

CHEN/SENG 455/655—CHEMICAL PROCESS SAFETY

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Textbook: Daniel A. Crowl and Joseph F. Louvar, *Chemical Process Safety: Fundamentals with Applications* (3rd Edition), Prentice Hall (2011)
(ISBN-10 0131382268)

Description: This course is concerned with all aspects of Chemical Process Safety and Loss Prevention. Process Safety differs from Personnel Safety (or Industrial Hygiene), in that it is concerned primarily with the identification of potential hazards and hazardous conditions associated with the processes and equipment involved in the Chemical Process Industries, and methods of predicting the possible severity of these hazards and presenting, controlling, or mitigating them.

Topics:

- Introduction—Process Safety Management
- Introduction—Toxic Materials
- Introduction—Hygiene
- Source Models
- Toxic Release and Dispersion
- Fires and Explosions
- Fire and Explosion Protection and Prevention
- Reliefs
- Relief Sizing
- Hazard Identification
- Risk Assessment
- Accident Investigations

Objectives:

- Recognize the professional and ethical elements of an outstanding safety program.
- Evaluate ethical issues that may occur in professional engineering practice.
- Recognize ethical standards and professional codes of conduct for engineers, e.g., NSPE Code of Ethics for Engineers.
- Identify government agencies, regulatory bodies, codes, and standards that govern the global, societal, and environmental impact of plant design projects.
- Identify examples of how unsound science or unethical behavior had a negative impact on society.
- Understand and apply OSHA PSM and EPA RMP in the chemical process industries.
- Understand and apply the principles and approach on inherently safer design to reduce and eliminate hazards and thereby lower the risk of new or currently operating chemical systems.
- Understand the operation of chemical process and equipment and apply engineering fundamentals to the analysis and prediction of performance under adverse circumstances.
- Perform quantitative engineering analysis based upon the application of mass and energy balance, fluid mechanics of liquid, gas, and two-phase flows, heat transfer and the conservation of energy, mass transfer, diffusion and dispersion under highly variable conditions, reaction kinetics, process control, and statistics.
- Perform PHA analysis of targeted chemical process industries and evaluate the safety performance.
- Identify the potential hazards and hazardous conditions associated with the processes and equipment involved in the chemical process industries.

4.2
CEUs

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PDHs