

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. SEMESTER : VII
CHEMICAL TECHNOLOGY

Subject Name: Solid Fluid Operations

Subject Code: 183503

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam(E)	University Exam(P)	Mid Sem Exam(Theory) (M)	Practical (Internal)
3	0	0	3	70	0	30	50

Sr. No	Course contents
1.	Particulate Solids - Particle Characterization, Particulate Solids in Bulk, Blending of Solid Particle, Classification of Solid Particles
2.	Size Reduction of Solids - Mechanism of Size Reduction. Energy for Size Reduction, Methods of Operating Crushers, Nature of Material to be Crushed, Types of Crushing Equipments
3.	Sedimentation - Gravitational Sedimentation, Centrifugal Separation, Flocculation.
4.	Flow through Packed Columns - Flow of a Single Fluid through a Granular Bed, Dispersion, Packed Columns
5.	Fluidization - Characteristics of Fluidized Systems, Liquid-Solid and Gas-Solid Systems, Applications of the Fluidized Solids Technique.
6.	Pneumatic and Hydraulic Conveying - Theory and Industrial Applications.
7.	Filtration - The Theory of Filtration. Filtration Practices, Filtration Equipments, Filtration in a Centrifuge and Filtration Calculations
8.	Flow of particulate matter - Flow of solids through silos and hoppers. Storage and transport of powders.
9.	Size Enlargement - Principles of agglomeration palletizing (cone and disk), press and tabulating machines and extrusion and granulating machines.

Reference Books:

1. Principles of Unit Operations, Alan Foust, Wiley, 1980
2. A Handbook of Unit Operations, D A Blackadder and R M Nedderman, Academic Press, 1971
3. Unit Operations of Chemical Engineering, W. L. McCabe, J, C, Smith and P. Harriot, McGraw Hill, 4th Ed. ,1985
4. Momentum Transfer Operations, S. K. Gupta, Tata McGraw Hill, 1979.
5. Solid Liquid Separations, L Svarovsky, Butterworth-Heinemann, 4th Ed.,2000
6. Principles of Unit Operations, S. Foust, L. A. Wenzel, C. W. Clump, L. B. Andersen, Wiley, New York, 2nd Ed. ,1980.
7. Unit Operations of Chemical Engineering, Warren McCabe, Jubian Smith and Peter Harriot, Mc Graw Hill, 7th Ed., 2004
8. Transport Processes & Unit Operations in Chemical Engineering ,Gean Koplis, Prentice Hall, 2003

9. Coulson and Richardson's Chemical Engineering Volume 1 - Fluid Flow, Heat Transfer and Mass Transfer , Coulson, J.M.; Richardson, J.F.; Backhurst, J.R.; Harker, J.H. Elsevier, 6th Ed., 1999
10. Coulson and Richardson's Chemical Engineering Volume 2 – Particle Technology and Separation Processes, B J Blackhurst & J H Harker, Elsevier, 5th Ed., 2002
11. Coulson and Richardson's Chemical Engineering Volume 3 – Biochemical Reactors & Process Control, B J Blackhurst & J H Harker, Elsevier, 3rd Ed., 1994
12. Coulson and Richardson's Chemical Engineering Volume 4 – Solutions to the Problems in Chemical Engineering from Vol- 1, B J Blackhurst & J H Harker, Elsevier, 2001
13. Coulson and Richardson's Chemical Engineering Volume 5 – Solutions to the Problems in Chemical Engineering from Vol- 2 and Vol-3, B J Blackhurst & J H Harker, Elsevier, 2001
14. Chemical Engineering Design Volume 6, R K Sinnott, Coulson and Richardson's Chemical Engineering Elsevier, 4th Ed, 2005