

## UCH712: DISTILLATION PROCESSES

|          |          |          |            |
|----------|----------|----------|------------|
| <b>L</b> | <b>T</b> | <b>P</b> | <b>Cr</b>  |
| <b>3</b> | <b>1</b> | <b>0</b> | <b>3.5</b> |

### **Course Objectives:**

To understand the principles and operation of various distillation processes.

**Basic Concepts:** Review of distillation processes. Phase equilibria in multi-component mixtures.

**Batch Distillation:** Shortcut methods for multi-component batch distillation, Stage-by-stage methods for multi-component batch rectification.

**Multi-component Multistage Distillation:** Approximate methods, Equilibrium-based methods, Rate based models for Distillation, Pseudocomponents based distillation.

**Enhanced Distillation:** Azeotropic and extractive distillation, Salt distillation, Pressure-swing distillation, Reactive distillation, Thermally coupled distillation, Dividing wall distillation.

**Column Sequencing:** Sequencing of simple columns, Marginal vapour rate method, Synthesis for complex columns.

### **Course Learning Outcomes (CLO):**

Upon completion of this course, the students will be able to:

1. use the shortcut method for binary and multicomponent distillation.
2. solve problems related to binary and multi-component distillation.
3. use of operational and design aspects of enhanced distillation processes.
4. use the concepts of column sequencing for efficient separation.

### **Text Books:**

1. Seader, J.D., and Henley, E.J., *Separation Process Principles* (2007).

### **Reference Books:**

1. Doherty, M.F. and Malone, M.F., *Conceptual Design of Distillation Systems*, McGraw Hill (2001).
2. Holland, C.D., *Fundamentals of Multicomponent Distillation*, McGraw-Hill (1982)
3. Watkins, R.N., *Petroleum Refinery Distillation*, Gulf Publishing Co. (1973).
4. Stichlmair, J. G., Fair, J.R., *Distillation: Principles and Practice*, Wiley-VCH (1998).

**Evaluation Scheme:**

| <b>S. No.</b> | <b>Evaluation Elements</b>                                      | <b>Weightage (%)</b> |
|---------------|---|----------------------|
| 1             | MST   | 30                   |
| 2             | EST   | 45                   |
| 3             | Sessional (May includes lab/tutorials/ assignments/ quiz's etc) | 25                   |