559-11	Thermal Desalination Technologies



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