

UG  
Course Code: CH417  
Credit: 3  
Version: 1  
Prerequisite Course: Nil

Department: **Chemical Engineering**  
Course Name: **Mechanical Design of Process Equipment**  
L-T-P: **3-0-0**  
Approved on:

**Pressure Vessels:** Introduction of codes for pressure vessel design; Classification of pressure vessels; Design of cylindrical and spherical shells under internal and external pressure; Selection and design of closures; Optimum length to diameter ratio of pressure vessel using common types of closures; Design of jacketed portion of vessels; Selection and design of nozzles; Elementary idea of compensation for openings; Selection of gaskets; Selection and design of flanges; Pipe thickness calculation under internal and external pressure; Introduction to inspection and non-destructive testing; Complete design calculations and shop drawing for at least one pressure vessel using heads and flanges as per code specifications.

**Tall Tower Design:** Design of shell, skirt, bearing plate and anchor bolts for tall tower used at high wind and seismic conditions.

**Supports:** Design of lug support and saddle support including bearing plates and anchor bolts.

**Storage Tanks:** Filling and breathing losses; Classification of storage tanks; Design of liquid and gas storage tanks.

**Heat Exchange Equipment:** Mechanical design and drawing of heat exchangers

**Foundation and Supports:** Foundation and supports for equipment/vessels, tall towers.

### Books

1. Bhattacharya, B. C., "*Introduction to Chemical Equipment Design: Mechanical Aspects*," 5<sup>th</sup> ed., CBS Pub., Delhi., 1991.
  2. Joshi, M. V. and Mahajani, V. V., "*Process Equipment Design*," 3<sup>rd</sup> ed., Macmillan, Delhi, 1996.
  3. Sinnott, R.K., "Coulson and Richardson's *Chemical Engineering*," Vol. 6, 3<sup>rd</sup> ed., Butterworth Heinmann, New Delhi, 2002.
  4. Brownell, L. E. and Young, H. E., "*Process Equipment Design*," John Wiley, 1959.
  5. Dawande, S. D., "*Process Design of Equipments*," 2<sup>nd</sup> ed., Central Techno. Pub. Nagpur, 2000.
  6. IS: 2825-1969, "*Code of Practice for Mechanical Design of Unfired Pressure Vessels*".
  7. IS:803-1962, "*Code of Practice for Design, Fabrication and Erection of Mild Steel Cylindrical Welded Oil Storage Tanks*".
  8. IS: 1239-1968, "*Specification of Mild Steel Tubes*".
  9. IS: 4503-1967, "*Specifications for Shell and Tube Type Heat Exchanger*".
- IS Code for Pipe Line.