VectorSolutions™

Municipal AEC Training

Online Course Catalog

Municipal AEC Training

Vector Solutions' online Municipal AEC training catalog offers hundreds of hours of content tailored for architecture, engineering, and construction professionals. The catalog features courses for engineers, land surveyors, landscape architects, code enforcement officers, and other professionals.

More than 10,000 agencies rely on Vector Solutions to improve their readiness goals. Our Unified Agency Readiness Platform helps agencies save time, strengthen compliance, improve performance, and achieve measurable outcomes.

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Vector Solutions' industry-leading online course library for Architecture, Engineering & Construction (AEC) professionals includes engaging courses developed to meet continuing education requirements and enhance critical skills.

We are continually integrating new industries and teaching technologies in order to expand our curriculum and keep pace with an ever-evolving industry.

ACCESSIBILITY/ADA

- Accessibility and Visitability
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- Conflicting and Non-Existent Accessibility Standards

Accessibility and Visitability (1-hour)

Imagine being unable to visit friends because their homes have stairs you can't climb, or having to avoid drinking liquids before social gatherings because you won't be able to use the bathroom. This interactive online course explores how simple design choices in home construction can create environments that welcome everyone, regardless of mobility challenges. We introduce the Visitability movement, founded by Eleanor Smith, which advocates for three key principles in new home construction: at least one zero-step entrance, wider doorways and hallways, and an accessible bathroom on the main floor. You'll learn how these features benefit not only people with disabilities but everyone — from parents with strollers to aging adults who wish to remain in their homes. Discover the surprisingly low cost of incorporating these features during initial construction versus expensive retrofits later, and understand how these small changes can dramatically improve quality of life, foster inclusive communities, and create housing that serves generations to come.

Accessibility by Building Type: Multi-Use Facilities (1-hour)

This one-hour course will address the design and construction of multi-use facilities using the requirements of the 2010 Americans with Disabilities Act (ADA) Title III Regulations Accessibility Guidelines - ADAAG, effective and mandatory for all such buildings and sites in the United States on and after the 15th of March 2012. You will experience a "virtual" tour of the newly renovated Texas A&M University - Memorial Student Center (MSC) in College Station, Texas by the State of Texas Registered Accessibility Specialist (RAS) of record - both exterior site and interior portions of the additions and renovations project. This presentation will discuss the myriad accessibility issues that had to be met during design and construction and will address the "above and beyond" selection criteria used by the APA / TGCPD Accessibility Awards Program - a joint program between the Accessibility Professionals Association and the Texas Governor's Committee on People with Disabilities.

Accessibility by Building Type: Universal Residential Design (1-hour)

Universal Design is a term used to describe the idea of creating buildings, products, and spaces accessible to older adults, people with disabilities, and people without disabilities. The focus is on creating an all-inclusive environment usable by everyone, regardless of age or physical ability. Today's designers are challenged by the many rules and regulations in their commercial practice including the American's with Disabilities Act (ADA) and the Fair Housing Act (FHA). The application of Universal Design in architecture and construction allows homeowners to continue to live in homes that they love as their physical needs change. This interactive online course addresses why learning universal design considerations - from the initial design concepts through the life-cycle of the home - is necessary. This course will also assist designers and those in the construction industry in providing an educated and sensitive approach when creating design solutions to meet the everyday "lifestyle" challenges of the disabled.

Accessible Parking (1-hour)

Beyond those familiar blue-painted spaces lies a world of precise measurements, thoughtful design, and life-changing accessibility. This course breaks down the 2010 ADA Standards for accessible parking, guiding you through everything from calculating the required number of spaces for different facility types to understanding the critical components that make parking truly accessible for people

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with visible and invisible disabilities. You'll learn about proper dimensions, access aisle requirements, signage placement, and special provisions for hospitals, rehabilitation facilities, and residential buildings. Through real-world examples of both effective and problematic implementations, you'll gain practical knowledge that makes the difference between merely complying with regulations and creating truly inclusive environments that allow everyone equal access to your facilities.

Accessible Restrooms (1-hour)

In order to have an accessible site where parking is provided, people must be able to get to the site first. This means accessible parking is a necessity. This is a common part of the accessibility codes that most design professionals and building inspectors will have to deal with in their everyday work. Parking is easy to make accessible, but also easy to get wrong. This interactive, online course will point out why this should be a top priority and how to avoid the pitfalls. Components of accessible parking, location, and how many spaces are required will also be discussed.

Accessible Routes: Getting In, Out, and Around (1-hour)

Many people are unaware that accessible routes can include ramps, elevators, and platform lifts, in addition to pedestrian paths This course will help architects, engineers, contractors, and building inspectors ensure that people with disabilities can get into, out of, and around accessible buildings and sites.

Accessible Signage (1-hour)

Accessible signage is one of the most commonly missed areas of accessibility because it is not well understood. Accessible signage is important to blind and low vision individuals to help them locate and identify rooms and spaces. This interactive online course aims to improve your knowledge and awareness of accessible signage issues.

ADA Guidelines 2010: Communication Elements and Features (1-hour)

The Americans with Disabilities Act/Architectural Barriers Act Accessibility Guidelines (2010 Guidelines) developed by the U.S. Architectural and Transportation Barriers Compliance Board (the Access Board) effectively replaces the 1991 ADA Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS). Chapter 7: Communication Elements and Features of the 2010 ADA Standards for Accessible Design focuses on ADA requirements for accessible modes of communication. In this course, you will learn about the requirements of Title II of the ADA for effective communication. Effective communication means that whatever is written or spoken must be as clear and understandable to people with disabilities as it is for people who do not have disabilities. Questions answered within this course include:What is effective communication?What are auxiliary aids and services?When is a state or local government required to provide auxiliary aids and services?Who chooses the auxiliary aid or service that will be provided?This course also provides criteria for basic elements within Chapter 7: Communication Elements and Features of accessibility as established by the guidelines, including: 701 General702 Fire Alarm Systems703 Signs704 Telephones705 Detectable Warnings706 Assistive Listening Systems707 Automatic Teller Machines and Fare Machines708 Two-Way Communication Systems ATTN: The content in this course

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generally addresses requirements from the American with Disabilities Act (ADA) that is adopted with amendments in the 2015 Minnesota State Building Code in Minnesota Rules Chapter 1341. For specific requirements in the 2015 Minnesota Accessibility Code, please reference the following link: *https://codes.iccsafe.org/content/MAC2015/toc*

ADA Guidelines 2010: General Site and Building Elements (1-hour)

The Americans with Disabilities Act/Architectural Barriers Act Accessibility Guidelines (2010 Guidelines) developed by the U.S. Architectural and Transportation Barriers Compliance Board (the Access Board) effectively replaces the 1991 ADA Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS). The General Site and Building Elements section of the 2010 ADA Standards for Accessible Design focuses on ADA requirements for exterior spaces. This course provides criteria for basic elements within the “General Site and Building Elements” of accessibility as established by the guidelines, including: General (501)Parking Spaces (502)Passenger Loading Zones (503)Stairways (504)Handrails (505)

ADA Guidelines 2010: Plumbing Elements and Facilities (1-hour)

The Americans with Disabilities Act/Architectural Barriers Act Accessibility Guidelines (2010 Guidelines) developed by the U.S. Architectural and Transportation Barriers Compliance Board (the Access Board) effectively replaces the 1991 ADA Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS). Plumbing Elements and Facilities (Chapter 6) of the 2010 ADA Standards for Accessible Design focuses on ADA requirements for accessible movement within restrooms and changes the design of plumbing fixtures. This course provides criteria for basic elements within the “Plumbing Elements and Facilities” of accessibility as established by the guidelines. ATTN: The content in this course generally addresses requirements from the American with Disabilities Act (ADA) that is adopted with amendments in the 2015 Minnesota State Building Code in Minnesota Rules Chapter 1341. For specific requirements in the 2015 Minnesota Accessibility Code, please reference the following link: https://codes.iccsafe.org/content/MAC2015/toc

ADA Guidelines 2010: Recreational Facilities (2-hour)

The Americans with Disabilities Act/Architectural Barriers Act Accessibility Guidelines (2010 Guidelines) developed by the U.S. Architectural and Transportation Barriers Compliance Board (the Access Board) effectively replaces the 1991 ADA Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS). The Recreation Facilities section (Chapter 10) of the 2010 ADA Standards for Accessible Design focus on ADA requirements for accessibility on newly designed or newly constructed and altered amusement rides. An “”amusement ride”” is defined by the guidelines as a system that moves people through a fixed course within a defined area for the purpose of amusement. ADAAG addresses only the built environment (structures and grounds). This interactive online course provides criteria for basic elements within the “Recreational Facilities” of accessibility as established by the guidelines. ATTN: The content in this course generally addresses requirements from the American with Disabilities Act (ADA) that is adopted with amendments in the 2015 Minnesota State Building Code in Minnesota Rules Chapter 1341. For specific requirements in the 2015 Minnesota Accessibility Code, please reference the following link: *https://codes.iccsafe.org/content/MAC2015/toc*

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ADA Guidelines 2010: Small Towns (1-hour)

People with disabilities continue to face architectural barriers that limit or make it impossible to access events or services. The American Disability Act (ADA) gives people with disabilities an equal opportunity to participate in the mainstream of public life offered to all Americans. The ADA's regulations and the ADA Standards for Accessible Design, originally published in 1991, set the standard for what makes a facility accessible. While the updated 2010 Standards retain many of the original provisions in the 1991 Standards, they do contain some significant differences. The Americans with Disabilities Act/Architectural Barriers Act Accessibility Guidelines (2010 Guidelines) developed by the U.S. Architectural and Transportation Barriers Compliance Board (the Access Board) effectively replaces the 1991 ADA Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS). This course specifically explores ADA compliance for small towns. Small towns offer a variety of essential programs and services that are fundamental to the public and to everyday American life. Although the range of services offered by small towns varies, it is essential that people with disabilities have the opportunity to participate in the programs and services that towns offer. This course presents an overview of some basic ADA requirements and provides cost effective tips on how small towns can comply with the ADA. The information in this course comes from various resources. These resources include documents and illustrations from publications released by the ADA National Network, the U.S. Access Board, and the U.S. Department of Justice. This course provides practical information on how to comply with the Americans with Disabilities Act, to clarify potential misunderstandings about the requirements of the ADA, and to highlight its flexible, common sense approach to accessibility.

ADA Guidelines: Achievable Barrier Removal and Accessibility (B) (1-hour)

The information in this course comes from various resources. These resources include documents and illustrations from publications released by the ADA National Network, the U.S. Access Board, and the U.S. Department of Justice. This course provides practical information on how to comply with the Americans with Disabilities Act, to clarify potential misunderstandings about the requirements of the ADA, and to highlight its flexible, common sense approach to accessibility.

ADA Guidelines: Designing Pedestrian Facilities using Public Right of Way Accessibility Guidelines (PROWAG) (1-hour)

The United States Access Board is the entity responsible for maintaining the American with Disabilities Act (ADA) guidelines. While the ADA guidelines address certain features common to public sidewalks, such as curb ramps, further guidance is necessary to address conditions and constraints unique to public rights-of-way. The Access Board has been developing Public Right of Way Accessibility Guidelines (PROWAG) for the past few years. Once PROWAGs are adopted by the Department of Justice, they will become enforceable under Title II of the ADA. This course will provide a summary of the most recent PROWAGs that have been published by the Access Board and how they relate to the design of pedestrian facilities within public right of ways.

Conflicting and Non-Existent Accessibility Standards (1-hour)

What do you do when you have conflicting accessibility standards? What about when there are no standards? How do you make sure your building or facility is compliant? This interactive online course will cover these scenarios and help you make sure that you are designing and building for accessibility.

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ACI ARCHITECTURE

- Reinforced Concrete Tilt-Up Panels

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Reinforced Concrete Tilt-Up Panels (1-hour)

The term tilt-up panel is almost self-descriptive. This method of construction has been utilized through history, but only relatively recently have the advantages become economically viable. A combination of labor savings, speed of construction, and good finish quality, has made tilt-up panels more competitive. The following course will explain the tilt-up panel method of construction, itemize some of the current advantages of this construction method, and give an example of the design of a typical warehouse type building constructed of tilt-up walls.

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ARCHITECTURE - DESIGN

- Ethical Decision Making for Design and Construction Professionals
- Principles of Professional Construction Management

Ethical Decision Making for Design and Construction Professionals (2-hour)

Designers, Planners, Architects, Landscape Architects, and Engineers all need to know about and adhere to established codes of ethics. Then you will protect the public and the environment now as well as in the future. This webcast gives you the history of the events that led to our current attitudes regarding ethical decision making. You will get specific examples of the consequences for making unwise decisions. You'll also receive instruction in the ethical considerations involved in making good, safe, ethical decisions.

Principles of Professional Construction Management (1-hour)

What is professional construction management? What services does a professional construction manager perform? This interactive online course will provide an overview of professional construction management, including program management. It will examine the structural, procurement and contractual components of the process, as well as some of the unique legal issues that are associated with this process (e.g., liability for safety, schedule and cost overruns to trade contractors).

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ASCE ARCHITECTURE

- Wind Design Using ASCE 7-16

Wind Design Using ASCE 7-16 (2-hour)

Have you kept current with ASCE's building design provisions? This interactive online course will describe the wind design changes that have occurred in ASCE 7-16 and how those changes will affect the practice of wind design when the 2018 building codes are adopted by local jurisdictions or when practitioners begin to use the revised standard.

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CODES

- Concrete Standards and Requirements
- Past, Present and Future of Building Energy Codes and DOE Appliance Mandates

Concrete Standards and Requirements (2-hour)

This course is a review of the Specification for Ready Mixed Concrete, ASTM C94, and discusses the aspects of ordering concrete, production, delivery and testing. It covers the responsibilities of the purchaser and the manufacturer of ready mixed concrete. The second part of the course covers the Building Code requirements for concrete materials (ACI 318) and covers specifications for concrete as addressed in ACI 301, Specification for Structural Concrete. The presentation covers strength and durability requirements for concrete as addressed in ACI 318 and ACI 301.

Past, Present and Future of Building Energy Codes and DOE Appliance Mandates (2-hour)

National, state, and even local energy codes have continued to change, requiring increasing energy conservation standards. ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) Standard 90.1 and International Energy Conservation model energy code have been increasing the energy conservation standard every three years. The Department of Energy (DOE) has mandated energy conservation standards for residential central air conditioners and heat pumps since 1992. These codes mandates have increased over time and will continued to do so. Commercial and residential construction techniques have changed dramatically over the past 20 years. This interactive online course will review the state of current mandates and standards and describe the future requirements of the model energy codes and DOE mandates.

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CODES & STANDARDS - ACSE

- Designing Using LRFD Principles
- Pier and Beam Foundation Design

Designing Using LRFD Principles (2-hour)

What is LRFD? LRFD (Load and Resistance Factor Design) principles are used in structural engineering applications so structural reliability is more consistent across various materials and loading conditions. This concept becomes particularly important in performance-based design scenarios when the structural engineering solutions are required to address how the structure is used and expected to perform - and not prescriptive building codes. This interactive, online course will review load factors, resistance factors, and reliability theory. We will also discuss the four material types (wood, steel, concrete, and masonry), looking at how each of these material standards deal with LRFD design.

Pier and Beam Foundation Design (2-hour)

This course will provide technical information important in the design of pier and beam foundation systems. The design process will focus on how to apply wind and flood loads to these foundation systems using ASCE 7-10, ASCE 24, the Wood Frame Construction Manual and the International Building Codes. The use of the masonry code will also be covered. An example is included that uses elements of each of the important references. Design methods for these foundations are not covered in most structural engineering programs at the university level and have not been found in any practice journals. While the design wind loads are frequently determined for buildings, the distribution of these loads to the foundation and supporting soil and the inclusion of flood loads are important and crucial elements of the design process.

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CONSTRUCTION ENGINEERING

- Anatomy of Construction Defects
- Construction Administration: MEP Commercial Buildings
- Construction Project Documentation: Navigating Pitfalls
- Green Building Materials: An Introduction
- Heavy Construction Equipment Basics - Earthmoving & Excavating
- LEED v4: Building Design and Construction
- Reliability Engineering Essentials
- Working Effectively with Building Officials and Inspectors

Anatomy of Construction Defects (2-hour)

Construction defects create unnecessary risk. Less than 15% questioned in a construction industry poll fully understood the role and significance of ICC ES Reports on reducing construction defect conditions. If you could reduce associated risks and increase safety in the built environment, wouldn't you jump at the opportunity? This interactive online course will set you on the path to do just that.

Construction Administration: MEP Commercial Buildings (1-hour)

This 1-hour interactive online course provides the commercial building professional with guidelines for administering construction activities in the MEP (mechanical, electrical, plumbing) discipline area. Many aspects of construction administration are reviewed to provide information on the roles and responsibilities involved with this position. This course reviews the steps of MEP design for a commercial building that construction administrators are involved in as well as explaining their role in performing MEP building surveys. It provides sources of information, design parameters and discusses requirements of various local jurisdictions in the review of MEP documents for the issuance of building permits. This course contains a lot of the same information as in the course titled 'Performing MEP Commercial Building Surveys', and it is not recommended that these courses be taken together. This course varies because it focuses on the role of the Construction Administrator.

Construction Project Documentation: Navigating Pitfalls (2-hour)

This course will show you how to successfully document your construction projects. While all projects start with the best intentions, problems will inevitably arise. Knowing how to use common documentation forms on a construction project will help ensure the successful resolution of these problems. This course will show you which documents to use, and when; what information to include, and why; and what to say, and how to say it persuasively. You will find tips, tools, checklists, along with good and bad examples of documentation. The instructor will lead you through each step to help you navigate the pitfalls of poor construction project documentation.

Green Building Materials: An Introduction (2-hour)

Growing concern over the future of our planet makes Green Building Materials: An Introduction a must for any professional in the AEC industry. This 2-hour interactive online course advocates the environmental benefits of green building materials by introducing you to the positive effects of building with environmentally friendly products, made especially with the future in mind. You will learn about green building materials and why they are important not only to the environment, but also to humans because they prevent future health problems caused so often by toxic chemicals. You'll also learn about the economic benefits, common misconceptions, consumer demand, professional responsibilities, and the "look" of green material. This is the first of two courses in a series on green building material. ATTN: This educational offering is recognized by the Minnesota Department of Labor and Industry as satisfying 3 hours of credit toward the required continuing education. Vector Solutions has a long history of providing industry-specific content for its customers. While this course and its content remain accurate and functional within our systems, the look and feel may not match our more modern offerings.

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Heavy Construction Equipment Basics - Earthmoving & Excavating (3-hour)

Contractors do many types of construction activities that require many different types, sizes and groupings of equipment. Most new construction projects are connected to the earth by some type of foundation system. Utilities are located underground so they are less obtrusive and not in the way. Building sites must drain away from the structure and divert the water to a safe place. All of these activities require excavating and earthmoving. The focus of this 3-hour interactive online course is “big iron” used for excavating and earthmoving. Discussion is intended to be basic. Content is not intended to be comprehensive. Discussion focuses on the basic principles for heavy equipment selection, grouping and simple costing. Earthmoving equipment discussed includes bulldozers, front-end loaders, motor graders, scrapers, and dump trucks. Excavating equipment discussed includes excavators, backhoes and trenchers.

LEED v4: Building Design and Construction (1-hour)

Are you aware that Leadership in Energy and Environmental Design, or LEED Version 4 is now officially adopted by the United States Green Building Council? The goal of sustainable development is to create healthy environments through environmentally responsible planning, design, construction, operation, and maintenance. The heart of the sustainable building movement is the USGBC LEED Green Building Rating System for buildings. This course specifically today covers the LEED for Building Design and Construction, known commonly as LEED BD + C. This course discusses the background of the LEED BD + C credit rating system and covers recent changes to the system, including the addition of new market sectors, simplified LEED credit submittal requirements, step-by-step reference guide materials with videos and tutorials, and a more intuitive technology platform. Other recent changes include the focus on outcomes to aid in building management, as well as the addition of new impact categories.

Reliability Engineering Essentials (1-hour)

This course is intended to present the essentials of reliability and a practical approach to its calculation and improvement. Participants will be able to apply basic concepts related to reliability to work on system improvements, calculate maintenance (preventive and predictive), and define warranty periods. We will be looking not only at the definition of reliability, but also other related measurements and systems configurations, as they are found in the real world.

Working Effectively with Building Officials and Inspectors (1-hour)

Who is an Authority Having Jurisdiction? How should you communicate with them? Anyone associated with building design and construction will eventually interact with a building official or inspector. This includes Fire Marshals, Health Departments, Planning Departments, local gas and electric companies and water and sewer departments. Having a positive and professional relationship will go a long way in creating a cost effective, timely and safe project. This interactive online course will present a number of techniques to use to ensure a productive outcome including: knowing the applicable codes, being professional, first impressions, understanding the role of the local AHJ, knowing when to appeal an unfavorable ruling, knowing when to accept an unfavorable ruling, and establishing your credentials.

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CRANE/FORKLIFT SAFETY

- Forklift Safety
- Worksite Safety 07: OSHA Cranes & Other Hoists

Forklift Safety (0.98-hour)

Contains basic forklift operating procedures intended to increase safety and help prevent the most common forklift accidents. Provides information on the most common types of forklifts used in general industry and warehouse environments. Includes important information required by OSHAs general industry standards (29 CFR 1910.178) as well as best practices on operating powered industrial trucks.

Worksite Safety 07: OSHA Cranes & Other Hoists (1-hour)

Moving large, heavy loads is critical to the manufacturing and construction industries, but unfortunately, cranes, derricks, hoists, and other lifting devices pose significant safety issues for both their operators and for workers in proximity to them. The rules are complex and often out of date; here, we give OSHA-Subpart N-recommended, ANSI-based tips for safe usage and cover cranes, derricks, hoists, elevators and conveyors. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

BACK

DATA CENTERS

- Data Centers: MEP, Fire Protection, and Equipment Rooms
- DC Power in the Data Center

Data Centers: MEP, Fire Protection, and Equipment Rooms (2-hour)

Connectivity. The internet of things. Uptime. Reliability. What are these things? These are all terms and concepts that relate to the always connected, always “on” world that has evolved out of the digital age. The cornerstone of these concepts is the modern data center - massive, hulking, and also secretive buildings that house the hardware, firmware, and software that power our everyday lives. Email, phone calls, Facebook, Google - these are all services provided by the computers housed in data centers. They are located all over the country and the world. They are in high rise buildings in dense urban areas, and they are located in remote rural campuses. They are small, occupying a few thousand square feet in old, Tier I locations, or they can be massive, hundreds of thousands of square feet with 50MW of electrical power. These technological marvels require significant infrastructure to maintain the always-on, always-available status that we demand of services in the modern world. That level of reliability is not achieved through chance. Significant effort and expense is required to facilitate conditions that are conducive to 24x7 reliability. Not the least of which are Mechanical, Electrical, Fire Protection, and Security Systems for these centers. In this course, we will dive into the complexities of these systems. By the end of this course, you will be familiar with the unique language and terms used to discuss the various elements of these systems - like PDU, UPS, EUI, and PUE (and, no, since this is not a one-man interpretation of Robin Williams’ efforts in “Good Morning, Vietnam!” you can rest assured that I didn’t make up any of those terms). You will also be able to understand the challenging design strategies that drive the installation and maintenance of these complex and integrated systems, and you will also have a much more in-depth understanding of the costs that drive data center design, construction, and maintenance efforts.

DC Power in the Data Center (1-hour)

Alternating Current (AC) power has been the default for data centers due to many factors, such as equipment availability and familiarity. As companies and agencies push for better energy efficiency, Direct Current (DC) power may become a more viable choice for energy, reliability, and availability of a data center. This course walks through a typical data center power chain then compares using DC power with discussion on five of the most typical DC power voltages in use today.

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DESIGN

- A Wetland Primer, Advanced: Field Evaluation & Permitting Considerations
- ASHRAE Essentials - 62.1-2016 Ventilation for Acceptable Indoor Air Quality
- ASHRAE Essentials: 55-2017 - Thermal Environmental Conditions for Human Occupancy
- ASHRAE Essentials: 90.1-2016 - Energy Standard for Buildings Except Low-Rise Residential Buildings
- ASHRAE Guideline 13-2014, Building Automation Systems
- Building a Sustainable Future
- Building Design and Construction Features for Fire Protection
- Coastal Engineering: Hurricanes and Nor'easters
- Coastal Engineering: Sea Level Rise
- Commercial HVAC Systems Essentials
- Complete Streets - An Introduction to the Complete Streets Concept
- Complete Streets - An Introduction to the Design of Complete Streets
- Construction Project Delivery Systems
- Design of Utility Infrastructure
- Designing Permanent Erosion and Sediment Control Systems
- Designing Temporary Erosion and Sediment Control Systems
- Green Street Retrofit
- Hydraulic Design of Storm Sewers
- Innovative Heat Pump Technology
- Land Development Projects: Design of Infrastructure
- Land Development Projects: Developing Feasibility Studies
- Land Development Projects: Grading and Drainage Design
- Principles of Design-Build
- Protecting People Against Terrorist Attacks: Chemical, Biological, and Radiological (CBR) Threat Protection
- Reinforced Masonry Design
- Retaining Wall Design - Part 1
- Structural Masonry Materials
- Unreinforced Masonry Design

A Wetland Primer, Advanced: Field Evaluation & Permitting Considerations (2-hour)

This 2-hour interactive online course is a follow-up to 'A Wetland Primer For Design Professionals' by the same author. Although a basic understanding of wetlands--crucial for architects, engineers, land surveyors and landscape architects--is mastered in that first course, design professionals often need a broader understanding of why wetlands play an increasingly important role in site considerations, and how they are identified. This course does exactly that, in a easily understood series of steps. There will be a multiple-choice quiz at the end of this course. Vector Solutions has a long history of providing industry-specific content for its customers.

ASHRAE Essentials - 62.1-2016 Ventilation for Acceptable Indoor Air Quality (1-hour)

ANSI/ASHRAE 62.1-2016 - Ventilation for Acceptable Indoor Air Quality, the ventilation standard for non-residential buildings is one of many developed and maintained by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, better known as ASHRAE. The intent of this course is to introduce you to the Standard, its origins, its purpose and its application in maintaining economical and effective air cleaning solutions in buildings that will benefit human health and performance. This one-hour, essential course is intended for engineers of building HVAC systems, architects, building code officials, HVAC equipment manufacturers and building managers and owners and will introduce participants to the ASHRAE standard; cover the fundamental requirements of the standard; explain how these requirements are met; outline challenges experienced in different building types in maintaining a healthy indoor environment; present basic design, construction, and operations & maintenance concepts; and present the relationship of this standard with other current standards (e.g., ASHRAE 189.1, ASHRAE 55).

ASHRAE Essentials: 55-2017 - Thermal Environmental Conditions for Human Occupancy (1-hour)

This course is an introduction to ANSI/ASHRAE 55-2017 - Thermal Environmental Conditions for Human Occupancy, the building industry's standard for defining and quantifying relative comfort in the built environment. The Standard is one of many developed and maintained by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, better known as ASHRAE. The intent of this course is to introduce learners to the Standard, its origins, its purpose and its application. This course is intended for engineers of building HVAC systems, architects, building code officials, HVAC equipment manufacturers and building managers and owners.

ASHRAE Essentials: 90.1-2016 - Energy Standard for Buildings Except Low-Rise Residential Buildings (1-hour)

This course is an introduction to ANSI/ASHRAE 90.1-2016 - Energy Standard for Buildings Except Low-Rise Residential Buildings, the building industry's standard for defining the steps that must be taken to meet and demonstrate minimum energy efficiency in the built environment. The Standard is one of many developed and maintained by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, better known as ASHRAE. The intent of this course is to introduce you to the Standard, its origins, its purpose and its application. This course is intended for engineers of building HVAC systems, architects, building code officials, HVAC equipment manufacturers and building managers and owners.

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ASHRAE Guideline 13-2014, Building Automation Systems (2-hour)

Perhaps the most complex, and certainly the most dynamic, aspect of building design and construction are the automation and control systems. From pneumatic controls to dry contacts to intelligent multi-modal sensors, the industry has seen dramatic change. This course will discuss ASHRAE guideline 13-2014, which provides a standard framework from which to define and specify DDC (direct digital control) of both HVAC and energy management systems.

Building a Sustainable Future (1-hour)

Over 7 billion people now inhabit the earth, placing unprecedented pressure on the planet's soils, waters, forests, and other natural capital. The majority of the global population lives in urban areas, where their interactions with nature, and the benefits that these interactions provide, commonly occur in small-scale sites and residential settings. Most often, these landscapes are treated as inconsequential, and their full potential to mend humanity's environmental offenses and improve our quality of life is commonly overlooked. This course illustrates the importance of creating regenerative and resilient systems that increase the provision of ecosystem services. Site sustainability is defined, and the value of education about sustainability and stewardship toward our built and natural ecosystems is discussed. The importance of instilling a love of nature in our children is examined, in addition to the monitoring and adaptive management of ecosystems so maintenance practices can be continually adjusted to improve the overall function of the site. The purpose of this course is to elevate the discussion of sustainability beyond "doing less bad"—attempting to merely slow down environmental degradation—to create regenerative sites that restore ecosystem function and rebuild the earth's natural capital.

Building Design and Construction Features for Fire Protection (1-hour)

Hostile fires are responsible for 3,000 deaths and 16,000 injuries each year. Approximately 100 firefighters die in the line of duty during that same period. In addition to human injury and death, is the property loss which is estimated to be almost $12 billion a year. This interactive online course will teach you the basic, but critical, aspects of how a building design influences the likelihood of a hostile fire and how that same design can mitigate the effects of an emergency fire incident. You will learn about basic building layout, construction components, building materials, fire ratings, occupancy considerations, emergency population management, and passive and active mitigating systems.

Coastal Engineering: Hurricanes and Nor'easters (2-hour)

What is the difference between a hurricane and a nor'easter? What kind of damage can they cause to your building project? Hurricanes and nor'easters can be destructive natural events creating high winds, storm surge, large waves, and causing large amounts of erosion, jeopardizing structures built along the nation's coastlines. This interactive online course will provide information about how to build to better resist the effects of these storms, what foundation types perform better, and why these storms are so damaging to the built environment. A few case studies will be included to illustrate techniques that are known to improve building performance.

Coastal Engineering: Sea Level Rise (2-hour)

What are some causes of sea-level rise? Is it impacting all coastlines? Sea-level rise is a very real flood condition that has caught the attention of many coastal communities around the U.S. This

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interactive online course will provide information about the potential magnitude of this rising water, the planning required to better resist the effects of this rising water, and why sea level rise can be so damaging to the built environment. A few case studies will be included to illustrate what is being done around the country to combat this serious climate change issue.

Commercial HVAC Systems Essentials (1-hour)

When planning HVAC systems for larger types of buildings, there are special considerations to take into account, such as higher density of people, special lighting and equipment, and other conditions that all may potentially generate heat. As a result, in most commercial buildings, the air conditioning and recirculation of air in the space becomes more important than providing heat - this is somewhat dependent on the location of the building. This course will provide essential information regarding HVAC systems in the areas of commercial refrigeration, space heating, boilers and furnaces, as well as controls and interfaces. If you're involved in HVAC systems in the areas of design, construction, maintenance, or management, this course will be a key training experience for your career. As a result of completing this training, you will have a better understanding of these core areas of HVAC systems and will be able to successfully contribute to your company - in system design, overseeing construction/maintenance, and management.

Complete Streets - An Introduction to the Complete Streets Concept (2-hour)

This course presents an introduction to the fundamental principles of Complete Streets. The planning and development of Complete Streets projects is presented. You will also learn about the elements of planning for Complete Streets and designing and implementing Complete Streets programs.

Complete Streets - An Introduction to the Design of Complete Streets (2-hour)

Complete streets are roads and streets designed and operated to provide safe access for all users, including motorists, bicyclists, pedestrians, and transit riders. Complete streets enable users of all ages, and all physical abilities to safely move along and cross an urban street. This course presents in detail elements of design for complete streets such as intersection design guidelines, modern roundabouts, pedestrian treatments, and bicycle lane guidelines. Each element will be described in terms of the general principles, design considerations, and recommended practice. A variety of case studies will be presented.

Construction Project Delivery Systems (1-hour)

This one hour course will provide an overview of the key attributes of project delivery systems. The primary focus will be on design-bid-build, at-risk construction management, and design-build, with some brief discussion on job order contracting, IPD (integrated project delivery), and public-private partnerships. Program and professional construction management, which can be used on all of the above-referenced systems, will also be addressed.

Design of Utility Infrastructure (2-hour)

Utilities and their infrastructure are one of the main facilities that support our modern society. From drinking water to telecommunications, underground utilities provide the basic services for our communities. Thus, their design is a critical component of construction projects. Through this

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interactive online course, engineers, architects, planners and contractors will learn design criteria for the design of different utility types, from gravity to pressurized flow facilities.

Designing Permanent Erosion and Sediment Control Systems (2-hour)

Development of land, whether it is for a new highway or a new office building, requires the re-contouring of terrain. And as such, requires a redistribution of drainage patterns. This change in the land creates the potential for long term erosion through storm events that occur during the life of the project. To prevent long term erosion, permanent erosion and sediment control system need to be developed as an integral part of the projects' designs. The primary goals of this interactive online course are to familiarize Engineers, Architects and Contractors with the design and application of different Best Management Practices (or BMPs for short) in the design of Permanent Erosion and Sediment Control.

Designing Temporary Erosion and Sediment Control Systems (3-hour)

Earthwork activities during construction disrupt natural and man-made ground coverage, creating the potential for erosion hazards and the contamination of natural resources. This interactive online course teaches you about best management practices for temporary erosion and sediment control. You will also learn about common regulations and requirements set in place to minimize significant impact upon the health, safety and welfare of the community.

Green Street Retrofit (2-hour)

How do you define a "green street"? This interactive, online course tells the story of street renovations implementing Low Impact Development design strategies. Retrofitting conventional streets into "green streets" provides stormwater treatment to remove pollutants from stormwater runoff and when feasible allowed to infiltrate as recharge. Monitoring of stormwater runoff volumes and pollutant loads can be conducted to demonstrate the effectiveness of the retrofit projects. Converted green streets also allow for educational potential to raise awareness about stormwater pollution (and solutions). This course will focus on the many environmentally friendly green infrastructure initiatives in Chicago, Illinois.

Hydraulic Design of Storm Sewers (2-hour)

Storm sewers are the hidden workhorse of our infrastructure. They are designed to ensure our urbanized communities remain dry and maintain safety during extreme events. For this reason it is important that storm sewers are designed with special detail and care. This interactive online course will discuss the design of storm sewer systems and its two core theories, the conservation of mass and energy. A sample spreadsheet will be provided as part of the course to help practitioners in the design of storm sewers.

Innovative Heat Pump Technology (1-hour)

Heat pumps have improved and evolved considerably since gaining acceptance as home heating systems in the 1970's. These air source heat pumps provided single zone heating in climates with mild winter temperatures. Today there are water source heat pumps, variable refrigerant flow heat pumps, and multi-zone heat pumps. Today's heat pump has improved efficiency and operates at lower outside air temperatures. This interactive online course will examine the latest heat pump technologies and the multitude of applications for this flexible and efficient technology.

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Land Development Projects: Design of Infrastructure (1-hour)

Land Development projects shape our communities and in many occasions create them. The primary goal of this interactive, online course is to assist planners, architects, engineers and contractors in developing a framework for optimizing infrastructure design that supports land development projects using guidelines from AASHTO, Urban Land Institute, Ten State Standards and other public and private organizations. The diversity of land development projects mirror our needs as a society. Even though they can be classified as commercial, residential, industrial, professional, institutional or governmental in nature they still need to be sustained by the same type of civil infrastructure. As our cities expand and population densities increase our infrastructure network has had to increase and adapt to serve our growing needs. This increase in capacity requirements has made ever more important the need to have efficient infrastructure designs.

Land Development Projects: Developing Feasibility Studies (2-hour)

Land Development projects are widely diverse and require a thorough knowledge of local regulations, physical site characteristics, and features surrounding the subject property. This interactive online course will teach you about different types of Land Development projects and their respective operational needs. You will learn about local, state and federal development regulations for projects within the U.S. The primary goals of this course are to familiarize planners, architects, engineers and contractors on key basic steps for developing feasibility studies that follow guidelines from the Urban Land Institute, National Home Builder's Association and other public and private organizations.

Land Development Projects: Grading and Drainage Design (1-hour)

Land development projects cover a wide range of needs for our communities, thus they have a wide range of configurations. Earthwork is one of the key construction costs for land development, thus an efficient grading design is an integral part of the site civil design. Grading is also tied in directly into several other components of the site civil design such as drainage, transportation, sanitary sewer and building finished floor elevation. In addition, the grading design needs to be sensitive to the end-users of the project. The primary goal of this interactive online course is to assist planners, architects, engineers and contractors in understanding the key components of an efficient grading design using guidelines from AASHTO, Urban Land Institute, National Home Builder's Association and other public and private organizations.

Principles of Design-Build (1-hour)

This one hour course will provide an overview of design-build. It will begin with an historical perspective, and then move into the key structural, procurement and contractual components of the process. Possible major legal issues will be presented as well.

Protecting People Against Terrorist Attacks: Chemical, Biological, and Radiological (CBR) Threat Protection (1-hour)

As contaminated air infiltrates a safe room, the level of protection to the occupants diminishes which can result in injury or death. This interactive online course teaches you how to add CBR protection capability to a shelter or safe room. You will learn about the design of shelters and how they are used to protect against chemical, biological, and radiological, and explosive (CBRE) attacks. Fallout

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shelters that are designed to protect against the effects of a nuclear weapon attack are not addressed in this course. This course will guide you through the process of designing a shelter to protect against CBRE attacks. The intent of this course is not to mandate the construction of shelters for CBRE events, but rather to provide design guidance for professionals who wish to design and build such shelters.

Reinforced Masonry Design (2-hour)

What is reinforced masonry? Reinforced masonry is often used for building foundations and exterior walls, for resistance to earthquake and wind loads, and where compressive resistance to loads is required. Where unreinforced masonry has some limited uses, reinforced masonry can be used in most building applications under most loading conditions. Masonry design is rarely taught in college design courses so practitioners must research how to use this material in design. This interactive online course will focus on reinforced masonry design and how the use of this design method is employed everyday for buildings, foundations, and retaining walls. This course is intended to close the knowledge gap and provide a background in the use of this material for design.

Retaining Wall Design - Part 1 (2-hour)

This 2-hour online course is part 1 of a two part course for analyzing and designing cantilever type retaining wall structures. The purpose of these walls is to hold back or support soil banks, and other storage materials such as coal, gravel, etc. at a higher elevation on one side of the wall than the other side. Part 1 involves the description of retaining walls, a review of the soil mechanics necessary to calculate the forces acting on the wall, and resisting the movement of this structure. Further, this course describes the procedure for evaluating the stability of the retaining wall. The body of this course is presented in a word document format which you must download.

Structural Masonry Materials (1-hour)

Did you know that masonry design is rarely taught in college design courses? Practitioners must research how to use this material. This interactive online course will focus on masonry materials, their structural properties and how these masonry is used in everyday designs for buildings, foundations, and landscaping. We will also discuss how masonry is often used for building foundations and exterior walls, for fire separation walls on building interiors and used in landscaped and terraced exterior walls. This course is intended to close the knowledge gap and provide a background in the use of masonry materials in design.

Unreinforced Masonry Design (2-hour)

How is unreinforced masonry used in construction? This interactive online course will focus on unreinforced masonry design and how the use of this design method is employed every day for buildings, foundations, and interior partitions. Unreinforced masonry is often used for building foundations and exterior walls, for fire separation walls on building interiors and used where compressive resistance to loads is required. Masonry design is rarely taught in college design courses so practitioners must research how to use this material in design. This course is intended to close the knowledge gap and provide a background in the use of this material for design.

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ELECTRICAL

- Critical Facilities - Emergency Electric Power
- Electrical Fire Alarm Systems
- Energy From Waste

Critical Facilities - Emergency Electric Power (2-hour)

Providing emergency electric power is of critical importance for several types of facilities, and can be mandated by regulatory agencies. For example - emergency egress lighting, hospital emergency rooms, cooling for medical supplies storage, and protection from interruption of public utilities. These systems also help in preventing significant economic losses and, in some cases, disastrous results from natural events. This course presents key information regarding emergency electric power. Included in the topics covered are emergency vs. standby systems, applicable codes, terms and definitions, system components, environmental considerations, and fuel systems. Technical personnel in the design, engineering, maintenance and operations areas of facilities will find this information extremely valuable.

Electrical Fire Alarm Systems (1-hour)

This course presents key information regarding electric fire alarm systems. Fire alarm systems are of critical importance for several types of facilities, and are mandated for specific facilities by regulatory and government agencies. We will cover system fundamentals, and the various types of systems available and in use today - specifically, voice and alarm communications, automatic alarm signals, controls and signal initiation, transmission and notification.

Energy From Waste (1-hour)

How can you obtain energy from waste? This interactive, online course will cover potential sources of waste available for energy recovery - hot exhaust gases, cooling water, and heat lost from hot equipment surfaces and heated products. Systems utilized for Energy from Waste technologies will also be reviewed. This information is useful training for design professionals, facility managers, and system maintenance personnel.

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ELECTRICAL ENGINEERING

- Electric Power Substations
- Power Transmission & Distribution - Basic Equipment and Terminology
- Power Transmission and Distribution
- Small Scale and Micro Scale Wind Applications

Electric Power Substations (1-hour)

This webcast covers basic information regarding electric power substations and the distribution of electric power, including components of power substations, individual equipment components, and electric power distribution systems. General information related to operational aspects of substations and distributing electric power is included.

Power Transmission & Distribution - Basic Equipment and Terminology (1-hour)

This course covers basic information regarding the transmission and distribution of electric power, including components of transmission lines, transformers and switchgear, substations and electric power distribution systems. General information related to electric service loads is covered, as well as operational aspects and costs involved in transmitting and distributing electric power. The future of electric power transmission is also discussed, providing some thoughts on what trends may be seen in coming years.

Power Transmission and Distribution (1-hour)

This webcast covers transmission and distribution of electric power, including components of transmission lines, transformers, switchgear, substations, and electric power distribution systems. General information related to electric service loads is covered, as well as operational aspects and costs involved in transmitting and distributing electric power.

Small Scale and Micro Scale Wind Applications (2-hour)

Exactly how can we harness the power in wind? Do you need a giant wind turbine? This interactive online course provides an overview of wind technology at a much smaller scale. Topics covered include small scale and micro scale wind technologies, including: applications, estimating wind turbine production, and siting considerations. We will also detail the process for installing small wind turbines and small wind system components and explore the newest research focused on micro (nano) wind technology.

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ELECTRICAL SAFETY

- Worksite Safety 02: OSHA Electrical Safety

Worksite Safety 02: OSHA Electrical Safety (2-hour)

OSHA's electrical standards were put in place to help minimize deaths and injuries from dangers such as electrocution, burns, electric shock, fires, and explosions. This course examines the main causes of different types of hazards and details precautions for preventing accidents. It looks specifically at the requirements of 29 CFR 1926, Subpart K - which covers the design characteristics of safe systems for use when installing and using electrical systems. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

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EMERGENCY/FIRE

- Fire and Smoke Dampers Simplified
- Fire! Designing Means of Escape

Fire and Smoke Dampers Simplified (1-hour)

Fire and smoke dampers are essential components of fire and life safety systems of a building. Their operation prevents the spread of fire and smoke and allows building occupants to safely exit a building during a fire. Fire and smoke dampers are also vital to the integrity of fire and smoke rated building assemblies. Improper specifications, installation, actuation or simply the lack of fire and smoke dampers can result in damage to a building or worse, loss of human life. This interactive online course will discuss fire walls, fire barriers, smoke barriers, fire partitions and horizontal assemblies.

Fire! Designing Means of Escape (2-hour)

Understanding fire is the first step toward designing features to prevent and protect against it. We cannot eliminate the potential for fire, but we can achieve a high level of fire safety by applying fundamental life safety principles during building planning, design, and operation. This 2-hour online course focuses on one of the important life safety protection features-adequate means of egress-in the context of two of the leading codes used in the U.S. today: the National Fire Protection Association (NFPA®) Life Safety Code, and the International Code Council (ICC) International Fire Code.

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ENVIRONMENT & HAZARDOUS MATERIALS

- Florida - Wind Design and Wind Mitigation Requirements

Florida - Wind Design and Wind Mitigation Requirements (1-hour)

The Sunshine State is known for its beautiful beaches and tropical weather. Surrounded by warm ocean waters, it is this location that makes it especially vulnerable to severe tropical storms. Winds from these storms can cause severe destruction; therefore, the State of Florida has enacted building regulations to help minimize the damage caused by severe storms. This interactive online course will cover the latest wind design and wind mitigation requirements from the Florida Building Code (based on ASCE 7-22, the 2022 version of the ASCE standard). In this course, we will cover what is applicable in this building code, types of issues covered in the wind design arena, and changes to the wind speed maps. Other issues covered include exposure of a building site, opening protection and enclosure classifications on how to protect a building in wind regions. The code has an alternate all heights method, which will be covered briefly. We will also talk about roof and wall components, and the special requirements for those components in high-velocity hurricane zones, or more specifically, South Florida.

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ENVIRONMENTAL & HAZARDOUS MATERIALS

- Florida Workers' Compensation Law (V16)
- Fuel and Combustion Systems Safety - Combustion Basics
- Fuel and Combustion Systems Safety - Gas Piping Repairs and Cleaning
- Transporting Hazardous Materials
- Worksite Safety 09: OSHA Materials Storage

Florida Workers' Compensation Law (V16) (1-hour)

Accidents can happen anywhere, even at work. That's why every state in the country, including Florida, has some form of workers' compensation program. It is very important for all employers and employees to know what the law states, and how it relates to them. This course focuses on coverage, construction related exemptions, and other specific construction concerns. This course has been updated according to the 2022 Florida Statutes, Chapter 440 Workers' Compensation. Some of the text of the statute is used in this course, as well as other useful information.

Fuel and Combustion Systems Safety - Combustion Basics (2-hour)

Welcome to Fuel and Combustion Systems Safety - Combustion Basics. In this course we lay a foundation for more complete technical understanding of fuel systems and combustion equipment. If you've been associated with this world, there may be little here that is new. If not, this is a course you may refer to over and over again in your career. The information in this course is out there in many forms and places. We will define combustion, review fuels, and explore the fire triangle. You'll get combustion chemistry and how to apply it to burner systems. We'll delve into environmental emission issues, basic burner design issues, and draft systems. We'll cover flames and instruct you in where to look and what to look for as well as fuel/air ratios evaluations. Throughout the course you will be given real-life stories so that you can see the practical applications for what you are learning.

Fuel and Combustion Systems Safety - Gas Piping Repairs and Cleaning (2-hour)

Welcome to Fuel and Combustion Systems Safety - Gas Piping Repairs and Cleaning. In this course we provide advanced concepts for facilitating the safe repair and cleaning of gas piping systems. Some of the most significant and horrific tragedies have come about from mistakes made in preparing gas piping for maintenance, bringing gas piping back into service, and trying to clean gas lines. The concepts presented in this course need to be made the subject of policies and practices with both designers and maintenance staffs. A section at the end of this course highlights a relatively new standard, NFPA 56, Standard for Fire and Explosion Prevention During Cleaning and Purging of Flammable Gas Piping Systems, which is central to this topic. It took many months of meetings with contributions from over a dozen experts to write NFPA 56. This is a very important and ground breaking piece of work that applies directly too many of the concepts presented in this course. Anyone who does or oversees activities related to gas line repairs and cleaning must become familiar with this standard. This course is not a design guide or a "how to" for gas line purging and cleaning. Each site and its circumstances and conditions are different, and nothing here should be seen as a replacement for sound engineering judgment and the requirements prescribed by applicable codes.

Transporting Hazardous Materials (0.5-hour)

Every day, hazardous materials are shipped in this country—materials that could threaten the safety of individuals, property, and the environment. These materials are transported by truck, by train, by air, and by water. Because of the risks posed by transporting hazardous materials, you need to know about the potential dangers and steps you must take to help protect yourself and others against them. In this interactive, online course, we'll cover some general requirements associated with transporting hazardous materials. We'll look at what's meant by the term hazardous materials, and we'll see how these materials are classified. We'll also look at documentation and packaging that must be used when hazardous materials are shipped, and we'll look at labels and placards used to identify hazardous materials.

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Worksite Safety 09: OSHA Materials Storage (1-hour)

The handling and storage of materials used in the construction trade involves diverse operations such as hoisting heavy steel bars with a crane, driving a truck loaded with concrete blocks, manually carrying bags, and stacking drums, lumber or loose bricks. When any of these things are done the wrong way, serious injuries and extensive costs can result. Avoid pitfalls by reading about OSHA's rules in this course. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

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ENVIRONMENTAL ENGINEERING

- Liquefied Natural Gas (LNG): Emerging Issues in the LNG Industry
- Liquefied Natural Gas (LNG): Evolution of LNG Markets & Primary Demand Regions
- Liquefied Natural Gas (LNG): Global LNG Demand & Emerging Demand Markets
- Liquefied Natural Gas (LNG): Global LNG Projects & Players
- Liquefied Natural Gas (LNG): Global LNG Supply
- Liquefied Natural Gas (LNG): Globalization of LNG
- Liquefied Natural Gas (LNG): Natural Gas & LNG in the 21st Century
- Liquefied Natural Gas (LNG): Safety & Environmental Sustainability of LNG
- Liquefied Natural Gas (LNG): The Impact of Shale Gas on Global Gas Markets
- Liquefied Natural Gas (LNG): The LNG Value Chain
- Mold Remediation
- Phytotechnologies: Using Plants to Clean Up

Liquefied Natural Gas (LNG): Emerging Issues in the LNG Industry (1-hour)

In this online interactive course, we provide an overview of some of the key emerging issues in the LNG industry including whether North America will become a major LNG exporter, the potential impact of the Panama Canal expansion project on LNG trade, the growing role of floating LNG (FLNG), the potential influence of the Gas Exporting Countries Forum (GECF) to act as a "Gas OPEC," and the emergence of LNG as a shipping and vehicle fuel to aid in emission reduction efforts around the world.

Liquefied Natural Gas (LNG): Evolution of LNG Markets & Primary Demand Regions (2-hour)

The first ever US-UK shipment of LNG in 1959 on the Methane Pioneer demonstrated that large quantities of LNG could be transported safely across the ocean and opened up the possibility of transporting large volumes of natural gas from otherwise stranded fields to distant destinations based on consumer demand. This interactive online course will discuss the evolution of LNG markets, including the history of LNG and an overview of the three major LNG Markets - Asia-Pacific LNG market, the European LNG market, and the North American/Atlantic Basin LNG market, which includes North America, South America and Latin America.

Liquefied Natural Gas (LNG): Global LNG Demand & Emerging Demand Markets (1-hour)

Until the late 1990s, LNG was a niche industry operating mostly in the Asia-Pacific region. As the world entered the 21st century, however, global demand for LNG surged in a "perfect storm" created by the industrial and commercial boom around the world that resulted in an ever-growing appetite for all energy resources. Between 2000 and 2008, the LNG industry entered a period of rapid growth with huge increases in supply coming from a growing number of LNG producing countries. However, between 2008 and 2009, the world endured the "worst recession since the Second World War" with demand for all energy dropping significantly. In 2010, as global economies appeared to be emerging from the recession, global natural gas demand resumed its long-term upward trajectory with the IEA projecting that natural gas will be the only fossil fuel for which demand is higher in 2035 than in 2008. While the ultimate wildcard for all natural gas demand is the pace and strength of the global economic recovery, the long term outlook for natural gas and LNG remands strong. In this interactive online course, we will identify LNG demand drivers. We will examine existing and emerging Asia-Pacific and European importers, and discuss the reasons behind the increased LNG demand in Latin America. We will also consider the "natural gas puzzle" faced by the Middle East/North African region. Lastly, we will investigate the market trends causing the U.S. to shift from LNG importer to LNG exporter.

Liquefied Natural Gas (LNG): Global LNG Projects & Players (2-hour)

How well versed are you in the Liquefied Natural Gas (LNG) industry? Do you know where and how much is produced? In this interactive online course, we will examine the specifics of the global LNG mega projects in Qatar and Australia, and also discuss new players and projects in countries such as Russia, Peru, Yemen, and Papua New Guinea.

Liquefied Natural Gas (LNG): Global LNG Supply (1-hour)

Although worldwide natural gas resources are sufficient to meet projected increases in demand, almost half of the world's proved natural gas reserves are found in just three countries: Russia, Iran and

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Qatar. With the world's largest proved natural gas reserves, the Middle East and Africa are expected to account for 72 percent of the increase in natural gas exports by 2030, mainly to supply Europe and North America, although Australia is also emerging as a key LNG exporter and also potentially the US and Canada. Understanding where new LNG supply will come from is one of the critical aspects of understanding the dynamics of the global LNG industry. This interactive online course provides a description and overview of key LNG supply projects around the world, discusses the impact these projects will have on the LNG global market, and identifies some of the challenges that may be faced by new projects.

Liquefied Natural Gas (LNG): Globalization of LNG (1-hour)

The growth in LNG trade over the past few years has led many to question whether the LNG markets have become "globalized" and whether LNG could ever trade as a global commodity. This interactive online course discusses the increased globalization of LNG markets and whether LNG could someday trade as a global commodity. The growth of LNG trade will be examined as well as the traditional oil-linked pricing structure for LNG. Recent pricing issues and the growing spot and short-term LNG market will also be discussed.

Liquefied Natural Gas (LNG): Natural Gas & LNG in the 21st Century (1-hour)

Policy makers around the globe continue to grapple with issues related to energy security, energy affordability, and an expected increase in demand for all energy sources. At the same time, concerns about global climate change and reducing greenhouse gas emissions remain in focus as the world struggles to define the path to a sustainable energy future. Since natural gas is an abundant, affordable, and clean-burning fuel, many countries around the world are increasingly looking to natural gas to play a key role in powering the future. The prospects for natural gas are so promising that the International Energy Agency (IEA) has suggested that the 21st century could be the "Golden Age of Gas" with demand for natural gas projected to increase by more than 50 percent from 2010 levels and account for over 25 percent of the world's energy supply mix by 2035. This interactive online course explores the growing role of LNG as the "glue" linking global gas markets and identifies the key opportunities and challenges for the LNG industry in the context of a number of competing drivers, including economic development, energy security, and climate change.

Liquefied Natural Gas (LNG): Safety & Environmental Sustainability of LNG (1-hour)

Do you have a solution to meet an ever-growing energy demand around the world? Many governments are looking to Liquefied Natural Gas. Not everyone agrees the LNG is the best answer. They claim there are serious safety and environmental impacts that negate the benefits of LNG as a fuel. In this interactive online course, we analyze how LNG can play a role in a sustainable energy future. Specifically, we will focus on the safety issues and environmental issues that accompany the use of LNG.

Liquefied Natural Gas (LNG): The Impact of Shale Gas on Global Gas Markets (1-hour)

The tremendous boom in US shale gas has been a "game changer" all over the world. What do you predict for the future? This online interactive course will discuss shale gas. We will describe the markets as well as importing and exporting liquefied natural gas worldwide. We will focus most on North America.

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Liquefied Natural Gas (LNG): The LNG Value Chain (1-hour)

The LNG value chain comprises a complex set of activities, all of which are capital intensive and require specialized knowledge in order to execute successfully. This interactive online course discusses the main stages of the LNG value chain - liquefaction, shipping and regasification and identifies the technologies used in these processes. Various LNG project structures and some basics of LNG measurement will be covered as well. The information in this course on the LNG value chain is designed to provide you with the foundation to develop a successful LNG project.

Mold Remediation (1-hour)

Buildings inevitably get wet, both inside and out, and they must be allowed to dry or mold will grow in them. This course provides an overview of mold remediation. We will review guidelines on cleaning and remediation methods for clean water damage. We will also cover some possible situations and useful methods or techniques for remediation.

Phytotechnologies: Using Plants to Clean Up (3-hour)

Phytotechnologies are a set of techniques that make use of plants to achieve environmental goals. This course will highlight the advantages and limitations of phytotechnology—whereby plants uptake and remove contaminants. We will also cover the cost-effective, natural cleanup methods that have a growing role in the following areas: remediation of environmental contaminants, eco-restoration, engineered wetland systems, and biofuels. The course will conclude with a discussion of current scientific case studies.

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FALL PROTECTION

- Worksite Safety 03: OSHA Fall Protection

Worksite Safety 03: OSHA Fall Protection (1-hour)

Each year, on average, between 150 and 200 workers are killed and more than 100,000 injured because of falls at construction sites. OSHA's construction industry safety standard for fall protection 29 CFR,Subpart M, outlines systems and procedures designed to prevent employees from falling off, onto, or through working levels and to protect employees from being struck by falling objects. Here, we outline the basics and provide some "do's" and "don'ts" for novices and those who need a refresher course. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

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GENERAL SAFETY COMPLIANCE

- Florida Engineering Laws and Rules
- Lead Safety in Construction: Keeping You Safe and Compliant
- Worksite Safety 01: OSHA Safety Introduction
- Worksite Safety 04: OSHA Struck-By & Caught-Between Accidents
- Worksite Safety 06: OSHA Scaffolds
- Worksite Safety 08: OSHA Power Tools and Excavations
- Worksite Safety 10: OSHA Demolition
- Worksite Safety 11: OSHA Hazards in Communication

Florida Engineering Laws and Rules (1-hour)

It is important for engineers to avoid illegal activity or immoral conduct by familiarizing themselves with Florida's laws and rules. The purpose of this interactive online course is to provide engineers with the bare essentials of laws pertaining to their field in the state of Florida. The rules presented here are not intended to serve as a substitute for actual statutes and laws but rather as introductions and summaries of the law per the current Florida Statutes.

Lead Safety in Construction: Keeping You Safe and Compliant (1-hour)

Lead exposure is a major health issue. Exposure to lead can cause brain damage, paralysis, kidney disease and even death however, there are many methods to protect workers from exposure. In this one-hour interactive course, we will discuss these and other acute and chronic symptoms. We'll discuss how lead is used in construction and identify the workers that are the most vulnerable to these risks. You'll be introduced to OSHA's Lead Standard on the responsibility of employers and how it's designed to protect workers. Finally, we'll go over the methods to reduce exposure to lead, including engineering controls as well as the proper protection for workers such as the use of personal protective equipment.

Worksite Safety 01: OSHA Safety Introduction (1-hour)

The Occupational Safety and Health Administration was founded in 1971 to address the rights and responsibilities of employees and employers in the national workplace in a cohesive manner. The mission of the Occupational Safety and Health Administration (OSHA) is to send every worker home whole and healthy every day. Since the agency was established in 1971, workplace fatalities have been cut by 62 percent and occupational injury and illness rates have declined 40 percent. This Introductory course covers a bit of the history and functions of OSHA and how it serves to benefit workers in ways that were unprecedented before its existence. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

Worksite Safety 04: OSHA Struck-By & Caught-Between Accidents (1.5-hour)

"Struck-by" and "caught-between" accidents are major causes of injuries and fatalities on construction worksites. Struck-by incidents are classified as accidents where workers are hit by swinging booms, falling objects (such as bricks from a scaffold), or flying objects (such as particles flying off an object being drilled or ground by a power tool). Caught-between accidents are often fatal occurrences when a worker is unwittingly caught in the gears of machinery; pinned between a vehicle and a wall, or even caught by the clothing or hair on a moving part and pulled into danger. This interactive online course provides information to assist the learner in the identification, avoidance, and control of these hazards in the workplace. While workers may need additional training based on OSHA standards and the specific hazards of their jobs, Vector Solutions' Worksite Safety courses can help inject entry-level workers with critical knowledge on a variety of OSHA-regulated safety and health topics. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

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Worksite Safety 06: OSHA Scaffolds (1-hour)

An estimated 2.3 million construction workers, or 65 percent of the construction industry, work on scaffolds frequently. In 1996, when OSHA issued the revised Scaffold Standard for construction, the agency estimated that by protecting these millions of workers from scaffold falls, 4,500 injuries and 50 deaths from scaffold-related accidents would be prevented every year. This course will familiarize you with the facts you need to know to be in compliance with OSHA 1926.451, Subpart L, and keep yourself safe during scaffold work. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

Worksite Safety 08: OSHA Power Tools and Excavations (1-hour)

It might seem silly to think of non-powered hand tools as hazardous, but anyone who's ever hit a finger with the full force of a hammer blow or staple-gunned their hand might beg to differ. Power tools are relatively safe when used properly and well maintained, but an electric shock resulting from a defective or modified device can be deadly. This course will teach you the basics for keeping yourself and your coworkers out of harms way when using tools. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

Worksite Safety 10: OSHA Demolition (1-hour)

Demolition is one of the most spectacular - and dangerous - undertakings in the construction industry. A tremendous number of safety precautions are taken and meticulous planning that goes into each such undertaking. This course will familiarize you with some of the basics of safe demolition practices and the attendant OSHA standard. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

Worksite Safety 11: OSHA Hazards in Communication (0.5-hour)

There are already more than 650,000 hazardous chemical products in circulation around any number of workplaces in the U.S., and hundreds more are introduced every year. More than 30 million workers may be exposed to a chemical hazard or to multiple chemical hazards. If you haven't yet been poisoned, remember: There's still time! Make sure it doesn't happen to you by familiarizing yourself with the HCS - OSHA's Hazard Communication Standard, which is discussed in this course. Also covered in this course is ear-drum-damaging occupational noise, and what OSHA requires employers and employees to do to monitor the levels and minimize exposure. We'll also look at precautions for dealing with one especially dangerous toxic substance that is widely found in the construction industry: Silica. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

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GREEN/SUSTAINABLE

- ASHRAE 100: Energy Efficiency in Existing Buildings
- Building Performance: Design Through Operations
- Cogeneration Systems Essentials
- Green Design and Ethical Decision-Making
- Green Design: Brownfield Redevelopment (RV-10900)
- Green Design: Economics of Green Building
- Green Design: Introduction to High Performance Building Design (Based on LEED v4)
- Green Design: Introduction to Indoor Environmental Air Quality (Based on LEED v4)
- Green Design: Introduction to Sustainability and Measurement Systems (Based on LEED v4)
- Green Design: Introduction to Sustainable Design Materials and Resources (Based on LEED v4)
- Green Design: Introduction to Sustainable Sites (Based on LEED v4)
- Green Design: Introduction to Sustainable Water Systems (Based on LEED v4)
- Green Design: The Ethics of Green Design
- Green Landscape Design: Reducing the Urban Heat Island Effect
- Green Urban Design
- Increasing Building Energy Efficiencies: Policies and Practice
- Introduction to Net Zero Buildings
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- LEED v4 - Operations and Maintenance
- LEED v4 for Existing Buildings: Operation & Maintenance (EBOM)
- LEED v4 for Interior Design + Construction
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- Sustainable Solutions: Air Pollution
- Sustainable Solutions: Human Health and Well-Being
- Sustainable Solutions: Loss of Biodiversity
- Sustainable Solutions: Urban Flooding and Water Pollution
- Sustainable Solutions: Water Shortages
- The WELL Building Standard
- Understanding Concrete's Environmental Advantage
- Uninterruptible Power Supply (UPS) System Efficiency

ASHRAE 100: Energy Efficiency in Existing Buildings (2-hour)

The entire design & construction industry is focused on increasing energy, water, and resource efficiency in building designs, however, new buildings represent a very small percentage of the full building portfolio. Over 95% of buildings that will be in operation 10 years from now are already built - the key to a national and cultural improvement in energy and water use is increased efficiencies within existing buildings. This course will explore ASHRAE 100, which is aimed directly at those improvements and standards required to improve resource efficiencies within existing building stock.

Building Performance: Design Through Operations (1-hour)

How has building design changed in recent years? Have you thought about how much more energy efficient your design could be today? How about in the next 5, 10, or 15 years? In this interactive online course, we will discuss how to best implement sustainable buildings from the design phase through the operations phase by focusing on the 3 main narratives of integrated design, construction commissioning, and performance tracking. By following up with the design of your building through the performance period, your project can meet the requirements of Architecture 2030 and can become a marketing opportunity of proven performance tracked on sustainable design.

Cogeneration Systems Essentials (1-hour)

Would you know enough about cogeneration to advise a client? Systems that generate both heat and electricity, called cogeneration or combined heat and power (CHP) systems, aim to reduce costs and emissions by providing two things at once. Usable heat is produced when a cogeneration system generates power, providing efficiency gains of nearly twice that of utility power. In this interactive online course we'll discuss the simultaneous goals of providing heat and power, characteristics of turbines and engines in use, and other details such as economics and air emissions limits.

Green Design and Ethical Decision-Making (0.98-hour)

Green design is considered an environmentally sensitive solution that helps protect and enhance cultural and natural resources. Design professionals typically use some green design daily, but do so differently. Standard terms that equate to green design include green infrastructure, sustainable design, holistic design, and climate-based design. Regardless of how we define "green design," it is evident that designs are more sensitive to impacts on people and places, clients are more aware of the benefits of green design, and the public demands these principles be applied to most projects. This course projects an overview of green design, how it has changed over the years, how it is currently being used, the difficulties involved with implementing green design, and how we seek to measure success.

Green Design: Brownfield Redevelopment (RV-10900) (1-hour)

Brownfield is used to describe land that is abandoned or underused out of concern that the land is contaminated. There are a variety of estimates that claim there are anywhere from 450,000 brownfields to over 5 million acres of abandoned properties throughout the US alone. These properties are sited in every metropolitan city in the U.S. as well as in rural America creating major urban infill opportunities. This interactive online course gives you a better understanding of what brownfield is, where it came from, where it still exists and with the help of USGBC and LEED, the multitude of Federal, State and local initiatives that surround brownfield redevelopment.

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Green Design: Economics of Green Building (2-hour)

In this course we will present an in-depth study of the perceived and actual costs associated with green building. You will get an overview of the federal, state, and local tax credits available; life cycle cost analysis; and business incentives to go green. We will also review a couple of case studies.

Green Design: Introduction to High Performance Building Design (Based on LEED v4) (3-hour)

There is consensus among the majority of scientists that the climate of the earth is changing in the direction of higher temperatures and that some of the change is anthropomorphic (caused by human activity). This course is intended to address that portion of the human contribution to climate change that is related to energy use in buildings. In this course, we will look at the ways buildings use energy and how buildings can be designed for high energy performance. It is important that architects and designers understand and are aware of the resources and methods available for improving building designs in the future. A major piece to understanding sustainable building design is also understanding the requirements of the Energy and Atmosphere category of LEED v4 Building Design and Construction (BD+C).

Green Design: Introduction to Indoor Environmental Air Quality (Based on LEED v4) (2-hour)

There is consensus among the majority of scientists that the climate of the earth is changing in the direction of higher temperatures and that some of the change is anthropomorphic (caused by human activity). This course is intended to address that portion of the human contribution to climate change that is related to energy use in buildings. At the conclusion of the course, you should be able to understand the ways buildings use energy and how buildings can be designed for high energy performance. You should be aware of activities and plans for improving building designs in the future. You will have an understanding of the requirements of the Energy and Atmosphere category of LEED v4 Building Design and Construction (BD+C).

Green Design: Introduction to Sustainability and Measurement Systems (Based on LEED v4) (1-hour)

In this course, we will discuss the concept of sustainability and the need for ways to measure the sustainability of a building design. In addition, we will describe the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) Version 4 for Building Design and Construction (BD+C), Neighborhood Development (ND), Homes (H), Building Operation and Maintenance (O&M), and Interior Design and Construction (ID+C) rating systems and the goals each strives to achieve. We will also outline for a prospective candidate the process of becoming a LEED Accredited Professional and lastly we'll compare other rating systems to the USGBC system.

Green Design: Introduction to Sustainable Design Materials and Resources (Based on LEED v4) (2-hour)

This course provides an introduction to the study of those materials and techniques that are both ecologically efficient and ecologically effective. After completing the course, you should have an understanding of: Characteristics of sustainable materials. The concepts of life cycle, embodied energy, and embodied carbon are introduced. The benefits of using sustainable materials. Environmental,

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economic, social, cultural, and aesthetic opportunities are discussed. Selecting a sustainable material selected. Techniques, databases, and organizations are introduced. Using sustainable materials. design for building and material reuse, construction waste management, and Leadership in Energy and Environmental Design (LEED) Materials and Resources (MR) credits are discussed.

Green Design: Introduction to Sustainable Sites (Based on LEED v4) (1-hour)

This course provides students with the conceptual foundation necessary for exploring many aspects of environmentally progressive site design. Aspects of site sustainability covered in the course include water, solar environment, natural ventilation, transportation, and civic patterns. Each is considered at a variety of scales ranging from the individual parcel to the neighborhood and placed within larger regional and global contexts. In this way, students are equipped to immediately begin making ecologically informed decisions about the site design of their projects, while simultaneously preparing themselves for further, more detailed study of various issues related to site sustainability.

Green Design: Introduction to Sustainable Water Systems (Based on LEED v4) (2-hour)

The goal of this online interactive course is to introduce you to a perspective on development and design practices that help professionals support communities in managing and sustaining use of local water resources. It is often said when discussing sustainable practices that people need to think globally and act locally. This is especially true when dealing with water resources. Unlike any other resource, water cycles through the earth's environments at global and continental scales, but each step of that journey serves as a highly valued local resource. This course will discuss a sustainable approach to water use and management in buildings, sites, and campuses. It systematically introduces key concepts that help practitioners understand the larger watershed and community water systems that local development practices impact, and the cultural, social, economic, and health benefits communities derive from earth's water systems. This course also introduces the consequences of conflicts between current development practices and these water systems and emerging developments practices that work better with, and have a lower-impact on, watershed systems. Brief overviews of LEED-BD+C v4.0 credits that contribute to improved water quality, reduced water use, management of local stormwater and groundwater resources are included to help orient professionals to practices they may wish to learn more about. Lastly, the author provides some examples of how strategies introduced in the lesson can contribute to and express the natural, cultural, social, and aesthetic character of places.

Green Design: The Ethics of Green Design (1-hour)

Green design is an evolutionary process—every day designers, engineers, academics and other innovators continue to expand the constellation of green design materials and techniques. No set of professional standards could ever be exhaustive enough to deal with every conceivable scenario. Therefore, a holistic ethical understanding of green design is necessary, as is an ability to embrace the constant change inherent to the industry. This course will cover ethical concepts and codified professional ethical standards as they relate to green design, as well as topical environmental and group functionality issues.

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Green Landscape Design: Reducing the Urban Heat Island Effect (2-hour)

As the earth's average temperature increases, cities, which are often significantly warmer than the surrounding landscapes (the urban heat island effect), will be faced with higher energy needs, increased pollution and degradation of air quality. The world is becoming more and more urban - it is estimated that within 50 years 80% of the world's population will live in urban areas. This interactive online course will address how we can mitigate the heat island effect so our urban cities remain healthy, economically viable places to live.

Green Urban Design (2-hour)

Urban design theory is the livability and sense of urban place. "Green urban design" incorporates sustainability and environmental stewardship in urban design decisions. This interactive online course gives you fundamental urban design principles and green urban design approaches. Specifically we'll discuss green urban design details that you can apply to your projects: green street design, parking approaches, alternate transportation options, storm water considerations, landscaping, and irrigation site elements.

Increasing Building Energy Efficiencies: Policies and Practice (2-hour)

While LEED and Sustainable Design dominated the industry landscape in the 2000's, the last several years have witnessed a pivot to specific improvements in resources, specifically in the areas of water and energy use and efficiency. That bar has been raised through increasingly stringent standards in ASHRAE 90.1-2010 and 189.1-2011, as well as Federal mandates increasing in stringency from EPAct05 through EISA 07, Executive Order 13423, EO 13423 & EO 13514, and most recently 10 CFR 433: Energy Efficiency Design Standards for new Federal Commercial Buildings.

Introduction to Net Zero Buildings (2-hour)

Gaining particular momentum in the design and construction industry is the notion of Net Zero buildings. For many in the design and construction industry Net Zero is a lofty goal, and one not usually realized. This interactive webcast will focus on the concept of Net Zero, which has several variations of what the term means in practice. We will look at the practicality and marketability of a Net Zero building that uses no more energy than it generates. We will conclude with discussion of the world-wide application of Net Zero building.

Introduction to Net Zero Carbon Design (1-hour)

As our climate continues to change and energy demands increase, buildings stand at the forefront of our environmental challenges. In the US, buildings' combined site work, construction, operation, and maintenance account for nearly 40% of national carbon emissions. Yet within this challenge to design and build more sustainably lies a tremendous opportunity. The path to Zero Net Carbon (ZNC) Buildings represents not just an environmental imperative, but a revolution in how we design, construct, and operate the spaces where we live and work. In this course, we will explore the principles, technologies, and strategies that form the foundation of Zero Net Carbon design specifically for California's diverse climate zones. You will learn how net-zero buildings generally perform beyond standard sustainability requirements, what defines a Zero Net Carbon building, how their metrics

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are evaluated, and why they're beneficial to the global environment. We'll examine how designing and implementing sustainable practices can dramatically reduce energy consumption while creating healthier and more comfortable spaces. You will also learn to evaluate existing building retrofit opportunities against new construction, select appropriate renewable energy systems, and incorporate climate resilience into your design processes. We will emphasize the importance of environmental justice and equitable design approaches that ensure sustainability benefits all communities.

Introduction to Rain Gardens (2-hour)

Rain gardens have become very popular, with good reason. You can create landscapes that add beauty, wildlife habitat, and interest to an area - while helping manage storm water more sustainably. You can use them to meet LID (Low Impact Development) requirements. This interactive online course will teach you how to significantly reduce the impacts of development and also aid in improving storm water quality.

Introduction to Sustainable Roof Technologies (2-hour)

Roofs account for one of the largest areas of imperviousness on a site. Impermeable roofs impact storm water quality and quantity, air quality, the urban heat island effect, and the energy needs of the building. This interactive webcast focuses on how we can potentially rethink how we build our roofs to ensure energy efficient buildings, harness energy from the sun to help us reduce our reliance on fossil fuels (nonrenewable energy), manage storm water as a resource, increase air and water quality, and reduce greenhouse gas emissions. We will provide an introduction to the fundamentals of sustainable roof technologies including: vegetative roofs, photovoltaic roof applications, cool reflective approaches, recycled or bio-based content roofs, or some combination thereof. Focus of learning includes the benefits and limitations of sustainable roofs and the potential of technological advancements in sustainable roof design. We will conclude with creative applications and site selection and placement considerations of sustainable roofs.

LEED v4 - Operations and Maintenance (2-hour)

Did you know that Leadership in Energy and Environmental Design or LEED Version 4 is now officially adopted by the United States Green Building Council (USGBC)? Since the first LEED Rating System launch, sustainable design and the idea of sustainable design has gone from a catchphrase to actually a prerequisite on how we build, maintain, and operate our buildings. The goal of sustainable development is to create healthy environments through things like responsible planning, design, construction, operation, and maintenance of those buildings. The heart of the sustainable building movement is the USGBC LEED Green Building Rating System for buildings. This course specifically covers LEED for Operations and Maintenance and focuses on the ongoing operations and maintenance of existing commercial and institutional buildings.

LEED v4 for Existing Buildings: Operation & Maintenance (EBOM) (2-hour)

This course is going to focus on LEED EB (Existing Buildings - Operations & Maintenance). This course will provide you with essential knowledge about LEED, which is an objective, unbiased, 3rd party green building rating standard. The acronym LEED stands for Leadership in Energy and

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Environmental Design. LEED was introduced as the standard developed by the United States Green Building Council, or USGBC, upon its founding in 1993. Since then, LEED has grown enormously, USGBC has also introduced the GBCI, or Green Building Certification Institute, which is responsible for accrediting personnel with the LEED-AP designation, for certifying buildings, at the LEED Certified, Silver, Gold, or Platinum levels, and for interpreting criteria, updating information, and generally ensuring day-to-day operations for the LEED system. We will be discussing the LEED Rating Paths, of which there are several, the intent of which has been to create as many specifically tailored and appropriate options as are reasonable to allow for ease of guidance and certification in the building design, construction, and operations processes. We'll review the variously available tools and resources that exist to support the efforts of project teams as they seek LEED certification, and of course we will delve significantly into our main focus, which is LEED EBOM, or Existing Buildings Operations & Maintenance.

LEED v4 for Interior Design + Construction (1-hour)

Green buildings, when operated as intended, improve working environments, promote higher productivity, reduce energy and resource costs, and prevent system failures. This interactive course discusses the importance of a facility that has been designed and built as not only "green" with energy efficiency and water consumption technologies but also allows us to breathe easy, give us views of nature and daylight, and makes us healthier. LEED for Interior Design and Construction (LEED ID+C) enables project teams who may not have control over whole building operations to develop indoor spaces that are more comfortable for users and more mindful of our resources.

LEED v4 for New Construction Projects (2-hour)

This course will describe how to navigate the new credits and prerequisites under the new version of LEED. It will address the changes from LEED 2009 in each credit category and how they will affect new projects registering under Version 4.

LEED v4: Residential Homes (1-hour)

The goal of this course is to describe Leadership in Energy and Environmental Design (LEED) for Homes Rating System and discuss recent updates to the system. LEED for Homes is a voluntary rating system that promotes the design and construction of high-performance green homes. This presentation discusses the basics of the LEED for Homes Rating System, including major proposed updates to the v.4 rating system and how it applies to single / multi family, low/mid/high rise, new and rehabbed homes and residential buildings, apartments, developments and dorms. Understanding of both LEED credentialing for professionals and the LEED credit categories for projects are essential for all green building projects.

LEED v5 Green Building Materials and Resources (1.5-hour)

As the constructed environment progresses towards enhanced resilience, the LEED® v5 Materials and Resources (MR) category offers guidance for minimizing environmental effects, increasing material transparency, and promoting principles of a circular economy. This course provides a comprehensive understanding of the updated LEED v5 standards, specifically focusing on the Materials and Resources (MR) credit category.Learners will be equipped to effectively incorporate green materials

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into projects, enhance sustainability outcomes, and contribute to LEED v5 certification goals. Explain the importance of sustainable material sourcing and its environmental impact.

LEED® v5 for Neighborhood Development (ND): Sustainable Community Planning (1.58-hour)

This course thoroughly examines LEED® v5 for Neighborhood Development (LEED®-ND), the newest standard in eco-friendly neighborhood planning. Participants will develop a complete understanding of the concepts, credits, and techniques required to attain LEED® certification for neighborhoods. Through case studies, the course will equip participants with the necessary tools to apply LEED®-ND principles effectively. Covered topics include green infrastructure, smart growth, resilience planning, and community involvement. By the conclusion of the course, participants will be prepared to implement LEED®-ND principles to create sustainable, resilient, and vibrant communities that align with contemporary environmental and social objectives.

LEED® v5 Certification Process (1.35-hour)

This course offers a comprehensive introduction to the Leadership in Energy and Environmental Design (LEED) v5 certification process. The training program encompasses a concise history of the development and progression of LEED, culminating in the most recent version (v5), and examines LEED v5's emphasis on tackling emerging environmental issues, such as carbon reduction, resilience, and indoor environmental quality. The primary goal of the training is to deliver a detailed guide to the LEED v5 certification process from determining the eligibility requirements for various project types (e.g., commercial, residential, industrial) to outlining the registration process, including required documentation, fees, and compliance preconditions. The course also provides steps to navigate the stages of GBCI review and outlines ongoing compliance requirements for maintaining LEED certification.

LEED® v5 for Cities and Communities (1.53-hour)

This course offers a comprehensive introduction to Leadership in Energy and Environmental Design® (LEED®) for Cities and Communities. As the world's population becomes more concentrated in urban areas, cities and communities encounter increasingly complex challenges, including climate change, resource shortages, and social inequalities. The Leadership in Energy and Environmental Design (LEED) for Cities and Communities offers a structured approach to tackle these issues by encouraging sustainable, resilient, and equitable development in urban areas. Created by the U.S. Green Building Council® (USGBC®), this certification system assesses cities and communities on essential performance metrics such as energy use, water management, waste handling, transportation systems, and social equity. By aligning local development efforts with global sustainability objectives, LEED for Cities and Communities enables municipalities to improve residents' quality of life while reducing their environmental footprint. This training delves into the principles, advantages, and strategies for implementing the LEED for Cities and Communities framework, emphasizing its crucial role in fostering a sustainable urban future.

Microgrid Essentials (1-hour)

Microgrids aim to reduce costs and increase reliability for the users. They may be the latest buzzword in energy efficiency discussions, but understanding them and where they can be implemented can be daunting. This course aims to enlighten those who own, operate, and benefit from microgrids as well as complexities and challenges.

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Structural Insulated Panels (SIPs) (1-hour)

Structural Insulated Panels (SIPs) are a new sustainable structural panelized building material that can be used for roofs, floors, and wall panels. This course will examine various uses and structural limitations on the materials. An exploration of code requirements and constructability will be included. Design examples will illustrate cost effective approaches to incorporating this new sustainable material. ATTN: This educational offering is recognized by the Minnesota Department of Labor and Industry as satisfying 1 hour of credit toward the required continuing education.

Sustainable Building Technology (2-hour)

This course covers key essentials in sustainable building technology, primarily in the areas of lighting, HVAC, and plumbing. Sustainable technology and design seeks to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments. Design and construction of buildings and related infrastructure create major direct and indirect impacts on the environment.

Sustainable Solutions: Air Pollution (2-hour)

Welcome to the course Sustainable Solutions: Air Pollution. In this course we will explore the relationship between air pollution and site development. Major pollutant sources and their impacts will be discussed along with strategies for reducing embodied energy and creating favorable microclimates that benefit the site and surrounding area.

Sustainable Solutions: Human Health and Well-Being (1-hour)

This course emphasizes the importance of using site design to increase physical activity within a community and provides strategies for doing so. It addresses the subject of maintaining positive mental health through the integration of natural landscapes. Strategies for implementing opportunities for social interaction among adults and spontaneous play among children are also discussed.

Sustainable Solutions: Loss of Biodiversity (1-hour)

Biodiversity refers to the richness and distribution of species living in a given area. This course will deal with strategies to effectively mitigate negative impacts to habitat and to restore damaged or degraded natural systems on-site.

Sustainable Solutions: Urban Flooding and Water Pollution (1-hour)

Living near water brings many opportunities and some inconveniences. In this course we will review some basics about flooding and water pollution as well as explore some specifics about these catastrophes and the sustainable solutions we can employ to prevent them.

Sustainable Solutions: Water Shortages (1-hour)

Over the next forty years, the global population is expected to increase from 6 billion to an estimated 9 billion, yet the world's water supply is constant. Only 3 percent of the global water supply is fresh;

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the majority of it is locked in ice or stored deep in the earth, making its extraction very expensive. The remaining 97 percent is found in the oceans and is too salty for human consumption, irrigation, and industrial uses. Water from the oceans can be processed; however, desalination is an energy-intensive practice. In this course we will explore site strategies for reducing water waste and recharging groundwater supplies.

The WELL Building Standard (3-hour)

How well does your building fit your tenants? Do your employees need a place to walk or work out? This interactive online course introduces the WELL Building Standard and discusses unique "features" (known as "credits" in LEED) to certify projects and gain the credential. We will discuss the application of the WELL standard to a hypothetical case study, conducting a feature-by-feature analysis and comparing the building before and after the standard is applied.

Understanding Concrete's Environmental Advantage (1-hour)

Environmental concerns are not new to humanity - they date back as long as there is recorded history. Civilizations have had to deal with pollution in many different forms, especially as societies began to grow and cities became more densely populated. The modern-day green movement in the United States can be traced back to the early 1970's with the beginning of the Earth Day movement and the founding of the Environmental Protection Agency, EPA. These efforts have been an attempt to draw attention to the impact humans have on the health and resources of the planet, and the importance of working toward sustainable living and development so future generations can continue to thrive here on earth. This course will take a detailed look at the many environmental advantages of ready mix concrete and how it is playing a growing role in green building design and construction. Participants will come away with a better understanding of how ready mix concrete can be used to minimize the environmental impact associated with construction and day-to-day building operations. They will be introduced to the life cycle methodology and shown how ready mix concrete contributes to earning LEED certification.

Uninterruptible Power Supply (UPS) System Efficiency (1-hour)

Uninterruptable Power Supply (UPS) systems are installed to ensure that critical loads are not affected during an outage. However, they have different modes of operation to save energy while still providing the same back-up power. In this interactive online course we will examine the differences, how they can be measured and show the possibilities of saving energy without risking equipment downtime.

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HAZWOPER

- HAZWOPER: Operations

HAZWOPER: Operations (1-hour)

OSHA has established several levels of training under the umbrella of HAZWOPER (Hazardous Waste Operations and Emergency Response). HAZWOPER training is required for personnel that may potentially be exposed to hazardous materials and for those involved in spill cleanup operations. OSHA defines HAZWOPER through their General Industry Regulation Title 29, section 1910.120, also known as 29 CFR 1910.20. This regulation defines several operations where HAZWOPER training is required. The Operations portion of the HAZWOPER training will cover the following: Levels of training which must be completed, Emergency plans and hazardous waste informational sources, Responses to various hazardous waste sources, Medical surveillance programs, Site monitoring, engineering controls and work practices, and Personal Protective Equipment (PPE).

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HVAC

- Compressed Air Systems in Industrial Plants
- HEPA High Efficiency Filters
- HVAC Design
- HVAC Distribution

Compressed Air Systems in Industrial Plants (3-hour)

This three-hour course discusses the application of compressed air systems in industrial plants. The course covers the different types of compressor systems used today. In addition to the compressor, the course covers the components of a compressed air system including dryers, receivers, traps, intercoolers, etc. Applications of compressed air systems are discussed and the economics of using compressed air are reviewed. This course will benefit anyone who uses, recommends, designs, or just wants to know more about the various types of compressed air systems that are used in industrial plants.

HEPA High Efficiency Filters (1-hour)

This webcast covers essential information regarding HEPA high efficiency filters and their importance in HVAC air handling systems. The course will include technical information about HEPA filters, as well as how HEPAs are constructed, tested, and maintained. We will also cover documentation regarding testing and maintenance of this important HVAC system component.

HVAC Design (1-hour)

This interactive webcast covers essential design information related to HVAC systems. Typical HVAC equipment and systems are covered, including key control concepts that provide reliable system operation. This course will be comprehensive in nature, reviewing most common types of air handling systems utilized today.

HVAC Distribution (1-hour)

This interactive webcast covers common design principles for HVAC distribution systems. We will review these distribution systems based on the various types of HVAC systems where they are used. The various HVAC operating concepts will also be reviewed and how they affect the design of the distribution system.

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- Explosive and Flammable Chemicals

Explosive and Flammable Chemicals (1-hour)

A review of the U.S. Chemical Safety Board's website shows a running scroll of chemical accidents in the news. Almost on a daily basis, there is a listing for a fire or explosion at an industrial site and many of these accidents are due to an explosive or flammable chemical. While production and use of these types of chemicals are essential to many industries, it is vital that they are handled properly to prevent the loss of life, property damage, or evacuations of nearby communities. Through this interactive, online course, a foundation for recognizing the classification of explosive or flammable chemicals will be provided. In addition, safe work practices for the storage and use of these chemicals will be presented.

BACK

INDUSTRIAL

- HVAC Acoustics

HVAC Acoustics (3-hour)

What is that sound? Is the HVAC system really that loud? How can I solve this problem? This interactive online course presents critical information regarding HVAC Acoustics that will be useful for designers, engineers, facilities maintenance and operations personnel. Important information presented includes fundamentals of sound, noise reducing materials, sound ratings, noise control for fans and other key HVAC system components. This course will serve as an important reference for people involved in HVAC systems and acoustics.

BACK

INDUSTRIAL ENGINEERING - MECHANICAL

- Power Plant: Steam Systems

Power Plant: Steam Systems (1-hour)

Steam Systems is a course designed to familiarize participants with the design and operation of the steam systems found in a typical power plant.

BACK

INTERIOR DESIGN

- Building Systems for Designers - Heating and Cooling Systems
- Building Systems for Designers - Indoor Air Quality
- Commercial Structural and Building Systems Essentials
- Construction Cost Estimating: Resources and Processes
- Construction Cost Estimating: Types and Purposes of Estimates

Building Systems for Designers - Heating and Cooling Systems (2-hour)

The building envelope's design influences comfort in the way it transmits heat to surfaces and slowly changes air temperature. Air and surface temperatures can often be controlled by passive design techniques. Air motion and air humidity contribute to comfortable cooling. Access to outdoor air improves air quality as well as provides daylight, a view, and solar heat on cold days. In the preface to the ninth edition of Mechanical and Electrical Equipment for Buildings, the authors explain how the perspective of engineers has changed: "Buildings today contribute to negative global consequences of the future, and our approach to mechanical and electrical systems must consider how best to avoid environmental impacts.… "We have moved from systems that centralize all sources of heating, cooling, water, and electricity toward those that encourage more localized production and control." (Benjamin Stein et al., John Wiley & Sons, Inc., Hoboken, NJ, 2006, p. xvii).

Building Systems for Designers - Indoor Air Quality (2-hour)

As buildings become more tightly controlled environments, indoor air quality (IAQ) and its effects on our health become an increasingly critical issue. Today, there are more than 80,000 synthetic chemicals in use, most of which have not been tested individually or in combination for their effects on human health. Also, the materials used in building, furnishing, and maintaining a building potentially can contain toxins that will effect air quality. In this course, we will take a look at the issue, materials, and contaminants that can cause poor indoor air quality. We will look at the was to counter act these issues and create a good indoor air quality through ventilation and air cleaners.

Commercial Structural and Building Systems Essentials (1-hour)

This course will cover essential information regarding structural and building systems, with a focus on commercial building structures and roofing systems. As a result of reviewing this course, you will gain valuable knowledge and training in these core areas of structural and building Systems. We will also review a number of case studies that will provide you with valuable insight into unique approaches with building construction that are in use today. These case studies will provide you with some interesting viewpoints that you'll find useful in the development of your own projects.

Construction Cost Estimating: Resources and Processes (1-hour)

Being able to accurately estimate (within acceptable ranges) the cost of construction of any project, at any given stage in the process (whether just at concept, during design development, or fully developed and ready-to-advertise design) is an invaluable skill for anyone in the construction industry. How can an estimator become better and more accurate? In order to prepare an estimate, there are several items to consider, including the estimating team, how the quantity takeoff is going to be done, what data resources are available for pricing, how the estimate's going to be prepared and organized and how it's going to be adjusted based on multiple bid factors and the construction economy. In this course, you'll learn how to utilize some of the most important resources and tools available to you, as an estimator.

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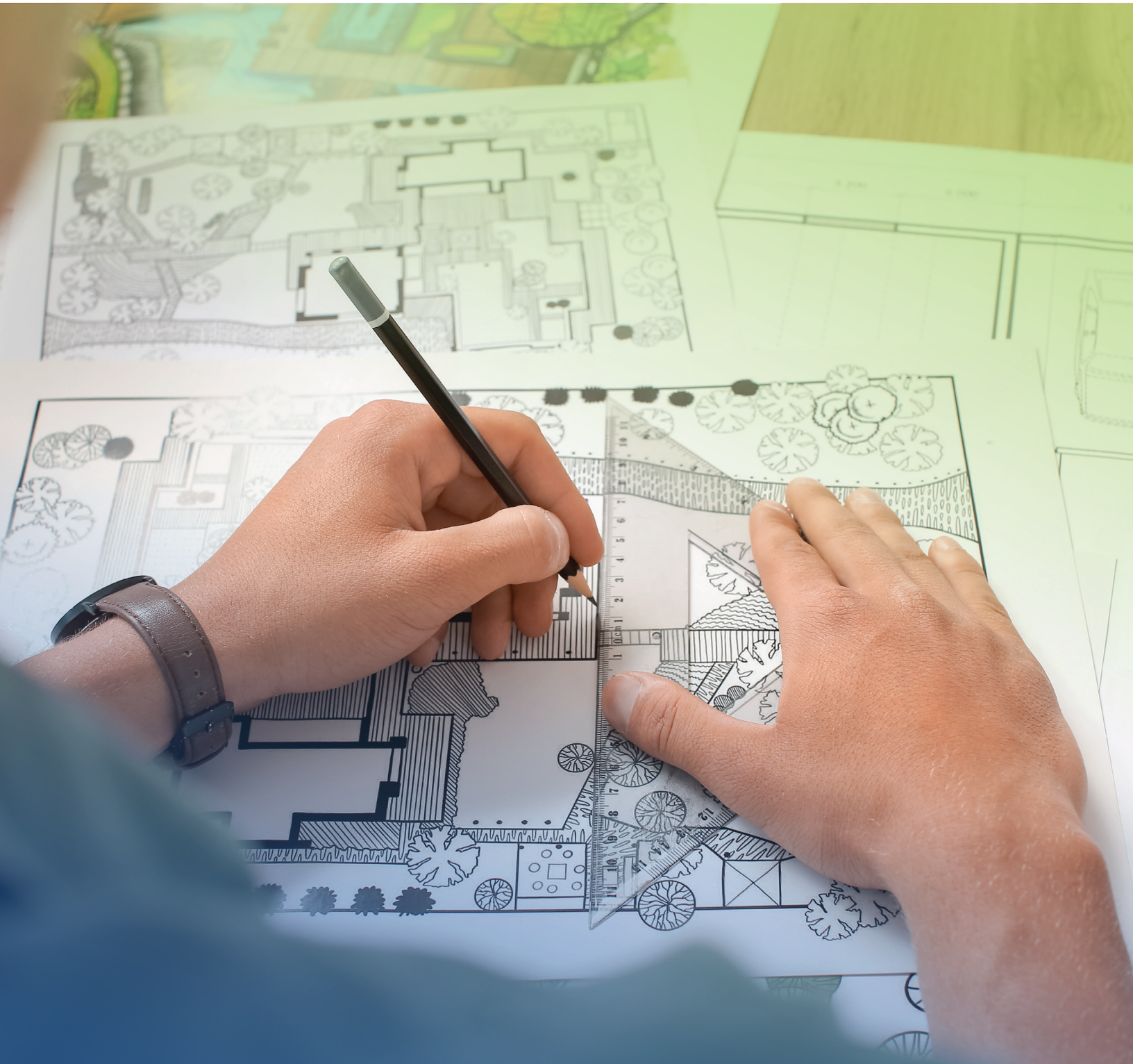
Construction Cost Estimating: Types and Purposes of Estimates (1-hour)

Did you know “opinion of probable cost” does not mean the same thing as an estimation of cost? While this may be a term used by design consultants in the preliminary stages of a project’s estimate, this should not be mistaken for an estimation of cost. This is simply a professional opinion based on experience and available knowledge. The responsibility of a Contractor is to provide a detailed quantitative analysis of each material cost or step in the process for a given project. This interactive online course will educate you on the various types of estimates that can be provided as well as the methods to do so accurately.

BACK

LANDSCAPE ARCHITECTURE

- Site Engineering for Landscape Architects: Horizontal and Vertical Road Alignment
- Site Engineering for Landscape Architects: Soils in Construction and Earthwork
- Soils and Foundations: The Low Down on Dirt



Site Engineering for Landscape Architects: Horizontal and Vertical Road Alignment (1-hour)

The purpose of this course is to present the basic engineering necessary to lay out roads and drives in the landscape. In order to create safe, enjoyable, and easily maneuverable vehicular circulation, roads must be engineered in both the horizontal and vertical planes. In this course you will receive information, examples with solutions, and opportunities to test your retention of the material presented. We will review basic components of road alignment and definitions of circular curve elements. You will get step-by-step processes and road alignment procedure. We will examine various approaches to design and practice making calculations using proven formulas.

Site Engineering for Landscape Architects: Soils in Construction and Earthwork (1-hour)

Soil structure and composition need to be considered in many aspects of site development. This course focuses on the use of soil as a construction material and provides an overview of how physical and engineering properties vary with soil type. We will cover definitions, soil characteristics, soil classifications systems, geotextile types and applications, and earthwork grading activities. We'll also give you examples of the computation of cut-and-fill volumes.

Soils and Foundations: The Low Down on Dirt (1.82-hour)

Dirt is dirt, right? Discover the critical relationship between soil conditions and successful construction in this comprehensive course led by industry expert Mark Woolley. Learn how to identify and address common soil-related challenges, from expansive soils to drainage issues, while exploring best practices for proper soil compaction and water management. Through real-world examples and cautionary tales from decades of construction experience, you'll understand why following geotechnical recommendations is crucial for avoiding costly structural failures. This course provides practical insights for construction professionals on how to effectively work with soil conditions, manage water drainage, and partner with geotechnical engineers to ensure project success.

BACK

LAWS, RULES, & ETHICS

- Ethical Decision Making for Engineers #1
- Ethical Decision Making for Engineers #2
- Ethical Decision Making for Engineers #3
- Ethical Decision Making for Engineers #4
- Ethics for Professionals
- Ethics for the Practicing Engineer - An Introduction
- Ethics for the Practicing Engineer - Managing Risks Imposed on the Public
- Ethics for the Practicing Engineer - Organizational Issues
- Ethics: Shades of Green

Ethical Decision Making for Engineers #1 (1-hour)

In this course we examine the NSPE Code of Ethics. We review cases ruled upon by the NSPE Board of Ethical Review, which will be key to helping you determine how you should act when faced with ethical decisions. We explore each of the 6 fundamental canons.

Ethical Decision Making for Engineers #2 (1-hour)

Engineering is an important and learned profession. As a member of the engineering profession, you are expected to maintain the highest standards of honesty and integrity. In order to continue this effectiveness, the services that you as an engineer provide require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public safety, health, and welfare. Engineers must adhere to a standard of professional behavior upholding the highest principles of ethical conduct. We call the standard of behavior “engineering ethics,” and embody it in the codes of ethics published by the state boards and by professional societies, such as NSPE. In this second course, we will continue the direction of the NSPE Code of Ethics by looking at a few case studies and how the Code specifically applies in each case. We will look into a case involving the use of unlicensed software to create work products. We will review the concept of conflict of interest. Finally, we will discuss cases involving licensure and practicing in different states.

Ethical Decision Making for Engineers #3 (1-hour)

Engineering is an important and learned profession. As a member of the engineering profession, you are expected to maintain the highest standards of honesty and integrity. In order to continue this effectiveness, the services that you as an engineer provide require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public safety, health, and welfare. Engineers must adhere to a standard of professional behavior upholding the highest principles of ethical conduct. We call the standard of behavior “engineering ethics,” and embody it in the codes of ethics published by the state boards and by professional societies, such as NSPE. In this third course, we will continue the direction of the NSPE Code of Ethics by looking at a few case studies and how they apply specifically to the Code. We will look into the topic of using existing work for different clients and disclosing required information. We will look at cases involving conflict of interest and the engineer’s responsibilities for handling incomplete specifications. Finally, we will look at the ethical responsibility to notify authorities and owners of potentially dangerous conditions.

Ethical Decision Making for Engineers #4 (1-hour)

Engineering is an important and learned profession. As a member of the engineering profession, you are expected to maintain the highest standards of honesty and integrity. Engineered solutions to modern problems require public acceptance and often public funding, both of which require continued public confidence in the engineering profession. Public confidence in any profession, whether it is engineering, medicine, law, etc., may easily be shaken by indications of unethical behavior in that profession. The engineering profession today enjoys a very high level of public confidence and, consequently, is effective in meeting the technological needs of society. In order to continue this

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effectiveness, the services that you as an engineer provide require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public safety, health, and welfare. Engineers must adhere to a standard of professional behavior upholding the highest principles of ethical conduct. We call the standard of behavior "engineering ethics," and embody it in the codes of ethics published by the state boards and by professional societies, such as NSPE. In this fourth course, we will continue the discussion of the Code of Ethics by looking at a few case studies and how they apply specifically to the Code. We will look into cases involving conflicts of interest and the appearance of conflicts of interest. We will also look at a case involving responsibilities of the engineer in situations that may endanger public safety. Finally, we will look at the responsibilities of an engineer when reviewing another engineer's work.

Ethics for Professionals (1-hour)

What are ethical guidelines and how do they apply to you in your professional field? Every day you face decisions that have ethical implications. While the welfare and safety of the public are everyone's primary concerns, time, personal and resource pressures can often challenge these commitments. Taking a pro-active approach to workplace ethics is the best course of action to mitigate this risk, avoid legal problems, and build a working atmosphere of integrity, trust and purpose. In this interactive online course, we will explore how to develop a strong and sustainable set of workplace ethics and guidelines designed to mitigate ethics creep, avoid legal implications, and build a solid, ethical foundation for a healthy workplace culture. We will explore common ethical topics and challenges and will detail the best practices when faced with thought provoking situations. We will also present the differences between a Code of Conduct and a Code of Ethics and how they can affect each professional differently.

Ethics for the Practicing Engineer - An Introduction (1-hour)

This course is designed to satisfy state board requirements for continuing education in ethics. This will be an introduction to professional ethics, contrasting common morality to professional ethics, and will present analytical tools to identify and classify ethical dilemmas potentially faced by practicing engineers.

Ethics for the Practicing Engineer - Managing Risks Imposed on the Public (1-hour)

All engineering designs and all operations of engineered systems expose the public to some risk. Engineers are ethically obligated to protect the public from unacceptable levels of risk, which raises the questions: How is risk defined and quantified? What levels of risk are acceptable? In this interactive online course, we will discuss ways to evaluate risks imposed on the public by engineers. We will also discuss ways to determine which risks are acceptable and which are unacceptable.

Ethics for the Practicing Engineer - Organizational Issues (1-hour)

Organizational issues can affect the decisions made by engineers every day. This interactive online course will focus on issues facing engineers working in large organizations. Case studies of organization-induced problems (such as the two space shuttle failures, the Macondo blowout, the GM ignition switch case) will be used to help participants recognize when organizational problems might cause ethical issues for engineers.

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Ethics: Shades of Green (3-hour)

This webcast will focus on how our professional ethics are no longer black and white, they are shades of green. Not only do professionals have an obligation to design for the health, welfare, and safety of people they represent; they also have an obligation to safeguard the environment. This course will discuss why professionals have a green ethical obligation to promote excellence of design and endeavor to conserve and preserve the integrity and heritage of the natural and built environment. We will focus on how professional societies and registration boards are holding professionals accountable for sustainable design and planning practices and to consider the environment in everything they do.

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LEGAL, INSURANCE, & RISK

- Construction Arbitration: A Brief Overview - Beginner
- Construction Claims: Changed Work

Construction Arbitration: A Brief Overview - Beginner (1-hour)

This 1-hour interactive online course provides a brief overview of the arbitration process for the construction professional. Arbitration is often used to resolve disputes arising from the construction process, both during and after contract performance. If you are a prime contractor, subcontractor, architect, engineer, construction manager, owner's representative, surety, insurance company, or otherwise involved in the construction industry, it is highly likely that you will be a party to one or more arbitration proceedings during your career. This course will provide basic information to the construction professional allowing him or her to understand the arbitration process.

Construction Claims: Changed Work (2-hour)

This 2-hour online interactive course provides a basic understanding of types of changes in work—directed or constructive change—and changed conditions. It provides an in-depth examination of cumulative impact, emphasizing how to identify types of change-related impacts, that includes a detailed discussion of the Leonard Study. In addition, it discusses how to address cumulative impact and assess allowance for recovery. Summaries of actual court cases are incorporated into the course to illustrate how changed work claims are determined.

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MANAGEMENT

- A Better Construction Contract
- Pricing as a Professional

A Better Construction Contract (2-hour)

This 2-hour online interactive course examines two types of Owner-Contractor agreements: (1) stipulated sum, and (2) cost plus a fee with a guaranteed maximum price (often called “GMP”) The use of general conditions with both types of contracts is assumed in this course and particular attention is paid to the general conditions as they constitute the bulk of the contract whether it is a stipulated sum or GMP type. This course assumes some familiarity with the AIA documents, the contractually defined roles of the Owner, Contractor, and Architect, and the interrelationship of the Contract Documents, such as the Agreement, General Conditions, and Drawings and Specifications. We will follow the organization of the AIA documents as a starting point. Consequently, the term “architect” will typically be employed, but the principles discussed in this course can apply to other design professionals as well. References to relevant sections of the AIA documents are included in parentheses throughout. As we review the two types of Owner-Contractor agreements, this course identifies major contract issues, performance problem areas, and definitions of important terms. Issues which are likely to cause conflict or generate disputes are identified. Subjects which often appear obscure to design professionals, such as insurance, are discussed.

Pricing as a Professional (2-hour)

This will not be a course in accounting. It will not rely on technical terms. It will be a common-sensical look at pricing with a keen eye to being practical and usable, using experienced-based methods. This 2-hour interactive online course provides an in-depth look at the elements of pricing that you as a contractor must consider if you are to operate on a successful professional level. Though the more prevalent common standard pricing considerations will be touched upon, the primary thrust of this course is to also consider the full panoply of pricing factors, including subjective and judgmental elements, that you must be aware of and use, if you are to be successful. This is a practical look, from an experienced contractors point of view, of often overlooked, but nevertheless important elements, that strongly influence your bottom line, and, perhaps, your ultimate success as a contractor. This course is written from the point of view of a contractor, but it contains information useful to many different professionals who deal with pricing issues.

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PETROLEUM CHEMICAL

- Brayton Cycle Analysis
- Fundamentals of Petroleum Engineering
- Hazardous Waste: Treatment
- Modern Shale Gas Development
- Petroleum and Natural Gas: Mud Logging Sensors and Modern EDR Systems
- Petroleum Drilling Technology
- Petroleum Engineering: Liquid Process Piping - General Piping Design
- Petroleum Engineering: Liquid Process Piping - Introduction and Design Strategy
- Petroleum Instrumentation and Measurement
- Petroleum Refining Processes and Related Health and Safety Considerations
- The Petroleum Industry - Crude Oil Classification and Benchmarks
- The Petroleum Industry - Exploration, Recovery, and Transportation
- The Petroleum Industry - History, Terminology, and Culture
- The Petroleum Industry - Oil Supply
- The Petroleum Industry - Origins and Occurrence of Oil
- The Petroleum Industry - The Crude Oil Market
- The Petroleum Industry - The Future

Brayton Cycle Analysis (1-hour)

The ideal cycle for the simple gas turbine is the “Brayton Cycle”, also called the Joule Cycle. In this 1-hour interactive online course, the open, simple Brayton Cycle used for stationary power generation is considered. The Brayton Cycle thermal efficiency is also presented (but only for the air as the working fluid) and the thermal efficiency derivation is presented with a simple mathematical approach. The Brayton Cycle is presented in the “T - s” diagram and its major performance trends (specific power output and power output) are plotted in figures as a function of compressor pressure ratio, gas turbine inlet temperature and working fluid mass flow rate. In this course, the student becomes familiar with the Brayton Cycle, its components, T - s diagram, operation and major performance trends. This course provides the student with background material regarding basic thermodynamic concepts and a glossary for reference material. It should be noted that this online course does not deal with capital, operational or maintenance costs.

Fundamentals of Petroleum Engineering (2-hour)

This course is designed to convey the basics of the oil and gas industry to the Construction Professional. Oil and gas operations have a sensitive and critical importance as it deals with very high pressure, temperature, and extreme natural conditions. So for a new person in this field, it is essential to have sound theoretical knowledge about oil and gas operations before getting started.

Hazardous Waste: Treatment (1-hour)

Hazardous waste can exist in liquid, solid or slurry forms. It may originate in a current manufacturing process or from clean-up of an abandoned site. This course will review the background and design considerations for different methods of treating hazardous waste.

Modern Shale Gas Development (3-hour)

The course provides an overview of modern shale gas development, as well as a summary of federal, state, and local regulations applicable to the natural gas production industry, and describes environmental considerations related to shale gas development. It describes the importance of shale gas in meeting the future energy needs of the United States including its role in alternative energy strategies and reducing greenhouse gas (GHG) emissions. The course is intended to serve as a technical summary document, including geologic information on the shale gas basins in the U.S. and the methods of shale gas development. By providing an overview of the regulatory framework and the environmental considerations associated with shale gas development, it will also help facilitate the minimization and mitigation of adverse environmental impacts. By so doing, the course can serve as an instrument to facilitate informed public discussions.

Petroleum and Natural Gas: Mud Logging Sensors and Modern EDR Systems (1-hour)

Technology advances with the passage of time. The existence of portable and digital processors provides proof of this advancement in technology. There is a rising demand for enhanced equipment such as geo-pressure control and administration, contributing to the need for an additional degree of

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drilling machinery monitoring or observing, mud circulation pressure, volume, and flow ratio sensors. This course discusses drilling data monitoring and drilling data analysis, the types of recorders used to monitor, rotary system management and circulating system management, and properties of mud.

Petroleum Drilling Technology (1-hour)

This course is designed to convey the oil and gas drilling aspects to the construction professionals. Drilling operations have a sensitive and critical importance as it deals with very high pressure, temperature and extreme natural conditions. Drilling fluids are composed of such chemicals which are dangerous for human health if they are not handled properly. So for a new person in this field, it is essential to have sound theoretical knowledge about it before getting started practically. Its importance in this regard is undeniable. In the oil and gas industry, safety is the first preference. If a person possesses superficial knowledge and understanding of oil and gas, he/she may not be recommended for any field work.

Petroleum Engineering: Liquid Process Piping - General Piping Design (2-hour)

Liquid process piping systems are used in many different industries to convey liquids to, from and between pumping, storage and treatment units. Proper design and construction of liquid process piping is necessary to ensure the integrity of a piping system during its service lifetime. This 2-hour interactive online course is the second in a series on general piping design including materials of construction, design pressure, sizing, stress analysis, flange, gaskets, and bolting materials, pipe identification, piping supports, and testing and flushing. Familiarity with the standards and recommendations for design of pressure piping will prepare the designer to make informed decisions throughout the design process.

Petroleum Engineering: Liquid Process Piping - Introduction and Design Strategy (1-hour)

Liquid process piping systems are used in many different industries to convey liquids to, from and between pumping, storage and treatment units. Proper design and construction of liquid process piping is necessary to ensure the integrity of a piping system during its service lifetime. This 1-hour interactive online course is an introduction to the design strategy of liquid process piping including piping design analysis, specifications, drawings, bases of design, loading conditions, and piping layout. Familiarity with the standards and recommendations for design of pressure piping will prepare the designer to make informed decisions throughout the design process.

Petroleum Instrumentation and Measurement (2-hour)

This course is designed to convey the basics of oil and gas instrumentation and measurement (primarily downstream) to the construction professionals and learners. Oil and gas operations have a sensitive and critical importance as it deals with very high pressure, temperature and extreme natural conditions. So for a new person in this field, it is essential to have sound theoretical knowledge about measurement instruments and measuring techniques before getting started practically. Its

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importance in this regard is undeniable. In the oil and gas industry, safety is the first preference. If a person possesses superficial knowledge and understanding of equipment and instruments, he/she may not be recommended for any field work. This course is important to impart basic knowledge of process variables measuring instruments and their measuring techniques which we use in oil and gas downstream. It also conveys the knowledge of process control automation and control valves.

Petroleum Refining Processes and Related Health and Safety Considerations (3-hour)

The petroleum refining industry is one of the largest sources of greenhouse gases among all manufacturing sectors in the US economy. Along with the environmental impacts of their operations, refiners face complex regulatory issues involving their products. The nature and chemistry of different major refinery products or by-products and their effects on human health and the surrounding environment makes it imperative for regulatory agencies like the EPA to impose heavy regulations on the petroleum refining industry in comparison to other industries in the US. It is important that the practitioners associated with the petroleum refining industry know about the operations in the refining process, the nature of the major products and by-products from the refining industry, the chemicals used in the process, and the overall impacts of the refining process and products on human health and safety to meet the ever increasing regulatory requirements of this industry. This course aims to fulfill these requirements by discussing the basic chemicals, processes, products and environmental impacts involved in refining petroleum.

The Petroleum Industry - Crude Oil Classification and Benchmarks (1-hour)

Fluctuations in the price of oil triggered the debate regarding the level of world oil reserves, and the capacity to meet future energy demand has taken on a new impetus. This has led to reinvestigation of the methods of crude oil classification and classification of reserves. For the purpose of the course, we'll define petroleum as a naturally occurring mixture of hydrocarbons, generally in a liquid state (that may also include compounds of sulfur, nitrogen, oxygen, metals, and other elements) which occurs in sedimentary rock deposits throughout the world. However, the definition of petroleum-associated materials has been varied, unsystematic, diverse, and often archaic. It is only recently that some attempt has been made to define these materials in a meaningful manner. Thus, it is not surprising that attempts to classify petroleum have also evolved. In this course we will review these methods and present them to you for further consideration in terms of pricing strategies.

The Petroleum Industry - Exploration, Recovery, and Transportation (2-hour)

This course will give a non-technical explanation of the technical aspects of oil exploration and recovery; but the information in this course is intended for the technical and non-technical person alike. We'll explore the different operations for exploration and recovery of crude oil and other sources of energy, such as tar sand. We'll also examine the different methods of transportation used to transport varying amounts of oil. This course will also touch upon how the exploration, recovery, and transportation oil affect oil economics, including prices, supply, and demand.

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The Petroleum Industry - History, Terminology, and Culture (2-hour)

When you think of crude oil, the first thing that probably comes to your mind is the black liquid that is pumped out of a reservoir. Or you might be thinking of the liquid you pump into your car, which you notice is a bit more expensive than it was a decade or even a week ago. The definition of crude oil is confusing and variable and has been made even more confusing by the introduction of other terms that add little, if anything to petroleum definitions and terminology. Actually, until the mid-1800s, this vast untapped wealth lay mostly hidden below the surface of the earth. Some oil naturally seeped to the earth's surface and formed shallow pools that were used as a source of medicinal liquids, illuminating oil, and, after evaporation of the volatile components, as a caulking for boats and a building mastic. For centuries, demand was limited but better refining techniques and surging demand for kerosene and lubricants in the late 19th century changed this. Today, crude oil is the major source of fuel used by people today. In this course, we will go back to petroleum's verbal roots, through its initial uses to its role in society today and the major oil companies that distribute it.

The Petroleum Industry - Oil Supply (1-hour)

In this course we will cover conventional and non-conventional oil sources, especially the impact of heavy oil and tar sand bitumen. We will also cover past and present technological, economic, and geopolitical factors of oil. These will be viewed in light of the expectance of peak oil, which is the peaking and subsequent decline of the production rate of oil, and the knowledge that oil is a limited resource.

The Petroleum Industry - Origins and Occurrence of Oil (1-hour)

In this course we will discuss the formation of oil and review the theories of its origin. You will get comprehensive information about oil reservoirs including their structure, oil accumulation, as well as distribution, migration and transformation of reservoir fluids. We will cover classification and evaluation of reservoirs and estimation of fuel reserves. We will also review fuel reserves focusing on quality, quantity, patterns, and benefits.

The Petroleum Industry - The Crude Oil Market (2-hour)

Petroleum economics is the field that studies human utilization of petroleum resources and the consequences of that utilization. In the simplest scientific terminology, petroleum use allows the production of energy. In this course we will discuss the factors and pricing strategies that determine oil prices, the transportation of oil from the producer to the consumer, and the structure of the crude oil market and global consumption of oil.

The Petroleum Industry - The Future (1-hour)

Crude oil is the major source of fuel used in the modern world, and the crude oil sector is the largest and most dominant economic sector of business in the United States. The United States has come not only to rely on crude oil but the nation is also addicted to crude oil. Cures for this addiction are possible, such as a reduction in the amount of oil required for daily life, but will take time and are unlikely to succeed in the near term. This course discusses the future of the petroleum industry and illustrates how the increasing demand for energy affects both crude oil resources and production of alternative fuels.

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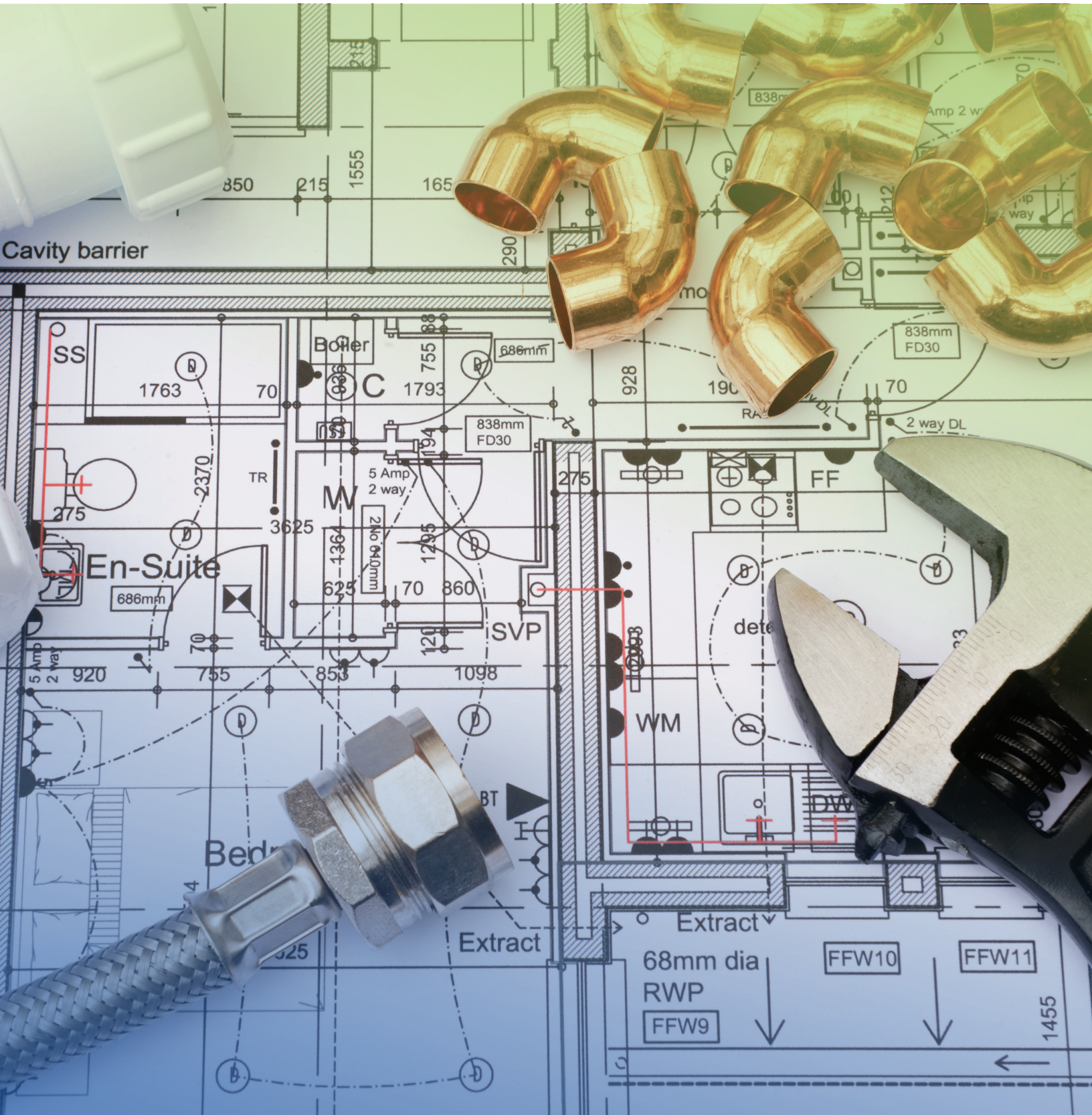
PLUMBING DESIGN

- Commercial Plumbing Systems Essentials



Commercial Plumbing Systems Essentials (1-hour)

This course will provide essential information regarding Plumbing Systems in the areas of water supply systems, drainage systems, commercial plumbing fixtures, and backflow compliance. If you're involved in Plumbing systems in the areas of design, construction, maintenance, or management, this course will be a key training experience for your career. As a result of this training, you will have a better understanding of these core areas of Plumbing systems and will be able to successfully contribute to your company- in system design, overseeing construction and maintenance activities, and company management.

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PPE

- Worksite Safety 05: OSHA Personal Protective Equipment

Worksite Safety 05: OSHA Personal Protective Equipment (1-hour)

Hazards in your workplace can be sharp edges, falling objects, flying sparks, chemicals, noise, or many other potentially dangerous situations. OSHA requires all employers to protect their employees from workplace hazards, and when they can't control a hazard at its source, they need to provide workers with accoutrements such as hard hats, gloves, respirators, goggles, safety shoes, and other gear to minimize the likelihood of a mishap. This course covers many common forms of PPE and how to choose it, wear it and care for it. OSHA recommends Outreach Training Program courses as an orientation to occupational safety and health for workers. Workers must receive additional training, when required by OSHA standards, on the specific hazards of their job. Please note: This course is not a part of the OSHA 10 Hour Construction Program.

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PROCESS EQUIPMENT & OPERATIONS

- Operator Responsibilities: Plant Production and Safety

Operator Responsibilities: Plant Production and Safety (0.5-hour)

The primary responsibility of a plant operator is to ensure that a unit functions safely and efficiently. To fulfill that responsibility an operator must be able to perform different types of duties under a variety of operating conditions. In this interactive online course, we'll focus on operator responsibilities related to plant production and we'll examine some safety responsibilities and regulations that apply to various operating conditions. We'll also examine some safety permits and regulations that operators must be familiar with.

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PROCESS SAFETY MANAGEMENT (PSM)

- Process Safety Management (PSM): 1910.119 Overview and Auditing
- Process Safety Management (PSM): An Overview
- Process Safety Management (PSM): Compliance Audits
- Process Safety Management (PSM): Contractors
- Process Safety Management (PSM): Emergency Planning & Response
- Process Safety Management (PSM): Employee Participation
- Process Safety Management (PSM): Hot Work Permits
- Process Safety Management (PSM): Incident Investigations
- Process Safety Management (PSM): Management of Change
- Process Safety Management (PSM): Mechanical Integrity
- Process Safety Management (PSM): Operating Procedures
- Process Safety Management (PSM): Pre-Startup Safety Review
- Process Safety Management (PSM): Process Hazard Analysis
- Process Safety Management (PSM): Process Safety Information
- Process Safety Management (PSM): Trade Secrets
- Process Safety Management (PSM): Training

Process Safety Management (PSM): 1910.119 Overview and Auditing (1-hour)

The OSHA 1910.119 Process Safety Management (PSM) regulation applies to many companies that use and process flammable liquids as well as hazardous chemicals. With 14 required elements - it's a very comprehensive and challenging regulation. The PSM regulation literally changes the way affected companies run their business. This course will show you how to develop an effective PSM Program as well as survive an OSHA PSM inspection.

Process Safety Management (PSM): An Overview (0.55-hour)

This overview of PSM will provide a basic understanding of what PSM is and the topics that comprise it. PSM addresses Highly Hazardous Chemicals identified by OSHA and the process industries. These chemicals require safety considerations over and above normal chemicals. These safety considerations are the basis of PSM. Following course completion you will be able to identify key elements and what is and is not acceptable under PSM.

Process Safety Management (PSM): Compliance Audits (1-hour)

Compliance audits serve as a self-evaluation for employers to measure the effectiveness of their process safety management system. Audits can identify problem areas and assist employers in directing attention to process safety management weaknesses. In this interactive online video course, you will learn from industry expert Jon Wallace (25 year safety veteran) about the importance of compliance audits as part of the overall process safety management program. You will also learn how to implement compliance audits into your overall process safety management program and how to evaluate compliance with process safety management compliance audit requirements.

Process Safety Management (PSM): Contractors (1-hour)

On October 23, 1989, an explosion occurred at the Phillips Petroleum polyethylene plant in Pasadena, Texas. A massive vapor cloud was created causing 23 fatalities and over 100 injuries. Investigation into the incident revealed that a specialist maintenance contractor employed to do work on one of the reactors did not follow the proper procedures prior to maintenance work. Process Safety Management (PSM) is a systematic process aimed at preventing highly hazardous chemicals from being released. Because contractors perform crucial activities on PSM covered processes, unsafe contractor work may jeopardize other employees as well as the contractors themselves. In this interactive online video course, safety expert Jon Wallace discusses the elements of the PSM Contractor requirement, including contractor selection, training, and evaluation. It is critical that contractors understand potential hazards of their work environment; therefore, a solid understanding of the PSM Contractor requirement will help ensure employers correctly train contractors on OSHA regulations.

Process Safety Management (PSM): Emergency Planning & Response (1-hour)

Proper training and preplanning is an essential part of an emergency action plan and can help prevent disasters from occurring. In this interactive online video course, you will learn from industry expert Jon Wallace (25 year safety veteran) about the importance of emergency planning and response as part

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of the overall process safety management program. You will also learn about emergency planning and response requirements and how to implement emergency planning and response into your overall process safety management program.

Process Safety Management (PSM): Employee Participation (0.5-hour)

The Union Carbide explosions in Bhopal India, 1984 and Institute, West Virginia in 1985. The Phillips Petroleum explosion in 1989, and ARCO explosion in 1990. These are just four major incidents that led to the OSHA Process Safety Management Standards. Process Safety Management (PSM) is aimed at preventing highly hazardous chemicals from being released. The employee participation element is a critical part of PSM that enhances overall effectiveness in areas including Process Hazard Analysis (PHA) and Incident Investigation. In this interactive online video course, learn from industry expert Jon Wallace about the employee participation component of the Process Safety Management Standards. Subjects covered include employer requirements for a written plan of action to confirm employee participation, consultation with employees regarding hazards, and employee access to process hazard analysis. Employers must follow OSHA regulations and ensure employee participation and EPA Clean Air Act Amendments are implemented in training.

Process Safety Management (PSM): Hot Work Permits (1-hour)

In January 2008 there was a fire at the Monte Carlo Resort and Casino in Paradise, Nevada. Welders at the time did not use fire protection mats, and the resulting fire caused 100 million dollars in damage, with thirteen people suffering from smoke inhalation and seventeen people suffering from minor injuries. This could have been prevented with an effective Project Safety Management Hot Work Permit Program. Process Safety Management (PSM) is a systematic process aimed at preventing highly hazardous chemicals from being released. The Hot Work Permit Program is one of the fundamental components of occupational safety. Hot Works is geared towards any work that produces sparks or flames, and can includes welding and cutting among potential ignition sources. In this interactive online video course, safety expert Jon Wallace discusses the components of an effective Hot Work Permit program, how to implement it, and how it can prevent property damage, and loss of life. An effective Hot Works Permit Program will also help avoid OSHA violations.

Process Safety Management (PSM): Incident Investigations (1-hour)

There have been many incidents involving multiple losses of life that led to the formation of the OSHA Process Safety Management Standard. Learning from past incidents and investigating the root causes of these incidents can help us be prepared and prevent history from repeating itself. In this interactive online video course, you will learn from industry expert Jon Wallace (25 year safety veteran) about the importance of incident investigation as part of the process safety management program. You will also learn about incident investigation requirements, and how to implement an incident investigation program into your overall process safety management program.

Process Safety Management (PSM): Management of Change (0.5-hour)

Uncontrolled change contributes to 80% of serious industrial accidents. Management of Change (MOC)

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requires written procedures to manage changes to process chemicals, technology, equipment, facilities and procedures that affect a covered process. Any potential change is evaluated for its impact on the process and all affected personnel will be informed and trained in the change prior to start-up of the process. In addition, any change requires all other elements of PSM to be updated to reflect the change. Lack of or an ineffective Management of Change Program is a ticking time bomb that will eventually explode.

Process Safety Management (PSM): Mechanical Integrity (0.5-hour)

Mechanical Integrity (MI) rivals Process Safety Information in complexity and receives the most OSHA citations. This is because MI addresses most of the equipment in a process and is therefore very broad. MI requires written procedures to maintain the integrity of process equipment and training for process overview, hazards and employee task procedures. Typically the most important task for Mechanical Integrity is equipment inspection and testing. This course offers a working knowledge of Mechanical Integrity and its many elements.

Process Safety Management (PSM): Operating Procedures (1-hour)

Methyl isocyanide, aldicarb oxime, anhydrous ammonia. These are just three examples of highly toxic chemicals that have been released into the atmosphere as a result of chemical plant explosions in recent years. Exposure to highly hazardous chemicals can be fatal; therefore, Process Safety Management (PSM) was designed to help prevent such chemicals from being released. PSM outlines steps for the management of hazards associated with processes using highly hazardous chemicals. Because most PSM covered processes are complex operations, the need for clear operating procedures is critical in order to maintain a safe and healthy work environment. In this interactive online video course, industry expert Jon Wallace discusses the required elements for operating procedures, including steps for each operating phase, operating limits, and safety and health considerations. A solid understanding of this information will help ensure employers are in compliance with OSHA PSM regulations.

Process Safety Management (PSM): Pre-Startup Safety Review (1-hour)

On August 28, 2008, an explosion at the Bayer CropScience plant in Charleston, West Virginia killed two workers and injured eight others. The ignition of a five-thousand pound chemical vat occurred during the restart of the methomyl unit after upgrades were performed on the system. Incident investigation revealed several causes, including inadequate pre-startup safety review, and inadequate operator training on the new system. This is an example of the importance of Process Safety Management (PSM). PSM is aimed at preventing highly hazardous chemicals from being released, and startup and shutdown are potentially the two most dangerous times for a PSM process. In this interactive online video course, safety expert Jon Wallace discusses the components of the PSM Pre-Startup Safety Review. The purpose of this review is to ensure safe operation of a PSM covered process by identifying and correcting unsafe conditions prior to process operation.

Process Safety Management (PSM): Process Hazard Analysis (0.5-hour)

Process Hazards Analysis (PHA) is best described as the building block for the successful PSM program. This course provides an overview of Process Hazards Analysis, acceptable methodologies

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and information required for PHAs. PHAs identify, evaluate, and control the hazards involved in the process. Priority of PHAs is determined by such considerations as extent of the process hazards, number of potentially affected employees, age of the process, and operating history of the process. This course is an introduction to PHAs and does teach how to conduct a Process Hazards Analysis.

Process Safety Management (PSM): Process Safety Information (0.5-hour)

Process Safety Information (PSI) identifies the many types of information necessary to convey an understanding of a PSM covered process. Process Safety Information is typically grouped into three topics: hazards, technology and equipment. The hazards of the process must be communicated to employees. The process technology of designing safe systems, safety components and devices help employees understand the safety built into the process. The key point of Process Safety Information is not to remember it, but to know where to find the information if needed.

Process Safety Management (PSM): Trade Secrets (0.5-hour)

There are companies that have millions of dollars in trade secrets and making that information accessible to competitors or the general public can have a significant effect on their competitive advantage. In this interactive online video course, you will learn from industry expert Jon Wallace (25 year safety veteran) about trade secret requirements outlined in the process safely management standard. You will also learn about your company's rights and responsibilities with respect to company trade secrets and OSHA's rights and responsibilities to access trade secret information.

Process Safety Management (PSM): Training (1-hour)

On January 31, 2006, an explosion caused by a runaway chemical reaction rocked the Synthron facility in Morganton, North Carolina. One worker was fatally burned, and 14 others were injured (two seriously). The explosion destroyed the facility and damaged structures in the nearby community. Incident investigation revealed that Synthron had minimal safety information on its chemical processes, and personnel were poorly prepared to recognize dangers from an uncontrolled chemical reaction. Process Safety Management (PSM) is aimed at preventing highly hazardous chemicals from being released, and effective training is needed to ensure the safe operation of oftentimes complex operations. In this interactive online video course, industry expert Jon Wallace discusses the elements of the PSM Training requirement, including initial training, refresher training, and training documentation. A solid understanding of the details of this requirement will help ensure employers are in compliance with OSHA PSM regulations.

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RESIDENTIAL

- Completing the Mold Remediation
- Cost Estimating: Fundamentals
- Health Effects Caused by Mold
- Leak Detection for Roofs
- Natural Gas Systems - Sizing and Design Consideration
- Preventing Mold Growth
- Residential Safety Essentials
- The Science of Mold
- Understanding Construction Claims
- Understanding Moisture Intrusion and Its Impact on Mold Growth

Completing the Mold Remediation (1-hour)

You work hard each day on the project, but it's how you finish the job that people remember. Remediation projects involve controlling the work place, consistency, follow through, and finishing. This course will show you how to "set the bar" so the technicians know what to do, clients are happy, and each project has a better chance of profit and success.

Cost Estimating: Fundamentals (1-hour)

Engineers, architects and contractors are often asked to prepare cost estimates when working on a new project. This 1-hour interactive online course takes you through the process discussing where, in the various stages in project development, cost estimates are made. Through illustrations, you will consider different methods of cost estimating, the level of project detail required for each, and when the use of each method is indicated. You will understand the uncertainties associated with a bid due to level of detail available and the economics of inflation. You will learn to recognize these uncertainties and include contingencies and adjustments for inflation. For those who are new to cost estimating, this course is an introduction. You may find yourself going over sections more than once. For the experienced Estimator, you will find this course a guide and a reference as the only way for any Estimator to improve is to practice what they have learned. Move on through this course and into the field of cost estimating. ATTN: This educational offering is recognized by the Minnesota Department of Labor and Industry as satisfying 1 hour of credit toward the required continuing education.

Health Effects Caused by Mold (1-hour)

Welcome to Health Effects Caused by Mold. This course includes information regarding the fungal health effects and how mold impacts our bodies. In addition, this course is designed to give you a basic understanding of what mold exposure can do to people and how dangerous it might be, and it even focuses on some specific reactions that individuals can suffer based on exposure to fungal materials.

Leak Detection for Roofs (1-hour)

Leak detection is an important job. Utilization of both scientific and artful techniques enables you to detect a leak in the least time with the least work. To do this, you must first understand the roof system that you are looking at, and know all its components and their function. This 1-hour interactive online course details specific techniques of detecting leaks in various waterproofing media, with an endeavor to give the professional practical and usable techniques that they can employ in the course of handling this important job.

Natural Gas Systems - Sizing and Design Consideration (1-hour)

What is that yellow pipe for? Do you know how to size a natural gas system? Natural gas piping systems are in use in virtually every commercial building. Natural gas is used for comfort heating, cooking, laundry, water heaters, fireplaces, even decorative lighting and fire pits. The proper design and installation of natural gas systems is essential for not only the efficient operation of appliances but also the safety and health of building occupants. This interactive online course will take an

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in-depth look at a number of considerations that must be addressed before design can begin including: Knowing the applicable codes, Knowing the requirements of the natural gas utility supplier, Venting requirements, Pipe identification and labeling requirements, Pipe support requirements, Gas meter clearances for windows, air intakes and electrical equipment, Sizing methods to use, and Selection of piping material.

Preventing Mold Growth (1-hour)

Preventing fungal growth begins with the building design and follows all the way through responding to a water intrusion event. This course will provide some basic science to help understand how mold happens. It will also provide examples of recommended building materials, their assembly, and building systems that both invite and avert mold growth.

Residential Safety Essentials (1-hour)

As you may or may not know, the top four causes of construction fatalities are Falls, Struck-By, Caught-in/between and Electrocutions. These hazards are ever present in the residential home building process and you are not exempt from these many dangers. This interactive online course will cover various safety topics and will explore how the lack of adherence to these standards are risk factors to the top four construction hazards. Please note that this course is for the express purpose of training workers on residential construction sites only.

The Science of Mold (1-hour)

Mold is found throughout nature and is critical to the success of the food chain in forests and low land areas. Yet, if mold shows up in your home interior, it is usually a sign that something is wrong. If not dealt with correctly, mold will become a problem for the human inhabitants. This course will introduce you to the fundamentals of what good and bad mold is, and why it should be respected but not feared. It will also provide the building blocks for a more complete understanding of what it takes for fungal growth and some simple steps toward safely remediating it from the indoor environment.

Understanding Construction Claims (2-hour)

This 2-hour interactive online course provides a basic overview of the five different types of construction claims that a contractor might have against an owner: Delay, Changed Work, Labor Productivity Loss, Acceleration, and Termination. It defines each type of claim and the subcategories within each, as well as defining the crucial concepts associated with each. It also provides a basic introduction to the various methods for calculating damages related to each type of claim, emphasizing the importance of the project schedule as an evaluation and analysis tool. The course material is supplemented with summaries of actual cases to illustrate how courts and boards rule on the different types of construction claims.

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Understanding Moisture Intrusion and Its Impact on Mold Growth (1-hour)

The basic role of a building is to protect the indoors from the outdoors. That includes water intrusion. Water intrusion can happen in many ways and can have a detrimental effect on the structure and the people within. This course studies the various forms of water intrusion; the physics of how it happens; its effects on building systems and materials; and ways to understand it, avoid it, and remedy it. It also illustrates the impact moisture intrusion has on mold growth , as well as the proliferation of other micro-organisms.

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RESIDENTIAL DESIGN

- Protecting People Against Terrorist Attacks: Design Considerations for Safe Rooms and Shelters

Protecting People Against Terrorist Attacks: Design Considerations for Safe Rooms and Shelters (1-hour)

The fact that data for manmade threats are scarce and that the magnitude and recurrence of terrorist attacks are unpredictable makes the determination of a particular threat for any specific site or building difficult and largely subjective. This interactive online course teaches you about potential manmade threats and design considerations for shelters. You will learn about explosive threats and chemical, biological, and radiological (CBR) attacks and the level of protection needed for shelters to protect people against terrorist attacks.

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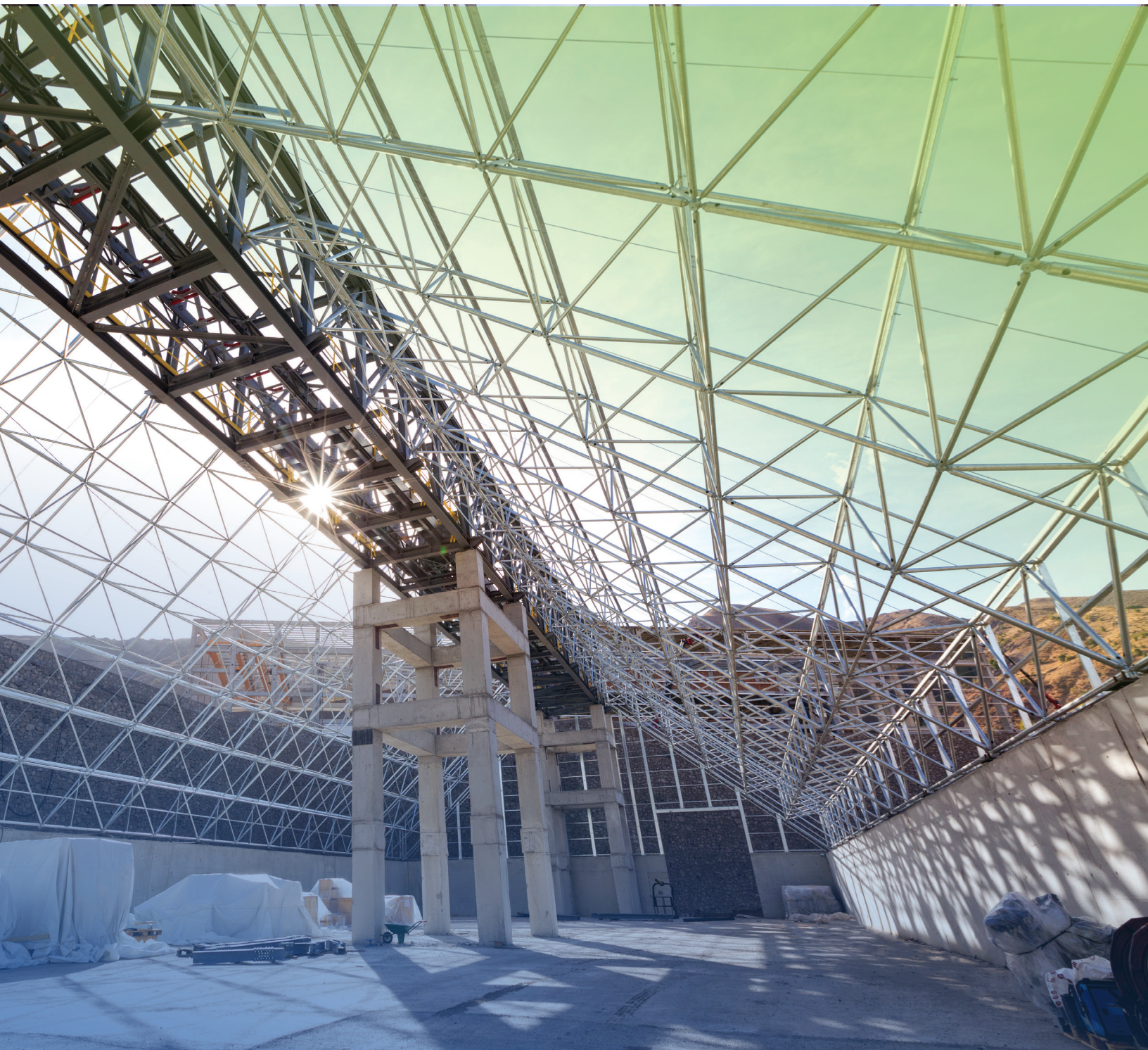
STRUCTURAL ENGINEERING

- Choosing the Best Structural Lateral Force Resisting System
- Designing Foundation Repairs
- Designing with Structural Composite Lumber
- Structural Design Philosophies ASD & LRFD
- Structural Steel - An Introduction



Choosing the Best Structural Lateral Force Resisting System (1-hour)

The decision of the lateral force resisting system for a building should be made by the structural engineer and the architect. The decision is based on a multitude of factors including structural performance, integration with architectural systems, integration with mechanical systems, constructability, and cost. This course will investigate several common lateral force resisting systems; steel moment frames, steel braced frames, wood shear walls, concrete shear walls and compare the suitability of those systems for use in low-rise buildings. Metrics will be developed to assist in the decision making process. Use of those metrics will be explored through examples.

Designing Foundation Repairs (2-hour)

What is causing that crack in the building? How can you repair it? Building foundations provide structural support to buildings but are often damaged and rendered nearly useless by many natural events (hurricanes, drought, excessive rain, etc.). Most foundations can be repaired and returned to their original load capacity, but each foundation damage case can present unique challenges depending on the extent of damage, the foundation material used, the foundation depth in the ground, and the loads being carried by the foundation. In this interactive online course, we will discuss different types of building foundations and several types of causes of foundation failures. We will also cover methods for foundation repair, as well as new materials and technologies used in repair.

Designing with Structural Composite Lumber (1-hour)

What is structural composite lumber? Is it reliable enough to build with in your area? The building industry is constantly developing new materials. Some of this innovation has occurred in the design of timber construction materials. Many of the new products have higher load carrying ability and improved serviceability when compared to their sawn lumber equivalents. In addition, these material are often more sustainable. This interactive online course will focus on innovations in Structural Composite Lumber (SCL). As a designer, it is critical to understand these materials in order to safely and cost effectively design with them.

Structural Design Philosophies ASD & LRFD (1-hour)

Structural engineering design philosophy is based on determining the demand on an element and designing that element with the capacity to withstand that demand. There are two basic approaches to developing the demand; LRFD (Load Resistance Factored Design) and ASD (Allowable Stress Design). Historically, design of different materials (wood, steel, concrete and masonry) has used either ASD or LRFD. This interactive, online course will look at the origins of the two approaches, discuss traditional uses of ASD and LRFD and their safety implications. We will also investigate the differing load combinations as defined in the International Building Code®. Understanding these approaches is an essential element of a life safe design process.

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Structural Steel - An Introduction (1-hour)

Are you faced with a project that requires an understanding of structural steel? Do you know the standard steel shapes and how they are connected to erect a building? What is that ASTM specification on the Mill Cert and how does it apply to steel selection? When should you choose structural steel over other materials? This course introduces the student to the basic fundamentals of structural steel.

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STRUCTURAL ENGINEERING DESIGN

- Prestressed and Reinforced Concrete: Choosing the Best Method for Your Project

Prestressed and Reinforced Concrete: Choosing the Best Method for Your Project (1-hour)

Reinforced? Prestressed? Post-Tensioned? Some precast concrete is prestressed and reinforced, but not all reinforced concrete is prestressed. Which construction method can I perform at the job site? Which one will need to be manufactured and delivered to my project? Confused? Let's clear up the differences between prestressed and reinforced concrete and how the two can work in tandem. All concrete looks pretty much the same on the outside, but inside, concrete contains steel that has been designed using years of extensive engineering and construction experience. In this interactive, online course, we will peer inside and see what reinforcing steel and prestressing strand can do for a structure. This course will focus on reinforced concrete and stressed (pre and post) concrete. Each type will be covered in depth.

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TECHNOLOGY

- AI in Architecture, Engineering, and Design Professions
- Automation of Engineering Workflows
- Drafting Software for Engineers and Designers

AI in Architecture, Engineering, and Design Professions (1-hour)

Forget the sci-fi robots - today's AI is already transforming how we design and build our world. This comprehensive course demystifies artificial intelligence for architects, engineers, and design professionals, showing you exactly how AI tools are revolutionizing everything from initial concepts to final construction. You'll explore cutting-edge applications across disciplines, learn implementation strategies that actually work, and discover how to leverage AI while avoiding common pitfalls. Whether you're excited or anxious about AI's impact on design professions, this course equips you with the practical knowledge to stay competitive in an rapidly evolving industry.

Automation of Engineering Workflows (0.9-hour)

As automation continues to revolutionize the engineering industry, understanding its applications and implications has become essential for modern engineering professionals. This course explores the fundamental concepts of automation in engineering, covering key topics such as manufacturing processes, robotics, 3D printing, CAD/CAM software, and artificial intelligence applications, while examining how these technologies are transforming traditional engineering workflows. Upon completion, learners will be able to define basic characteristics of automation, discuss how automation influences the engineering profession, recognize applications in manufacturing and products, evaluate software solutions, and identify opportunities for incorporating artificial intelligence into engineering workflows.

Drafting Software for Engineers and Designers (1-hour)

Computer-Aided Design (CAD) software is an essential tool that has revolutionized how professionals create, visualize, and refine their projects across architecture, engineering, and construction industries. This comprehensive course explores the evolution and capabilities of various CAD platforms, from basic 2D drafting to sophisticated 3D modeling and Building Information Modeling (BIM), helping learners understand the differences between software types and their practical applications. Through detailed examination of industry-leading software providers and emerging trends, you'll learn to evaluate which CAD solution best fits your needs based on factors like functionality, cost, and workflow integration, while gaining insight into future developments including cloud computing, artificial intelligence, and enhanced geospatial capabilities.

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TRANSPORTATION ENGINEERING

- Concrete 1: Evaluation and Causes of Damage
- Concrete Fundamentals: An Introduction
- Essentials of Intelligent Transportation Systems
- Essentials of Quality Concrete
- Fundamentals of Asphalt Pavement Design
- Grading and Drainage Design of Modern Roundabouts
- Handling, Placing and Finishing Concrete
- Highway Engineering: Highway Drainage and Surveys
- Highway Engineering: Part 1 - Highway Materials, Maintenance and Rehabilitation
- Parking Lot Design: Essentials
- Transportation Engineering: Highway Capacity
- Use of Steel in Design & Construction

Concrete 1: Evaluation and Causes of Damage (1-hour)

When taking on a concrete repair project, the first step is an important one - conducting a thorough evaluation. This 1-hour interactive online course begins with techniques for surveying the condition of the concrete, and reviews design and construction documentation, operation and maintenance records, instrumentation data, visual examination, methods of nondestructive testing and laboratory specimen analysis. The second part of the course identifies basic causes of deterioration, and covers typical symptoms, and recommendations for preventing further damage. This course is the first in a series that provides guidance on evaluating the condition of the concrete in a structure.

Concrete Fundamentals: An Introduction (2-hour)

Are your customers or clients using words like slump, water-cement ratio, cement content, and compressive strength? Do you understand admixtures and their functions? How about reading and understanding a mix design? Do you know how to place and finish concrete? This interactive online course introduces you to the basic fundamentals of concrete.

Essentials of Intelligent Transportation Systems (1-hour)

What is an Intelligent Transportation System? Intelligent Transportation Systems (ITS) apply a variety of technologies to monitor, evaluate, and manage transportation systems to enhance efficiency and safety. This interactive online course provides an overview and history of ITS from early initiatives through the evolution of technology, systems engineering, and institutional structures. We will also describe the role of ITS in changing travel and commuter patterns and travel demand management.

Essentials of Quality Concrete (2-hour)

This course provides an overview of concrete, including its properties and basic components, the properties required for plastic and hardened concrete, and the variables that influence the quality of concrete. It will discuss some of the mechanical and durability characteristics required of concrete for various applications. The materials used in concrete mixtures, including portland cement, supplementary cementitious materials, aggregates, water and air will be discussed along with the general concepts of proportioning concrete mixtures. This course will introduce admixtures and explain their purpose. It explores air entraining and water reducing admixtures, accelerators and retarders, as well as other “value added” admixtures. This course also provides the basics of troubleshooting concrete slabs, such as workability, place-ability, finish-ability, and causes for cracking and other defects in concrete.

Fundamentals of Asphalt Pavement Design (2-hour)

This training presents the fundamentals of asphalt pavement design. This course will introduce asphalt pavement systems, as well as asphalt pavement materials and their properties. The characteristics of asphalt concrete are presented, followed by description of the properties of asphalt pavements. A review of current asphalt concrete mix design methods is presented. The elements of the structural design of

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asphalt pavements will be discussed in detail. This includes the AASHTO method for determining layer thicknesses. This course will enable pavement engineers, materials engineers as well as materials technicians to gain a better understanding of the fundamentals of the asphalt pavement design process and analysis. Examples and sample calculations are included throughout this course.

Grading and Drainage Design of Modern Roundabouts (1-hour)

Modern roundabouts are a proven and effective safety improvement for roadway intersections. The main focus of roundabout design documentation has been in its traffic capacity and geometry. Once these features are set, the vertical design (grading and drainage) becomes the most critical portion of the design execution and the main component in determining the construction cost of roundabouts. In this interactive online course, engineers, architects, planners and contractors will learn design techniques and best practices to develop efficient roundabout grading and drainage designs.

Handling, Placing and Finishing Concrete (2-hour)

This course is an overview of the proper methods and procedures for transporting, placing and finishing concrete. The material covers transporting, forms, placement tips, concrete conveying devices, and curing concrete, as well as precautions for hot and cold weather concreting. It briefly discusses some problems associated with improper construction practices that can result in cracking, scaling and other defects in the finished structure.

Highway Engineering: Highway Drainage and Surveys (4-hour)

Good highways are so interwoven with every phase of our daily activities that it is almost impossible to imagine what life would be like without them. One of the most important considerations in locating and designing rural highways and city streets is providing adequate drainage. Adequate and economic drainage is absolutely essential for the protection of the investment made in a highway structure and for safeguarding the lives of the persons who use it.This 4-hour interactive online course discusses some of the fundamental concepts of highway and street drainage. Surface drainage in essentially rural areas is discussed in considerable detail; accompanying this is a discussion of measures for the prevention of erosion of shoulders, sideslopes, and side ditches. Considerable space is devoted to the location, design, and construction of culverts. Material is also presented relative to subdrainage, and the course concludes with a brief discussion of drainage in municipal areas. This is the sixth course in a series on highway engineering. Vector Solutions has a long history of providing industry-specific content for its customers. While this course and its content remain accurate and functional within our systems, the look and feel may not match our more modern offerings.

Highway Engineering: Part 1 - Highway Materials, Maintenance and Rehabilitation (8-hour)

Good highways are so interwoven with every phase of our daily activities that it is almost impossible to imagine what life would be like without them. Each year in the United States, enormous quantities of construction materials are used for improvements to the public roadway system. Such projects require annually over 590 million tons of aggregates, 11 million tons of bituminous materials, and 19 million

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tons of cement, as well as vast quantities of steel, lumber, explosives, and petroleum products. This 8-hour interactive online course is the first half of the eighth course in a series on highway engineering. This course describes some of the physical characteristics and quality control tests for soils, aggregates, bituminous materials, and portland cement. Detailed material specifications and tests for these and other highway construction materials have been published by the American Association of State Highway and Transportation Officials.

Parking Lot Design: Essentials (2-hour)

This training presents the fundamentals of the planning and design of parking facilities. This course will introduce participants to parking users, parking facilities, and common parking terminology. The characteristics of parking users are presented in detail, followed by a discussion on the different types and classifications of parking and parking facilities. A review of parking configurations and the geometry of parking are then presented. The factors that are considered in developing efficient parking layouts are discussed in detail. This course concludes with a discussion on factors relating to parking accommodations and accessible parking spaces for users whose needs are met by regulations outlined in the Americans with Disabilities Act. This course will enable practitioners to gain a better understanding of the analysis and design of parking facilities. Examples and practical cases are included throughout this course.

Transportation Engineering: Highway Capacity (2-hour)

Highway accidents result in thousands of deaths a year. Knowing how highway capacity analysis is used in the design of safe and efficient roadway facilities is essential to the health safety and welfare of the general population. This interactive online course will teach you about the fundamental concepts of highway capacity analysis. You will learn about transportation system elements, types of roadway facilities, design vehicles, the concept of level-of-service, traffic volume parameters, and speed parameters and how they are relevant in analyzing the capacity of roadway facilities.

Use of Steel in Design & Construction (1-hour)

This 1-hour interactive online course discusses the use of steel in design and construction, with the primary focus of the design segment relating to design of buildings, and not entailing design of the myriad of other things in modern society that are made from steel. We will start with a look at the methods of manufacturing various types of steel. The resultant physical characteristics of different types of steel will be examined to understand those applications where the use of different steel is recommended. Techniques for proper use and erection of steel in buildings will be discussed, in conjunction with design considerations.

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WATER RESOURCES ENGINEERING

- Aquifer Remediation
- Basics of Water Resources: Groundwater Hydrology
- Biofilters: A Natural Approach to Storm Water Pollutant Removal
- Effective Groundwater Supply Management
- Green Landscape Design: Water Conservation in the Landscape
- Lead Contamination of Public Water Systems
- LEED: Water Efficiency
- Septic System Design
- Trenchless Methods: An Introduction
- Water Well Design

Aquifer Remediation (1-hour)

Approximately 40% of the world's drinking water is drawn from wells, and in some locations, like in the Pacific Southwest, 80% of potable water is drawn from aquifers. Groundwater is an easily accessible resource, and this accessibility is also its biggest threat. Contaminants above ground and underground can easily seep into aquifers. There are a large variety of contamination sources, both natural and man-made. Similarly, there are a wide variety of remediation techniques to properly treat contaminated aquifers. Throughout this course, engineers, architects, planners and contractors will learn about the most common contamination sources and the industry best practices used for groundwater aquifer remediation.

Basics of Water Resources: Groundwater Hydrology (1-hour)

This 1-hour interactive online course covers the fundamentals of water supply hydrology. From the hydrologic cycle to the nature and character of groundwater as it goes from recharge zones to discharge points, the basic concepts and terminology are introduced in a clear and easy to read form. Vector Solutions has a long history of providing industry-specific content for its customers. While this course and its content remain accurate and functional within our systems, the look and feel may not match our more modern offerings.

Biofilters: A Natural Approach to Storm Water Pollutant Removal (2-hour)

Bioswales and constructed wetlands are under increasing use to address pollutants in storm water runoff. However, many installations of these BMPs have failed or have not been as successful as hoped. This interactive online course provides a discussion of the concepts of biofilters. Most of the failures can be attributed to insufficient information being available or to bad or no expert input into the design, construction, vegetating, or maintenance of the bioswale or constructed wetland. This course is intended to provide information on the design and use of biofilters so that designers will be able to make better decisions on the design, construction, implementation, and maintenance of these Best Management Practices.

Effective Groundwater Supply Management (1-hour)

Effective Groundwater Supply Management is essential if groundwater resources are to remain viable for the foreseeable future. Groundwater Management is a rapidly evolving discipline that is incorporating ever more factors into the evaluation of principles that will ensure that no harmful effects arise from the utilization of this resource while ensuring that all potential resources that can be maintained are used to satisfy an ever-increasing demand. This interactive online course will present a history of Groundwater Management from its beginnings in the middle of the last century through the present day. Current parameters and environmental factors of concern will be outlined.

Green Landscape Design: Water Conservation in the Landscape (2-hour)

Were you aware that an efficient and effective irrigation system can reduce wasted water and save money? Current technology provides easy solutions to keep irrigation systems fine-tuned and make it

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easy to adjust remotely. This interactive online course will focus on the tenets of water conservation in landscaping including: appropriate plant selection, irrigation planning and design principles, efficient irrigation technologies, and others. Case studies of community conservation programs and site specific approaches are also featured.

Lead Contamination of Public Water Systems (1-hour)

Lead contamination of drinking water is a major topic of concern across the country, particularly in areas with aging lead pipes. Lead contamination in Flint, Michigan; Washington, DC; and Newark, New Jersey, has focused attention on America's decaying pipes. At least $384 billion of improvements are needed to maintain and replace essential parts of the country's water infrastructure to through 2030, according to the US Environmental Protection Agency. While these improvements are underway, treatment technologies can be utilized to significantly limit the migration of lead into the potable water supply. This interactive online course will describe these technologies and opportunities for implementation.

LEED: Water Efficiency (1-hour)

What do you know about getting LEED certified in Water Efficiency? This course introduces you to the LEED Rating Systems - Water Efficiency and Innovation and Design Sections. This webcast gives you an overview of the rating system, the prerequisite for Water Use Reduction and descriptions of the available credits.

Septic System Design (0.32-hour)

Septic is from the Greek "septikos," meaning to putrefy. Most commonly this word is used to describe a system for sewage treatment and disposal or septic systems. Sewage treatment uses anaerobic decomposition to break down organic matter. When sewage or waste is generated it can be processed in a municipal water treatment plant or several types of land treatment systems. Even with the urban or suburban sprawl that has occurred in the recent decades, some residential and commercial properties are still located in areas that are not on the municipal sewer grid. These places tend to use onsite sanitary sewer treatment for its waste. This course places its focus on treating sewage with an onsite septic system. An example problem is given to provide the student with more direction in septic system design. The concentration of this course is designing on-site septic systems using a septic tank and infiltrator trenches in the leachfields. Items discussed include: sizing septic tanks, percolation tests, sizing infiltration chamber, the environmental health effects of sewage and much more. By the time you reach the end of this course, you should be armed with all the knowledge and skills to design basic on-site septic systems and to further your study in this important field.

Trenchless Methods: An Introduction (1-hour)

There is a tremendous need to rehabilitate pipes, especially sewer and water lines. In the U.S. alone, there are 1.2 million miles of sewer pipe and approximately 880,000 miles of water distribution pipes. In both cases, the operable life of the infrastructure is 50 to 100 years. The majority of these pipes were laid in the 1940"s, after World War II, and most are 50 to 125 years old. Additionally, on-going

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maintenance is necessary to protect against pipe corrosion, root intrusion, structural failure and other problems. Trenchless technology includes a large family of methods utilized for installing and rehabilitating underground utility systems with minimal surface disruption and destruction resulting from excavation. This 1-hour online course presents an introduction to the most common types of trenchless technology used in the U.S. and provides a real-life example to help you determine the correct technology for the given project. Vector Solutions has a long history of providing industry-specific content for its customers. While this course and its content remain accurate and functional within our systems, the look and feel may not match our more modern offerings.

Water Well Design (2-hour)

Extracting groundwater for use as public water supply, irrigation, or industrial supply presents a challenge to Engineers, Geologists, and Well Drilling Contractors. Water wells must be designed to fit existing natural conditions. Factors including aquifer parameters (location, depth, rock types, and water yield capacity), geology and water quality, are unique to every location. The professional engineer, geologist, and well driller need to be informed of these factors to complete a successful water well construction project. This two hour interactive online course will introduce you to the necessary steps in a water well design project. Proceeding with researching of local groundwater conditions to obtaining information necessary to locate and plan a well, this course presents techniques for designing a water well. You will learn valuable skills in the phases necessary to implement a well construction project.

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