



[www.niulpe.org](http://www.niulpe.org)  
email: [info@niulpe.org](mailto:info@niulpe.org)

**NATIONAL INSTITUTE FOR THE UNIFORM LICENSING OF POWER ENGINEERS, INC.**  
**PO BOX 16369**  
**PITTSBURGH, PA 15242-0369**  
**PHONE: (888) 648-5566 FAX: (888) 648-5577**

# **REFERENCE SYLLABUS**

For

**Power Engineer (2nd Class)**



# POWER ENGINEER (2ND CLASS)

## SYLLABUS

### Introduction

This Syllabus is intended to assist candidates studying for the Power Engineer (2nd Class) Examination.

#### **Recommended Study Program:**

It is recommended that, before undertaking this examination, the candidate completes Power Engineering Course of study, offered through a recognized and approved technical institute or training provider which addresses the Syllabus Outline.



# POWER ENGINEER (2ND CLASS)

## SYLLABUS

Reference Syllabus for Power Engineer (2nd Class) Examination Candidates

### **Major Topic: Code Calculations and Legislation**

Topic 1 A.S.M.E. Code Calculations - Cylindrical Components

Topic 2 ASME Code Calculations: Stayed Surfaces, Pressure Relief Valves and Furnaces

Topic 3 Boiler and Pressure Vessel Legislation

Topic 4 Plant Design and Installation

Topic 5 Management and Supervision

Topic 6 Plant Maintenance

Topic 7 Safety

Topic 8 Linear Motion

Topic 9 Angular Motion

Topic 10 Friction

Topic 11 Static and Dynamic Forces

Topic 12 Fluid Mechanics

### **Major Topic: Thermodynamics and Metallurgy**

Topic 1 Heat, Expansion of Solids, and Heat Transfer

Topic 2 Thermodynamics of Gases

Topic 3 Thermodynamics of Steam

Topic 4 Practical Thermodynamic Cycles

Topic 5 Metallurgy

Topic 6 Testing of Metals

Topic 7 Corrosion of Metals

Topic 8 Introduction to Welding Symbols



# POWER ENGINEER (2ND CLASS)

## SYLLABUS

### **Major Topic: Boilers and Water Treatment**

Topic 1 Boiler and Steam Generator Components and Design

Topic 2 Specialized Boiler Designs

Topic 3 Boiler and Steam Generator Operation

Topic 4 Boiler and Steam Generator Maintenance and Inspection

Topic 5 Pumps

Topic 6 Water Chemistry and Analysis

Topic 7 Water Pre-Treatment I

Topic 8 Water Pre-Treatment II

Topic 9 Internal Water Treatment

Topic 10 Non-Boiler Water Treatment

### **Major Topic: Prime Movers**

Topic 1 Steam Turbine Theory and Construction

Topic 2 Steam Turbine Auxiliaries and Control

Topic 3 Steam Turbine Operation and Maintenance

Topic 4 Steam Condensers

Topic 5 Internal Combustion Engines: Components and Auxiliaries

Topic 6 Internal Combustion Engines: Operation and Maintenance

Topic 7 Gas Turbine Design and Auxiliaries

Topic 8 Gas Turbine Operation and Control

Topic 9 Lubrication

Topic 10 Piping

Topic 11 Mechanical Drawing

### **Major Topic: Combustion and Plant Systems**

Topic 1 Power Plant Fuel Systems

Topic 2 Power Plant Water and Steam Systems

Topic 3 Measurement and Control Components

Topic 4 Control Instrumentation Systems

Topic 5 Fuels and Combustion Calculations

Topic 6 Firing and Draft Equipment

Topic 7 Combustion Control and Safeguards

Topic 8 Environmental Monitoring

Topic 9 Environmental Control Methods



# POWER ENGINEER (2ND CLASS)

## SYLLABUS

### **Major Topic: Electricity and Refrigeration**

**Topic 1 Alternating Current Theory**

**Topic 2 Direct Current Machines**

**Topic 3 Alternating Current Generators**

**Topic 4 Alternating Current Motors**

**Topic 5 Transformers**

**Topic 6 Electrical System Protection**

**Topic 7 Air and Gas Compression**

**Topic 8 Refrigeration Systems and Equipment**

**Topic 9 Refrigeration Safety, Control, and Operation**

**Topic 10 Refrigeration Calculations**