Swagelok

Swagelok University

Online Course Catalog

General Technical Topics

Scientific Fundamentals

Safety

Plant Science

Industry-Specific Topics

Product Information

LEARN | GROW | ADVANCE

Swagelok University Online Course Catalog

Thank you for choosing Swagelok University Online Training. This catalog includes all of the information you need to develop a learning plan that's right for you.

You'll find individual course descriptions for more than 130 industrial training courses, as well as descriptions of Swagelok University pre-made bundles. And, don't forget, you can build custom bundles by selecting courses in groups of 10, 20, or 30.

All courses and bundles have a continuing education unit (CEU) value and courses are accessible for 12 months.

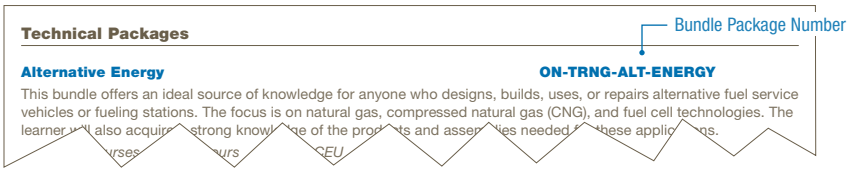
You also have the option of assigning an administrator to oversee participants' learning activities. Administrators can review learning records, assign due dates to courses, and run reports on their participants.

Groups of five or more request an administrator at no charge; for fewer than five, a nominal fee applies and the license must be ordered. To order an administrator license, use ordering number: **ON-TRNG-ADMIN**

Pre-Made Bundles

Pre-made course bundles contain all of the relevant coursework on a particular product or technical topic and can be ordered using a single ordering number. Topics range from fittings and valves to alternative energy, materials, and plant maintenance.

To order a pre-made bundle, use the bundle package number.



Example: **ON-TRNG-ALT-ENERGY**

Custom Bundles

Custom bundles are a cost-effective option for purchasing multiple courses. Just select courses in groups of 10, 20, or 30 to build the bundle that's right for you and contact your authorized Swagelok® sales and service representative to place your order.

Online Course Descriptions

The catalog includes descriptions for more than 130 individual industrial training courses, ordering number, and the estimated time required to complete each course. Most courses can be completed in 20 to 60 minutes, and users may return to the selected course if they are unable to complete in one sitting. Every course includes an assessment that measures the understanding of the course content. Courses may be taken as many times as needed to gain understanding or may be used to refresh knowledge.

To order, add the individual course number to the online training basic ordering number: **ON-TRNG-**

Example: ON-TRNG-**CSPROD-79**

Swagelok University Pre-Made Bundles

Technical Packages

Alternative Energy — ON-TRNG-ALT-ENERGY

This bundle offers an ideal source of knowledge for anyone who designs, builds, uses, or repairs alternative fuel service vehicles or fueling stations. The focus is on natural gas, compressed natural gas (CNG), and fuel cell technologies. The learner will also acquire a strong knowledge of the products and assemblies needed for these applications.

12 courses 8 hours 0.8 CEU

Course Title	Page
Alternative Fuel Service (AFS) Ball Valve	12
Check Valve Basics	15
Check Valve Products	15
CNG Fueling Stations and Station Components	16
Fuel Cell—Balance of Plant	19
Fuel Cell Basics	19
Medium-Pressure Products	23
Properties of CNG and Natural Gas Vehicles	25
SK Series Medium-Pressure Ball Valves	27
Swagelok Pipe Fittings	28
Swagelok Tube Fitting Assembly	29
Swagelok Tube Fittings	29

Analytical Instrumentation — ON-TRNG-ANALYTICAL

This comprehensive bundle covers most everything a learner needs to know about process analyzer systems—from basic chemistry through sampling system design and build, all the way to system troubleshooting and optimization. The more than two dozen courses address analytical instrumentation theory, components, systems, analysis techniques, and much more.

25 courses 16 hours 1.6 CEU

Course Title	Page
Analytical Instrumentation—Chromatography	12
Analytical Instrumentation—Electrochemistry	12
Analytical Instrumentation—Measurements	12
Analytical Instrumentation—Modular Analyzer Systems	12
Analytical Instrumentation—Overview	12
Analytical Instrumentation—Sample Systems	13
Analytical Instrumentation—Spectroscopy	13
Analytical Instrumentation—Traditional Analyzer Systems	13
Calibration and Switching Module	14
Chemistry—Basic Principles 1	15
Chemistry—Basic Principles 2	15
Fast Loop Module	18
Field Station Module	19
Fluid Distribution Header	19
Instrumentation and Control—Automatic Process Control 1	21
Instrumentation and Control—Automatic Process Control 2	22
Instrumentation and Control—Density, Clarity, and Moisture	22
Instrumentation and Control—Measurement of Concentration	22
Instrumentation and Control—Measurement of Pressure and Temperature	22
Process Sampling—Obtaining Samples	25
Process Sampling—Testing Samples	25
Sample Probe Basics	27
Sample Probe Module	27
SSV Series Stream Selector System	27
Swagelok Tube Fitting Assembly	29

Bioprocessing

ON-TRNG-BIO PROCESS

This bundle explores the design and development of equipment and processes used to manufacture products from biological materials. Courses address bioprocessing basics, the fermentation process, various flow measurement technologies, bioprocessing instrumentation, cleaning and sterilization, utility support systems, and even the essential biopharmaceutical and biotechnology terms.

16 courses *11 hours* *1.1 CEU*

Fluid System Basics

ON-TRNG-FLUID SYS-BASICS

This 36-course bundle will answer many questions by addressing the plant science of fluid systems, fluid system principles and components, technologies for measuring and managing flow/temperature/leakage, using diagrams and blueprints, and much more. The bundle features detailed information about valves, actuators, regulators, gauges, hose and flexible tubing, fittings, probes, and even compressors.

36 courses *21 hours* *2.1 CEU*

General Technical

ON-TRNG-GENERAL-TECH

This bundle covers all the essential technical topics. They include blueprint and diagram reading, industrial math, fluid system principles and components, flow measurement technologies, temperature, pressure, leakage, steam, valve variables and materials, and oxygen safety. Courses also teach about furnaces, boilers, pumps, orbital welders, compressors, assembling fittings, and more.

23 courses *14 hours* *1.4 CEU*

Instrumentation

ON-TRNG-INSTRUMENTATION

Focused on downstream processing, this bundle begins with an introduction to pressure, temperature, and leakage, and ends with process sampling. The learner will study system components, functions, operation, even automatic process control. He or she will learn how to measure and control density, clarity, moisture, concentration, level and flow, pressure, and temperature.

20 courses *13 hours* *1.3 CEU*

Instrumentation and Control — ON-TRNG-I-C

This bundle will provide a solid overview of how instrumentation is used to measure and control density, clarity, moisture, concentration, level and flow, pressure, and temperature. Also addressed: when and how to use automatic process control. This bundle and others include guidelines on how to properly assemble Swagelok tube fittings.

7 courses 4.5 hours 0.5 CEU

Course Title	Page
Instrumentation and Control—Automatic Process Control 1	21
Instrumentation and Control—Automatic Process Control 2	22
Instrumentation and Control—Density, Clarity, and Moisture	22
Instrumentation and Control—Measurement of Concentration	22
Instrumentation and Control—Measurement of Level and Flow	22
Instrumentation and Control—Measurement of Pressure and Temperature	22
Swagelok Tube Fitting Assembly	29

Maintenance — ON-TRNG-MAINTENANCE

This ambitious bundle starts with fluid system principles and the basics of downstream processing. The courses cover the essentials of maintaining a plant, including compressors, heat exchangers, furnaces, boilers, pumps, valves, fittings, and more. Also covered: Utility support systems, wastewater treatment, and oxygen safety.

31 courses 19 hours 1.9 CEU

Course Title	Page
Boilers—Basic Principles and Types	14
Boilers—Combustion, Water, and Steam	14
Compressors—Introduction	16
Compressors—Operation of Centrifugal and Axial Types	16
Environmental Protection—Air Pollution	18
Environmental Protection—Water Pollution and Waste Disposal	18
Fluid System Principles and Components	19
Furnaces—Introduction	20
General Technical: Leakage	20
Heat Exchangers—Condensers and Reboilers	20
Heat Exchangers—Cooling Towers	21
Heat Exchangers—Introduction	21
Industrial Math—Algebra	21
Industrial Math—Formulas, Graphs, and Trends	21
Nondestructive Testing and Examination Methods for Orbital Welding	23
Oxygen Safety Awareness	24
Piping and Auxiliaries—Basic Components and Functions	24
Piping and Auxiliaries—System Components and Operation	24
Pumps—Basic Types and Operations	25
Pumps—Performance and Inspection	26
Swagelok Tube Fitting Assembly	29
Swagelok Tube Fittings	29
Utility Support Systems—Air	29
Utility Support Systems—Steam	30
Utility Support Systems—Water	30
Valves—Basic Types and Operation 1	30
Valves—Basic Types and Operation 2	30
Valves—Electric and Hydraulic Actuators	30
Valves—Introduction to Actuators	30
Water Treatment—Wastewater 1	31
Water Treatment—Wastewater 2	31

Materials

ON-TRNG-MATERIALS

When it comes to industrial materials, steel is just the beginning. This bundle explores the many types of metallic materials, nonferrous metals and alloys, the mechanical properties of alloys, and corrosion. There are specific courses dedicated to standard austenitic stainless steel, superaustenitic stainless steel, nickel alloys, cobalt-based alloys, duplex stainless steel, and carbon steel.

11 courses *6 hours* *0.6 CEU*

Plant Operations

ON-TRNG-PLANT-OP

This bundle addresses the complexities of operating a process sampling operation. Learners will study fluid system principles and components as they explore the science of heat, gases, flowing liquids, and corrosion. Several courses focus on furnaces, boilers, and heat exchangers. Participants will also learn how to treat water, dispose of waste properly, and respect oxygen.

22 courses *14.5 hours* *1.4 CEU*

Safety

ON-TRNG-SAFETY

This bundle includes procedures to minimize environmental pollution, including air pollution, water pollution, and waste disposal. Specific courses address workplace ergonomics, electrical safety, hearing conservation, respiratory protection, material safety data sheets, warning signs/labels, and the classes of fires and extinguishers. Also includes a course that teaches the proper assembly and installation of Swagelok tube fittings.

12 classes 6 hours 0.6 CEU

Science

ON-TRNG-SCIENCE

This bundle focuses on the basic principles of chemistry and plant science as it pertains to gases, flowing liquids, solids, heat, and fluid systems. Learners will gain a stronger understanding of pressure, temperature, leakage, corrosion, and alloys. Other courses explore fluid system principles and components, industrial math, and the proper assembly of Swagelok tube fittings.

17 classes 11 hours 1.1 CEU

Product Packages

Fittings — ON-TRNG-FITTINGS

Swagelok offers many types and configurations of fittings. The courses in this bundle explain the many fitting types and materials, plus deliver needed information about Swagelok tube, end connection basics, fitting basics, fluid system principles and components, proper tube fitting assembly, and more.

9 courses 6 hours. 0.6 CEU

Course Title	Page
Brass Tube Fitting Quarter Turn	14
End Connection Basics	18
Fitting Basics	19
Fluid System Principles and Components	19
Medium-Pressure Products	23
Stainless Steel Tube Fitting Hinging Action	28
Swagelok Pipe Fittings	28
Swagelok Tube Fitting Assembly	29
Swagelok Tube Fittings	29

Hose and Tubing — ON-TRNG-HOSE

This bundle brings together seven courses to help the learner understand and specify the correct Swagelok hose or tubing solution. Courses cover the following: hose and flexible tubing basics, Quick-Connect basics, tube fittings, Coreflex™ series hose products, tube fitting assembly, quarter-turn brass tube fittings, and ultrahigh-purity fluoropolymer tubing.

7 courses 5 hours 0.5 CEU

Course Title	Page
Brass Tube Fitting Quarter Turn	14
Coreflex Series Hose Products	16
Hose and Flexible Tubing Basics	21
Swagelok Quick-Connect Basics	28
Swagelok Tube Fitting Assembly	29
Swagelok Tube Fittings	29
Ultrahigh-Purity Fluoropolymer Tubing	29

Measurement — ON-TRNG-MEASUREMENT-PROD

This bundle introduces the learner to the many types of Swagelok measurement products trusted around the world. The courses cover variable area flowmeters, pressure regulators and specialty regulator products, thermometers and thermowells, gauges, rupture disks, and other components.

7 courses 5 hours 0.5 CEU

Course Title	Page
Back-Pressure and Specialty Regulator Products	13
Gauge Basics	20
Pressure-Reducing Regulators	25
Regulator Basics	26
Regulator Options and Assembly Products	26
Thermometers and Thermowells	29
Variable Area Flowmeters	31

Swagelok Products

ON-TRNG-PRODUCTS

This bundle is for those who want to discover the comprehensive family of Swagelok fluid system components that includes valves, actuators, fittings, connectors, regulators, gauges, flowmeters, thermometers and thermowells, hose and flexible tubing, universal mounts for steam applications, ultrahigh-purity fluoropolymer tubing, SSV series stream selector systems, and many more.

40 courses 21 total hours 2.1 CEU

Valves

ON-TRNG-VALVES

Swagelok offers many different valve configurations. This bundle covers the basic valve product types to support better product selection to enhance system design. Courses address the many types of valves, valve variables and materials, connection basics, fluid system principles and components, piping products, universal mounts for steam applications, SSV series stream selector systems, and more.

28 courses 13 hours 1.3 CEU

Swagelok University Online Courses

Swagelok University Online Course Descriptions

A

Actuator Basics — CSPROD-18

A mechanical actuator is a common component used to activate a valve when manual actuation is impractical. *Actuator Basics* discusses pneumatic, electric, and electropneumatic actuators. This course discusses both the design and function of the three types of actuators and is ideal for those learners with a nontechnical background or for those who require a basic introduction to mechanical actuators.

Completion Time: 20 min *CEU: 0.03*

Alternative Fuel Service (AFS) Ball Valve — CSPROD-79

The Swagelok AFS (Alternative Fuel Service) ball valve was designed specifically to meet the needs of alternative fuel applications. This course discusses the design of the Swagelok AFS ball valve, the industry specifications the valve meets, and the performance characteristics associated with the AFS ball valve.

Completion Time: 20 min *CEU: 0.03*

Analytical Instrumentation—Chromatography — CSMKT-13

This course provides the learner with a description of chromatographic analysis techniques, including gas chromatography and high-performance liquid chromatography. The function, critical considerations, and some components of each technique are described in detail. Learners will also be introduced to terminology commonly used in the discipline of chromatography.

Completion Time: 20 min *CEU: 0.03*

Analytical Instrumentation—Electrochemistry — CSMKT-17

This course describes the basic principles of electrochemistry. Upon completion of this course, learners should be able to recall the four basic components of an analytical instrument, describe the basic principles of electrochemistry, recall the four most common electrochemical measurements, describe how the four common measurements work, and recall two ways to measure conductivity.

Completion Time: 40 min *CEU: 0.07*

Analytical Instrumentation—Measurements — CSMKT-11

Analytical chemistry instruments determine the composition of substances by measuring the energy state and recording the consequences of the interaction between the substance under consideration and an external source of energy. This course describes how external energy sources, including electromagnetic radiation, chemicals, electric or magnetic fields, and thermal or mechanical energy, interact with matter to provide measurable results. It also defines analytical techniques and methods, procedures, and protocols in basic terms.

Suggested Prerequisite: *Analytical Instrumentation—Overview* (CSMKT-10)

Completion Time: 20 min *CEU: 0.03*

Analytical Instrumentation—Modular Analyzer Systems — CSMKT-20

This course examines the role of the New Sampling/Sensor Initiative (NeSSI™) in driving the industry toward miniature modular platforms and sampling systems. Upon completion of this course, learners should be able to describe the drivers for change in the way process analyzer systems are engineered, installed, operated, and maintained; recall the role that industry organizations are playing in the evolution of miniature modular analyzer systems; describe the scope of each generation of the NeSSI initiative; and, recall the details of the standard that defines the surface mount and substrate seal interface.

Completion Time: 55 min *CEU: 0.04*

Analytical Instrumentation—Overview — CSMKT-10

This course provides the learner with an overview of analytical instrumentation, including the history of the discipline, the industries that use it, why it is used, and industry trends. In addition, learners will be introduced to the basic components and systems found in analytical instrumentation applications, including analyzers and sampling systems.

Completion Time: 35 min *CEU: 0.06*

Analytical Instrumentation—Sample Systems CSMKT-12

This course discusses how sample systems ensure accurate analysis. Upon completion of this course, learners should be able to describe the primary factors in achieving this purpose, discuss the three characteristics that all sample systems have in common, and describe the processes that can be found in a complex sampling system. Finally, the learner should be able to describe the major performance issues in a sampling system and how they can impact the ability of a sample system to function.

Completion Time: 60 min *CEU: 0.10*

Analytical Instrumentation—Spectroscopy CSMKT-14

This course provides the learner with an overview of spectroscopy, the different effects that electromagnetic energy can have on samples, and the most common types of spectroscopy. The principles of the various types of spectroscopy and sample system considerations are also discussed.

Completion Time: 30 min *CEU: 0.05*

Analytical Instrumentation—Traditional Analyzer Systems CSMKT-18

This course educates the learner about typical configurations for traditional analytical sampling systems. It introduces offline, at-line, online, inline, and noninvasive categories of analysis and discusses the components used in the process of sample collection for both single- and multiple-stream applications.

Completion Time: 50 min *CEU: 0.08*

B

Back-Pressure and Specialty Regulator Products CSPROD-58

Swagelok offers a variety of back-pressure and specialty regulators. This course introduces the learner to the function and the features associated with each series and type. Upon completion of this course, the learner should be able to recall the function of back-pressure, vaporizing, and gas cylinder changeover regulators; identify the features common to back-pressure and specialty regulators; recall design features specific to each series of regulator; and describe the system operating parameters where each series of regulator may be used.

Completion Time: 45 min *CEU: 0.08*

Ball and Plug Valve Basics CSPROD-13

Ball valves and plug valves are commonly found in many fluid systems. The function of these valve types is taught using a simple model that constructs a valve component by component. In addition, this course teaches the learner about common configurations for ball and plug valves. This simple course is ideal for those learners with a nontechnical background or for those who require a basic introduction to fluid system components.

Completion Time: 20 min *CEU: 0.03*

Basics of Blueprint Reading CSTECH-03

This course provides learners with a general understanding about how to read, comprehend, and process the many details found in a blueprint. After completing this course, learners should be able to visualize a part based upon the views in a blueprint and comprehend the data presented in each of the section on a blueprint.

Completion Time: 60 min *CEU: 0.10*

Bellows Valve Basics CSPROD-11

Bellows valves perform shutoff and flow control functions within a fluid system. *Bellows Valves Basics* introduces the learner to typical bellows valve types and their packless construction. This simple course is ideal for those learners with a nontechnical background or for those who require a basic introduction to fluid system components.

Completion Time: 20 min *CEU: 0.03*

Biopharmaceutical and Biotechnology Glossary of Terms CSREF-01

This glossary contains approximately 80 terms used in bioprocessing and biotechnology industries. It is offered in a PDF format and can be viewed online or printed and used as reference source.

Completion Time: N/A *CEU: N/A*

Bioprocessing Basics — CSPROD-76

This course introduces learners to basic concepts associated with bioprocessing. In this course, bioprocessing is defined as the practice of creating and maintaining an ideal environment for the growth of a cell, providing the cell with a food source, and harvesting the product that the cell produces. This five-lesson course presents both the upstream and downstream processes, and it discusses the utility support systems that are required for creating and maintaining an aseptic environment. This course is ideal for those learners who possess fluid system knowledge but require an introduction to bioprocessing concepts and systems.

Completion Time: 75 min *CEU: 0.13*

Bioprocessing Instrumentation — CSMKT-32

This course provides the learner with an overview of the bioprocessing variables that are measured, and where they are measured. The learner will also gain an understanding of the Process Analytical Technology initiative and how it relates to bioprocessing instrumentation and the drug discover process.

Completion Time: 60 min *CEU: 0.10*

Bioprocessing Materials — CSPROD-82

Materials used in bioprocessing applications must meet specific requirements. This course provides an introduction to the materials commonly used in bioprocessing applications and goes on to discuss the characteristics associated with each. In addition, learners receive a basic overview of specifications that affect the choice of materials, common corrosion problems, and their potential solutions.

Completion Time: 60 min *CEU: 0.10*

Boilers—Basic Principles and Types — CPRIM-39

This course introduces learners to fundamental concepts related to industrial plant boilers. After completing this course, learners should be able to describe the basic requirements for steam production and combustion and explain how a boiler produces steam. They should also be able to identify three types of heat transfer and explain how heat transfer occurs in a typical boiler. In addition, learners should be able to describe how water, combustion gases, and steam flow through fire tube and water tube boilers.

Completion Time: 30 min *CEU: 0.05*

Boilers—Combustion, Water, and Steam — CPRIM-38

This course familiarizes learners with the basic principles associated with combustion in a boiler and the flow of air and combustion gases during boiler operation. After completing this course, learners should be able to identify the elements needed for combustion in a boiler, explain how fuel is delivered to the burners, and describe the parts and operation of various types of burners. They should also be able to describe the air and gas flow path through a boiler and describe methods used to remove particulates and harmful gases from combustion gases. In addition, learners should be able to explain when and why vents, drains, blowdown valves, and soot blowers are used.

Completion Time: 35 min *CEU: 0.06*

Brass Tube Fitting Quarter-Turn — CSPROD-73

This course demonstrates what happens to a brass Swagelok® tube fitting and copper tubing during installation at quarter-turn increments. In addition, learners will be introduced to a leakage formula developed by The Engineering Standards Committee on Control Valves of the Fluid Controls Institute in an effort to more clearly define the amount of leakage that may occur in a given system. The factors in this leakage formula that the Swagelok tube fitting can affect are explained and can be seen as the tube fitting is “made up” in quarter-turn increments. This is a companion course to *Stainless Steel Tubing Fitting Hinging Action* (CSPROD-72).

Completion Time: 30 min *CEU: 0.05*

C

Calibration and Switching Module — CSPROD-107

In a sample system, Swagelok’s Calibration and Switching Module (CSM) is designed to perform the final conditioning functions before the sample is delivered to the analyzer. This course introduces the learner to the functions of the CSM, the variety of standard configurations available, the features and options associated with the system.

Completion Time: 45 min *CEU: 0.08*

Carbon Steel — CSTECH-21

This course focuses on the most elementary form of steel. In this course, particular emphasis is placed on the grades of carbon steel Swagelok employs in the manufacture of its components. Topics in this course include the properties of carbon steel, the differences between the carbon steel grades Swagelok uses, and the elements found in carbon steel and the effects each has on the final product.

Completion Time: 20 min *CEU: 0.03*

Check Valve Basics — CSPROD-05

A check valve functions as a directional control valve by ensuring that system fluid flows only in one direction. *Check Valve Basics* explains this function and describes the construction of a check valve. In addition, common pressure terms are reviewed in context of the function of a check valve. This simple course is ideal for those learners with a nontechnical background or for those who require a basic introduction to fluid system components.

Completion Time: 20 min *CEU: 0.03*

Check Valve Products — CSPROD-06

A check valve is a specific type of directional flow-control valve that allows flow in one direction only. This course introduces the types of check valves that Swagelok manufactures and discusses the design features associated with each check valve series. In addition, options and accessories for each valve series are discussed.

Completion Time: 20 min *CEU: 0.03*

Chemistry—Basic Principles 1 — CPRIM-01

This course is designed to familiarize learners with basic concepts associated with the composition of matter and the general characteristics of compounds, mixtures, and solutions. After completing this course, learners should be able to identify the particles that make up an atom and describe two ways in which atoms form chemical bonds. They should also be able to explain what compounds and mixtures are and how they differ from one another. In addition, learners should be able to describe what a solution is, calculate the weights of materials in a percent-by-weight solution, and explain what a pH measurement represents.

Completion Time: 30 min *CEU: 0.05*

Chemistry—Basic Principles 2 — CPRIM-02

This course is designed to familiarize learners with the principles of chemical reactions, material balancing, and organic chemistry. After completing this course, learners should be able to use a chemical equation to explain what occurs during a chemical reaction and how combustion reactions, replacement reactions, and neutralization occur. Learners should also be able to describe the basic steps involved in balancing the materials represented in a simple equation. In addition, learners should be able to explain what organic chemistry is and how some organic chemicals are named.

Suggested Prerequisite: *Chemistry—Basic Principles 1* (CPRIM-01)

Completion Time: 45 min *CEU: 0.08*

Classes of Fires and Extinguishers — CPRIM-70

The purpose of this course is to give learners a general understanding regarding basic principles of fire, types of fire extinguishers, and how to identify different types of fire extinguishers. Learners will receive a basic understanding of three elements of combustion, four classes of fires, common types of fire extinguishers and extinguishing agents, and ways of identifying different types of fire extinguishers.

Completion Time: 20 min *CEU: 0.03*

Cleaning and Sterilization — CSMKT-25

This course introduces the learner to the steps involved in clean-in-place (CIP) and steam-in-place (SIP) processes. Learners will be exposed to typical system requirements as well as equipment and configurations for each process. This course is ideal for those learners who possess an understanding of fluid system principles and basic fluid system dynamics, but who would like to learn about the clean-in-place and steam-in-place processes.

Completion Time: 35 min *CEU: 0.06*

CNG Fueling Stations and Station Components — CSMKT-09

CNG Fueling Stations and Station Components is a robust, two-lesson course that introduces the learner to these special fueling stations and the types of components used in them. The first lesson discusses basic principles of compressed natural gas (CNG), which help the learner to appreciate why some CNG fueling stations must operate as they do. Next, the operation of the three types of CNG fueling stations is discussed. The second lesson describes the four functions each must perform as well as the potential problems resulting from moisture in compressed natural gas. This course is ideal for those learners who possess a basic understanding of fluid systems and who would like to learn more about these specialized systems.

Completion Time: 60 min *CEU: 0.10*

Cobalt-Based Alloys — CSTECH-19

Cobalt-base alloys are very corrosion resistant, highly alloyed, and expensive. Cobalt-base alloys can be extensively age-hardened to extremely high yield and tensile strengths. Upon completion of this course, learners should be able to describe the similar properties of three cobalt-base alloys, and discuss their limiting compositions and corrosive properties.

Completion Time: 15 min *CEU: 0.03*

Compressors—Introduction — CPRIM-10

This course familiarizes learners with the operation of compressors and compressed gas systems. Learners are taught about two general types of compressors and the components and operation of a typical compressed air system. In addition, this course discusses hazards and safety precautions associated with compressors and compressed gas systems and describes the functions of systems and devices commonly used with compressors and compressed gas systems.

Completion Time: 40 min *CEU: 0.07*

Compressors—Operation of Centrifugal and Axial Types — CPRIM-11

This course provides learners with knowledge of basic concepts associated with the startup, operation, and shutdown of centrifugal and axial compressors. After completing this course, learners should be able to describe the general functions of instrumentation and control devices used with centrifugal and axial compressors. They should also be able to identify operator responsibilities associated with starting up, operating, and shutting down centrifugal and axial compressors.

Completion Time: 40 min *CEU: 0.07*

Coreflex Series Hose Products — CSPROD-45

The Coreflex series of hoses provide increased value over the typical PTFE and PFA products available in the market. The Coreflex series of hoses, originally developed for biopharmaceutical, pharmaceutical, and food and dairy applications, has also proven to be valuable in semiconductor and many general industry applications. Upon completion of this course, learners should be able to recall the features, options, and accessories that are common to the Coreflex series of hose products, describe the construction of each hose series, and describe the differentiating features of each hose series.

Completion Time: 45 min *CEU: 0.08*

Corrosion — CSTECH-14

This course describes the different forms of corrosion that can affect the appearance or performance of metal components. Topics in this course include the cost of corrosion to industry, the electrochemical reactions behind all forms of corrosion, different forms or types of corrosion, the primary methods used for corrosion prevention, and methods used in corrosion resistance.

Completion Time: 50 min *CEU: 0.08*

D

Diagrams—Basic Diagrams and Symbols 1 — CPRIM-12

This course introduces plant system diagrams and diagram symbols. After completing this course, learners should be able to distinguish and describe the purpose of equipment arrangement diagrams, elevation drawings, piping system (flow) diagrams, piping and instrumentation diagrams (P&IDs), electrical diagrams, and legends. Learners should also be able to identify symbols commonly used on flow diagrams and use a flow diagram to trace the flow paths of a system.

Completion Time: 30 min *CEU: 0.05*

Diagrams—Basic Diagrams and Symbols 2 CPRIM-13

This course is designed to familiarize learners with symbols commonly used on piping and instrumentation diagrams (P&IDs) and electrical one-line diagrams. After completing this course, learners should be able to identify instrument symbols and line symbols used in P&IDs, describe the types of information typically found on a legend, and use a P&ID to locate the components of a system. They should also be able to identify symbols used on electrical one-line diagrams.

Suggested Prerequisite: *Basic Diagrams and Symbols 1* (CPRIM-12)

Completion Time: 25 min *CEU: 0.04*

Diagrams—Flow and Electrical CPRIM-14

This course familiarizes learners with the use of flow diagrams and electrical one-line diagrams. After completing this course, learners should be able to use a flow diagram to trace the flow of materials through a system. They should also be able to use a flow diagram and a valve lineup checklist to line up valves in a system; use an electrical one-line diagram to learn the components and layout of an electrical system; and determine how to isolate a piece of equipment for maintenance or repair.

Completion Time: 25 min *CEU: 0.04*

Diagrams—Piping and Instrumentation CPRIM-15

This course is designed to familiarize learners with the use of piping and instrumentation diagrams (P&IDs). After completing this course, learners should be able to describe the kinds of information that can be found on a P&ID and explain why this information is useful. They should also be able to explain how to use P&IDs to troubleshoot system problems.

Completion Time: 30 min *CEU: 0.05*

Diaphragm Valve Basics CSPROD-17

Diaphragm valves are typically used for shutoff within fluid systems. *Diaphragm Valve Basics* introduces the learner to the construction and function of five common diaphragm valve types. In addition, the course discusses the benefits of each diaphragm valve type. This course is ideal for those learners with a nontechnical background or for those who require a basic introduction to fluid system components.

Completion Time: 30 min *CEU: 0.05*

Duplex Stainless Steel CSTECH-20

This course focuses on a class of stainless steels containing both austenite and ferrite. Upon completion of this course, learners should be able to list the alloys known to be duplex stainless steel, describe the relationship of duplex stainless to the ferritic and austenitic grades of stainless steels, and discuss the defining characteristics of each of the duplex stainless steel grades.

Completion Time: 20 min *CEU: 0.03*

Downstream Processing Part 1 CSMKT-29

This course discusses the downstream processing portion of the bioprocess. It introduces the learner to the difference between intracellular and extracellular products and the five factors that determine the type of downstream processes used. The course concludes with a discussion of the general characteristics associated with downstream processing systems.

Completion Time: 20 min *CEU: 0.03*

Downstream Processing Part 2 CSMKT-30

This course discusses mechanical cell disruption techniques, including bead milling and homogenization. In addition, it provides a description of separation methods used in the recovery process, including centrifugation, filtration, settling, and sedimentation, with extended discussions on centrifugation and filtration. The course concludes with a discussion about the primary isolation methods of solvent extraction, sorption, precipitation, and ultrafiltration.

Suggested Prerequisite: *Downstream Processing 1* (CSMKT-29)

Completion Time: 45 min *CEU: 0.08*

Downstream Processing Part 3 CSMKT-31

This course begins with a discussion about the purification processes that remove impurities and concentrate the product and ends with the compounding and packaging of a finished product. The final product isolation processes that prepare the product for manufacturing into its final dosage form are also discussed in detail.

Suggested Prerequisites: *Downstream Processing 1* (CSMKT-29); *Downstream Processing 2* (CSMKT-30)

Completion Time: 35 min *CEU: 0.06*

E

Electrical Safety — CPRIM-72

This course gives learners a general understanding of the basic principles of electricity and electrical safety. At the conclusion of this course, learners will have a basic understanding of electrical shock, hazards associated with working near electricity, and how to provide protection from electrical hazards. In addition, this course addresses how to provide aid to an electrical shock victim and how to respond to an electrical fire.

Completion Time: 25 min *CEU: 0.04*

End Connection Basics — CSPROD-38

All fittings consist of a body with end connections. The fitting body determines the shape of the fitting, and the end connections attach system components to the fitting body. This course defines five major types of end connections and provides the learner with a basic overview of the components and operation of each. This basic course is an ideal introduction to one of the most common fluid system components.

Completion Time: 35 min *CEU: 0.06*

Environmental Protection—Air Pollution — CPRIM-16

This course addresses the basic concepts associated with what air pollution is, and how it can be controlled. After completing this course, learners should be able to explain what air pollution is, where it comes from, and how it can be monitored. They should also be able to explain how air pollution from industrial facilities can be controlled.

Completion Time: 40 min *CEU: 0.07*

Environmental Protection—Water Pollution and Waste Disposal — CPRIM-17

This course addresses the basic principles of preventing pollutants from getting into plant wastewater and removing pollutants from plant wastewater before the water is released into the environment. Also covered are methods of waste disposal and general considerations associated with hazardous wastes. After completing this course, learners should be able to identify sources of water pollution and explain how pollutants are kept out of plant wastewater. They should also be able to describe wastewater treatment and waste disposal methods.

Completion Time: 35 min *CEU: 0.06*

F

Fast Loop Module — CSPROD-108

A fast loop, also referred to as a bypass loop, is a method of sample transport intended to speed instrument response to changes in the process by transporting the sample to the analyzer faster. These subsystems play an important role in analytical instrumentation sampling systems. This course introduces the learner to the fast loop configurations offered by Swagelok, including the features and functions.

Completion Time: 45 min *CEU: 0.08*

Fermentation Principles and Fermenters — CSMKT-23

This course provides learners with an overview of the fermentation process. This course addresses the types of fermenters and bioreactors used for microbial fermentation and mammalian cell culturing as well as other systems that interface with the fermentation process. This course is ideal for those learners who possess an understanding of fluid system principles and basic fluid system dynamics, but who would like to learn about fermentation principles and fermenters.

Completion Time: 45 min *CEU: 0.08*

Fermenters and Their Subsystems — CSMKT-24

This course introduces learners to design considerations for standard fermenters and discusses the various subsystems that interface with a fermenter. Upon completion of this course, learners should be able to describe the typical components and characteristics of a fermenter. They should also be able to recall the purpose of the fermentation subsystems, how the subsystems affect the requirements of the fermenter, and recall the utility support systems that interface with a fermenter.

Suggested Prerequisite: *Fermentation Principles and Fermenters* (CSMKT-23)

Completion Time: 50 min *CEU: 0.08*

Field Station Module — CSPROD-106

This course addresses the four functions of a field station and describes the two basic models offered by Swagelok and the features associated with the Swagelok field station module.

Completion Time: 45 min *CEU: 0.08*

Fitting Basics — CSPROD-40

"Fitting" is a general term used to describe the category of components whose purpose is to create a connection between tubing, pipe, or components within a fluid system. *Fitting Basics* focuses on three common types, including tube, pipe, and weld fittings. The learner will be introduced to common fitting terms and will be able to discern between them. This course builds on the concepts introduced in *End Connection Basics* (CSPROD-38).

Suggested Prerequisite: *End Connection Basics* (CSPROD-38)

Completion Time: 35 min *CEU: 0.06*

Flow-Control Bellows Valves — CSPROD-19

This course discusses the features, options, and accessories to the Swagelok bellows valves that are used for flow control and directional flow control. After completing this course, the learner should be able to describe features of each series of flow control bellows valves, describe common applications, and describe various options and accessories available to the flow control bellows valves product offering.

Completion Time: 30 min *CEU: 0.05*

Flow Measurement Technologies — CSTECH-05

Flow measurement and control are important variables for a variety of industrial processes. This course introduces the learner to ten different methods by which flow is measured. It also discusses common applications in which the technology may be used. In addition, the advantages and disadvantages associated with the technologies are discussed. After completing this course, the learner should be able to recall the principles of operation, applications, advantages, and disadvantages for the flow measurement technologies presented.

Completion Time: 40 min *CEU: 0.07*

Fluid Distribution Header — CSPROD-103

Fluid distribution headers are common components found in a variety of fluid systems and applications. This course introduces the learner to Swagelok's fluid distribution header. The learner will gain knowledge about the function, components, and features of the fluid distribution header product offering.

Completion Time: 25 min *CEU: 0.04*

Fluid System Principles and Components — CSPROD-43

Using a basic tube and bucket model, *Fluid System Principles and Components* introduces the learner to basic fluid system principles, terms, and components. Types of fittings, including union, elbow, tee, and cross, are discussed. In addition, the function of four valve types, including shutoff, flow control, directional flow control, and overpressure protection, are explained. This course is an ideal introduction to fluid systems for those learners who do not possess a technical background or for those just learning about fluid systems.

Completion Time: 15 min *CEU: 0.03*

Fuel Cell—Balance of Plant — CSMKT-16

Fuel Cell—Balance of Plant presents the various systems used to support the electrochemical reaction that takes place within a fuel cell. Commonly referred to as the "balance of plant," these systems supply fuel, air, and sometimes moisture to the fuel cell at carefully balanced pressures, flow rates, and humidity levels.

Completion Time: 50 min *CEU: 0.08*

Fuel Cell Basics — CSMKT-15

A fuel cell is an electrochemical energy conversion device. This course introduces the learner to a wide variety of fuel cell concepts, including the types and operation of fuel cells along with a discussion of the advantages and disadvantages of each type. Specifically, this course discusses polymer electrolyte membrane, alkaline, phosphoric acid, molten carbonate, solid oxide, and direct methanol fuel cell types.

Completion Time: 60 min *CEU: 0.10*

Furnaces—Introduction CPRIM-37

This course introduces learners to basic concepts associated with furnace operation. After completing the course, learners should be able to identify the major parts of a furnace and describe, in general terms, how a furnace produces heat. They should also be able to explain how heat transfer occurs in a furnace. This course also discusses how air, combustion gases, and process fluid move through different types of furnaces.

Completion Time: 40 min *CEU: 0.07*

G

Gauge Basics CSPROD-62

Pressure gauges are designed to mechanically measure fluid pressure and then convert that measurement into a mechanical motion so it can be read on the dial of the gauge. *Gauge Basics* is an introductory course that provides the learner with an overview of the typical construction of a pressure gauge. In addition, construction variations as well as accuracy standards are introduced. This course is ideal for those learners with a nontechnical background or for those who require a basic introduction to pressure gauges.

Completion Time: 25 min *CEU: 0.04*

General Technical: Leakage CSTECH-12

This course opens with a discussion about why leakage is a serious consideration in the design, construction, and operation of fluid control systems. Lesson two introduces the learner to the formula used to calculate a leak and four common leak-testing methods. Upon completion of this course, the learner should be able to define common terms and principles associated with leakage, describe the difference between leakage of liquids and gases in fluid control systems, explain how leakage occurs, discuss the environmental issues related to leakage, discuss the effects of leakage of specific fluids, and describe the advantages and limitations of bubble, pressure, and pressure change measurement.

Completion Time: 45 min *CEU: 0.08*

General Technical: Temperature CSTECH-11

This course discusses temperature, temperature measurement, and the effect of temperature in designing fluid control systems. This course defines temperature in relation to the Kinetic Theory of Matter, explains how temperature alters basic fluid system properties and affects process variables, explains temperature as a measure of the molecular activity of a gas or liquid, provides examples of temperature as experienced in industrial applications, describes temperature scales and devices for measuring temperature, and demonstrates how temperature changes with the addition of heat.

Completion Time: 45 min *CEU: 0.08*

H

Hearing Conservation CPRIM-73

The purpose of this course is to give learners a basic understanding of how to protect themselves from hazardous levels of noise in the workplace. At the conclusion of this course, learners will have a general understanding of when noise levels are hazardous, the basic requirements of the OSHA regulation on hearing conservation, and devices that are used to provide hearing protection.

Completion Time: 25 min *CEU: 0.04*

Heat Exchangers—Condensers and Reboilers CPRIM-18

This course introduces learners to the basic operation of condensers and reboilers. After completing this course, learners should be able to describe the function and operation of a typical condenser, basic procedures for starting up and shutting down a condenser, and some operator checks that are typically performed during condenser operation. They should also be able to explain the operation of kettle-type and thermosiphon reboilers and identify some operator responsibilities associated with reboiler operation.

Completion Time: 45 min *CEU: 0.08*

Heat Exchangers—Cooling Towers CPRIM-19

This course explains the basic operation of a cooling water system and various types of cooling towers. Learners will explore how cooling occurs in a cooling tower and learn about the general design and operation of natural-draft and mechanical-draft cooling towers. In addition, the course will cover operator checks typically performed on cooling towers, the effects of contaminants on cooling water, and how chemicals can be safely added to cooling water systems.

Completion Time: 35 min *CEU: 0.06*

Heat Exchangers—Introduction CPRIM-20

This course introduces learners to the basic principles of heat transfer and the components and operating principles of shell and tube, and plate heat exchangers. After completing this course, learners should be able to explain what heat is and describe three ways that heat transfer can occur in a heat exchanger. They should also be able to describe the basic operation and components of a shell and tube heat exchanger and identify auxiliary equipment that is commonly used with heat exchangers. Finally, learners should be able to explain how a plate heat exchanger operates and identify its components.

Completion Time: 40 min *CEU: 0.07*

Hose and Flexible Tubing Basics CSPROD-23

This course provides the learner with a basic, yet broad overview of fundamental hose and flexible tubing concepts, including purposes, types, and construction. Upon completion of this course, the learner should be able to define basic hose and flexible tubing terms, describe the typical construction of hose and flexible tubing, recall the various types of hose and flexible tubing and characteristics associated with each, and recall eight common methods of attaching end connections.

Completion Time: 50 min *CEU: 0.08*

I

Industrial Math—Algebra CPRIM-63

This course addresses the basic concepts of algebra. After completing this course, learners should be able to define terms commonly associated with the use of algebra, isolate an unknown in an equation, and use the processes of distribution and factoring. They should also be able to explain what ratios and proportions are and the difference between a direct proportion and an inverse proportion. Finally, learners should be able to use a calculator to solve math problems.

Completion Time: 30 min *CEU: 0.05*

Industrial Math—Formulas, Graphs, and Trends CPRIM-60

This course teaches the basic principles associated with using formulas, reading and interpreting graphs, and detecting and analyzing trends. After completing this course, learners should be able to explain what a formula is and how to use formulas to find areas, volumes, and volumetric flow rates. They should also be able to describe how graphs and charts can provide information about process variables. In addition, learners should be able to describe basic procedures for detecting and analyzing trends.

Completion Time: 25 min *CEU: 0.04*

Introduction to Pressure CSCI-01

Pressure is one of the key variables in a fluid system. This course provides a basic introduction to the key concepts about pressure, including the definition of pressure, types of pressure, and the ways it can be measured and expressed. Atmospheric, gauge, and absolute pressure are all discussed in this course. *Introduction to Pressure* is an ideal course for those learners who have little to no experience with fluid systems.

Completion Time: 20 min *CEU: 0.03*

Instrumentation and Control—Automatic Process Control 1 CPRIM-49

This course familiarizes learners with basic concepts associated with automatic control of process systems. After completing this course, learners should be able to describe the functions of the four basic elements of an automatic process control system and explain how a process disturbance can affect a process control system. They should also be able to explain how feedback control and feedforward control can be used in process control systems and how resistance, capacitance, dead time, and lag time can affect a process control system.

Completion Time: 30 min *CEU: 0.05*

Instrumentation and Control—Automatic Process Control 2 CPRIM-50

This course familiarizes learners with control modes used with automatic process control systems. After completing this course, learners should be able to describe two-position control, proportional control, reset control, rate control, and PID (Proportional-Integral-Derivative) control. They should also be able to explain how each of these control modes works in a control system.

Completion Time: 40 min *CEU: 0.07*

Instrumentation and Control—Density, Clarity, and Moisture CPRIM-22

This course introduces learners to devices that can be used to measure density, clarity, and moisture. Specifically, this course will cover hydrometers, bubbler systems, and radioactive density analyzers that measure density. When discussing clarity, learners will be exposed to the basic operation of a colorimeter, a turbidity meter, and an opacity meter. Finally, when discussing moisture measurement, sling psychrometers, dry bulb recording psychrometers, hygrometers, and infrared moisture analyzers will be addressed.

Completion Time: 40 min *CEU: 0.07*

Instrumentation and Control—Measurement of Concentration CPRIM-23

This course introduces learners to analytical variables and methods for measuring concentration in liquids and gases. After completing this course, learners should be able to define five analytical variables that are commonly measured in plants and explain how and why analytical variables are measured. They should also be able to describe the basic operation of several different types of analyzers that can be used to measure liquid and gas concentrations.

Completion Time: 40 min *CEU: 0.07*

Instrumentation and Control—Measurement of Level and Flow CPRIM-24

This course introduces learners to instruments that measure level and flow. After completing this course, learners should be able to explain what level is and describe the basic operation of various direct and indirect level measurement devices. They should also be able to explain what fluid flow, flow rate, and total flow are as well as describe some common examples of direct and indirect flow measurements.

Completion Time: 35 min *CEU: 0.06*

Instrumentation and Control—Measurement of Pressure and Temperature CPRIM-25

This course teaches learners some fundamental aspects of process variable measurement and some of the basic instruments used for pressure and temperature measurement. After completing this course, learners should be able to describe the function of process instrumentation and how to obtain accurate readings from instruments such as gauges, indicators, and recorders. They should also be able to explain what pressure and temperature are and how they expressed. Finally, this course will discuss the operation of several pressure and temperature measuring devices.

Completion Time: 35 min *CEU: 0.06*

L

Laboratory Safety CPRIM-74

This course provides a general understanding of the basic principles of safety in a laboratory setting. Learners will gain a basic understanding of general hazards that exist in laboratories, basic personal protection equipment to safeguard from those hazards, how to locate information about chemicals, basic standard operating procedures and chemical hygiene practices, and how to respond in emergency situations.

Completion Time: 40 min *CEU: 0.07*

M

Material Safety Data Sheets CPRIM-75

The purpose of this course is to give learners a general understanding of the types of information that can be found in Material Safety Data Sheets (MSDS). At the conclusion of this course, learners will know why an MSDS is important and what types of information an MSDS provides. They will also know how to find specific types of information in an MSDS.

Completion Time: 30 min *CEU: 0.05*

Materials—Metals CSTECH-15

This course provides the learner with a broad-based background on a wide variety of metallic materials, including the elements found in many materials. Students taking this course will learn about the composition of common metallic materials, their properties, material classes and classifications, and typical applications. Both ferrous and nonferrous metals are discussed in detail.

Completion Time: 60 min *CEU: 0.10*

Mechanical Properties of Alloys CSTECH-13

This course discusses the primary mechanical properties of metals and how the selection of alloys drives the performance of the end product. Topics in this course include industry standards that drive testing methods; the information provided by a stress-strain curve; ductility, hardness, and fracture toughness; the primary metal working processes and how they affect mechanical properties; the grain structure of metals; and fracture mechanics including fracture toughness, impact testing, and ductile and brittle fractures.

Completion Time: 50 min *CEU: 0.08*

Medium-Pressure Products CSPROD-51

The term “medium pressure” is used by Swagelok to describe applications that can reach pressures up to 15 000 psig (1034 bar). Swagelok offers medium-pressure tube fittings and a valve to meet the demands of these applications. In this course, learners receive an overview of the target applications for these products. They also learn how the products function and the differentiating features, options, and accessories available for these products.

Completion Time: 50 min *CEU: 0.08*

Metering Needle Valves CSPROD-02

Metering needle valves provide very precise flow control. This course provides the learner with an overview of Swagelok metering needle valve products. In this course, the characteristics of metering needle valves are introduced, as well as the features associated with each series of Swagelok metering needle valves. In addition, a variety of options and accessories are discussed to better familiarize the learner with the Swagelok product lines.

Completion Time: 20 min *CEU: 0.03*

N

Needle Valve Basics CSPROD-01

Needle valves are fluid system components that are used to shut off or control the flow of system media. *Needle Valve Basics* introduces these functions by using a simple model. The function of each component is explained as a needle valve is built component by component. This course is an ideal introductory course for those learners with a nontechnical background or who require a basic introduction to fluid system components.

Completion Time: 20 min *CEU: 0.03*

Nickel Alloys CSTECH-18

This course discusses nickel-base alloys. Although more expensive than iron-base alloys, nickel-base alloys exhibit much better corrosion resistance and mechanical strength. Upon completion of this course, learners should be able to describe the evolution of nickel-base alloys, discuss the defining characteristics of each of the nickel-base alloys included in the course, and understand the ASTM codes necessary for proper alloy selection.

Completion Time: 35 min *CEU: 0.06*

Nondestructive Testing and Examination Methods for Orbital Welding CSPROD-127

Welders, weld examiners, and weld inspectors need to be knowledgeable about nondestructive testing and examination methods and the discontinuities and defects discovered through these methods. This course introduces the types of nondestructive testing and examination methods that are most commonly encountered when examining small diameter tube and pipe welds. This course will also introduce common welding discontinuities and defects one must need to identify when examining a completed weld.

Completion Time: 60 min *CEU: 0.10*

O

Other Metals and Alloys — CSTECH-22

Upon completion of this course, learners should be able to describe nonferrous alloys and be familiar with associated terminology, discuss the defining characteristics of each of the nonferrous alloys included in the course, and understand the ASTM composition and mechanical properties of the metals and alloys discussed in this course.

Completion Time: 25 min *CEU: 0.04*

Oxygen Safety Awareness — CSTECH-24

Although oxygen systems can present unusual and serious conditions, they exist safely throughout industry because the risks can be minimized through system design. This course introduces the risks associated with oxygen systems as well as ways of reducing those risks.

Completion Time: 30 min *CEU: 0.05*

P

Piping and Auxiliaries—Basic Components and Functions — CPRIM-27

This course familiarizes learners with the basic components commonly found in piping systems. After completing this course, learners should be able to state the purpose of piping and pipe fitting and be able to list some common types of pipe fittings. They should also be able to describe devices that are used to accommodate the weight and movement of piping and to explain how insulation and heat tracing help to control temperatures in piping systems.

Completion Time: 35 min *CEU: 0.06*

Piping and Auxiliaries—System Components and Operation — CPRIM-28

This course is designed to familiarize learners with some of the auxiliary components commonly found in piping systems. After completing this course, learners should be able to describe the function and operation of rupture discs, relief valves, safety valves, and some common types of steam traps. The learner should also be able to describe basic procedures for draining liquid systems and some typical operator checks for fluid systems.

Completion Time: 35 min *CEU: 0.06*

Piping Products Part 1 — CSPROD-70

While the purpose of a process piping system is to transport large volumes of a fluid product, there are instances where an instrumentation system must interface with the piping system. Swagelok *Piping Products 1* introduces the learner to the process interface components that Swagelok offers for use in these applications. This three-lesson course discusses the typical process interface configurations as well as the design, function, and features of the Swagelok process interface components.

Completion Time: 50 min *CEU: 0.08*

Plant Science—Fluid Systems — CPRIM-03

This course introduces learners to the characteristics, components, and operation of fluid systems. The course begins by explaining what a fluid is and goes on to describe a plant system. It also discusses the basic layout of a liquid system and describes energy conversions in a liquid system. Finally, the course describes the basic parts of a compressed air system and the basic operation of several gas and vapor system devices, including a jet pump, a nozzle, and a condenser.

Completion Time: 45 min *CEU: 0.08*

Plant Science—Gases and Flowing Liquids — CPRIM-04

This course familiarizes learners with general concepts associated with the properties of gases and flowing liquids. This course describes the major properties of gases and explains how these properties are related. It also explains how pressure can be measured and the effects of flow, velocity, and friction on the head pressure of a liquid.

Completion Time: 50 min *CEU: 0.08*

Plant Science—Heat CPRIM-05

This course introduces learners to some of the basic principles associated with heat and heat transfer. After completing this course, learners should be able to describe some of the effects of heat, the relationship between temperature and thermal energy, and the Law of Energy Conservation. Learners should also be able to define the terms sensible heat and latent heat and describe the effects of pressure on the temperature at which a substance undergoes a phase change.

Completion Time: 35 min *CEU: 0.06*

Plant Science—Heat Transfer CPRIM-66

This course introduces learners to the fundamentals of heat transfer and the basic operation of a typical heat exchanger. After completing this course, learners should be able to describe the effects of a temperature difference on heat transfer and the three modes of heat transfer. They should also be able to describe the basic operation of a shell and tube heat exchanger and identify problems that can occur in a heat exchanger.

Completion Time: 40 min *CEU: 0.07*

Plant Science—Solids and Liquids CPRIM-65

This course addresses basic scientific principles that relate to solids and liquids. After completing this course, learners should be able to describe the general molecular structure of solids, liquids, and gases. They should also be able to describe specific properties attributed to solids and liquids.

Completion Time: 45 min *CEU: 0.08*

Pressure-Reducing Regulators CSPROD-66

A pressure regulator is designed to control outlet pressure under a given set of inlet pressure and flow conditions. Pressure reducing regulators are the most commonly used pressure regulators. This course introduces the learner to the variety of pressure reducing regulators offered by Swagelok. In addition, the common as well as distinguishing features are discussed for each series, and common applications are also provided.

Completion Time: 50 min *CEU: 0.08*

Process Sampling—Obtaining Samples CPRIM-35

This course familiarizes learners with the basic concepts associated with obtaining samples of process materials. After completing this course, learners should be able to describe hazards associated with sampling and the precautions that may be required. They should also be able to take contaminant-free representative samples of process liquids, solids, and gases.

Completion Time: 40 min *CEU: 0.07*

Process Sampling—Testing Samples CPRIM-62

This course provides learners with basic procedures for performing tests on samples of process materials and products. After completing this course, learners should be able to describe how to perform a pH test, a percent solids test, a specific gravity test, and a titration test. They should also be able to describe the operation of a gas chromatograph and how it is used to perform tests on complex gas mixtures or solutions.

Completion Time: 40 min *CEU: 0.07*

Properties of CNG and Natural Gas Vehicles CSMKT-08

Compressed natural gas (CNG) is a substitute for gasoline or diesel fuel and is considered to be an environmentally "clean" alternative to those fuels. *Properties of CNG and Natural Gas Vehicles* is a robust, two-lesson course that provides the learner with a basic overview of natural gas and the properties of compressed natural gas. The course goes on to address the fuel system components of natural gas vehicles and CNG as a vehicle fuel. This course is ideal for those learners who have a basic understanding of fluid systems but require an introduction to compressed natural gas and natural gas vehicles.

Completion Time: 45 min *CEU: 0.08*

Pumps—Basic Types and Operations CPRIM-55

This course is designed to introduce learners to the basic components and operation of positive displacement pumps and centrifugal pumps. After completing this course, learners should be able to explain how pumps can be identified, identify the basic components of a pump, and describe the functions of various types of pump auxiliary equipment and systems. They should also be able to describe the general operation of reciprocating and rotary positive displacement pumps, and single-stage and multistage centrifugal pumps.

Completion Time: 40 min *CEU: 0.07*

Pumps—Performance and Inspection CPRIM-54

This course is designed to introduce learners to factors that affect the performance of pumps and some of the symptoms of improper pump operation. After completing this course, learners should be able to identify and explain the relationship between various factors that affect pump performance and to explain how pump performance can be evaluated. They should also be able to identify symptoms of some common pump problems and explain how to check a pump for signs of problems such as leaks and cavitation.

Completion Time: 35 min *CEU: 0.06*

R

Regulator Basics CSPROD-65

Regulating the pressure of fluid as it flows through a system can be critical. *Regulator Basics* is a four-lesson course that provides a robust overview of the function and construction of pressure-reducing regulators. Since pressure reduction can be achieved through various pressure regulator designs, common designs for the control element, sensing element, and loading element are also introduced. Key performance characteristics are discussed, such as supply-pressure effect, creep, and droop. This course is an ideal course for those learners who require an introduction to pressure regulators but who already possess a basic knowledge of fluid system function.

Completion Time: 50 min *CEU: 0.08*

Regulator Options and Assembly Products CSPROD-59

This course complements *Swagelok Pressure Reducing Regulators* (CSPROD-66) and *Backpressure and Specialty Regulator Products* (CSPROD-58) with a discussion about options that are available for Swagelok regulators. This course also discusses products used with regulators in a pressure control system.

Completion Time: 30 min *CEU: 0.05*

Relief Valve Basics CSPROD-07

A proportional relief valve is designed to protect fluid system components from overpressurization, which can cause damage and possible failure. *Relief Valve Basics* explains the function of a proportional relief valve and introduces the learner to typical valve construction. This simple course is ideal for those learners with a nontechnical background or for those who require a basic introduction to fluid system components.

Completion Time: 20 min *CEU: 0.03*

Relief Valve Products CSPROD-08

Proportional relief valves are self-actuating valves that are normally closed and only actuate when pressure rises above a preset limit. *Relief Valve Products* introduces learners to the Swagelok proportional relief valve product offering. This course provides an overview of each series of valve and its features, options, and accessories.

Completion Time: 20 min *CEU: 0.03*

Respiratory Protection CPRIM-76

This course gives learners a general understanding of basic types of respirators and proper methods for the use and care of respirators. At the conclusion of this course, learners will have a basic understanding of air purifying respirators, air supplied respirators, and how to properly use and care for respirators.

Completion Time: 20 min *CEU: 0.04*

Rupture Discs CSPROD-10

This course provides a basic overview of the components and operating principles of rupture disc units for overpressure protection. It also addresses safety precautions for using rupture disc devices. After completing this course, the learner should be able to describe the features of rupture discs, common applications for rupture discs, options and accessories available for rupture disc products, and precautions to be taken when using rupture disc devices.

Completion Time: 20 min *CEU: 0.03*

S

Sample Probe Basics — CSPROD-104

The purpose of a sample system is to provide a representative sample to the analyzer in an appropriate, compatible condition within a required time. The selection and placement of sample probes plays a key role in meeting these requirements. This course introduces the learner to probe selection variables and how the right probe contributes to the effectiveness of the sampling process.

Completion Time: 30 min *CEU: 0.05*

Sample Probe Module — CSPROD-105

The Sample Probe Module consists of two products that can be used together to enhance the performance of analytical instrumentation sampling systems. The SP series sample probe and the SPV series process interface valve were designed to meet the criteria of sample systems. This course discusses the two types of SP series probes and the four types of SPV series valves offered by Swagelok including features and options.

Completion Time: 35 min *CEU: 0.06*

Severe-Service Needle Valves — CSPROD-04

Because of the valve design and materials of construction, severe-service needle valves are suitable for use in high-pressure and/or high-temperature applications. This course introduces learners to the severe-service needle valves offered by Swagelok. The course describes what the term “severe service” means and provides the learner with an overview of the features, options and accessories for each series.

Completion Time: 25 min *CEU: 0.04*

Shutoff Bellows Valve Products — CSPROD-12

This course provides a basic overview of the components and operating principles of shutoff bellows valve products and the system conditions in which they operate. This course introduces the learner to the features of each shutoff bellows valve series, lists common applications for each series, and discusses available options and accessories for each series.

Completion Time: 20 min *CEU: 0.03*

60 Series Process Ball Valves — CSPROD-14

The 60 series is Swagelok’s primary process ball valve. Although there is one basic design, the product line represents a variety of general-purpose and special-application ball valves. This course introduces the learner to the design features, options, and accessories of the general-purpose 60 series ball valve. In addition, the course discusses the wide variety of 60 series special-application models that are available and how they are different from the standard 60 series model. After completing this course, the learner should be able to recall the design features of the standard 60 series ball valve, describe the operation of the seat seal in low- and high-pressure applications, describe how the 60 series stem seal offers improved performance over conventional stem packing, and recall the 60 series special-application models.

Completion Time: 30 min *CEU: 0.05*

SK Series Medium-Pressure Ball Valves — CSPROD-91

The SK series ball valve is an economical, general industrial quarter-turn ball valve that can be used in a variety of process and control applications. *SK Series Medium-Pressure Ball Valves* provides the learner with an overview of the SK series ball valves including the design, features, options, accessories, and approvals. It also compares the SK series ball valve to the 33 series ball valve, which it replaces.

Completion Time: 25 min *CEU: 0.04*

SSV Series Stream Selector System — CSPROD-85

The purpose of a sampling system is to provide a representative sample to a detector in an analyzer. Sample stream selection technology is key to proper sampling. This course discusses the evolution of the analytical instrumentation sample stream selection technologies and introduces the learners to Swagelok SSV series stream selector valve. The operation, features, and options of the Swagelok Stream Selector Valve are also discussed.

Completion Time: 40 min *CEU: 0.07*

Stainless Steel Tube Fitting Hinging Action — CSPROD-72

This course demonstrates how the Swagelok fitting components work together during assembly. Specifically, this course discusses the stainless steel Swagelok tube fitting with the advanced geometry back ferrule. The fitting design and hinging action are thoroughly explained so the learner not only understands what happens to the fitting but also why it happens.

Completion Time: 30 min *CEU: 0.06*

Standard Austenitic Stainless Steel — CSTECH-16

This course discusses the properties and characteristics of standard grades of austenitic stainless steel. Upon completion of this course, learners should be able to define austenitic stainless steel, describe the evolution of austenitic stainless steels, discuss the defining characteristics of each of the austenitic stainless steel grades listed in the course; and understand the ASME codes necessary for proper alloy selection.

Completion Time: 30 min *CEU: 0.05*

Steam Basics — CSPROD-67

Steam is a widely used utility within many manufacturing environments. *Steam Basics* introduces a wide range of steam concepts, including how steam is generated and used, the effect of pressure and temperature on heat transfer, properties of steam at different temperatures, common steam trap designs, valve function in a steam system, steam trap failure modes, and steam trap testing. This four-lesson course is ideal for those learners who are familiar with basic fluid system concepts but require an introduction to steam concepts and steam systems.

Completion Time: 75 min *CEU: 0.13*

Steels Commonly Used in General Industry — CSTECH-23

This course discusses steels that are commonly used in general industry, but rarely in Swagelok fluid system components. The defining characteristics of low-alloy, martensitic, ferritic, superferritic, and precipitation hardened stainless steels are discussed.

Completion Time: 25 min *CEU: 0.04*

Superaustenitic Stainless Steel — CSTECH-17

This course discusses the defining characteristics of each of the superaustenitic stainless steel grades and compares these characteristics to austenitic stainless steels. Upon completion of this course learners should be able to list the alloys known to be superaustenitic, describe the relationship of superaustenitic stainless to the austenitic stainless steels, and identify the graphical comparisons that exist between different superaustenitic and austenitic grades of steel.

Completion Time: 25 min *CEU: 0.04*

Surge-Protection Valves — CSPROD-09

A surge-protection valve safeguards the fluid system or the environment from excess flow of a liquid or gas, which can be uncontrolled leakage to atmosphere. *Surge-Protection Valves* provides the learner with an overview of the purpose of surge-protection valves and introduces the Swagelok XS series surge-protection valve series. This course discusses the function, features, and options and accessories of the XS series of valves.

Completion Time: 20 min *CEU: 0.03*

Swagelok Pipe Fittings — CSPROD-34

Pipe fittings have two or more threaded end connections and connect various types of threaded components. In this course, the learner will receive a basic overview of the features and options for Swagelok pipe fittings. In addition, this course discusses the different types of threads available on the fittings and where applicable, additional sealants that may be required.

Completion Time: 30 min *CEU: 0.05*

Swagelok Quick-Connect Basics — CSPROD-25

Quick-connects are mechanical devices that join and separate fluid system components without the use of tools. *Quick-Connect Basics* is an introductory course that teaches the learner about the design and operation of three common types of quick-connects. System variables, such as flow direction, pressure and temperature ratings, system media, flow capacity, locking mechanisms, and end connections, are discussed as fluid system variables to be given consideration in the selection of a quick-connect product. This course is ideal for those learners with a nontechnical background or for those who require a basic introduction to quick-connect components.

Completion Time: 30 min *CEU: 0.05*

Swagelok Tube Fitting Assembly — CSPROD-50

This course makes extensive use of short video segments to demonstrate safety and assembly procedures for making up Swagelok tube fittings. The first lesson focuses on manual assembly of the Swagelok tube fitting end connection to tubing. It also addresses two types of end connections unique to the Swagelok design, the tube adapter and machined ferrule. The second lesson focuses on Swagelok tube fitting assembly using the air-actuated hydraulic swaging unit (AHSU) and the multihead hydraulic swaging unit (MHSU) to swage or pre-swage tube fittings.

Completion time: 60 min *CEU: 0.10*

Swagelok Tube Fittings — CSPROD-37

This course provides a basic overview of the four components of the Swagelok tube fitting and how they work together to create a leak-tight seal. Eight different features of the Swagelok tube fitting are addressed, as well as options and accessories.

Suggested Prerequisites: *End Connection Basics* (CSPROD-38); *Fitting Basics* (CSPROD-40)

Completion Time: 40 min *CEU: 0.07*

T

Thermometers and Thermowells — CSPROD-60

This course introduces the learner to bimetallic strip thermometers and thermowells. This course explains the principles of operation, features, and options available for Swagelok's bimetallic thermometer product line. It also describes the purpose, construction, and features of Swagelok's thermowell product offering.

Completion Time: 35 min *CEU: 0.06*

Types of Pressure — CSCI-02

Types of Pressure builds on the concepts taught in *Introduction to Pressure* (CSCI-01). This course uses basic fluid system components to explain five types of pressure, including working pressure, differential pressure, back pressure, overpressure, and vacuum. This course also introduces common terms, including inlet, outlet, upstream, downstream, pressure ratings, and overpressure protection. *Types of Pressure* is a good introductory course for those learners with little to no experience with fluid system pressure variables.

Suggested Prerequisite: *Introduction to Pressure* (CSCI-01)

Completion Time: 20 min *CEU: 0.03*

U

Ultrahigh-Purity Fluoropolymer Tubing — CSPROD-78

Swagelok ultrahigh-purity tubing is designed to work with other Swagelok plastic products in a variety of applications. This course provides the learner with information about features, materials, applicable specifications and standards, and available packaging options.

Completion Time: 15 min *CEU: 0.03*

Universal Mount for Steam Applications — CSPROD-75

Steam is widely used in process systems to maintain an elevated temperature in a process line and to prevent process lines from freezing. *Universal Mount for Steam Applications* introduces the learner to those steam applications in which the Swagelok universal mount and integrated test valve assembly can be used. The components, operation, and features of these products are discussed as well as how to interpret the various modes of steam trap failure using the integrated test valve assembly.

Completion Time: 20 min *CEU: 0.03*

Utility Support Systems—Air — CSMKT-28

This course introduces learners to the use of air systems in a bioprocessing facility and describes the most common methods of air sterilization. Upon completion of this course, learners should be able to identify the most economically practical method for use in bioprocessing applications and recall the steps in the air filtration process.

Completion Time: 30 min *CEU: 0.05*

Utility Support Systems—Steam CSMKT-27

This course describes the role that steam systems play in bioprocessing. Upon completion of this course, the learner should be able to recall the types of steam used in a bioprocessing facility, describe how clean steam and pure steam are generated and used, recall the design issues associated with a steam system, and identify the two most common types of steam sterilization autoclaves.

Completion Time: 30 min *CEU: 0.05*

Utility Support Systems—Water CSMKT-26

This course describes the role that water systems play in bioprocessing by opening with an explanation about why water is analyzed prior to use. It goes on to describe common methods of analysis as well as purification technologies. Learners are introduced to different types of utility support systems, stills used to produce water for pharmaceutical applications, common water system loop configurations, and how used bioprocessing water is handled.

Completion Time: 35 min *CEU: 0.06*

V

Valves—Basic Types and Operation 1 CPRIM-42

This course introduces learners to the basic parts and operation of valves commonly used in process systems. After completing this course, learners should be able to describe the purpose and uses of valves on process systems, identify the main parts of a typical valve, and describe the function of each part. They should also be able to describe the specific uses, parts, and operation of gate valves, globe valves, plug valves, ball valves, and butterfly valves.

Completion Time: 40 min *CEU: 0.07*

Valves—Basic Types and Operation 2 CPRIM-43

This course introduces learners to valves that are commonly used to isolate components, to throttle flow, to prevent reverse flow through a process system, and to protect systems from overpressure conditions. After completing this course, learners should be able to identify and describe the basic functions and operation of diaphragm valves, pinch valves, and check valves. They should also be able to explain how relief valves and safety valves protect system equipment and piping from excessive pressure.

Completion Time: 40 min *CEU: 0.07*

Valves—Electric and Hydraulic Actuators CPRIM-36

This course introduces learners to various types of electric and hydraulic actuators that are used to control valves in process systems. After completing this course, learners should be able to describe the basic operation of solenoid actuators, motor-operated actuators, and various types of hydraulic actuators. They should also be able to explain the function of a pilot valve and describe problems associated with hydraulic actuators.

Completion Time: 40 min *CEU: 0.07*

Valves—Introduction to Actuators CPRIM-44

This course discusses actuators in general, but focuses on pneumatic actuators. Learners will explore three basic types of actuators and they will learn how actuators position control valves. This course also addresses the basic design and operation of single- and double-acting diaphragm actuators, single- and double-acting piston actuators, vane actuators, and positioners. The course closes with a discussion of common actuator problems.

Completion Time: 50 min *CEU: 0.08*

Valve Variables and Materials CSPROD-42

A variety of variables should be considered for safe and appropriate valve selection. *Valve Variables and Materials* provides the learner with a general overview of valve selection variables including function, pressure, temperature, flow rate, end connections, system media, and frequency of actuation. This course is not intended to teach the learner how to select a valve for a particular application, but to provide an overview of variables that must be considered in the valve selection process.

Completion Time: 40 min *CEU: 0.07*

Variable Area Flowmeters — CSPROD-57

Variable area flowmeters, commonly referred to as “rotameters,” measure the flow rate in a fluid system. This course introduces the learner to the Swagelok variable area flowmeter (VA flowmeter) models, including both the glass and metal tube models. In addition, learners will gain a more thorough understanding on the effects of system changes to the VA flowmeter operation. After completing this course, the learner should be able to describe the measuring principles of variable area flowmeters and recall the advantages and disadvantages associated with variable area flowmeters.

Completion Time: 50 min *CEU: 0.08*

W

Warning Signs and Labels — CPRIM-77

This course provides learners with a general understanding of the purpose and use of warning signs and various types of labels. At the conclusion of this course, learners will have a basic understanding of government regulations that deal with labeling. They will also have a general understanding of the types of information that can be obtained from hazardous product labels, shipping labels, and warning signs.

Completion Time: 20 min *CEU: 0.04*

Water Treatment—Wastewater 1 — CPRIM-45

This course familiarizes learners with basic concepts associated with treating industrial wastewater to prepare it for safe discharge and reuse. Learners will be taught about processes and equipment typically used for wastewater collection and primary treatment. In addition, this course addresses the use of chemical precipitation and dissolved air flotation in intermediate treatment and the use of activated sludge in secondary treatment.

Completion Time: 40 min *CEU: 0.07*

Water Treatment—Wastewater 2 — CPRIM-46

This course acquaints learners with basic concepts associated with treating industrial wastewater so that it can be safely reused or discharged into the environment. After completing this course, learners should be able to describe how filtration and activated carbon adsorption can be used in tertiary treatment and how quality standards affect the discharge of wastewater from an industrial facility. They should also be able to describe general operator responsibilities associated with activated sludge systems.

Completion Time: 35 min *CEU: 0.06*

Workplace Ergonomics — CPRIM-71

This course gives learners a general understanding of ergonomics in the workplace. Learners will gain a basic understanding of how ergonomics can prevent musculoskeletal disorders (MSDs). They will also be able to identify ergonomic risk factors and work activities associated with MSD hazards; describe some common MSDs, including their signs and symptoms and the importance of reporting them early; and describe the actions that they can take to control ergonomic hazards.

Completion Time: 35 min *CEU: 0.06*

Swagelok

July 2012, R9, CORP-0005-E