

Course No. 1557

Industrial Utilities Engineering Training Course

UTILITIES & PLANT ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Industrial Utilities Engineering Training Course provides a comprehensive and practical framework for understanding, operating, optimizing, and managing the utility systems that support industrial plants and production facilities. Industrial utilities are fundamental to safe, reliable, and efficient operations because they provide the essential services required by process units, manufacturing systems, equipment, and facility infrastructure. The course develops a structured understanding of utility systems and their interaction with industrial processes, equipment, maintenance, energy management, and operational performance.

The programme covers the engineering principles, operating requirements, performance considerations, and management practices associated with major industrial utility systems. Participants examine steam and condensate systems, boilers, cooling water, chilled water, compressed air, industrial gases, water treatment, wastewater systems, electrical utilities, fuel systems, and other supporting services commonly found within industrial facilities. Particular attention is given to system reliability, energy efficiency, equipment performance, operational risks, and effective utility management.

Industrial utility systems can significantly influence production continuity, operating costs, equipment reliability, and environmental performance. The course therefore focuses on identifying performance losses, understanding system interactions, recognizing common operational problems, and applying engineering approaches to improve utility efficiency and reliability. Participants also explore the relationship between utility demand, production requirements, equipment capacity, process conditions, and maintenance strategies.

Designed for industrial and corporate environments, the Industrial Utilities Engineering Training Course is particularly relevant to oil and gas organizations, petrochemical facilities, power and energy companies, manufacturing plants, water and wastewater facilities, infrastructure operators, and large industrial organizations. The programme combines technical concepts with practical problem-solving exercises to help participants evaluate utility systems and make better engineering and operational decisions.

Through practical applications, engineering case studies, system analysis, and performance improvement exercises, participants develop the ability to assess industrial utility systems from an integrated perspective. The course supports organizations in strengthening utility reliability,

improving energy and resource efficiency, reducing avoidable losses, supporting maintenance effectiveness, and maintaining dependable services for critical industrial operations.

Objectives

- Analyze the principal industrial utility systems supporting production facilities and identify their operational requirements within the course timeframe.
- Evaluate the operating principles and performance characteristics of boilers, steam systems, cooling systems, compressed air systems, and water systems.
- Assess utility demand and system capacity requirements against industrial production and process conditions.
- Apply engineering principles to identify common operational problems affecting industrial utility systems.
- Develop practical approaches for improving utility system efficiency, reliability, and operational performance.
- Evaluate energy and resource consumption across major industrial utility systems and identify opportunities for improvement.
- Analyze the interaction between utility equipment, distribution networks, process requirements, and production operations.
- Apply appropriate engineering methods to troubleshoot utility system performance problems and determine potential causes.
- Strengthen understanding of preventive and predictive maintenance requirements for critical utility equipment.
- Assess utility system risks and identify appropriate operational, engineering, and maintenance controls.
- Design practical improvement initiatives addressing utility losses, inefficiencies, reliability issues, and operational constraints.
- Develop an integrated utility performance improvement action plan by the end of the course.

Who Should Attend

The Industrial Utilities Engineering Training Course is designed for engineers, technical professionals, supervisors, and managers involved in the design, operation, maintenance, optimization, and management of industrial utility systems. It is particularly suitable for Mechanical Engineers, Chemical Engineers, Electrical Engineers, Utilities Engineers, Process Engineers,

Maintenance Engineers, Reliability Engineers, Energy Engineers, Facilities Engineers, Operations Engineers, and Utility System Specialists.

The programme is also relevant to Utility Managers, Engineering Managers, Maintenance Managers, Operations Managers, Plant Managers, Technical Services Managers, Energy Managers, Reliability Managers, and supervisors responsible for industrial support systems. Professionals working in boiler operations, steam systems, cooling water, chilled water, compressed air, water treatment, wastewater treatment, industrial gases, electrical utilities, and energy management will benefit from the integrated technical perspective of the course.

The course is especially valuable for professionals working in oil and gas, petrochemical, refining, power generation, manufacturing, heavy industry, water and wastewater, and other utility-intensive environments. It can also support senior technical personnel and decision makers responsible for capital planning, operational reliability, energy performance, maintenance strategies, and long-term improvement of industrial utility infrastructure.

Learning Outcomes

- Explain the purpose, configuration, and operating principles of major industrial utility systems.
- Evaluate the performance requirements of steam, boiler, cooling water, chilled water, compressed air, and water systems.
- Assess utility demand, capacity, distribution, and operating conditions within an industrial facility.
- Identify common causes of utility system inefficiency, instability, and equipment performance degradation.
- Analyze steam generation, distribution, condensate recovery, and steam utilization practices.
- Evaluate cooling water and chilled water systems in relation to heat removal and process requirements.
- Assess compressed air systems and identify potential sources of pressure loss, leakage, and inefficient operation.
- Explain the principles of industrial water treatment, wastewater management, and utility water quality control.
- Apply structured troubleshooting techniques to industrial utility equipment and distribution systems.
- Identify maintenance and reliability requirements for critical utility equipment and supporting

infrastructure.

- Evaluate opportunities for improving energy efficiency and reducing utility losses.
- Develop practical recommendations for improving the reliability, efficiency, and operational performance of industrial utility systems.

Course Outline

DAY 01

Industrial Utility Systems and Engineering Fundamentals

- Role and importance of industrial utilities in production facilities
- Industrial utility system architecture and major utility networks
- Utility demand, capacity, reliability, and operational requirements
- Utility integration with process units and production operations
- Fundamentals of energy and mass balances for utility systems
- Utility system design considerations and operating parameters
- Utility equipment selection and capacity considerations
- Utility distribution networks and system interfaces
- Common industrial utility failures and operational challenges
- Principles of utility reliability and availability

PRACTICAL APPLICATION

Develop an integrated utility system map for a representative industrial facility and identify critical utility dependencies

DAY 02

Steam, Boilers, and Thermal Utility Systems

- Boiler operating principles and major boiler components
- Boiler feedwater systems and water quality requirements
- Combustion fundamentals and boiler efficiency
- Steam generation, pressure control, and distribution
- Steam traps, condensate systems, and condensate recovery

DAY 02 — CONTINUED

- Steam pressure reduction and utility demand management
- Boiler blowdown and operational considerations
- Heat exchangers and thermal utility applications
- Common boiler and steam system problems
- Boiler and steam system efficiency improvement opportunities

PRACTICAL APPLICATION

Analyze a steam and boiler system, identify performance losses, and develop improvement recommendations

DAY 03

Cooling Water, Chilled Water, and Compressed Air Systems

- Industrial cooling water system configurations
- Cooling towers and heat rejection principles
- Cooling water circulation, temperature control, and quality management
- Fouling, corrosion, scaling, and their impact on system performance
- Chilled water systems and industrial cooling applications
- Chillers, pumps, heat exchangers, and system controls
- Compressed air generation and distribution systems
- Compressor selection, operating conditions, and performance
- Pressure losses, leakage, moisture, and air quality considerations
- Energy efficiency opportunities in cooling and compressed air systems

PRACTICAL APPLICATION

Diagnose performance problems in cooling and compressed air systems and identify engineering improvement measures

DAY 04**Industrial Water, Wastewater, Electrical Utilities, and Reliability**

- Industrial water sources and utility water requirements
- Water treatment processes and quality management
- Industrial wastewater collection and treatment systems
- Effluent quality, operational control, and environmental considerations
- Industrial electrical utility systems and critical power requirements
- Emergency power, standby generation, and electrical reliability
- Pumps, motors, drives, and utility equipment performance
- Utility equipment preventive and predictive maintenance
- Reliability-centered approaches for critical utility assets
- Failure modes, troubleshooting, and root cause analysis

PRACTICAL APPLICATION

Evaluate the reliability of a selected utility system and develop a maintenance and performance improvement strategy

DAY 05**Utility Optimization, Energy Efficiency, and Integrated Performance Management**

- Industrial utility performance indicators and measurement approaches
- Utility energy consumption and efficiency analysis
- Identifying energy losses and operational inefficiencies
- Utility optimization and demand management
- Integration of utility operations with production planning
- Utility system reliability and risk management
- Performance monitoring and operational data analysis
- Developing utility improvement projects and prioritizing opportunities
- Economic and operational considerations in utility system improvements
- Continuous improvement and long-term utility management

DAY 05 — CONTINUED

FINAL WORKSHOP

Conduct an integrated assessment of an industrial utility system and develop an action plan covering efficiency, reliability, maintenance, risk, and operational improvement

Register or Request More Information

Course page: <https://quest-training.com/courses/industrial-utilities-engineering-training-course>

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