Gujarat Technological University

B.Pharm Semester-II

Pharmaceutics-II

(3 hours/week; 3 credits; 45hours)

1	**Size Reduction** Objectives, theory of size reduction, factors influencing size reduction, energy requirements in size reduction, study of various mills including ball mill, hammer mill, fluid energy mill, colloid mill, cutter mill, etc. Introduction to methods of generating nanoparticles	**7**
2	**Size Separation** Principles of size separation, screens- types, pharmacopoeial standards, screening methods, screening equipments including shaking and vibrating screens, gyratory screens, sedimentation tank, elutriation and cyclone type separators etc. Application of size separation in pharmacy, angle of repose, carr's index, hausner ratio.	**4**
3	**Mixing** Theory of mixing, mixing mechanisms, solid – solid, solid – liquid and liquid – liquid mixing equipments. Importance of content uniformity in solid dosage forms.	**7**
4	**Crystallization** Objectives, crystal lattice, types of crystal, crystal form, size and habit, formation of crystals, supersaturation theory, factors affecting crystallization process, crystal growth. Study of various types of crystallizers including Swenson walker, tanks, circulating magma, vaccum and crystal cooling crystallizer, etc. Spherical crystallization and its application in ph, brief introduction of co-crystals, polymorphism and amorphous forms of drugs.	**9**
5	**Extraction** Principle, theory, types of extraction, solvents used for extraction, leaching and extraction equipments, small scale and large scale extraction methods, special extraction techniques, application in pharmaceutical industry.	**5**
6	**Compaction and Compression** Objectives, theory, process of compression, effect of compressional force on powders/granules. Kawakita equations. Applications in tablet dosage forms (direct compression, etc.) Hecker and Kawakita equations.	**6**
7	**Automated Process Control Systems** Temperature, pressure, vacuum, flow level and their measurements. Elements of automatic process control systems.	**4**
8	**Industrial Hazards and Safety Precautions** Mechanical, Chemical, Electrical, Fire and dust hazards. Introduction to waste water treatment in industry.	**3**

Pharmaceutics-II
PRACTICALS

(3 hours/week, 3 credits, 45 hours)

Practicals related to topics mentioned in the theory should be carried out.

Books Recommended:

1 Elementary Chemical Engineering - Max S. Peters, Published by McGraw Hill Book Company, New York, 1954
2 Perry's Chemical Engineer's Handbook - Robert H Perry, Green D.W., Maloney J.O.7th Edition, 1998, McGraw – Hill Inc., New York.
3 Tutorial Pharmacy by Cooper & Gunn, ed. S.J.Carter, CBS Publishers & Distributors, Delhi, 6th Edition, 2000.
4 Unit Operations of Chemical Engineering, 5th edition - McCabe, Smith & Harriott, McGraw – Hill Inc., New York.
5 Pharmaceutics: The Science of Dosage Form Design - M.E. Aulton.
6 The Theory & Practice of Industrial Pharmacy – Lachman L., Lieberman H.A. & Kanjig J.L., 3rd edition, 1990 Varghese Publishing House, Bombay.
7 Alfonso G. Remington: The Science & Practice of Pharmacy. Vol.I & II. Lippincott, Williams & Wilkins Philadelphia.