Process Equipment Design

1.1 Course Number: CH414

1.2 Contact Hours: 2-0-0 Credits: 6

1.3 Semester-offered: 4th Year- odd

1.4 Prerequisite: Chemical Engineering Thermodynamics and Mass Transfer Operations-01

1.5 Syllabus Committee Member: Dr. Milan Kumar and Dr. Rakesh Kumar

2. **Objective:** The course aims to provide knowledge of designing of process equipment which are employed in chemical plants and petroleum refineries.

3. **Course Content:**

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Heat Exchanger	Internals of Shell and Tube heat exchanger, Selection of materials, Tube layout, Bell Delaware method	6
2	Condenser	Types and internals, Condensation inside and outside of tubes, Flooding in vertical tubes, Desuperheating and subcooling, condensation of mixtures, partial condenser, sizing and pressure drop calculation	5
3	Reboiler	Types and internals, Chen's method, design of forced-circulation reboiler, thermosyphon, kettle reboilers	6
4	Evaporator	Single and multi-effect evaporators, Internals, selection of materials, design	5
5	Distillation column	Internals, selection of materials, layout of trays, process and pressure drop calculations	6
		Total	**28**

4. **Readings**

4.1 Textbook:

1. Backhurst, J. R. and Harker J. H.,"Coulson and Richardson Chemical Engineering", Vol. II, 5th Ed., 2002, Butterworth-Heinemann.
2. Sinnott, R.K., "Coulson and Richardson's Chemical Engineering Series: Chemical Engineering Design", Vol. VI, 4th Ed., 2005, Elsevier Butterworth-Heinemann.
3. Serth, R.W., "Process Heat Transfer: Principles and Applications" 2007, Elsevier Ltd.

4.2 Reference books:

5. **Outcome of the Course:**

At the end of the course students will be able to design of process equipment widely used in chemical industries.