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See the special membership offer on page 29.

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1. **Online at www.aiche.org/education**
2. **By phone at 1-800-242-4363 or 1-203-702-7660 outside the U.S.**

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CHEMICAL ENGINEERING ESSENTIALS

Essentials of Chemical Engineering for Non-Chemical Engineers

Course No.: CH710
Course Length: 3 days
CEUs: 2.3 **PDHs:** 23
Pricing: AIChE Members – $1,595
Non-Members – $1,795

Gain the knowledge of basic chemical engineering concepts you need to work with chemical engineers on projects, scale-ups and process evaluations. In this introductory course, you'll learn the fundamentals of chemical engineering analysis, design and calculations.

In just three days, you'll cover the basics of fluid flow, heat transfer, heat exchanger design and cooling towers. You'll get up-to-speed on solids handling, tank and vessel design, polymerization and polymer processing and how to use this knowledge to sharpen projects and evaluations. And, through case studies, you'll see the concepts you learn in action.

Here's a preview of what you'll learn:

- The role of chemical engineering and chemistry scale-up
- The basics of stoichiometry
- Commonly used chemical engineering calculations
- The basics of safety, industrial hygiene and reactive chemicals
- What you need to know about fluid flow, heat transfer, heat exchanger design and cooling towers
- Separation technologies – including distillation, absorption, stripping, adsorption, ion exchange and membranes
- What every non-chemical engineer needs to understand about evaporation, crystallization, liquid-solid separations and drying
- Solids handling – the basics
- Breaking down the basics of tank and vessel design
- Essentials of polymerization and polymer processing
- A working knowledge of process control

Who should attend:

This course is designed for those without formal chemical engineering training who have up to three years of experience working in a plant with chemical engineers. It will be especially valuable to:

- Operating technicians
- Engineering managers who are not chemical engineers
- Chemists
- DHS, EPA and other government employees
- Other engineers

About your instructor:

Jack Hipple is an experienced chemical engineer with a chemical engineering degree from Carnegie Mellon University. He has been responsible for chemical engineering scale-ups in the brine and bromine chemicals area, halogenated organic chemicals, lithium chemicals, fabricated plastics and materials, and aerogels. He has 30 years of industrial innovation experience, including responsibility for global chemical engineering at Dow Chemical.

Locations:

City	Dates
New Orleans	February 25 – 27, 2013
Las Vegas	April 15 – 17, 2013
Houston	June 10 – 12, 2013
Atlanta	September 16 – 18, 2013
Philadelphia	October 28 – 30, 2013

**You may also be interested in…
CH024: Chemical and Bioengineering Fundamentals for Technical and Scientific Professionals, see p. 4**

FLUIDS AND HEAT TRANSFER

Heat Exchanger Design and Operations

Course No.: CH294
Course Length: 2 days
CEUs: 1.5 **PDHs:** 15
Pricing: AIChE Members – $1,195
Non-Members – $1,395

Learn state-of-the-art strategies you can apply to ensure the success of your next project involving heat exchanger sizing, specification and operation. In this course, you'll get up-to-date on the latest developments and strategies in heat exchanger design and the diagnosis, correction and troubleshooting of operating problems, including those common to distillation column reboilers and condensers. You'll examine the design of shell-and-tube exchanger technology and learn how to minimize fouling and ensure trouble-free operation. And, you'll learn how to efficiently operate other types of exchangers, including gasketed plate, spiral plate and air-cooled equipment.

Here's a preview of what you'll learn:

- Shell-and-tube heat exchanger technology – what's new and how to apply it
- The critical aspects of heat exchanger design
- A look at the thermal design of shell-and-tube heaters, coolers, column reboilers and condensers
- How to quickly and accurately troubleshoot, diagnose and correct operating problems in distillation column reboilers and condensers

Who should attend:

Experienced chemical and mechanical engineers involved in:

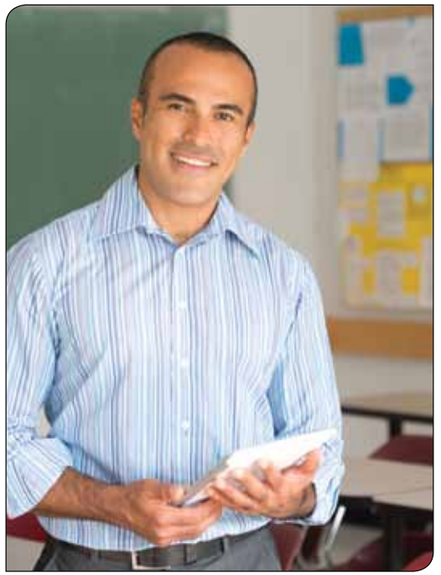
- Plant operations
- Technical services
- Project design
- Projects related to heat exchanger sizing, specification and operation

About your instructor:

Thomas G. Lestina, Vice President, Engineering Services, Heat Transfer Research Inc. (HTRI), has over 25 years of engineering and project management experience. He earned a B.S. and an M.S. in mechanical engineering from Union College, Schenectady, NY and Rensselaer Polytechnic Institute, Troy, NY, respectively. Lestina serves on the technical committee for the ASME Performance Test Code 12.5, Single Phase Heat Exchangers. He also routinely teaches workshops and courses as part of the HTRI training program. He is a licensed Professional Engineer in Texas.

Locations:

City	Dates
Houston	March 11 – 12, 2013
Orlando	December 9 – 10, 2013



Instructor–Led Training

Chemical and Bioengineering Fundamentals for Technical and Scientific Professionals

Course No.: CH024
Course Length: 3 days
CEUs: 2.3 PDHs: 23
Pricing: AIChE Members – $1,595
Non-Members – $1,795

If you have little or no background in chemical or biological engineering, here's your chance to learn the basic concepts you need to know to approach and solve problems the way chemical engineers do. In three days, you'll gain a better understanding of the principles of fluid flow, and heat and mass transfer, and see examples of applications. You'll explore depth and tangential flow filtration, extraction, distillation and chromatography, and centrifugation. You'll also gain a firm grounding in the principles of bioreactor design and operation, process control and optimization, and plant design and process economics. And, you'll apply what you learn through hands-on problem worksheets.

Here's a preview of what you'll learn:

- Basic chemical and biochemical engineering concepts
- The principles underlying
  - Heat and mass transfer
  - Fluid flow
  - Chemical and (bio) processing
  - Separations and purification
  - (Bio) reactor design
  - Process economics
- Using mass and energy balances to assess the performance of unit operations
- Understanding how process equipment is designed and works
- How to estimate if a chemical process can economically produce the product you want

Who should attend:

This course will be especially valuable to technical professionals involved in chemical and/or biomaterials processing or in developing process technology. Those who should attend include life scientists, chemists, mechanical engineers and process/research technicians working in:

- Process and product development
- (Bio) chemical entity manufacturing
- Commercialization and start-up of new products and facilities
- Evaluation of (bio) chemical manufacturing technologies
- And other related fields

About your instructor:

Dale Gyure brings to this course over 25 years of experience in the chemical and biotechnology industries. He has an extensive background in the development of chemical and biochemical process technology and the commercialization and manufacture of chemical and biochemical-entity products. He has taught chemical engineering courses for over 10 years. Dr. Gyure is division head for manufacturing at National Bioproducts Institute in Durban, South Africa.

Locations:

City	Dates
Atlanta	September 16 – 18, 2013
Las Vegas	December 9 – 11, 2013

You may also be interested in...
CH710: Essentials of Chemical Engineering for Non-Chemical Engineers, see p. 2

Bioseparations: Principles, Applications and Scale-Up

Course No.: CH401
Course Length: 2 days
CEUs: 1.5 PDHs: 15
Pricing: AIChE Members – $1,195
Non-Members – $1,395

Gain a solid understanding of the principles, applications and scale-up of bioseparation processes and how to apply them to your day-to-day work. In two days, you'll learn the most important unit operations in industrial bioseparation processes and how to avoid mistakes when analyzing and interpreting bioseparation data. You'll find out how to select appropriate bioseparation equipment and techniques for successful scale-up. Plus, you'll cover a wide range of other relevant topics from filtration and extraction to chromatography and adsorption, drying, and beyond.

Here's a preview of what you'll learn:

- The basic science and mechanisms of various types of bioseparations
- Assaying the biological activity and purity of bioproducts
- How to identify and select the right laboratory methods
- How to perform engineering analyses of bioseparation processes
- Selecting the right bioseparation equipment
- How to perform scale-up calculations for bioseparation equipment

Who should attend:

This course is designed for engineers and scientists who need a better understanding of the bioseparation processes used for bioproducts. It will be especially valuable if you're in these industries:

- Pharmaceutical
- Biotechnology
- Food

About your instructor:

Roger G. Harrison is first author with three co-authors of the highly acclaimed textbook *Bioseparations Science and Engineering*, which has been adopted for courses at more than 60 universities throughout the world. Before becoming a professor in the University of Oklahoma School of Chemical, Biological and Materials Engineering, he worked at Phillips Petroleum Company and Upjohn, where he focused on bioseparations.

Location:

City	Dates
San Francisco	May 20 – 21, 2013

Register online at www.aiche.org/education or call 1-800-242-4363 (or 1-203-702-7660 outside the U.S.)

Conceptual Development and Capital Cost Estimating

Course No.: CH139
Course Length: 2 days
CEUs: 1.5 **PDHs:** 15
Pricing: AIChE Members – $1,195
Non-Members – $1,395

Learn how to accurately identify the overall scope and monetary cost of engineering projects. In this course, you'll focus on the basics of conceptual development and capital cost estimating and how to apply them to avoid deficient conceptual estimates that waste time and money. In two days, you'll learn estimating terminology and concepts and how to perform different types of project estimates. You'll examine how to predict and account for equipment costs, installation factors and cost escalation. Plus, you'll walk through the detailed cost-estimating process, including methodology and mechanical estimating methods.

Here's a preview of what you'll learn:

- How to effectively conceptualize projects
- How to perform cost estimating based on project type, size and location
- Applying cost-estimating techniques
- Dealing with uncertainties and risks inherent in cost estimating
- Understand the capital cost-estimating process

Who should attend:

This course is designed for anyone involved in conceptualizing engineering projects and developing timely cost estimates. It will be of special value to decision-makers in the process industries, including:

- Plant engineers
- Project engineers
- Project managers
- Plant maintenance personnel
- Engineering managers

About your instructor:

John Williams, P.E., is a practicing engineer in the process industries with a 30+ year background in project development, cost estimating and financial analysis. His deep experience spans the chemical, metals, refining, biotech and pharmaceutical industries. In his engineering practice, he specializes in conceptualization, technical and economic analysis, process optimization, plant design and plant retrofits.

Locations:

City	Dates
Houston	May 20 – 21, 2013
San Diego	September 16 – 17, 2013

SAVE $495 or more
when you take both CH139 and CH140 together. Just register for course CH758: Project Evaluation and Cost Estimating Combo Course.

Project Evaluation: Operating Cost Estimating and Financial Analysis

Course No.: CH140
Course Length: 2 days
CEUs: 1.5 **PDHs:** 15
Pricing: AIChE Members – $1,195
Non-Members – $1,395

Develop your understanding of operating expenses and return on investment (ROI), as well as how to improve your analysis of technical and engineering projects as prospective investments. In two information-packed days, you'll gain a practical framework for evaluating projects and understanding the evaluations others make. You'll learn how to accurately estimate operating expenses and calculate return on investment. Plus, you'll examine how to conduct a cash flow analysis of financial, operating and investment activities, including how to conduct a discounted cash flow (DCF) analysis to evaluate the attractiveness of an investment, and use net present value (NPV) and the internal rate of return (IRR) to appraise long-term projects.

Here's a preview of what you'll learn:

- A value-oriented perspective of potential projects
- How to accurately estimate operating expenses
- ROI: How to calculate it
- Key cash flow analysis terms you need to understand, including:
  - Heat and mass transfer
  - Fluid flow
  - Chemical and (bio) processing

Who should attend:

This course is designed for technical managers, R&D personnel, managers, project engineers and project managers involved in projects in the process industries, including:

- Chemical
- Pharmaceutical
- Biological
- Petrochemical
- Materials
- Petroleum
- Gas

About your instructor:

John Williams
(See Course CH139 on page 6.)

Locations:

City	Dates
Houston	May 22 – 23, 2013
San Diego	September 18 – 19, 2013

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when you take both CH139 and CH140 together. Just register for course CH758: Project Evaluation and Cost Estimating Combo Course.

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TRIZ: The Theory of Inventive Problem-Solving

Offered Jointly by AIChE & ASME
Course No.: PD513
Course Length: 3 days
CEUs: 2.3 PDHs: 23
Pricing: AIChE Members – $1,625
Non-Members – $1,725

Discover how to solve problems and create new product and business concepts using TRIZ, an inventive problem-solving process. You'll learn how this structured, left-brain approach to breakthrough innovation uses patterns of invention documented in the most inventive of the world's patents. And you'll learn an overall algorithm for use in prediction, forecasting, analysis and planning. You'll receive all course notes, problems and solutions in addition to a copy of the TRIZ 40 Inventive Principles and the book, *Hands-On Systematic Innovation*, by Darrell Mann.

Here's a preview of what you'll learn:

- Patterns of invention and how to use breakthrough ideas from parallel-universe technology areas
- The basic TRIZ problem-solving algorithm and its basic tools, including Ideal Final Result, resource identification and use, contradiction resolution, 40 inventive principles and the TRIZ contradiction table
- How to use TRIZ for failure prediction and analysis
- How to use TRIZ for business and organizational problem-solving
- The TRIZ Lines of Evolution and how to use them for strategic planning, new product development, and forecasting
- How to integrate TRIZ with other enterprise tools and assessments
- How to integrate TRIZ effectively within your organization

For more information, please go to the ASME.org website for complete course listings and upcoming schedules.

Who should attend:

- Engineers, scientists, and technical managers focused on breakthrough innovation and problem-solving
- Professionals interested in adding a breakthrough problem-solving tool to problem definition processes such as Six Sigma and DFSS
- Innovation managers interested in improving the quality of inventions and intellectual property

About your instructor:

Jack Hipple is a certified TRIZ practitioner and TRIZ trainer for the Altshuller Institute for TRIZ Studies. He holds a chemical engineering degree from Carnegie Mellon University and has 30 years of industrial innovation experience, including responsibility for overseeing the Discovery Research Program at The Dow Chemical Company, where he was in charge of global chemical engineering. Mr. Hipple also teaches other courses for AIChE and ASME. He was responsible for collaborative project teams in technology management at the National Center for Manufacturing Sciences as well as new product development at Ansell Edmont and Cabot Corporation.

Locations:

City	Dates
Toronto, Canada	Apr 8 – 10, 2013
Orlando	May 20 – 22, 2013

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Combustible Dust Hazards: Dust Explosions

Course No.: CH034
Course Length: 2 days
CEUs: 1.5 PDHs: 15
Pricing: AIChE Members – $1,195
Non-Members – $1,395

Get the up-to-date tools you need to identify, respond to, control and eliminate dust hazards while fulfilling your regulatory obligations as an employer. In two days, you'll learn how OSHA's Combustible Dust National Emphasis Program addresses dust explosions and fire hazards in facilities and impacts how you handle powder and bulk materials in your plant. You'll review the latest tools for examining your workplace for hazards and assessing your protection needs. You'll also learn how to respond to regulatory requirements efficiently and cost-effectively and reduce your risk and vulnerability.

Here's a preview of what you'll learn:

- How to spot dust explosion hazards hidden in many workplaces
- Tools to help you identify and assess the existence, severity and consequences of a hazard
- How to control and eliminate hazards
- How to assess the adverse effects of protection and prevention systems
- The reasoning behind industrial standards and regulations

Who should attend:

This course is designed for a broad spectrum of professionals concerned with the risks and vulnerabilities associated with dust hazards and explosions, including:

- Chemical engineers
- Mechanical engineers
- Process engineers/scientists
- Fire protection professionals
- Plant/process safety/risk managers
- Facility managers and all others who need to be aware of the risks and vulnerabilities in plants

About your instructor:

Erdem Ural is a well-known combustible dust expert with over 25 years of experience working on research, litigation, insurance, protection, testing and regulatory aspects of combustible dust problems. He has published numerous papers on the subject and is author of the "Explosion Prevention and Protection" chapter of the National Fire Protection Association (NFPA) *Handbook of Fire Protection*.

Locations:

City	Dates
Las Vegas	June 3 – 4, 2013
Orlando	September 23 – 24, 2013

CCPS' HAZOP Studies and Other PHA Techniques for Process Safety and Risk Management

Course No.: CH157
Course Length: 3 days
CEUs: 2.3 PDHs: 23
Pricing: AIChE Members and Employees* of CCPS Member Companies – $1,595
Non-Members – $1,795

Learn how to prepare for, conduct and report an effective process hazard analysis (PHA) while complying with the latest regulations. In three days, you'll get up-to-date on your obligations under the OSHA Process Safety Management (PSM) Rule and EPA Risk Management Program (RMP) regulations. You'll learn how to determine the adequacy of your safeguards and report findings and recommendations. You'll examine various hazard evaluation methods, including the Hazard and Operability (HAZOP) Study, and how to select the method appropriate for your facility. Plus, you'll look at hazard evaluation of procedure-based operations and PLC-controlled processes and how to conduct the final meeting and quality check. You'll also receive the CCPS book, *Guidelines for Hazard Evaluation Procedures, Third Edition.*

Here's a preview of what you'll learn:

- The anatomy of a process safety incident
- How to structure a PHA the way OSHA and the EPA require
- Tips for leading common PHA methods, including those used for procedure-based operations
- The HAZOP Study: fundamental concepts and methodology
- Tools and techniques for analyzing scenario risks and determining the adequacy of safeguards

Who should attend:

This course is designed for engineers and other technical professionals who play key roles in the management of their organization's process safety. Those who should attend include PHA team leaders and other professionals who must know how to select and apply various PHA methods.

About your instructor:

Robert W. Johnson is a Fellow of AIChE and an industry leader in the development and use of risk analysis methods and risk management strategies. Since 1978, he has been helping companies prioritize risk reduction options, develop corporate and plant technical safety programs, identify inherently safer processes, train process hazard analysis team leaders and analyze fire, explosion and toxic release hazards. Johnson teaches chemical process safety at The Ohio State University. He was the primary contractor of *Guidelines for Conditional Modifiers and Enabling Conditions* and *Guidelines for Hazard Evaluation Procedures, Third Edition*. He is also author of two process safety sections in *Perry's Chemical Engineers' Handbook*.

Locations:

City	Dates
New Orleans	February 25 – 27, 2013
Calgary, Canada	June 3 – 5, 2013
Boston	September 23 – 25, 2013
Orlando	November 4 – 6, 2013

SAVE $495 or more
when you take CH157 and CH754 together. Just register for course CH759: CCPS' HAZOP Studies, Other Hazard Evaluation Procedures and Advanced Concepts for Process Hazard Analysis Combo Course.

*To receive the CCPS Member discount, contact ccps@aiche.org for a promo code to use when registering.

CCPS' Advanced Concepts for Process Hazard Analysis

Course No.: CH754
Course Length: 2 days
CEUs: 1.5 PDHs: 15
Pricing: AIChE Members and Employees* of CCPS Member Companies – $1,195
Non-Members – $1,395

Expand your basic understanding of process hazard analysis (PHA) and learn how to extend order-of-magnitude scenario risk calculations to other uses. In this course, you'll work with a team to learn and practice PHA techniques. You'll use an Excel spreadsheet to document and analyze HAZOP Studies, and you'll modify your spreadsheet to include findings and recommendations as pseudo safeguards. You'll examine the concept of importance measures applied to PHAs and how to use a PHA to identify safety instrumented systems and safety integrity levels. And, your team will present your HAZOP Study results to other participants. You'll also receive the CCPS book *Layer of Protection Analysis: Simplified Process Risk Assessment*.

Here's a preview of what you'll learn:

- A review of the cause-by-cause HAZOP Study methodology
- How to calculate action item importance measures
- How to determine the safety integrity levels for a safety instrumented system
- Strategies for reporting your study results

Who should attend:

This course is designed for any engineer who conducts or is otherwise involved in process hazard analysis, including:

- Chemical engineers
- Mechanical engineers
- Process engineers
- Process safety/risk managers
- Facility managers

About your instructor:

Robert W. Johnson
(See Course CH157 on page 10.)

Locations:

City	Dates
New Orleans	Feb 28 – Mar 1 2013
Calgary, Canada	June 6 – 7, 2013
Boston	September 26 – 27, 2013
Orlando	November 7 – 8, 2013

SAVE $495 or more
when you take CH157 and CH754 together. Just register for course CH759: CCPS' HAZOP Studies, Other Hazard Evaluation Procedures and Advanced Concepts for Process Hazard Analysis Combo Course.

Start your trial membership today

If you're not an AIChE member and you register for an instructor-led class you are eligible for a 1-year trial membership in AIChE. Just call AIChE Customer Service at 1-800-242-4363 (or 1-203-702-7660 outside the U.S.) within 30 days of completing a course to start your trial membership.

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Register online at www.aiche.org/education or call 1-800-242-4363 (or 1-203-702-7660 outside the U.S.)

Emergency Relief Systems Design Using DIERS Technology

Course No.: CH173
Course Length: 3 days
CEUs: 2.3 **PDHs:** 23
Pricing: AIChE Members – $1,595
Non-Members – $1,795

Discover OSHA-recognized Design Institute for Emergency Relief Systems (DIERS) techniques for providing adequate pressure relief for runaway reactions and other pressure-producing events. In three days, you'll gain a broad introduction to emergency relief system design goals and strategy and take an in-depth look at DIERS methods. You'll examine vessel disengagement dynamics and vent flow dynamics. You'll also look at simplified emergency relief system design and effluent handling. Through a simulation, you'll see computerized emergency relief design methods in action. You'll also receive the textbooks *Emergency Relief Systems Design Using DIERS Technology* and *Guidelines for Pressure Relief and Effluent Handling Systems*. Both are published by the Center for Chemical Process Safety and include CCflow computer routines on CD-ROM.

Here's a preview of what you'll learn:

- Emergency relief system design – an overview
- A detailed look at the DIERS methods
- State-of-the-art venting and flow technology
- How to handle runaway reactions – especially under two-phase flow conditions
- Using computational methods for real-world problems

Who should attend:

This course is designed for chemical and other engineers responsible for operating, designing or managing chemical process industry facilities that require emergency overpressure relief to ensure safety in the event of runaway reactions or other pressure-producing events.

About your instructors:

(each course will be taught by two of the following instructors):

James E. Huff was one of the original members of the intercompany committee that became DIERS. He also served as chairman of the DIERS Relief System Hydrodynamics and Safety Valve Stability/Capacity Technical Advisory Committee and the DIERS Users Group Venting Technology Committee. He spent 33 years with The Dow Chemical Company.

Arthur Shaw was chairman of the Mathematical Modeling ERS Committee of the DIERS Users Group and contributing author of the AIChE/DIERS Project Manual and two AIChE/DIERS books. After a 28-year career with Monsanto Corporation, he joined ioMosaic Corporation, where he is currently a principal engineer.

John J. Hauser has been involved in DIERS since 1986. He served on the SuperChems technical evaluation committee and currently is chair of the ERS Design for Fire Committee and a member of the book-writing committee for the *CCPS Guidelines for Pressure Relief and Effluent Handling, 2nd Edition*. As principal engineer and president of PROSAF Inc., he's been helping clients for over 21 years with emergency relief system design, process safety and safety instrumented systems.

Robert N. D'Alessandro is the Director of the Process Technology Department at Evonik Degussa Corporation where he has worked since 1991. He received his B.S. in Chemistry and Mathematics from Fordham University in 1976, his B.S. in Chemical Engineering from Columbia University in 1978, and his M.S. in Chemical Engineering from Manhattan College in 1981. Robert is a Registered Professional Engineer in the State of Alabama. His work experience includes positions in a technology company, engineering & construction company, and several operating companies. Robert has been an active member of the DIERS Users Group since its inception in 1986. Since 2004, Robert has served as the elected secretary of the DIERS Users Group. He is also on the editorial board of Process Safety Progress, a peer reviewed journal published by the AIChE. Robert is also the author of many publications on emergency relief systems and an active member of AIChE.

Locations:

City	Dates
Las Vegas	March 11 – 13, 2013
Chicago	October 21 – 23, 2013

CCPS' Fundamentals of Process Safety

Course No.: CH500
Course Length: 2 days
CEUs: 1.5 **PDHs:** 15
Pricing: AIChE Members and Employees* of CCPS Member Companies – $1,195
Non-Members – $1,395

As a chemical engineer, your job is to assess and quantify the risks inherent in the processes you design, manage and operate. To do so, you need a clear understanding of the fundamentals of process safety. In this CCPS course process safety expert Brian Kelly will give you an up-to-date look at the causes and contributors to major incidents in the process safety industry and the latest engineering solutions.

In two interactive days, you'll learn how to analyze and address hazards and failure modes to avoid loss of containment. You'll examine hazard release scenarios illustrating leaks, spills, fires and explosions and their toxic effects. You'll also consider inherently safer concepts in process design, common equipment failure modes, human error considerations in design and operation, and much more. Throughout the course, you'll take part in numerous case studies and breakout exercises that highlight the latest engineering applications related to layout and spacing, system isolation, grading and drainage, relief and blowdown, electrical area classification, fire protection, instrumentation, human factors and facility siting.

Here's a preview of what you'll learn:

- Accident theory: How and why major incidents occur
- Physical and process hazards, flammability and toxicity
- Mechanical integrity and reliability
- Loss prevention practices
- Engineering practices that reduce the potential for loss of containment

Who should attend:

- Chemical engineers
- Mechanical engineers
- Safety specialists
- Operations supervisors

About your instructor:

Brian Kelly has 35 years of engineering and operations experience. A consultant with AIChE's Center for Chemical Process Safety (CCPS), Kelly has conducted numerous process safety audits, incident investigations and workshops throughout North America, Europe and Asia. He previously was with Imperial Oil and Syncrude Canada Ltd.

Locations:

City	Dates
Las Vegas	April 15 – 16, 2013
Philadelphia	November 4 – 5, 2013

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Instructor–Led Training

PROCESS SAFETY

CCPS' The OSHA Regulatory Approach to Process Safety Management

Course No.: CH501
Course Length: 3 days
CEUs: 2.3 **PDHs:** 23
Pricing: AIChE Members and Employees* of CCPS Member Companies – $1,595
Non-Members – $1,795

Learn how to implement, evaluate and audit an OSHA or EPA process safety management (PSM) program in your organization. In this course, you'll update your knowledge of the OSHA PSM Regulation 29CFR 1910.119 and the EPA Prevention Program process safety regulatory requirements. You'll review PSM principles and values; audit procedures for compliance with process safety regulatory requirements; and learn the benefits of an effective PSM program plant- and company-wide. You'll look at process safety failures that drive home the need for effective process safety programs. You'll also receive the textbook *Guidelines for Risk Based Process Safety* published by AIChE's Center for Chemical Process Safety.

Here's a preview of what you'll learn:

- Your regulatory obligations under OSHA PSM Standard 29CFR 1910.119 and EPA Prevention Program 40CFR Chapter 1, Part 68
- Fulfilling PSM regulatory requirements in your workplace: What is needed and expected
- How to apply Recognized and Generally Accepted Good Engineering Practices (RAGAGEP) to an effective and compliant PSM program
- OSHA's 14 key PSM elements
- Comparing the CCPS 20-element approach to the OSHA 14 key elements
- EPA's Risk Management Program: Process Safety Regulation
- PSM tools and how to's:
  - ❑ PHA Methodologies
    - Checklists
    - What if?
    - Fault tree analysis
    - HAZOP
  - ❑ Siting: Protection of people in buildings
- Other often-overlooked considerations, including human factors, incident investigations and security risks

Who should attend:

This course is designed for new and experienced front-line engineers responsible for design, maintenance, manufacturing or supervision, as well as managers and engineers involved in regulatory compliance. It also will be of value to:

- Auditors of regulatory and/or company policy compliance
- Insurance inspectors
- Compliance program managers and engineers
- Plant managers
- Department managers
- Corporate process safety support staff

About your instructor:

Adrian Sepeda brings to this seminar a broad, 33-year background in the chemical industry. After managing process safety, risk management and accident investigations for Occidental Chemical Corporation's worldwide operations, he started his own process safety and risk management consulting firm. He has national and international clients, including both large corporations and small businesses.

Locations:

City	Dates
Las Vegas	March 4 – 6, 2013
Chicago	September 16 – 18, 2013

*To receive the CCPS Member discount, contact ccps@aiche.org for a promo code to use when registering.

SEPARATIONS

Distillation in Practice

Course No.: CH004
Course Length: 3 days
CEUs: 2.3 **PDHs:** 23
Pricing: AIChE Members – $1,595
Non-Members – $1,795

Get up-to-date on essential distillation concepts and developments and how to apply them to improve process support, operations and design. In three days, you'll learn strategies for solving thermodynamics, vapor liquid equilibrium, process design, column operation and simulation issues. You'll discover how to specify and select the most appropriate hardware. Plus, you'll learn how to successfully predict efficiency using today's most effective modeling techniques.

Here's a preview of what you'll learn:

- How to confidently solve thermodynamics, vapor liquid equilibrium, process design, column operation and simulation issues
- Tips for purchasing the right hardware
- Problem-solving and troubleshooting distillation problems in the real world
- Predicting efficiency using the latest modeling techniques

Who should attend:

This course is designed for new and veteran engineers and chemists who must troubleshoot and solve difficult distillation problems in the plant or conceptualize problems in the engineering office or laboratory, including those in the areas of:

- Process support
- Operations
- Design engineering

About your instructor:

John P. Farone is a sought-after consultant to the chemical industry with over 40 years of experience in process separations, process simulation and equipment design. He has unique knowledge of the practical design and operation of trayed and packed distillation towers and their internals. Previously, he was with The Dow Chemical Company for 36 years, where he specialized in process engineering in distillation and stripping.

Locations:

City	Dates
Las Vegas	April 15 – 17, 2013
Chicago	November 4 – 6, 2013

You may also be interested in...
CH401: Bioseparations: Principles, Applications and Scale-Up, see p. 5

Instructor–Led Training

Flow of Solids in Bins, Hoppers, Chutes and Feeders

Course No.: CH032
Course Length: 2 days
CEUs: 1.5 **PDHs:** 15
Pricing: AIChE Members – $1,195
Non-Members – $1,395

Give yourself the advantage of proven design and troubleshooting principles for handling bulk solids in bins, hoppers, feeders and transfer chutes for safe and trouble-free plant operation. In two days, you'll review the fundamentals of bulk material flow and examine common flow problems, types of flow patterns in equipment and how flow properties of bulk solids are measured. You'll consider feeder design, learn proven troubleshooting techniques and gain insight into flow problems that occur when handling fine powders. You'll also cover common mechanisms of segregation and solutions and get practical advice for using flow aid devices.

Here's a preview of what you'll learn:

- The pitfalls of poor bulk solids handling
- Common flow problems and their costly consequences
- The flow patterns and features of silos, bins and hoppers
- Testing bulk solids flow properties and how to use the results
- Solving ongoing bulk solids feeder problems
- Why fine powders can have restricted or uncontrolled flow rate
- Step-by-step procedures for designing a bin or silo
- Practical solutions to segregation mechanism problems
- Selecting the appropriate common flow aid device
- How to avoid transfer chute plugging and how to minimize wear and dusting

Who should attend:

This course is designed for those involved in designing, selecting, troubleshooting, maintaining or purchasing bulk solids handling equipment, including:

- Plant and project managers
- Operation and process managers
- Project, process and maintenance engineers
- Unit operators and superintendents
- Anyone new to the field of bulk solids handling

About your instructors:

Eric Maynard is the director of education and a senior consultant for Jenike & Johanson, Inc., a world-renowned engineering consulting firm specializing in the storage, flow and processing of powder and bulk solids. He has designed handling systems for bulk solids, worked on over 500 solids handling and conveying projects, and has specialized knowledge of dust explosions, crushing technology and static electricity generation.

Herman Purutyan is the CEO of Jenike & Johanson, Inc. He has been recognized worldwide for his technical ability and experience in the field of storage and flow of solids. He has 20 years of experience designing solids handling systems and troubleshooting handling programs in a wide variety of industries.

Locations:

City	Dates
San Francisco	April 9 – 10, 2013
Toronto, Canada	June 18 – 19, 2013
Houston	September 24 – 25, 2013
Atlanta	December 10 – 11, 2013

SAVE $395 or more
when you take CH032 and CH033 together. Just register for course CH757: Flow of Solids/Pneumatic Conveying Combo Course.

Pneumatic Conveying of Bulk Solids

Course No.: CH033
Course Length: 1 day
CEUs: 0.8 **PDHs:** 8
Pricing: AIChE Members – $795
Non-Members – $995

Improve the efficiency, safety and reliability of your pneumatic conveying systems transporting powders and bulk solids, using practical design and troubleshooting principles. In this course, you'll review the fundamentals of gas/solids flow and address common pneumatic conveying problems, modes of transport in a pipeline and scale-model tests and their use in designing and evaluating poorly operating systems. You'll discuss line chargers (feeders), proven pipeline layout rules and criteria for elbow/bend selection. You'll also cover specialized topics including dense phase conveying systems and gas/solids separators such as cyclones, filters and bag houses.

Here's a preview of what you'll learn:

- Modes of conveying: dilute phase and dense phase
- Types of systems: positive pressure, vacuum, pull/push and closed-loop
- The science underlying gas and solids flow through pipelines
- Understand key terms – like "saltation and pickup velocity" and "solids loading ratio"
- How to read a state diagram illustrating system performance
- The four primary system components: gas mover, silo/feeder, pipeline/bends and separator
- How to select elbows, line chargers and other key primary system components
- Know the features of solid separators – cyclones, filter/collectors and bag house
- Dense phase conveying technology – what you need to know
- Troubleshooting common conveying problems – including wear, attrition, rate limitation and line plugging
- Applying safe handling practices for the pneumatic conveying of combustible solids

Who should attend:

This course is designed for engineers involved in designing, selecting, troubleshooting, maintaining or purchasing pneumatic conveying equipment, including:

- Plant and project managers
- Operation and process managers
- Project, process and maintenance engineers
- Unit operators and superintendents
- Professionals new to the field of pneumatic conveying

About your instructors:

Eric Maynard is the director of education and a senior consultant for Jenike & Johanson, Inc., a world-renowned engineering consulting firm specializing in the storage, flow and processing of powder and bulk solids. He has designed handling systems for bulk solids, worked on over 500 solids handling and conveying projects, and has specialized knowledge of dust explosions, crushing technology and static electricity generation.

Herman Purutyan is the CEO of Jenike & Johanson, Inc. He has been recognized worldwide for his technical ability and experience in the field of storage and flow of solids. He has 20 years of experience designing solids handling systems and troubleshooting handling programs in a wide variety of industries.

Locations:

City	Dates
San Francisco	April 11, 2013
Toronto, Canada	June 20, 2013
Houston	September 26, 2013
Atlanta	December 12, 2013

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CH611 – Six Sigma for Chemical Engineers

CH751 – Fuels Blending Technology and Management

CH756 – Integrated Process Synthesis

CH762 – Control System Technique in Equipment Design and Operations

CH763 – Particle and Bulk Solids Characterization Technology

CH901 – CCPS' Recognizing Catastrophic Incident Warning Signs

CH902 – CCPS' Leadership and Management of Process Safety

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In-Company Training

Spotlight Course:
CH900 CCPS Process Safety Boot Camp

The CCPS Process Safety Boot Camp is an intensive 4-day course, taught at your company location, which is designed to quickly bring young chemical engineers up to speed on the fundamentals of Process Safety. It will be taught by 2 of the 10 Process Safety instructors listed.The course includes numerous case studies and workshop problems to reinforce the topics presented. The Boot Camp can be tailored to include aspects specific to your organization.

- The four pillars and 20 elements of Risk-Based Process Safety.
- The different types of Process Hazard Analysis, including an introduction to HAZOP.
- An overview of OSHA's PSM regulations and EPA's RMP regulations.
- How to incorporate Process Safety Management into Process Design and Plant Operations
- The concept of Layers of Protection to prevent and/or mitigate loss of containment events
- The principles of Risk Analysis and Risk Management
- How to consider Inherently Safer Processes during plant design

Who should attend:

- Process Engineers, project engineers, operations engineers, and safety engineers that need to move beyond an understanding of personnel safety and learn the basics of Process Safety and Process Safety Management.
- Chemical engineers who interface with design teams, plant engineers, or plant operations personnel.

Course Overview

Day 1

- Introduction
  - ❑ Occupational safety vs. process safety
  - ❑ Business case for process safety
  - ❑ Key principles of process safety
- Anatomy of an Incident
- Loss of Containment
  - ❑ Containment and control
  - ❑ Prevention
  - ❑ Mitigation

Day 2

- Introduction to Management Systems and Risk Based Process Safety
- Process Safety Culture Compliance with Standards
- Inherently Safety Concepts
  - ❑ Process Design
- Process Safety Competency
  - ❑ Workforce Involvement
  - ❑ Human Factors
- Stakeholder Outreach
- Process Knowledge Management
- Understanding Material Hazards

Day 3

- Specific Hazards
  - ❑ Chemical hazards
  - ❑ Reactivity
  - ❑ Toxicity
  - ❑ Corrosivity
  - ❑ Inherent Safety
- Hazard Identification and Risk Analysis
  - ❑ Hazard evaluation techniques
  - ❑ Consequence and Impact Frequency
  - ❑ Risk Analysis
  - ❑ Risk criteria
  - ❑ Risk acceptance
- Operating Procedures
- Safe Work Practices

Day 4

- Hot Work Permits, etc.
- Asset Integrity and Reliability
- Contractor Management
- Training and Performance Assurance
- Management of Change (MOC)
- Operational Readiness & PSSR
- Conduct of Operations and
- Emergency Management and Incident Investigation
- Measures, Metrics and Auditing Compliance
- Management Review and Continuous Improvement
- Additional EPA RMP regulations
- Course Wrap up

Your instructors:

Louisa Nara, John Murphy, Brian Kelly, Jerry Jones, Adrian Sepeda, Robert Ormsby, Dennis Hendershot, Donald Abrahamson, James Conner and John Herber

CHEMICAL ENGINEERING ESSENTIALS

Spreadsheet Problem-Solving for ChemEs

Course No.: ELS101
Course Length: 30 hours
CEUs: 3.0 **PDHs:** 30
Pricing: AIChE Members – $795
Non-Members – $995

Our Top Selling Course

Spreadsheets are the tool of choice for engineers and scientists in all fields. In this course, you'll learn how to use Excel's myriad of features and capabilities to make calculations and solve problems in your work as a chemical engineer. Throughout the course, you'll see live spreadsheet demonstrations and have opportunities to practice the techniques and methods you learn so you can confidently apply them and improve your productivity and the quality of your work.

Here's a preview of what you'll learn:

- How to set up Excel for engineering work
- How to improve your efficiency
- Working with tables of data and information
- Carrying out process calculations including flowsheeting and economic analysis
- The principles of applied statistics including regression analysis
- Solving equations relevant to chemical engineering scenarios
- Overview of programming in Excel using VBA
- Excel basic skills
- Tables
- Process calculations
- Applied statistics
- Regression analysis
- Algebraic and differential equations

Who should attend:

- Chemical engineers with basic Excel skills who use or want to use spreadsheets for problem solving and daily work
- Chemical engineers who are proficient in Excel and want to take their skills to the next level

About your instructor:

David Clough has been teaching spreadsheets to undergraduate chemical engineers for 25 years. He is a professor in the department of chemical and biological engineering at the University of Colorado, where he has been a faculty member for 36 years.

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Intellectual Property for Chemical Engineers

Course No.: ELS107
Course Length: 10 hours
CEUs: 1.0 **PDHs:** 10
Pricing: AIChE Members – $695
Non-Members – $895

Get the most up-to-date information on the new U.S. patent laws, new ways to challenge patents and new defenses to patent infringement. In this course, you'll gain an overview of the America Invents Act (AIA) and the laws surrounding the protection of ideas, discoveries and inventions – including intellectual property areas such as trade secrets, copyrights and trademarks.

Here's a preview of what you'll learn:

- How the AIA has changed patent law
- Intellectual property law principles: patents, copyrights, trademarks and trade secrets
- The patenting process
- How and when to obtain a patent
- Principles and guidelines of copyright, trademark and trade secret protection
- Introduction to intellectual property
- Introduction to patents
- Patents and utility
- Patents and novelty
- Patents and non-obviousness
- The patenting process
- Copyrights
- Trade secrets
- Trademarks

Who should attend:

- Engineers at any level and in any field
- Engineers involved in R&D and/or intellectual property development and management

About your instructor:

Heath Briggs is a chemical engineer and registered patent attorney who teaches intellectual property for engineers at the University of Colorado at Boulder. He has participated in more than 15 reexam-ination proceedings before the U.S. Patent and Trademark Office.

Chemical Engineering for Non-Chemical Engineers

Course No.: ELA110
Course Length: 30 hours
CEUs: 3.0 **PDHs:** 30
Pricing: AIChE Members – $695
Non-Members – $895

Do you work with chemical engineers but aren't a ChemE? Add the chemical engineering knowledge you need to work with or supervise chemical engineers and interact with or manage chemical engineering work.

Here's a preview of what you'll learn:

- The basic concepts of chemical engineering
- Safety and reactive chemical concepts, reaction stoichiometry
- Chemical stoichiometry and unit conversions
- Momentum, mass and energy balances
- Fluid flow and pumping equipment
- Heat transfer and heat exchangers, cooling towers
- Mass transfer concepts, distillation, absorption, stripping/desorption, chromatography, ion exchange, and extraction
- Evaporation, crystallization, filtration, and drying
- Solids handling, characterization, transfer, and storage
- Process control
- Polymers and plastics
- Tanks and process vessels

Who should attend:

- Engineering managers
- Chemists
- Engineers from other disciplines
- Patent attorneys
- Legal and government personnel who work with chemical engineers and the chemical industry

About your instructor:

Jack Hipple is a 30-year veteran of the chemical industry, and has led global engineering research at Dow Chemical. He also managed chemical material technology projects for the National Center for Manufacturing Sciences, new product development for Ansell Edmont and process scale-up at Cabot Corporation.

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CHEMICAL ENGINEERING ESSENTIALS

Essentials of Chemical Engineering for Operators

Course No.: ELA117
Course Length: 15 hours
CEUs: 1.5 **PDHs:** 15
Pricing: AIChE Members – $795
Non-Members – $995

Learn the chemical engineering fundamentals that will help you communicate with chemical engineers. This dynamic course is for those operators who are not chemical engineers but who work with them. The course offers a comprehensive overview of the function, principles, requirements, and operation of process equipment. Professionals will learn key concepts that will enable them to develop a deeper understanding of how chemical engineering relates to their own disciplines.

Here's a preview of what you'll learn:

- How to participate in discussions about conservation principles, chemical reactions, thermodynamics and equilibrium
- The basics of fluid flow and mixing, heat exchangers, chemical reactors and process control
- How to confidently handle complex concepts, including distillation and mass transfer operations
- To broaden your view of chemical engineering and how it relates to your discipline
- Conservation principles
- Chemical reactions
- Thermodynamics and equilibrium
- Fluid flow and mixing
- Heat transfer
- Chemical reactors
- Process control
- Distillation
- Mass transfer operations

Who should attend:

- Chemists
- Civil and mechanical engineers
- Electrical and industrial engineers
- Construction engineers
- Technical project managers
- Scientists

Your instructors:

Sunil Gupta
Cathy Hood
Margaret Muallem
Maruthi Ravinuthala
Andrew Sarkisian

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FLUIDS AND HEAT TRANSFER

Industrial Fluid Mixing for Engineers

Course No.: ELA115
Course Length: 9 hours
CEUs: 0.9 **PDHs:** 9
Pricing: AIChE Members – $895
Non-Members – $1,095

Build your understanding of the fundamentals of mixing theory and how to apply the right technology to the mixing process. This course walks you through a variety of relevant basic and advanced topics, including how to scale-up, analyze geometric variables and apply Laser Doppler Velocity (LDV).

Here's a preview of what you'll learn:

- The fundamentals of mixing
- A comparison of the performance characteristics of the new fluid foil impellers vs. models of traditional design
- How to apply Laser Doppler Velocity (LDV) data and Computational Fluid Dynamics (CFD)
- How to analyze a variety of key geometric variables including tank shape, impeller spacing and baffles
- How to scale-up and scale-down
- New fluid foil impellers
- Tank shape, impeller spacing and baffles

Who should attend:

- Directors of engineering and research
- Process engineers involved in research
- Mechanical equipment specialists
- Technicians
- Development and design project engineers
- Chemists
- Vendor engineers

Fluid Mixing Technology for Operators

Course No.: ELA116
Course Length: 8 hours
CEUs: 0.8 **PDHs:** 8
Pricing: AIChE Members – $795
Non-Members – $995

Learn about mixing theories and how they work in today's mixing technology. In this course, you'll address a variety of fundamental and advanced topics as well as practical applications in today's world, without getting too product-specific.

Here's a preview of what you'll learn:

- The basic principles of mixing
- Mixing theories and how they are applied in the real world
- Advances in mixing technology
- An in-depth look at solid-liquid processes and gas liquid dispersion
- Troubleshooting fluid mixing problems
- Fundamentals: Physical properties and hydrodynamics
- Practice: Mixing equipment, blending, heat transfer and troubleshooting
- Advanced topics: Solid-liquid processes and gas liquid dispersion

Who should attend:

- Beginning operators
- Experienced operators
- Anyone who can use a better understanding of mixing theories to improve their performance and results

About your instructor:

W. Roy Penney worked for more than 25 years for leading industrial companies, including Phillips Petroleum, Monsanto, AE Staley Co., and Henkel Corp. He has created numerous computerized mixing equipment design programs and is the author of more than 40 technical publications.

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eLearning Courses

SOLIDS HANDLING

Crystallization Process Development

Course No.: ELA101
Course Length: 8 hours
CEUs: 0.8 **PDHs:** 8
Pricing: AIChE Members – $395
Non-Members – $595

Improve the design method and operational performance of your crystallization process. In this course, you'll examine an integrative approach to crystallization development. You'll learn how to use models to analyze the solid-liquid equilibrium (SLE) behavior of the system, validate the model using relevant experimental data, and systematically synthesize a crystallization process based on the SLE behavior.

Here's a preview of what you'll learn:

- How to interpret and use SLE phase diagrams in synthesizing crystallization processes
- Systematic methods for generating and evaluating crystallization process alternatives using SLE phase diagrams
- New calculation and experimental methods for generating SLE phase diagrams
- An overview of design and scale-up issues
- Intro to crystallization process development
- Basics of SLE and phase diagrams
- Thermodynamics-based conceptual design of crystallization processes
- Synthesis of crystallization-based separation and purification processes
- Chiral resolution and polymorphic crystallization
- Modeling, experiments and analysis of data

Who should attend:

- Chemists and engineers who develop processes or operations that involve crystallization
- Researchers who want to improve the design method and operational performance of their crystallization process
- Process engineers interested in a logical and systematic approach to synthesizing and developing crystallization processes
- Managers who want to introduce the latest crystallization process and development methodologies in their group

About your instructor:

Christianto Wibowo has nearly 10 years of experience managing project-related crystallization development and SLE separation processes. He is a principal engineer at ClearWaterBay Technology Inc.

Flow of Solids in Bins, Hoppers, Chutes and Feeders

Course No.: ELS102
Course Length: 10 hours
CEUs: 1.0 **PDHs:** 10
Pricing: AIChE Members – $495
Non-Members – $695

Gain a solid grounding in the fundamentals of bulk solids handling, equipment selection, design and troubleshooting. Gain strategies for alleviating costly flow problems in silos, bins, hoppers, feeders and transfer chutes. Learn proven techniques for designing solids handling equipment that operates efficiently, safely and reliably.

Here's a preview of what you'll learn:

- The basics of bulk material flow and solids handling
- How flow properties of bulk solids are measured
- Feeder design and troubleshooting techniques
- Fine powder flow problems
- How to interpret a flow properties test report and use the results in a silo design
- Common mechanisms of segregation and solutions to these costly problems
- Designing transfer chutes to prevent plugging, abrasive wear, dust generation and spillage
- Flow patterns in bins and hoppers
- Flow properties and their application to design/troubleshooting
- Bulk solids feeders – screws, belts, rotary valves
- Interpreting a flow properties test report

Who should attend:

Engineers who design, select, troubleshoot, maintain or purchase bulk solids handling equipment, including:

- Plant or Project managers
- Operation or Process managers
- Unit operators and superintendents

About your instructor:

Eric Maynard has been with Jenike & Johanson, Inc., a leading engineering firm specializing in bulk solids handling technology, for 15 years. He has worked on nearly 500 projects designing material handling and pneumatic conveying systems for powders and bulk solids, and has written 25 technical articles on the topic.

Particle Technology

Course No.: ELS106
Course Length: 20 hours
CEUs: 2.0 **PDHs:** 20
Pricing: AIChE Members – $595
Non-Members – $795

Learn the ways powders behave and how to use this knowledge to minimize processing problems, decrease downtime and improve quality control and environmental emissions. This introduction to particle technology covers a variety of broad areas and links the science involved to industrial practice.

Here's a preview of what you'll learn:

- Introduction: Particle Technology in the Process Industries
- Single particles in fluids
- Particle size measurement
- Flow of fluids through packed beds of particles
- Fluidization
- Pneumatic transport of powders
- Gas cyclones
- Storage – hopper design
- Mixing and segregation
- Fire and explosions – hazards of fine powders

Who should attend:

This course is designed for engineers and scientists working in process industries where particulate solids are handled and processed, including:

- Pharmaceutical
- Biotechnology
- Oil
- Chemical
- Mineral processing
- Those new to working with powders
- Those who have experience working with powders and want to solve re-occurring problems

About your instructor:

Martin Rhodes served on the editorial boards of Advanced Powder Technology and co-founded the Australasian Particle Technology Society and KONA. He is Professor Emeritus in the department of chemical engineering at Monash University in Australia.

eLearning Courses

CCPS' HAZOP Studies

Course No.: ELS104
Course Length: 10 hours
CEUs: 1.0 **PDHs:** 10
Pricing: AIChE Members and Employees* of CCPS Member Companies – $495
Non-Members – $695

Get up-to-speed on the concepts and techniques of the Hazard and Operability (HAZOP) Study methodology. Learn how to apply them in your processing operation to identify, evaluate and eliminate risk. Learn how to prepare for and lead a HAZOP Study, participate as a team member, facilitate team meetings, report, and more.

Here's a preview of what you'll learn:

- Process hazard analysis terminology
- The basic HAZOP Study approach to developing potential incident scenarios
- How to estimate scenario risk to determine the adequacy of safeguards
- How to apply the HAZOP Study method to procedure-based operations
- Planning and executing HAZOP Study team reviews
- The anatomy of process safety incidents
- The HAZOP Study method for scenario development
- Determining the adequacy of safeguards
- Developing findings and recommendations
- Variations on the basic HAZOP Study method
- Application to procedure-based operations
- Batch-operation example
- Preparing for and leading HAZOP Study team reviews
- Updating and revalidating HAZOP Studies

Who should attend:

This course is not intended to replace full HAZOP team leader (facilitator) training, but it is a good refresher for anyone who has led HAZOP Studies, as well as for:

- HAZOP Study team members
- Coordinators of process safety management programs
- Professionals responsible for addressing the findings and recommendations generated by HAZOP Study teams

About your instructor:

Robert W. Johnson is a Fellow of AIChE and an industry leader in the development and use of risk analysis methods and risk management strategies. Since 1978, he has helped companies prioritize risk reduction options, develop corporate and plant technical safety programs, identify inherently safer processes, train process hazard analysis team leaders and analyze fire, explosion and toxic release hazards. He teaches chemical process safety at The Ohio State University, and was the primary contractor of *Guidelines for Conditional Modifiers* and *Enabling Conditions and Guidelines for Hazard Evaluation Procedures, Third Edition*. He is also the author of two process safety sections in *Perry's Chemical Engineers' Handbook*.

CCPS' Process Safety Management Overview

Course No.: ELS105
Course Length: 10 hours
CEUs: 1.0 **PDHs:** 10
Pricing: AIChE Members and Employees* of CCPS Member Companies – $495
Non-Members – $695

Gain an overview of what process safety is, why it is needed, and how to address and implement it. Plus, gain the tools you need to ensure your process safety management systems succeed. In this course, you'll examine the U.S. OSHA PSM 14 regulatory requirements and the CCPS 20-element approach to process safety.

Here's a preview of what you'll learn:

- Common process safety management tools and how to use them
- Management of Change (MOC) and how it may be the best way to control hazards
- Regulatory requirements vs. what you really should do to keep your plant running safely
- Incident investigation lessons learned
- How Layer of Protection Analysis (LOPA) is a system management approach as well as an investigative technique
- Ranking risk

Who should attend:

- New engineers
- Seasoned engineers newly assigned to process safety projects
- Supervisors who need an overview of process safety and its importance
- Managers looking for a refresher course on process safety fundamentals
- Anyone responsible for communicating process safety information and expectations to the front line

About your instructor:

Adrian Sepeda has a 33-year chemical industry background, which includes accident investigations and process safety and risk management. He now runs a consulting firm specializing in process safety and risk management programs, issues, education and auditing. He also manages AIChE's Center for Chemical Process Safety's Process Safety Incident Database.

CCPS' Layer of Protection Analysis (LOPA)

Course No.: ELA109
Course Length: 8 hours
CEUs: 0.8 **PDHs:** 8
Pricing: AIChE Members and Employees* of CCPS Member Companies – $495
Non-Members – $695

This course offers an overview of Layer of Protection Analysis (LOPA) to mitigate risk in your processes. The course covers the basic LOPA approach to analyzing potential incident scenarios.

Here's a preview of what you'll learn:

You will learn the finer points of topics such as enabling conditions and conditional modifiers, and the logistical aspects of planning and executing a LOPA study, including documentation and program management. You'll also gain new Center for Chemical Process Safety (CCPS) guidance on initiating events, independent protection layers, enabling conditions and conditional modifiers — including the likelihood of ignition. Concepts covered include:

- Understanding LOPA methodology
- How to execute the detailed steps of the LOPA method for scenario analysis
- How to identify enabling conditions and conditional modifiers
- Closing the risk gap
- Managing LOPA documentation, updates, revalidations and follow-up
- Introductions
- LOPA scenarios
- Target risks, scenario impacts
- Initiating events, enabling conditions
- Independent protection layers
- Conditional modifiers
- Documentation options, examples
- Implementing actions, updating LOPAs

Who should attend:

- Hazard evaluation teams
- Dedicated site or corporate LOPA teams
- Anyone who manages LOPAs as well as expert analysts and safety teams

About your instructor:

Robert W. Johnson
(See Course ELS104 on page 26.)

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SEPARATIONS

Distillation in Practice

Course No.: ELA112
Course Length: 20 hours
CEUs: 2.0 **PDHs:** 20
Pricing: AIChE Members – $895
Non-Members – $1,095

Gain an understanding of the essential distillation concepts you may be expected to know in your process support, operations or design engineering role. In this course, we'll cover all the important distillation topics as well as tips for specifying and selecting hardware.

Have 10 or more people to train?
Contact us at edu@aiche.org or 646-495-1384 and ask about our **15% discount.**

Here's a preview of what you'll learn:

- The fundamentals of distillation
- The practice of distillation in the real world
- Advanced topics, including troubleshooting
- Vapor liquid equilibrium
- Stages and transfer units
- General column design
- Tray column design
- Packed column design
- Other devices
- Efficiency
- Scale-up
- Start-up and troubleshooting
- Enhanced distillation

Who should attend:

- Engineers or chemists who troubleshoot difficult distillation problems in the plant or who conceptualize difficult distillation problems in the engineering office or laboratory
- Distillation veterans
- Distillation newcomers with a few years of experience

About your instructor:

John P. Farone is a sought-after consultant to the chemical industry with over 40 years of experience in process separations, process simulation and equipment design. He has singular knowledge of the practical design and operation of trayed and packed distillation towers and their internals. Previously, he was with The Dow Chemical Company for 36 years, where he specialized in process engineering in the areas of distillation and stripping.

With **Jose Bravo** and **James R. Fair**

Distillation Technology for Operators

Course No.: ELA113
Course Length: 10 hours
CEUs: 1.0 **PDHs:** 10
Pricing: AIChE Members – $795
Non-Members – $995

Gain a thorough understanding of the theory underlying successful distillation processes — and, beyond theory, learn what actually happens in a column.

This course covers a wide range of topics – from basic column design to installation, start-up, shutdown and more. Your instructor, a distillation technology expert, will detail the critical aspects of operating principles common to most distillation operations, regardless of the distillates being produced.

Here's a preview of what you'll learn:

- The fundamentals of distillation and the distillation process
- How to leverage distillation technology basics in your overall system design and tray and packed column design
- Advanced knowledge of installation, start up and shutdown, troubleshooting and distillation column control
- A solid foundation in the principles of operations that apply across all products
- Fundamentals: Beginning principles and the distillation process
- Practice: Overall system design, tray column design and packed column design
- Advanced topics: Installation, start-up and shutdown, troubleshooting and distillation column control

Who should attend:

- Engineers or chemists who troubleshoot difficult distillation problems in the plant or conceptualize difficult distillation problems in the engineering office or laboratory
- Distillation veterans
- Distillation newcomers with a few years of experience

About your instructor:

John P. Farone, Jose Bravo, and **James R. Fair**
(See Course ELA112 on page 28.)

Why not take advantage today?

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eLearning Courses

SACHE CERTIFICATE PROGRAM

The program chosen by thousands of students, practicing engineers and AIChE and Center for Chemical Process Safety (CCPS) members to put their process safety training on track.

Demonstrate your proficiency in process safety. The Safety and Chemical Engineering Education (SAChE) program was originally offered only to students through teachers. Very popular and widely used by students, the four-hour sessions are now being made available to the chemical process and other industries.

Take one session, or all eight, and you'll be making an investment in your career and your future:

- Safety in the Chemical Process Industries
- Runaway Reactions
- Risk Assessment
- Chemical Reactivity Hazards
- Inherently Safer Design
- Dust Explosion Control
- Process Safety 101
- Process Safety Lessons Taught from Experience

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Taught by industry experts

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Each Course Length: 4 Hours

Each Course Earns 4 Professional Development Hours

Pricing:

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AIChE Members and Employees* of CCPS Member Companies: $99
Non-Members: $129

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ELA901: Safety in the Chemical Process Industries

Get a solid introduction to the application of chemical process safety technology in an actual chemical facility. This session covers the concept of corporate safety programs, laboratory safety inspections, personal protective equipment and process area safety features and procedures. The video also covers Design Institute for Emergency Relief Systems (DIERS) methods for characterizing runaway reactions, equipment and methods for characterizing flammable dusts and vapors, and informal and formal safety reviews

Your instructor: Dan Crowl

ELA902: Runaway Reactions

Before you can handle chemical reactions safely, you must first understand them. In this course, you'll identify potential runaway reactions and tools for sizing relief systems to safely control and contain them.

Your instructor: Amy Theis

ELA903: Risk Assessment

Explore the latest methods for detecting, preventing and mitigating risks in plants. In this course, you'll learn how methods of risk assessment, management and reduction are related and how to ensure they function together successfully in your operation. You'll learn how to assess the health effects of risks, perform a what-if analysis, and plan and implement a Hazard and Operability (HAZOP) Study. You'll delve into screening analysis techniques, checklist reviews, fault tree and event tree analysis, preliminary hazards analysis and chemical plume and dispersion analysis. You'll also address safety audits, explosion and fire analysis, Failure Modes and Effects Analysis (FMEA) and quantified risk assessment.

Your instructor: Ralph W. Pike

ELA904: Chemical Reactivity Hazards

Learn how to avoid uncontrolled chemical reactions and the serious harm they can cause. In this course, you'll gain a basic understanding of chemical reactivity hazards and how to avoid unintended reactions and control intended reactions.

Your instructor: Robert Johnson

ELA905: Inherently Safer Design

Explore inherently safer design of chemical processes and plants, and learn how to avoid hazards rather than control them. In this session, you'll identify the principles for achieving inherently safer process that have a low level of danger even if things do go wrong.

Your instructor: Dennis Hendershot

ELA906: Dust Explosion Control

Dust explosions continue to occur in the chemical industry, killing workers, injuring others, and damaging industrial facilities. The U.S. Chemical Safety Board has made recommendations for preventing dust explosions. In this session, you'll learn what those recommendations are and how they must be applied to minimize and control the hazards related to dust explosions.

Your instructor: Joe Louvar

ELA907: Process Safety 101

Gain a basic understanding of the U.S. process safety regulations and key concepts related to process safety. In this session, you'll examine process descriptions, process safety management and mechanical integrity. You'll take a close look at process controls, and flammability and static electricity. You'll also learn about Design Institute for Emergency Relief Systems (DIERS) and reliefs and corrosion.

Your instructor: Jon Bernardi

ELA908: Process Safety Lessons Taught from Experience

Examine important case histories related to process safety – including Bhopal, Seveso, examples of tank failures and T2 – and how to use lessons learned to avoid similar mistakes. This course can be used in safety orientations at industrial facilities.

Your instructor: Ron Willey

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Notes

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