

# Distillation, Absorption and Extraction Practice Course

25 – 29 July 2027
Johannesburg

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**Ref:** 1912_242304 **Date:** 25 – 29 July 2027 **Location:** Johannesburg **Fees:** 6000 Euro

## Overview

Distillation, Absorption and Extraction Practice Course is a one-week intermediate course for chemical and process engineers, operations teams, and technical specialists who leave with a Separation Operations Decision Workbook. Participants apply phase-equilibrium and mass-transfer methods to column behavior, solvent choice, operating limits, troubleshooting, and separation process selection. The course connects vapor-liquid equilibrium analysis with distillation column troubleshooting, gas absorption and stripping, and liquid-liquid extraction. Agile Leaders Training Center delivers this course on practical industrial separation operations.

## Who Should Attend

- Functions responsible for selecting and evaluating industrial separation methods
- Teams responsible for operating tray and packed separation columns
- Groups responsible for diagnosing purity, capacity, and energy-performance deviations
- Technical services responsible for solvent screening and process improvement
- Project and commissioning functions responsible for separation-equipment review

The course assumes participants can interpret process flow diagrams, material balances, and basic thermodynamic data, and it leaves out detailed mechanical design and software-vendor certification.

## Departments and Industries

The course supports separation decisions across process operations and product-purification environments.

- Chemical and petrochemical process engineering departments
- Oil, gas, and refining operations teams
- Pharmaceutical and specialty-chemical production functions
- Food, beverage, and solvent-recovery facilities
- Environmental treatment and emissions-control groups

## Learning Objectives

By the end of this course, participants will be able to:

- Apply phase-equilibrium data to separation decisions
- Use operating lines to assess column performance
- Analyze reflux, stage, and packing behavior
- Diagnose absorption, stripping, and distillation deviations
- Compare solvents and extraction arrangements
- Prioritize separation improvements by capacity, energy, and recovery

## Course Agenda

### Day 1: Equilibrium and Process Selection

- Phase-Equilibrium Data Interpretation Map
- Mass-Transfer Driving-Force Diagram
- Equilibrium-Stage and Transfer-Unit Comparison
- Separation Process Selection Matrix
- Material-Balance and Recovery Worksheet

### Day 2: Distillation Column Performance

- Vapor-Liquid Equilibrium Analysis Chart
- McCabe–Thiele Operating-Line Method
- Minimum-Reflux and Stage-Count Screening
- Tray and Packing Selection Checklist
- Flooding, Weeping, Entrainment, and Pressure-Drop Diagnostic Map

### Day 3: Gas Absorption and Stripping

- Solubility and Solvent-Capacity Screening Table
- Gas-Liquid Operating-Line Construction Method
- Minimum-Solvent-Rate Assessment
- Packed-Column Transfer-Unit Method
- Absorber and Stripper Performance-Diagnostic Checklist

### Day 4: Liquid-Liquid Extraction

- Ternary Phase Diagram Interpretation
- Distribution Coefficient and Selectivity Worksheet
- Extraction Solvent Selection Matrix
- Crosscurrent and Countercurrent Stage Method
- Mixer-Settler and Column Contactor Comparison

## Day 5: Separation Operations Practice

- Suggested Exercise: Diagnose a Distillation Purity Deviation
- Suggested Exercise: Assess Absorber Loading and Solvent Rate
- Suggested Exercise: Compare Liquid-Liquid Extraction Arrangements
- Suggested Exercise: Prioritize Energy, Solvent, and Recovery Improvements
- Capstone Exercise: Complete the Separation Operations Decision Workbook

## Practical Exercises

The course uses suggested activities to connect equilibrium evidence, equipment behavior, and operating decisions.

- Suggested activity: construct equilibrium and operating lines for a defined separation case
- Suggested activity: diagnose tray or packing symptoms from pressure, temperature, flow, and composition evidence
- Suggested activity: screen solvents for absorption and extraction against capacity, selectivity, recovery, and handling constraints
- Suggested activity: compare separation options and record a bounded improvement recommendation

## FAQs

### Who suits distillation, absorption and extraction practice, and what does it assume?

Process engineers, operations specialists, technical services, and project personnel suit the course. It assumes working familiarity with flow diagrams, material balances, and basic thermodynamics while leaving detailed mechanical design and vendor-software certification outside scope.

### How does separation operations training differ from chemical engineering fundamentals?

Separation operations training concentrates on equilibrium data, operating lines, trays, packing, solvents, column limits, and diagnostics. Chemical engineering fundamentals surveys a wider range of balances, fluid flow, heat transfer, reactions, control, and safety at introductory depth.

### What causes poor distillation column performance?

Poor distillation performance commonly follows unsuitable reflux, feed-condition changes, limited stages, flooding, weeping, entrainment, fouling, pressure variation, or damaged internals. Diagnosis connects composition, temperature, pressure drop, flow, and operating-history evidence.

## How are solvents selected for gas absorption and liquid-liquid extraction?

Solvents are compared through capacity, selectivity, equilibrium behavior, regeneration demand, phase separation, losses, stability, compatibility, safety, and waste considerations. The preferred choice must also match the contactor and operating window.

## When should distillation, absorption or extraction be selected?

Selection depends on phase behavior, volatility, solubility, selectivity, feed condition, target purity, recovery, energy use, solvent handling, equipment limits, and downstream integration. A decision matrix makes the tradeoffs explicit.

## Conclusion

Participants take back a Separation Operations Decision Workbook containing equilibrium checks, operating-line assessments, equipment diagnostics, solvent comparisons, and improvement priorities. It gives teams a repeatable basis for interpreting separation performance and challenging assumptions. The workbook supports clearer operating, troubleshooting, and project-review decisions across industrial separation systems.