



Armstrong Global Learning Course Handbook





Knowledge Not Shared Is Energy Wasted® is more than a marketing headline; it is a fundamental theme that speaks to the core of the Armstrong International brand. Throughout our century-plus history, Armstrong has grown to be identified as a “sage” - a company with the knowledge, products and people uniquely qualified to solve customer problems through the application of intelligent system solutions for steam, air and hot water utilities.

As we continue to grow and expand to markets around the world, we face the challenge of consistently applying the vast amount of collective knowledge possessed by the highly-skilled members of our global enterprise. Because we are fortunate to increasingly serve an array of multinational customers - such as Nestlé, Solvay, Coca-Cola, and others - our continued growth depends on our ability to deliver solutions that are not only best-in-class, but also consistent throughout the world.

Armstrong International is committed to capturing the global knowledge in our organization. This is an important project for us because we want to ensure that employees have access to information they need to quickly and easily to do exceptional work.

Armstrong’s Global Learning Mission

The purpose of Armstrong International’s global learning initiative is to give employees a solid understanding of basic steam, air and hot water utilities, an awareness and perspective concerning safety in the workplace, the habit of continued learning, and the power to enrich careers. Built upon a simple and swift approach to learning, Armstrong’s global learning initiative has been developed to provide an online- academic platform for continued professional and personal growth. Armstrong seeks to develop in each employee the ability and passion to work safely, efficiently and effectively for the betterment of the Armstrong culture and brand.

Deans and Professors

Internal experts from around the world have stepped up to share their advanced insights to create educational programs for Armstrong University. Throughout the process of developing course modules, each college has been led by one Dean and multiple Professors. Professors are selected based on product and service experience along with global representation.



The Learning Environment

Armstrong University offers an online learning experience that is convenient and flexible. Course modules are web-based and can be accessed anywhere, anytime at **education.armstronginternational.com**. After quickly registering for Armstrong University, you will be able to access every course that is currently available. Log on instructions can be found on page 3.

Armstrong University will be offered to all employees in three different learning environments:

- 1) **Study Hall:** An individual course will be presented to groups of 25 in the Armstrong Demo Room. A paper test will be administered after the course is complete. Study halls will be scheduled in advance. Schedules and sign up sheets will be posted around campus.
- 2) **Computer Lab Sessions:** The Armstrong Demo Room will be reserved for employees to have Internet and computer access for one hour sessions. Employees will have the opportunity to sign up for a specific course, but will be able to navigate and complete the course individually. Computer Lab Session schedules and sign up sheets will be posted around campus. These sessions are limited due to computer availability.
- 3) **Independent Study:** Armstrong University is available online 24 hours a day, every day. Create your own schedule and complete individual courses at your own pace anywhere you choose. Since Armstrong University is a web-based program all you need is a computer with Internet connection! All computer workstations around the Three Rivers campus, including the Demo Room, will be available for employee use on a 'first come, first served' basis.

Armstrong University Curriculum

The curriculum is comprised of ten colleges with over 150 courses total. Over the next four years numerous new courses will be introduced. Courses are categorized as 1) required, 2) highly-recommended or 3) elective. Your course schedule will be affected depending on your department. Please find your department course requirements within this handbook.

Colleges of Armstrong University

- ▶ **College of Environmental, Health and Safety** – Dean Rick Cumbo
- ▶ **College of Steam** – Dean Jon Bingaman
- ▶ **College of Condensate Return** – Dean Nevena Iordanova
- ▶ **College of Humidification** – Dean J.F. Frambot
- ▶ **College of Heat Recovery** – Dean Michel Poulin
- ▶ **College of Hot Water** – Dean Larry Daugherty
- ▶ **College of Water Treatment** – Dean Siddharth Raiker
- ▶ **College of Refrigeration** – Dean Rex Scare
- ▶ **College of Flow Measurement** – Dean Jon Bingaman

How do I access Armstrong University online?

1) Armstrong University is accessible three different ways:

- Click the Armstrong University icon located on your computer's desktop
- Visit the Armstrong Neighborhood and click the special Armstrong University icon
- Visit **education.armstronginternational.com** (Note: Pop-Up Blocker must be turned off on Internet browser)

Look for the Armstrong University Emblem in the Neighborhood or on your computer's desktop



Armstrong Single Sign-on

Enter your Username and Password

Username:

Password:

[Forgot your password?](#)

Armstrong Employees: Username must be entered as **domain\username**, where username is the first part of your email address.
Currently supported domain names are:

- amc
- alpi
- armintl
- sa

Everyone Else: Your username is your email address.

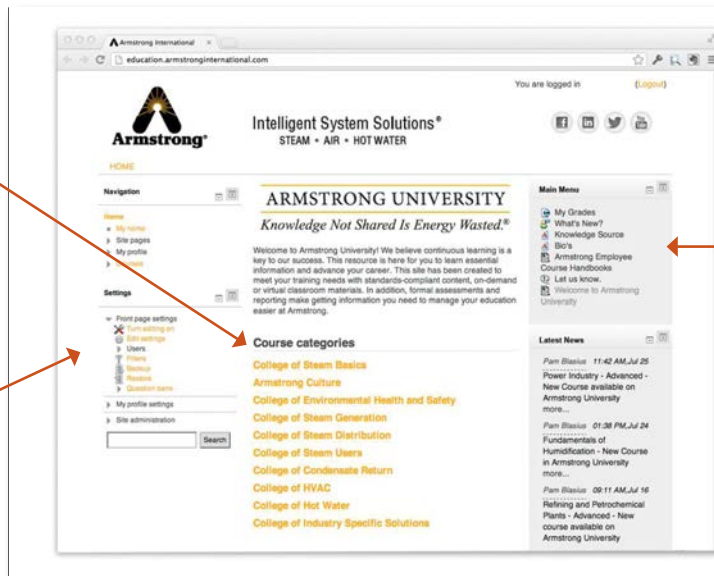
Sign in using your current network email, domain and password.

Navigating Armstrong University online

2) Once you are logged in, familiarize yourself with the homepage of Armstrong University. You'll find the list of **Courses** organized in the center of the page, **Navigation** tools on the right side of the page and **Settings** at the bottom left of the page.

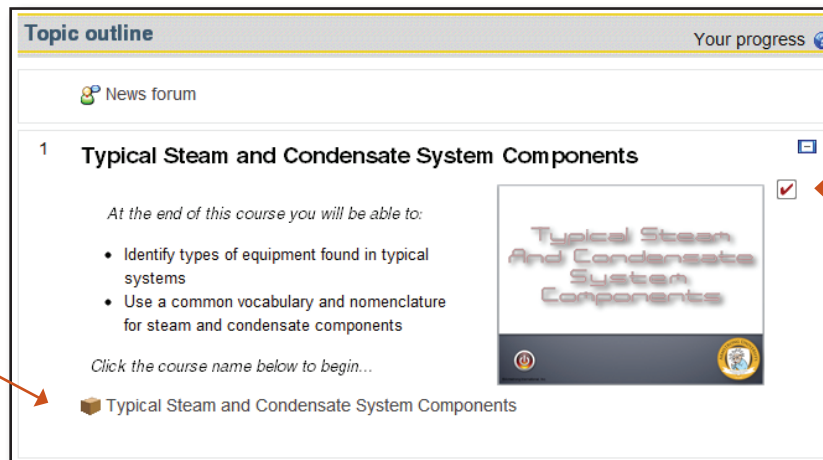
Available colleges and courses are displayed here.

Update your profile settings here.



Access Armstrong University tools here.

3) By selecting a course from the homepage, you will be able to access the lesson and test assessment.



Click here to begin the course module.

A red check mark indicates completion of the course.

4) More detailed instructions are available within the course module. Step-by-step guidelines are presented at the beginning of each course. *If you need technical assistance, please contact the CIU Help Desk (ext.5225) or press F11 to access the SysAid Help Desk online.*

Armstrong Culture - A Legacy of Leadership

Course 1

At the end of this course you will be able to:

A Legacy of Leadership

In this video, you'll learn about the importance of family culture at Armstrong.

All global employees are required to complete this course.

Time: 14 minutes

Language

Availability: English, French and Chinese

College Objective

Armstrong International is responsible for addressing environmental, health and safety issues in order to provide a safe working environment for its employees. These courses are designed to help you obtain an extensive education on environmental, health and safety practices.

Course 1

At the end of this course you will be able to:

Policy Violation

Armstrong Service Only

1. Explain the purpose for the policy
2. Give examples of how the policy applies to Armstrong employees
3. Identify what procedures to follow when a policy is violated

Time: 30 minutes

Language

Availability: English

Course 2

At the end of this course you will be able to:

First Aid, Medical and Bloodborne Pathogen

1. Identify how you might be exposed to bodily fluids in the workplace
2. Understand how you can protect yourself from exposure
3. Safely manage contaminated waste
4. Understand your right to medical evaluations

Time: 30 minutes

Language

Availability: English and Chinese

Course 3

At the end of this course you will be able to:

Workplace Injury and Accident Investigation

Armstrong Service Only

1. Insure employees receive prompt medical treatment and care due to workplace related injury
2. Understand the importance of immediately investigating an accident
3. Understand why an accident should be investigated in the first place
4. Know what needs to be investigated
5. Conduct the investigation of an accident
6. Complete what documents are required when an employee is injured

Time: 30 minutes

Language

Availability: English and Chinese

Course 4

At the end of this course you will be able to:

Work Alone

1. Understand the responsibilities for all Armstrong employees regarding work alone procedures
2. Implement steps to follow when working alone
3. Explain the Designated Representatives role to track an employee working alone
4. Understand the procedures to follow when an employee working alone does not respond

Time: 15 minutes

Language

Availability: English and Chinese

Course 5

At the end of this course you will be able to:

Personal Protective Equipment

1. Use various types of Personal Protective Equipment (PPE) on the job site correctly
2. Avoid common mistakes of PPE
3. Identify ways to protect yourself from fall injuries and electrical shock

Time: 20 minutes
Language
Availability:
English & Chinese

Course 6

At the end of this course you will be able to:

Hearing Conservation

1. Understand the importance of protecting your hearing
2. Understand how hearing damages can be prevented and monitored
3. Learn when to use personal hearing equipment

Time: 20 minutes
Language
Availability:
English & Chinese

Course 7

At the end of this course you will be able to:

Emergency Preparedness

1. Understand the need to plan for an emergency
2. Understand each person's responsibility
3. Prepare the steps to be taken in case of an emergency

Time: 20 minutes
Language
Availability:
English & Chinese

Course 8

At the end of this course you will be able to:

Job Hazard Analysis

1. Understand the responsibilities of the job hazard analysis team
2. Identify hazards that could cause personal injury or equipment damage
3. Develop and implement a job hazard plan

Time: 25 minutes
Language
Availability:
English & Chinese

Course 9

At the end of this course you will be able to:

Fall Protection

1. Understand the importance of using fall protection equipment
2. Define when it is necessary to use fall protection equipment and what type of equipment to use
3. Perform elevated work utilizing fall protection equipment

Time: 30 minutes
Language
Availability:
English & Chinese

Course 10

At the end of this course you will be able to:

Lockout/Tagout

1. Understand the importance of following proper lockout/tagout procedures
2. Know how to identify and use Armstrong lockout/tagout equipment
3. Effectively use lockout/tagout procedures to prevent accidents and damage to equipment

Time: 40 minutes
Language
Availability: English

Course 11

At the end of this course you will be able to:

Compressed Gases and Flammable Liquids

1. Understand how to safely handle compressed gases and flammable liquids
2. Know how to properly store compressed gases and flammable liquids
3. Know what to do in case of an emergency

Time: 30 minutes

Language

Availability: English

Course 12

At the end of this course you will be able to:

Electrical Safety

1. Understand the hazards associated with high voltage and current
2. Understand how current behaves and how it is controlled
3. Identify the right PPE to wear when working with electricity

Time: 35 minutes

Language

Availability:
English & Chinese

Course 13

At the end of this course you will be able to:

Machine Guarding

1. Understand that safeguards are in place to protect employees from potentially hazardous equipment
2. Identify different types of safeguards and how they work
3. Recognize danger points that should be guarded

Time: 12 minutes

Language

Availability:
English & Chinese

Course 14

At the end of this course you will be able to:

Fire Protection

1. Identify potential fire hazards
2. Determine which equipment to use in specific situations
3. Understand when to fight a fire and when to call for help

Time: 30 minutes

Language

Availability:
English & Chinese

Course 15

At the end of this course you will be able to:

Hot Work

1. Recognize the importance of proper hot work procedures
2. Know how hot work areas are defined
3. Understand the process involved in acquiring a hot work permit which will vary by location
4. Explain the roles of personnel involved in hot work

Time: 25 minutes

Language

Availability: English

Course 16

At the end of this course you will be able to:

Confined Space Entry

1. Identify permit-required confined spaces
2. Understand the hazards of confined spaces and when not to enter a confined space
3. Know the proper procedures to use when working in and around a confined space
4. Know how to prepare for emergency rescue situations

Time: 30 minutes

Language

Availability: English

Course 17

At the end of this course you will be able to:

Cranes, Hoists and Rigging

1. Understand proper safety measures when operating cranes, hoists and rigging
2. Understand the hazards involved when lifting materials
3. Conduct a crane, hoist and rigging safety inspection

Time: 17 minutes

Language

Availability:

English & Chinese

Course 18

At the end of this course you will be able to:

Arc Flash Awareness

1. Understand the causes of arc flash and how to avoid exposure
2. Understand why equipment should be placed in an electrically safe work condition prior to service using lockout/tagout
3. Select the correct personal protective equipment to wear when working with different voltages of electricity
4. Use safe work practices to reduce the hazards associated with an arc flash

Time: 30 minutes

Language

Availability: English

Course 19

At the end of this course you will be able to:

Powered Industrial Vehicles

1. Understand the hazards associated with powered industrial vehicles
2. Know how to properly balance loads to reduce risk of tip over
3. Use safe operating techniques to help avoid accidents

Time: 20 minutes

Language

Availability: English

Course 20

At the end of this course you will be able to:

EPCRA (Emergency Planning Community Right-To-Know Act)

1. Understand comprehensive emergency management roles and duties of emergency managers
2. Describe history of EPCRA and current roles in all-hazard management
3. Explain notification requirements for emergency releases of hazardous chemicals

Time: 30 minutes

Language

Availability: English

Course 21

At the end of this course you will be able to:

Regulated Waste

1. Identify what is regulated waste
2. Establish responsibilities and requirements for handling and disposal of regulated waste
3. Encourage resource conservation while ensuring adequate protection of human health and the environment
4. Identify whom to go to with questions

Time: 30 minutes

Language

Availability: English

Course 22

At the end of this course you will be able to:

Spill Prevention, Control and Countermeasures

1. Understand what SPCC means and to what it applies
2. Determine if your facility is regulated under this requirement
3. Understand reporting requirements, and
4. Know the responsibilities of individuals and response teams

Time: 20 minutes

Language

Availability:

English & Chinese

Course 23

At the end of this course you will be able to:

Line Breaking

1. Establish the responsibilities and requirements for preventing personal injury and equipment damage associated with disassembling (unthreading, unbolting, cutting) or otherwise opening piping.
2. Understand the potential injury risks when lines, pumps, vessels, tanks, or any other equipment are opened for the first time after use.

Time: 30 minutes

Language

Availability:

English and Chinese

Course 24

At the end of this course you will be able to:

Hazard Communication

1. Understand Chemical hazards, routes of entry, emergency first aid procedures, safe work practices, proper use of personal protective equipment, labels and storage and Material Safety Data Sheets (MSDS).

Time: 60 minutes

Language

Availability: English

Course 25

At the end of this course you will be able to:

Heat Stress

1. Determine the difference between heat cramps, heat exhaustion and heat stroke
2. Learn to avoid heat cramps, heat exhaustion and heat stroke
3. Understand best practices to ensure safety in hot conditions
4. Learn to safely work with heat producing equipment

Time: 30 minutes

Language

Availability: English

Course 26

At the end of this course you will be able to:

Storm Water Pollution Prevention Plan (SWPPP)

1. Understand the impact storm water pollution has on the environment and on the company
2. Understand established policies regarding handling of storm water run off
3. Identify types of pollution and control measures to reduce these pollutants
4. Learn the steps to take in case of an incident

Time: 30 minutes

Language

Availability: English

Course 27

At the end of this course you will be able to:

Permit Compliance

1. Learn the routine operational requirements regarding permit compliance
2. Understand the air, water and solid waste disposal and discharge requirements
3. Understand how Armstrong employees must comply with facility permit requirements

Time: 20 minutes

Language

Availability: English

Course 28

At the end of this course you will be able to:

Workplace Violence

1. Understand workplace violence and an active shooter
2. Increase your awareness and understanding of situations of workplace violence
3. Prescribe actions to take in the event of an active shooter incident
4. Learn how to respond when law enforcement arrives.

Time: 10 minutes

Language

Availability: English

Course 29

At the end of this course you will be able to:

Wellness

1. Understand how wellness affects your everyday life
2. Explain health risks and how to identify if you are at an increased risk
3. List ideas that you can utilize to manage/improve your overall health
4. Discover other positive steps that you can take to protect your health and safety

Time: 35 minutes

Language

Availability: English

Course 30

At the end of this course you will be able to:

Hazard Communication - Revise

1. Identify chemical hazards and properties
2. Discuss the handling and storage of chemical hazards
3. Identify labels and discuss safety data sheets
4. Discuss toxicology, ecological, transport and regulatory information
5. Discuss emergency measures

Time: 20 minutes

Language

Availability: English

College of Steam - Principles

College Objective

The College of Steam - Principles is comprised of numerous courses that explain the types of equipment found in typical steam systems, the types and variances of heat exchangers and also the types of boilers (high pressure and small package). Throughout these courses you will gain a better understanding of steam generation, distribution, heat transfer and condensate return processes. You'll learn how steam travels through a system. Some lessons explain different types of customer applications and challenges/problems and encourage you to develop a common vocabulary and nomenclature for steam components.

Course 1

At the end of this course you will be able to:

Typical Steam and Condensate System Components

1. Identify types of equipment found in typical systems
2. Use a common vocabulary and nomenclature for steam and condensate components

Time: 30 minutes

Language

Availability:

English, Chinese and French

Course 2

At the end of this course you will be able to:

Steam Quality - Revision

1. Basic concepts of steam quality and steam dryness fraction
2. Measure steam dryness fraction
3. Root causes of poor steam dryness fraction
4. Air & non-condensable gases affect steam quality
5. Effects of poor steam quality on steam system efficiency

Time: 30 minutes

Language

Availability:

English and Chinese

Course 3

At the end of this course you will be able to:

Air and Non-condensable Gases in Steam

1. Identify air and non-condensable gases in steam
2. Identify the effects of air and NCG on the steam system
3. Recognize how air and NCG enter the steam system
4. Apply Armstrong solutions to manage the air and NCG

Time: 23 minutes

Language

Availability: English

Course 4

At the end of this course you will be able to:

Steam Basics

1. Understand the fundamentals of what steam is
2. Understand how the energy of steam is used
3. Identify and understand the properties of steam

Time: 20 minutes

Language

Availability:

English & Chinese

Course 7

At the end of this course you will be able to:

Water Hammer

1. Understand basic mechanics of water hammer
2. Identify conditions under which water may occur
3. Apply preventative solutions for water hammer

Time: 30 minutes
Language
Availability:
English & Chinese

Course 8

At the end of this course you will be able to:

Superheated Steam

1. What superheated steam is and how it is generated
2. The benefits and drawbacks of superheated steam
3. The common applications for superheated steam
4. The typical steam system components that are used with superheated steam
5. Recommended optimizations for superheated steam

Time: 40 minutes
Language
Availability:
English

College Objective

The College of Steam - Generation will help you understand and identify the types of equipment involved in generating steam in a typical steam system. These courses will help you gain a better understanding of steam generation process.

Course 1

At the end of this course you will be able to:

Introduction to Deaerators

1. Identify and understand basic functions of a deaerator (DA)
2. Differentiate different types of DAs and their uses
3. Understand types of chemicals used in DAs
4. Identify DA components
5. Determine proper DA sizing
6. Calculate the quantity of steam used in a DA

Time: 60 minutes

Language

Availability:

English and Chinese

Course 2

At the end of this course you will be able to:

Advanced Deaerator Practices

1. Understand common maintenance practices related to Deaerators (DAs)
2. Identify typical DA problems and their root causes
3. Understand energy best practices related to DAs

Time: 30 minutes

Language

Availability:

English and Chinese

Course 3

At the end of this course you will be able to:

Steam Costs

1. The variables that contribute to steam costs
2. Ways to control steam costs
3. How to explain cost saving methods

Time: 30 minutes

Language

Availability:

English and Chinese

Course 4

At the end of this course you will be able to:

Combustion Air Pre-Heaters

1. Understand how air pre-heaters function to improve efficiency
2. Learn the types of pre-heaters and their capabilities
3. Understand how utility and packaged boiler air pre-heaters function in a plant setting to improve efficiency and life cycle of associated equipment
4. Understand the importance of proper condensate drainage and non-condensable venting
5. Learn best practice recommendations for steam coil air pre-heater design
6. Learn potential uses for flash steam
7. Learn types of location, mounting, or installation of pre-heaters on utility and packaged boilers

Time: 23 minutes

Language

Availability:

English

Course 5

At the end of this course you will be able to:

Feedwater Pumps

1. Understand the different types of pumps and their applications
2. Understand the sizing basics of feedwater pumps
3. Learn proper piping procedures of feedwater pumps
4. Learn how to troubleshoot feedwater pumps
5. Understand optimizations and best practices related to feedwater pumps

Time: 30 minutes

Language

Availability:

English &

Chinese

Course 6

At the end of this course you will be able to:

Typical Boiler House Layout

1. Identify the types of equipment found in a boiler house, describe their function and how they are interrelated to the system
2. Use a common vocabulary and nomenclature for boiler house components

Time: 30 minutes

Language

Availability: English

Course 7

At the end of this course you will be able to:

Types of Boilers

1. Identify different types of industrial and commercial boilers
2. Recognize typical boiler applications

Time: 30 minutes

Language

Availability: English

Course 8

At the end of this course you will be able to:

Drain Separators

1. Define the purpose of a drain separator
2. Explain the basic concepts of steam quality
3. Describe how a drain separator works
4. List the different types of drain separators List the factors used for sizing a drain separator

Time: 25 minutes

Language

Availability: English

Course 9

At the end of this course you will be able to:

Combustion Basics

1. Learn the basic elements required for proper combustion
2. Identify the fuels, air and heat properties to optimize combustion efficiency
3. Apply time, temperature and turbulence for efficient combustion
4. Understand the emissions as a result of the chemical process and variables

Time: 30 minutes

Language

Availability: English

Course 10

At the end of this course you will be able to:

Typical Optimizations in the Boiler House

1. List the most common problems in boiler systems and their symptoms
2. Identify and recommend optimal solutions to problems
3. Review best practices

Time: 30 minutes

Language

Availability: English

College of Steam - Generation, continued

Learning Objectives

Course 11

At the end of this course you will be able to:

O&M Best Practices for Boilers

1. Importance of boiler quality checks
2. Identify maintenance and routine checks
3. Key attributes of standard operating procedures

Time: 20 minutes

Language

Availability: English

College Objective

From learning how to design steam distribution piping to understanding typical problems on a steam distribution system, the College of Steam - Distribution will help you identify and understand the key components of a steam distribution systems. Lessons focus on PRVs and safety valves as well as instrumentation and auditing.

Course 1

At the end of this course you will be able to:

Pressure and Temperature Control Essentials

1. Understand pressure and temperature control theory
2. Identify types of PRVs
3. Explain how PRVs operate
4. Identify PRV noise issues
5. Understand PRV sizing basics

Time: 60 minutes

Language

Availability:

English and Chinese

Course 2

At the end of this course you will be able to:

Pressure Reduction Stations

1. Learn the benefits of using a PRS
2. Role of PRS and key components
3. Relationship of components within the PRS
4. Where key components are located within a PRS
5. Understand the Importance of dripping PRS/Separators
6. Calculating superheat after PRS
7. Capacity of PRV vs. Capacity of PRS. (resultant CV of combined CV's of valve and PRV)
8. Difference between PRS with control valve and PRS with pressure reducing valve

Time: 30 minutes

Language

Availability:

English and Chinese

Course 3

At the end of this course you will be able to:

Pressure Reduction Troubleshooting

1. Learn how to troubleshoot issues with PRVs and pressure reduction stations
2. Understand challenges of each type of PRV
3. Identify the root causes of the problem
4. Apply Armstrong optimizations to resolve typical issues

Time: 20 minutes

Language

Availability:

English and Chinese

Course 4

At the end of this course you will be able to:

Designing Steam Distribution Piping

1. Learn how to design a system from an energy, safety, savings, and reliability standpoint
2. Understand the safety issues associated with steam distribution
3. Understand which standards must be followed by region
4. Learn the steam distribution system's role in maintaining steam quality

Time: 40 minutes

Language

Availability:

English & Chinese

Course 5

At the end of this course you will be able to:

Safety Relief Valves

1. Identify safety relief valves and their purpose
2. Understand basic function of safety relief valves
3. Understand and apply proper placement, sizing and piping standards
4. Recognize monitoring and maintenance expectations

Time: 33 minutes

Language

Availability:

English and Chinese

Course 6

At the end of this course you will be able to:

Noise - Meeting Regulatory Requirements

1. Discuss the noise regulation requirements for a PRV
2. Learn how the different decibel levels correlate to different levels of flow and pressure
3. Understand the external noise suppression devices and the acoustic/insulation jacket as it relates to minimizing noise levels
4. Identify the orifice plate and the different sizes as it relates to minimizing noise levels
5. Compare how noise suppression devices meet various requirements

Time: 20 minutes

Language Availability:
English

Course 7

At the end of this course you will be able to:

Typical Optimization of a Steam Distribution System

1. List the most common problems in steam distribution systems and their symptoms
2. Identify and recommend possible solutions to problems
3. Suggest where to obtain additional information for problems and solutions
4. Review best practices

Time: 20 minutes

Language Availability:
English

Course 8

At the end of this course you will be able to:

Steam Distribution Headers

1. Design a boiler header for a multiple boiler system
2. Determine the proper sizing for steam distribution headers
3. Manage condensate formation and draining
4. Reduce boiler and boiler header carryover

Time: 30 minutes

Language Availability:
English

Course 9

At the end of this course you will be able to:

Piping Specifications

1. Explain what specifications are
2. Understand how pipe schedules are used
3. Identify types of flanges and how they affect a project
4. List the types of materials used for steam and condensate piping

Time: 20 minutes

Language Availability:
English

Course 10

At the end of this course you will be able to:

Insulation

1. Understand the basics of heat loss
2. Learn about insulation's energy savings and safety requirements
3. Know the key properties of insulation and how they factor into insulation systems design
4. Learn about insulation types and considerations for installation maintenance
5. Understand the protective coverings and finishes that protect insulation from abrasion and water damage.

Time: 30 minutes

Language Availability:
English

College of Steam - Distribution, continued

Learning Objectives

Course 12

At the end of this course you will be able to:

Liquid Drainers

1. List the features and benefits of liquid drainers
2. Explain the typical applications for liquid drainers including sour gas service
3. Describe the steps use to size and select the proper liquid drainer
4. Identify NACE requirements

Time: 20 minutes

Language Availability:
English

College Objective

The College of Steam - Users will help you identify important steam users in a steam system. Lessons will focus on typical steam users in industrial and institutional environments. Other areas of focus include heat exchangers, steam tracing, insect heat treatment, control valves, steam traps and more.

Course 1

At the end of this course you will be able to:

Calculating the Amount of Steam Used in Equipment

1. Identify and gather the required variables needed for steam consumption calculations
2. Understand the difference between design flows and operating steam flows and when to use them
3. Understand the different methods that can be used to calculate steam flow

Time: 35 minutes

Language

Availability:

English and Chinese

Course 2

At the end of this course you will be able to:

Typical Steam Users

1. Understand the types of steam usage throughout an industry
2. Identify the types of equipment that use steam
3. Recommendations of condensate drainage and air venting of various types of steam users

Time: 30 minutes

Language

Availability:

English and Chinese

Course 3

At the end of this course you will be able to:

Control Valves - Revised

1. Discuss control valve theory
2. Discuss control valve features and benefits
3. Discuss installation best practices

Time: 37 minutes

Language

Availability: English

Course 4

At the end of this course you will be able to:

Steam Tracing

1. Describe a steam tracing system
2. List the three main applications for steam tracing
3. Describe the four methods used for steam tracing
4. List the different types of steam traps used on tracer lines
5. Explain steam distribution and condensate collection manifold stations and the design and installation considerations of a system

Time: 30 minutes

Language

Availability: English

Course 5

At the end of this course you will be able to:

Tank Heaters

1. Define what a tank heater is and describe an overview of its usage and applications, and identify potential problems with tank heaters
2. List the common tank heater designs and the advantages and disadvantages of each design type
3. Describe the temperature control strategies for tank heating and how proper trapping and condensate handling affects tank heaters
4. Understand the sizing and selection of tank heaters

Time: 32 minutes

Language

Availability: English

Course 6

At the end of this course you will be able to:

Smart Solutions

1. Understand Smart Solutions and industry applications
2. Learn how Smart Solutions can help identify system issues and reduce energy costs
3. Learn about the basics of wireless technology
4. Understand the value of Steam Asset Management

Time: 35 minutes

Language

Availability: English

Course 7

At the end of this course you will be able to:

Heat Exchangers

1. Types of heat exchangers
2. Typical heat exchanger applications
3. Typical heat exchanger optimizations
4. Best practices for heat exchanger installation

Time: 20 minutes

Language

Availability: English

Course 8

At the end of this course you will be able to:

Basic Heat Transfer

1. Review the first two laws of thermodynamics
2. Understand the types of heat transfer and the equations for calculating
3. Explore the elements that affect heat transfer

Time: 23 minutes

Language

Availability: English & Chinese

Course 9

At the end of this course you will be able to:

Steam Traps

1. Learn the purpose of steam traps
2. Explore steam trap types
3. Learn how to size and select steam traps
4. Identify typical maintenance and preventive measures

Time: 40 minutes

Language

Availability: English & Chinese

Course 10

At the end of this course you will be able to:

Typical Optimizations on Steam Users

1. List the most common problems associated with steam users
2. Identify and recommend possible solutions to problems
3. Review typical optimizations

Time: 35 minutes

Language

Availability: English

Course 11

At the end of this course you will be able to:

O&M Best Practices for Steam Users

1. Learn the importance of steam user quality
2. Identify key performance indicators
3. Discuss best practices for steam users
4. Identify equipment maintenance and routine checks
5. Discuss key attributes of standard operating procedures

Time: 15 minutes

Language

Availability: English

College of Steam - Users, continued

Learning Objectives

Course 12

At the end of this course you will be able to:

Steam Ejectors

1. The fundamentals of steam ejectors
2. How steam ejectors operate
3. Benefits of steam ejectors
4. Typical applications
5. Best practices for design and installation

Time: 20 minutes

Language

Availability: English

College Objective

Measuring the flow of liquids is a critical need in many industrial environments. In some operations, flow measurement is so crucial that it can make a significant impact on our customers' bottom line. Inaccurate flow measurements or failure to take measurements can cause serious or even catastrophic results. The College of Flow Measurement will introduce a new Armstrong solutions offering. The courses included will help you gain a better understanding of typical flow measurement solutions.

Course 1

At the end of this course you will be able to:

Fundamentals of Flow Measurement - Introduction

1. Define flow measurement
2. Explain why flow measurement is important
3. Describe basic science principles behind flow measurement
4. List key technologies used to measure flow
5. Compare the features and benefits of each technology

Time: 30 minutes

Language

Availability:

English & Chinese

Course 2

At the end of this course you will be able to:

Fundamentals of Flow Measurement - Advanced

1. Identify the various flow meters that are appropriate for use on steam
2. Compare and contrast the advantages and disadvantages of these flow meters
3. List design and installation parameters for differential pressure technologies
4. Describe the basic types of transmitters used in flow measurement systems

Time: 25 minutes

Language

Availability:

English & Chinese

College Objective

Management of condensate accumulation and distribution is an important element in an efficient steam system. The College of Condensate Return will explain everything you need to know from sizing a condensate return line to what causes condensate contamination. You'll gain an in-depth knowledge about how condensate affects a steam system.

Course 1

At the end of this course you will be able to:

Stalling Theory

1. Understand what causes stalling in equipment
2. Learn about the typical equipment prone to stalling
3. Understand the negative effects of stalling
4. Learn how to detect when a heat exchanger is stalling
5. Become familiar with the factors contributing to stalling and the solutions to stalling

Time: 40 minutes

Language

Availability:

English & Chinese

Course 2

At the end of this course you will be able to:

Calculating and Returning Condensate

1. Understand the equipment that uses the steam and the requirements to provide condensate return
2. Understand the capabilities of the equipment and parameters of the fluid it is heating
3. Explore ways to measure condensate return if no data exists

Time: 41 minutes

Language

Availability:

English & Chinese

Course 3

At the end of this course you will be able to:

Condensate Quality and Contamination - Part 1

1. Understand condensate quality and types of contamination
2. Understand and identify the root causes and sources of contamination
3. Identify the problems caused by contamination
4. Understand how to address the issues and what the capabilities are to solve contamination and manage condensate systems
5. Learn how condensate polishers work and understand how to size them

Time: 23 minutes

Language

Availability: English

Course 4

At the end of this course you will be able to:

Condensate Quality and Contamination - Part 2

1. Understand condensate quality and types of contamination
2. Understand and identify the root causes and sources of contamination
3. Identify the problems caused by contamination
4. Understand how to address the issues and what the capabilities are to solve contamination and manage condensate systems
5. Learn how condensate polishers work and understand how to size them

Time: 14 minutes

Language

Availability: English

Course 5

At the end of this course you will be able to:

Designing Condensate Return Lines

1. Identify different types of condensate return including dry closed systems and pumped systems
2. Determine how to calculate line size and use available tables
3. Determine how to calculate back pressures
4. Understand and identify best piping practices for condensate lines

Time: 37 minutes

Language

Availability: English

College of Condensate Return, continued

Learning Objectives

Course 6

At the end of this course you will be able to:

Flash Steam

1. Define flash steam and explain how it is formed
2. List common application for recovered steam and identify the basic equipment used with flash steam

Time: 30 minutes

Language

Availability: English & Chinese

Course 7

At the end of this course you will be able to:

Typical Optimization for a Condensate Return System

1. List common problems in condensate return systems
2. Identify and recommend solutions to problems
3. Know where to obtain additional information for problems and solutions

Time: 25 minutes

Language

Availability: English

Course 8

At the end of this course you will be able to:

O&M Best Practices for Condensate Return Systems

1. Learn the importance of water quality checks
2. Explore piping issues, repairs, and installations
3. Identify pumps and other equipment maintenance and routine checks

Time: 25 minutes

Language

Availability: English

College Objective

Armstrong has been sharing know-how in humidification applications since 1938. Through the design, manufacturing and application of humidification equipment, Armstrong has led the way to countless savings in energy, time and money. The lessons offered in the College of Humidification will help you gain a better understanding of the typical HVAC components.

Course 1

At the end of this course you will be able to:

Components of an HVAC System

1. Identify and explain the role of equipment typically found in an HVAC system
2. Use a common vocabulary for HVAC components

Time: 21 minutes

Language

Availability:

English and Chinese

Course 2

At the end of this course you will be able to:

Fundamentals of Humidification

1. What humidification is and why it is important.
2. Understand the problems associated with low humidity.
3. Learn how to determine humidity requirements.
4. Understand how Psychrometrics are used in humidification design, and learn about the different methods of humidification-Isothermal and Adiabatic.

Time: 20 minutes

Language

Availability:

English & Chinese

Course 3

At the end of this course you will be able to:

Pressurized Steam Humidifiers

1. Understand pressurized steam humidifier benefits.
2. Learn about typical pressurized steam humidifier applications.
3. Understand best practices for installation.

Time: 30 minutes

Language

Availability: English

Course 4

At the end of this course you will be able to:

Absorption Distance

1. Learn the steam and water absorption theory for humidification
2. Learn how steam and water humidification design affects absorption distance

Time: 20 minutes

Language

Availability: English

Course 5

At the end of this course you will be able to:

Electrode Steam Humidifiers

1. Electrode steam humidifier benefits
2. Typical electrode steam humidifier applications
3. Electrode steam humidifier principles of operation
4. Best practices for installation and maintenance

Time: 25 minutes

Language

Availability: English

Course 6

At the end of this course you will be able to:

Resistive Element Humidifier

1. Resistive element humidifier benefits
2. Typical resistive element humidifier applications
3. Resistive element humidifier principles of operation
4. Best practices for installation and maintenance

Time: 35 minutes

Language

Availability: English

Course 7

At the end of this course you will be able to:

Psychrometrics

1. Define how psychrometrics are used in HVAC design
2. Explain what each line in the psychrometric chart represents
3. Provide psychrometrics examples for heating, humidifying, cooling, dehumidification and mixed air processes

Time: 30 minutes

Language

Availability:

English

Course 8

At the end of this course you will be able to:

Hydro-Pneumatic Humidifiers

1. Hydro-Pneumatic humidifier benefits
2. Typical Hydro-Pneumatic humidifier applications
3. Principles of operation
4. Best practices for installation

Time: 30 minutes

Language

Availability:

English

Course 9

At the end of this course you will be able to:

Evaporative Pad Humidifiers

1. Evaporative pad humidifier benefits
2. Typical evaporative pad humidifier applications
3. Principles of operation
4. Best practices for installation

Time: 30 minutes

Language

Availability:

English

College Objective

Heat recovery is a method of reducing the overall energy consumption of industrial facilities. The College of Heat Recovery will explain how recovered heat can help reduce energy consumption and provide useful heat for other purposes.

Course 1

At the end of this course you will be able to:

Typical Components of a Heat Recovery System

1. Identify types of equipment found in a typical heat recovery system
2. Use a common vocabulary and nomenclature for heat recovery components

Time: 30 minutes

Language

Availability:
English & Chinese

Course 2

At the end of this course you will be able to:

Coolers & Condensers

1. Learn the different types of coolers and condensers
2. Identify general applications for coolers and condensers
3. List the basic components of coolers and condensers
4. Understand the best practices for coolers and condensers installation

Time: 25 minutes

Language

Availability: English

Course 3

At the end of this course you will be able to:

Combined Heat & Power (Cogen & Trigen)

1. Learn the basic functions of a combined heat and power (CHP) system
2. Identify cogeneration and trigeneration systems
3. Review the advantages of CHP and CCHP

Time: 30 minutes

Language

Availability: English

College Objective

The College of Hot Water offers a detailed explanation of typical industrial and institutional hot water systems. You'll gain an extensive knowledge of the major components found in a hot water system. Modules focus on hot water generation with great emphasis on digital and thermostatic controls.

Course 1

At the end of this course you will be able to:

Industrial Hot Water Systems

1. Identify major components used in a hot water system and their role
2. Understand differences in recirculation and non-recirculation systems
3. Identify ways to balance multiple temperature and pressure systems
4. Understand the role of system pumps in industrial settings
5. Understand potential contamination issues with process water

Time: 40 minutes

Language

Availability:

English and Chinese

Course 2

At the end of this course you will be able to:

Direct Contact Water Heating - Flo-Direct®

1. Understand when to use direct-fired water heaters and what is most efficient for the customer
2. Understand the distribution of serpentine and dead leg water systems
3. Understand role of booster pumps used in industrial settings
4. Identify ways to balance a system
5. Understand contamination issues

Time: 45 minutes

Language

Availability:

English and Chinese

Course 3

At the end of this course you will be able to:

Institutional Hot Water Systems - Introduction

1. Understand the different types of systems that are used in high rise vs. non-high rise buildings
2. Understand the distribution of water systems - serpentine and grid
3. Differentiate when there is an issue that is coming from in the system rather than equipment.
4. Understand the role of booster pumps used in institutional settings
5. Understand water balancing in a grid system

Time: 40 minutes

Language

Availability:

English and Chinese

Course 4**Institutional Hot Water Systems Advanced**

1. Understand water quality issues and how to address them
2. Understand how key water heaters operate
3. Use troubleshooting techniques for hot water systems

Time: 40 minutes

Language

Availability:

English and Chinese

Course 5**Institutional Water Temperature Controls - North America**

1. Explore hot water system safety
2. Experience different ways of controlling water temperature in institutional building types, types of water temperature controls and their applications
3. Appreciate how traditional thermostatic and new age digital mixing valves differ and the best applications for use
4. Develop hot water system visibility by integrating digital water temperature controls with building automation systems

Time: 43 minutes

Language

Availability: English

Course 6

At the end of this course you will be able to:

Legionella

1. Understand the history of Legionella and potential dangers if left untreated
2. Learn how Legionella develops in hot water distribution systems
3. Identify ways to kill Legionella using current treatment methods
4. How to design hot water systems that discourage the growth of Legionella

Time: 37 minutes

Language

Availability:

English & Chinese

Course 7

At the end of this course you will be able to:

Industrial Water Temperature Controls and Washdown - North America

1. Explore hot water system safety
2. Experience different ways of controlling water temperature in institutional building types, types of water temperature controls and their applications
3. Appreciate how traditional thermostatic and new age digital mixing valves differ and the best applications for use
4. Develop hot water system visibility by integrating digital water temperature controls with building automation systems

Time: 30 minutes

Language

Availability: English

Course 8

At the end of this course you will be able to:

Water Boilers

1. Learn about the different water boiler types
2. Discover the features, benefits and typical applications of each boiler

Time: 30 minutes

Language

Availability: English

Course 9

At the end of this course you will be able to:

Typical Energy Savings in a Hot Water System

1. Learn about typical heater efficiencies
2. Discover various methods of capturing waste heat to pre-heat hot water
3. Look at system efficiencies versus equipment returns on investment

Time: 30 minutes

Language

Availability: English

Course 10

At the end of this course you will be able to:

Heat Pumps

1. Describe what a heat pump is and how it works
2. Outline the basic parameters for using a heat pump
3. List the types of heat pumps and their typical applications
4. Describe heat recovery options for a heat pump in a facility

Time: 30 minutes

Language

Availability: English

Course 11

At the end of this course you will be able to:

Heat Exchangers for Domestic and Process Hot Water

1. Discuss the types of heat exchangers for domestic and process hot water
2. Learn about the typical heat exchanger applications
3. Learn about the typical heat exchanger optimizations
4. Discuss best practices for heat exchanger installations

Time: 25 minutes

Language

Availability:

English

College Objective

The College of Water Treatment will help you gain a better understanding of the processes of treating water for industrial use. The courses included will introduce Armstrong solutions that serve the water treatment process.

Course 1

At the end of this course you will be able to:

Boiler Water Quality Requirements

1. Learn why boiler water needs to be treated
2. Identify impurities found in water
3. Discover water treatment methods
4. Learn about feedwater and boiler drum water quality
5. Discover the energy relationship between boiler blowdown and water treatment

Time: 30 minutes

Language

Availability: English

Course 2

At the end of this course you will be able to:

Water Chemistry & Corrosion

1. Understand sources of water and comparisons of water quality
2. Identify water impurities and their consequences in steam, hot water, and humidification
3. Apply best practices for water chemistry and corrosion issues

Time: 40 minutes

Language

Availability: English

Course 3

At the end of this course you will be able to:

Industrial Water Treatment Methods

1. Explains why water treatment is required
2. Identify different water treatment methods available

Time: 30 minutes

Language

Availability: English

College Objective

Armstrong's developments and improvements in the design and function of refrigerated solutions have led to significant savings in energy, time and money. The lessons offered in the College of Refrigeration will help you gain a better understanding of the typical components used in a refrigeration system and how a refrigeration system operates.

Course 1

At the end of this course you will be able to:

Typical Components of a Refrigeration System

1. Describe how a basic refrigeration cycle works
2. Identify the types of equipment found in a refrigeration system and describe the function of each
3. List common industry vocabulary and nomenclature for refrigeration systems
4. Explain how to improve system efficiency
5. Describe how to apply Armstrong purger solutions

Time: 30 minutes

Language

Availability: English

Armstrong provides intelligent system solutions that improve utility performance, lower energy consumption, and reduce environmental emissions while providing an “enjoyable experience.”



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