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# **REFERENCE SYLLABUS**

For

**International Power Engineer (1st Class)**



# INTERNATIONAL POWER ENGINEER (1ST CLASS)

## SYLLABUS

### Introduction

This Syllabus is intended to assist candidates studying for the International Power Engineer (1st 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.



# INTERNATIONAL POWER ENGINEER (1ST CLASS)

## SYLLABUS

Reference Syllabus for International Power Engineer (1st Class) Examination Candidates

### Major Topic: **Applied Thermodynamics and Plant Cycles**

Topic 1 Rankine and Brayton Cycles

Topic 2 Thermodynamics of Steam

Topic 3 Steady Flow Process Calculations

Topic 4 Thermodynamics of Perfect Gases

Topic 5 Expansion and Heat Transfer

Topic 6 Refrigeration Calculations

### Major Topic: **Principles of Applied and Fluid Mechanics**

Topic 1 Lifting Machines

Topic 2 Energy and Momentum

Topic 3 Centripetal Force and Acceleration

Topic 4 Torque and Torsion

Topic 5 Stress and Strain

Topic 6 Static Fluids

Topic 7 Fluids in Motion

### Major Topic: **Applied Engineering Technologies**

Topic 1 Metallurgy

Topic 2 Corrosion, Chemistry and Processes

Topic 3 Boiler Corrosion

Topic 4 Corrosion Monitoring and Prevention Techniques

Topic 5 Corrosion Prevention Programs

Topic 6 Fuel Types

Topic 7 Burner Design

Topic 8 Combustion Optimization

Topic 9 Combustion Safety and Emissions

Topic 10 Water Pre-Treatment

Topic 11 Internal Water Treatment

Topic 12 Water Treatment Management

Topic 13 Non-Boiler Water Treatment



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### **Major Topic: Power Plant Operations**

Topic 1 Electrical Energy Management

Topic 2 Plant and Equipment Efficiencies

Topic 3 Power Plant Construction

Topic 4 Commissioning and De-Commissioning

Topic 5 Retrofitting

### **Major Topic: Legislation and Codes for Industrial Equipment**

Topic 1 Codes, Acts and Regulations

Topic 2 ASME Section I

Topic 3 ASME Section VIII and IX

Topic 4 CSA B-51 and B-52

Topic 5 Piping and API Codes

### **Major Topic: Safety, Loss, and Environmental Program Management**

Topic 1 Loss Control

Topic 2 Safety Legislation

Topic 3 Safe Work Programs

Topic 4 Emergency Response and Incident Investigation

Topic 5 Environmental Legislation

Topic 6 Environmental Management



# INTERNATIONAL POWER ENGINEER (1ST CLASS)

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### Major Topic: **Inspection, Maintenance and Repair Practices**

Topic 1 Project Management

Topic 2 Maintenance Management Practices

Topic 3 Boiler Repairs

Topic 4 Pressure Vessel and Piping Repairs

Topic 5 Non-Destructive Examination

Topic 6 Rotating Equipment Maintenance

Topic 7 Rotating Equipment Monitoring

### Major Topic: **Business and Workforce Management**

Topic 1 Business Management

Topic 2 Contract Management

Topic 3 Problem Solving and Decision Making

Topic 4 Leadership

Topic 5 Communication and Conflict Resolution

Topic 6 Labor Relations

Topic 7 Recruitment and Employee Development

Topic 8 Management Structures and Organization