



4-DAY COURSE SYLLABUS

Piping and Heat Exchangers – Design and Operation

TFBE01-ONL26 · ONLINE (ZOOM)

This course equips participants with the skills needed to design, size, and troubleshoot essential components of thermo-fluid systems, ensuring optimal performance and process improvement. Achieving productivity targets and improving processes relies on a solid understanding of system performance, accurate design and sizing calculations, and effective troubleshooting techniques. This course provides participants with the knowledge to design, size, select, and assess the performance of key components in thermal-fluid systems, including gas piping systems (fans, compressors, and ducts), liquid piping systems (piping and pumps), and heat exchangers (shell and tube, double pipe, plate and frame, cross-flow).

CEUS / PDHS	INSTRUCTOR	DAYS	PRICE	WORKSHOPS	SKILL LEVEL	COURSE CODE
2.2 / 22	Dr. Mohamed Hamed, PhD, P.Eng., FEC	4	\$2,095.00 CAD	3 workshops	Beginner	TFBE01- ONL26

DESCRIPTION

This course equips participants with the skills needed to design, size, and troubleshoot essential components of thermo-fluid systems, ensuring optimal performance and process improvement.

Achieving productivity targets and improving processes relies on a solid understanding of system performance, accurate design and sizing calculations, and effective troubleshooting techniques. This course provides participants with the knowledge to design, size, select, and assess the performance of key components in thermal-fluid systems, including gas piping systems (fans, compressors, and ducts), liquid piping systems (piping and pumps), and heat exchangers (shell and tube, double pipe, plate and frame, cross-flow).

This course is designed for individuals with limited experience, while also providing valuable insights for experienced professionals looking to refine their skills in thermal-fluid systems.

WHAT YOU WILL LEARN

- Apply principles of thermodynamics, heat transfer, and fluid mechanics in designing and sizing piping and heat exchangers
- Use analytical and empirical tools for designing and analyzing piping and heat exchangers
- Evaluate technical alternatives while considering practical limitations and criteria

COURSE OUTLINE

- 01 Selected Topics in Fluid Mechanics
- 02 Selected Topics in Thermodynamics
- 03 Selected Topics in Heat Transfer
- 04 Gas Piping Systems
- 05 Liquid Piping Systems
- 06 Double Pipe Heat Exchangers
- 07 Shell and Tube Heat Exchangers
- 08 Plate and Frame Heat Exchangers
- 09 Cross-Flow Heat Exchangers
- 10 Equipment Selection, Operation, and Troubleshooting

WHO SHOULD ATTEND

- Design and project engineers
- Technologists
- Plant and facility engineers
- Consultants
- Mechanical engineers and technologists
- Maintenance and operation personnel
- Other technical personnel needing to develop/upgrade/refresh their knowledge of HVAC and thermal-fluid systems
- Engineering students

REGISTER NOW →

Customize this course — We can offer a customized version of this course, in terms of duration and content, upon request.

REQUEST CUSTOMIZATION

DAILY SCHEDULE

4-Day Course Schedule

START

10:00 AM EST

END

5:00 PM EST

FORMAT

Live Online

One-hour lunch break each day, plus refreshment and networking breaks each morning and afternoon session.

DAY	TOPIC	SUBTOPICS
DAY I	Selected Topics in Fluid Mechanics	- Fluid properties - Basic equations of fluid mechanics - Flow in pipe systems
	Selected Topics in Thermodynamics	- Properties of Ideal gases - Steam properties
	Selected Topics in Heat Transfer	- Modes of heat transfer (conduction, convection, and radiation) - Calculation of heat transfer coefficients in different configurations
	Gas Piping Systems	- Steam Piping - Compressed air piping - Types of compressors - Sizing compressed-air-system components - Compressed-air receiver size and pump-up time
DAY II	Workshop I	Size a compressor for a compressed-air system under the instructor guidance
	Liquid Piping Systems	- Types of pumps - Pump testing methods - Cavitation and net positive suction head - Dimensional analysis of pumps - Specific speed and pump types - Design and sizing of water piping systems
DAY III	Double Pipe Heat Exchangers	- Analysis of double Pipe Heat Exchangers - Effectiveness-NTU Analysis - Design Considerations
	Shell and Tube Heat Exchangers	- Analysis of Shell and Tube Exchangers - Effectiveness-NTU Analysis - Increased Heat Recovery - Design considerations - Optimum outlet temperature analysis
	Workshop II	Size a shell and tube heat exchanger under the instructor guidance
DAY IV	Plate and Frame Heat Exchangers	- Design features - Selection and sizing guidelines
	Cross-Flow Heat Exchangers	- Design features - Selection and sizing guidelines
	Equipment Selection, Operation, and Troubleshooting	- Selecting type of heat exchanger for specific applications - Performance enhancement - Fouling factors in heat-exchanger sizing and selection - Troubleshooting
	Workshop III	Size a plate and frame heat exchanger under the instructor guidance