

Course Type	Course Code	Name of the Course	L	T	P	Credits
DP	NCHC515	Chemical Engineering Lab	0	0	3	1.5

Course Objective	
<ul style="list-style-type: none"> Provide practical experience in a number of pharmaceutical/chemical engineering unit operations involving heat, mass and momentum transfer. 	
Learning Outcomes	
<ul style="list-style-type: none"> Understanding and hands-on practical experience of different unit operation techniques used in pharmaceutical industries in terms of working principle and operational procedure of equipment 	

List of Experiments

Sl.No	Topics to be covered	Lecture Hours	Learning Outcome
1.	Reynolds experiment for pipe flow in different discharge conditions	3	Understanding of flow transition
2.	Determination of thermal conductivity of materials	3	Understanding of heat conduction in solids
3.	Determination of overall heat transfer coefficient of shell and tube heat exchanger	6	Understanding of heat transfer equipment
4.	Nano grinding in planetary ball mill	3	Understanding of mechanical operations in size reduction
5.	Settling characteristics of powder materials	3	Understanding of sedimentation
6.	Studies on kinetics of given reacting system	3	Understanding of chemical kinetics
7.	Determination of activation energy for a given reaction	3	Effect of temperature on reaction kinetics
8.	Kinetics of solid dissolution	6	Measurement of solubility limits
9.	To study the drying characteristics of material	6	Measurement of the drying rate curve
10.	Determination of specific cake resistance and filter medium resistance for the filtration of given slurry using leaf filter	6	Measurement of filtration process
Total contact hours		42	

Text Books:

1. J. P. Holman, (2011) Heat transfer 10th Ed., McGraw Higher Education.
2. Kern, D. Q. (2001) Process Heat Transfer 1st
3. Levenspiel, O. (2006). *Chemical reaction engineering*. 3rd Edition, Wiley India Pvt. Limited.

Reference Books:

1. Frank P. Incropera, David P. Dewitt, Theodore L. Bergman, Adrienne S. L. (2018). Principles of Heat and Mass Transfer, Wiley India Edition.
2. Geankoplis, C. J. (1993). Transport Processes and Unit Operations. 3rd edition, Prentice Hall.
3. McCabe, W. L., Smith, J. C., & Harriott, P. (2017). *Unit operations of chemical engineering*. 7th edition, McGraw-Hill.