



## Fractionation Operations for Early-Career Engineers SIM-FOE

### COURSE

#### About the Course

This interactive 2-day course combines elements of high fidelity, generic process simulators as well as a student-driven learning model centered around the INSTO Methodology. The course allows early-career engineers an opportunity to explore the same system dynamics and process upsets that plant operators face.

In this course each trainee will have access to their own generic simulators including a Heat Exchanger, Flash Drum, and Fractionation simulator. Trainees will have an opportunity to startup each piece of equipment as well as spend time troubleshooting common malfunctions relating to exchanger and separating units. Tower operations that promote both safety as well as optimization are stressed throughout the course. The material of the course is applicable to refineries, petrochemical sites, chemical plants, and any other facilities that operate distillation columns.

#### Target Audience

Early-career process or controls engineers that would benefit from an operations bootcamp

#### You Will Learn

- Manually operate and optimize a cascade loop in a counter current shell and tube heat exchanger
- Determine the effects of product yields and product purities in flash drums as well as distillation columns
- Identify key operating points in a distillation column including the effects of changing throughput, operating temperature, operating pressure and reflux ratio have on product specifications
- Analyze trends and relate this information to various normal and abnormal situations for exchangers, flash drums and distillation columns
- Utilize the Think EQ.U.I.P.P.E.D. method to expand troubleshooting options while operating a distillation column
- Discuss and simulate HAZOP analyses on common troubleshooting scenarios with exchangers and distillation columns focusing on specific mitigation techniques
- Assess critical safety concerns during the startup or restart of exchangers and distillation columns as well as simulate these startup procedures
- Practice techniques for distillation column optimization including dynamically adjusting column operating conditions to meet new specifications determined by simulated changes in feedstock or market conditions

## Course Content

- A complete startup procedure for a heat exchanger and distillation column
- Operating an outlet temperature to hot side flow cascade loop including manually engaging these controls
- Simulating the effects of varying flow characteristics (flow rate, temperature, density) within a shell and tube heat exchanger
- Simulating changes to flow rates, operating temperature, and operating pressure of a flash drum and the resultant effects to product yields and purities
- Operating a binary distillation column with equipment including a reboiler, overhead condenser, hot vapor bypass pressure system and feed preheaters
- Troubleshooting scenarios for a distillation column including loss of preheat, reboiler fouling, loss of air to controllers, tower flooding, and incorrect instrumentation readings
- HAZOP analysis on loss of cooling to a distillation column and simulating the corresponding shutdown procedure
- Change in feed composition to a distillation column (more lights in feed) with objectives to maintain product purities by adjusting key operating variables
- Integrated dynamic profitability analysis within the simulator to determine profitability based on energy efficiency and minimum product specifications

## Product Details

Categories: [Upstream](#)

Disciplines: [Operations & Maintenance](#) [Refining](#)

Levels: [Foundation](#)

Product Type: [Course](#)

Formats Available: [In-Classroom](#)

Instructors: [Donald Glaser](#)