

- Students will also complete a report independently or in a group on a Drug Use Evaluation.
- Students will take the assignment tasks to enhance verbal presentation, communication, written and problem-solving skills, critical analysis of data and provision of care through a weekly conference and projects

PHARMACEUTICS-IV (INDUSTRIAL PHARMACY) (Theory)

Paper 3

Marks 100

1. **MASS TRANSFER.**
2. **HEAT TRANSFER.**
3. **DRYING:** Theories of drying, Drying of Solids, Classification of dryers, General Methods, Fluidized Bed systems, Pneumatic systems, Spray dryer, Freeze drying.
4. **COMMINUTION (SIZE REDUCTION):** Reasons for size reduction, Factors affecting size reduction, size analysis, Sieving, Energy Mills (Ball Mill, Endrumer, Edge Rumer, Disintegrant, Colloid Mill, Hammer Mill, Cutter Mill and Fluid Energy Mill etc).
5. **MIXING:** Fundamentals, Mechanisms, Mixing Equipment used in Liquid/Liquid, Liquid/Solid and Solid/Solid mixing.
6. **CLARIFICATION AND FILTRATION:** Theory, Filter Media, Filter aids, Filter selection and Equipment (Leaf filter, Filter press, Meta filters and Rotary filters).
7. **EVAPORATION:** General principles of Evaporation, Evaporators and Evaporation under reduced pressure.
8. **COMPRESSION AND COMPACTION:** The solid-air Interface, Angle of Repose, Flow rates, Mass volume relationship, Density, Heckel Plots, Consolidation, Granulation, Friability, Compression (dry method, wet method, slugging), Physics of Tableting, tableting machines and other equipment required, problems involved in tableting, tablet coating, **Capsulation:** (Hard and Soft gelatin capsules).
9. **SAFETY METHODS IN PHARMACEUTICAL INDUSTRY:**
 - (a) Mechanical, chemical and fire hazards problems.
 - (b) Inflammable gases and dusts.
10. **EMULSIONS:** Mechanical Equipments, Specific formulation Considerations and Emulsion stability.
11. **SUSPENSIONS:** Formulation of suspensions, Equipment used in preparation and test methods for pharmaceutical suspensions.
12. **SEMISOLIDS:** Equipment used for Ointments, Pastes, Gels and Jellies, Packaging of ointments.
13. **STERILE PRODUCTS:** Sterile area and its Classification, Ophthalmic ointments, Preparation of parenterals (Building, Equipment), Complete Sterility (Aseptic area), air control, (Laminar flow etc.), air locks, Environmental monitoring methods, Sterilization, Filling/Packaging (Plastic and glass containers), Added substances (Preservatives, anti-oxidants, solubilizer, suspending agents, buffers, stabilizers etc.), In-process Quality Control of Parenterals (Sterility, leakage, pyrogens, clarity etc.).

14. PACKING & PACKAGING: Influence of Packaging materials, Stability, Packaging Lines, Packaging Area, Packaging Equipment.

STUDY TOUR: A visit to the pharmaceutical industries will be an integral part of the syllabi and will prepare and submit a report about operations in Pharmaceutical industry that will be evaluated in practical examination.

PHARMACEUTICS-IV (INDUSTRIAL PHARMACY) (Practical)

Paper 7

Marks 100

NOTE: Practical of the subject shall be designed from time to time on the basis of the above mentioned theoretical topics and availability of the facilities, e.g.

- Manufacture of Tablets by Wet Granulation Method, by Slugging and by Direct Compression.
- Coating of Tablets (Sugar Coating, Film coating and Enteric Coating).
- Clarification of liquids by various processes.
- Size Reduction, Homogenization.
- Ampoule filling, sealing and sterilization clarity and leakage tests in injectables.
- Capsule filling by semi automatic machines.
- Manufacture of sustained action drugs.
- Tablets Tests like Disintegration. Dissolution. Friability. Hardness and thickness tests.
- Determination of weight variation in tablets.
- Density of powder. Particle size analysis (Note: A minimum of 20 practicals will be conducted).

PHARMACEUTICS-V (BIOPHARMACEUTICS & PHARMACOKINETICS) (Theory)

Paper 4

Marks 100

1. **DEFINITIONS AND TERMINOLOGY:** Biopharmaceutics, Generic Equivalence, Therapeutic Equivalents, Bioavailability, Bioequivalence, Drug Disposition, Pharmacokinetics (LADMER: Libration, absorption, distribution, metabolism, elimination and response).
2. **GASTRO-INTESTINAL ABSORPTION:** Forces which help in transmembrane movements, Anatomical and physiological factors influencing absorption of drugs. Physicochemical properties of drugs affecting absorption. Absorption of different oral dosage forms.
3. **BIOLOGICAL HALF LIFE AND VOLUME OF DISTRIBUTION:** Introduction, types, methods of determination and application.
4. **DRUG CLEARANCE:** Introduction, Mechanism, Models, determination and relationship of clearance with half-life.