

## **Industrial Foundation Tuition \$550**

**Certification:** Clemson University

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Despite the diversity in industrial facilities with respect to size, processes, complexity, and equipment, there are common skills and knowledge sets applicable to all industries that must be mastered for successful job performance in operations and maintenance. The Foundation Series consists of nine core subject areas required to succeed in industry operations and maintenance from a technical perspective: Overview of Industrial Facility Systems, Safety, Mathematics, Tools, Maintenance, Environment, Computers, Print Reading, and Science. These subject areas comprise a total of 45 modules that are divided into objective-driven topics. The topics focus on the entry-level skills and knowledge, presented within an industrial context, necessary to achieve the requisite competency for further specialization.

**Overview of Industrial Facility Systems** - This introductory module provides an overview of industrial-scale systems, including electrical, water, and HVAC, as well as industrial standards and units of measure. These systems are used to provide examples and practical applications of the content presented in each subsequent subject area.

**Safety** - The modules in the Safety subject area begin by providing an overview common industrial facility hazards and protective systems, including the areas of a facility where these hazards may be encountered. These modules also introduce fire and electrical safety practices, as well as discuss topics such as hazardous communications, lockout/tagout, industrial signage, and personal protective equipment.

**Mathematics** - Mathematics is one of the oldest and most fundamental sciences and is used in all aspects of modern industry in some form or another. The modules in this subject area range from basic calculations using whole numbers and fractions to problem solving and analysis using algebra and trigonometry. A working knowledge of mathematics not only improves the general efficiency of day-to-day tasks and operations, but also positively affects the economic stability of the organization.

**Tools** - Understanding the proper uses and safety requirements for hand and power tools is essential for technicians and workers in all industrial fields. The modules in this subject area provide participants with an overview of the most common types of tools used in industry as well their functions, applications, and requirements for safe operation. Acquiring a working knowledge of these tools not only facilitates a more productive work environment but reinforces safety issues, as well.

**Maintenance** - The modules in the Maintenance subject area discuss the importance of preventive maintenance, predictive maintenance, and troubleshooting practices, as well as how they aid in prolonging the life and increasing the reliability of equipment, instrumentation, and general facilities. These modules provide an overview of the advantages and benefits of each type of maintenance, including best practices, tools and techniques, and useful resources.

**Environment** - The modules in the Environment subject area provide a detailed overview of the impact of different environmental issues on industry, including the pollutants and hazardous materials commonly found in plant environments. These modules also introduce environmental, health, and safety regulations established by law through agencies such as OSHA and the EPA. Additionally, this area discusses ways to minimize pollution, as well as the proper safety precautions to follow when handling hazardous materials.

Computers - This subject area provides an overview of basic computer concepts and the use of computers for industrial applications. The topics covered in this module include basic computer components, file management and naming conventions, and networking concepts. These modules also introduce residential and industrial computer systems, equipment control and monitoring systems, and portable peripheral devices, including both those that interface with equipment or a process and those that are used for recording information.

Print Reading - The use of prints is the most efficient way to convey information about systems and equipment that cannot be expressed by words alone. By using symbols and notes, a large amount of information that might require many pages of written description can be presented in a condensed form on one diagram. Within the topics in this module, participants learn how to identify the different types of mechanical and electrical drawings, as well as how to read the symbols and other information contained within them.

Science - The Science subject area introduces fundamental concepts of science and how they apply to plant operation and maintenance. The modules begin with a discussion of basic chemistry and water chemistry, including descriptions of the different parameters monitored within industrial systems and applications. This subject area goes on to provide a detailed overview of applied physics, including topics such as laws of motion, work, energy, and power, heat transfer, fluid mechanics, ideal gas law, and thermodynamics.

## OUTLINE

### **Overview of Industrial Facility Systems**

- Overview of Industrial Facility Systems
- Safety
- Industrial Facility Safety
- Fire Safety
- Hazardous Communications
- Lockout/Tagout
- Electrical Safety
- Industrial Signage
- Personal Protective Equipment
- Benzene Awareness
- First Aid I
- First Aid II
- Hydrogen Sulfide

### **Mathematics**

- Whole Numbers
- Fractions
- Decimals and Percentages
- Exponents and Scientific Notation
- Fundamentals of Algebra I
- Fundamentals of Algebra II
- Fundamentals of Geometry I
- Fundamentals of Geometry II
- Fundamentals of Trigonometry
- Scientific Calculator Use
- Fundamentals of Statistics I
- Fundamentals of Statistics II
- Introduction to Calculus

### **Tools**

- Hand Tools I
- Hand Tools II
- Power Tools
- Maintenance
- Preventive Maintenance
- Predictive Maintenance
- Basic Troubleshooting
- Environment
- Environmental Awareness
- Hazardous Materials

### **Computers**

- Computer Use Basics
- Computers in Industry
- Print Reading
- Print Reading Basics
- Piping and Instrumentation Diagrams

### **Science**

- Introduction to Chemistry
- Water Chemistry
- Applied Physics I: Work, Energy and Power
- Applied Physics II: Laws of Motion
- Applied Physics III: Heat Transfer
- Applied Physics IV: Fluid Mechanics
- Applied Physics V: Ideal Gas Law
- Applied Physics VI: Thermodynamics

### **ASSESSMENTS/TESTING**

Each module contains numerous Knowledge Checks along the way to help you measure your understanding. At the end of each module there is a final quiz. A score of 80% or higher is required to earn a certificate of completion.

### **CONTACT HOURS**

22.5 hours

### **OUTCOME**

Upon successful completion of the Foundation Series nine core subject areas students will gain basic knowledge to work in industry operations and maintenance from a technical perspective: Overview of Industrial Facility Systems, Safety, Mathematics, Tools, Maintenance, Environment, Computers, Print Reading, and Science. IACET CEU's awarded along with certificate of completion

### **FORMAT**

Self-directed lessons using Visual Demonstrations & Multimedia Presentations

### **STUDENT ACCESS**

1 year