B.Pharm 4TH Semester

1.4.1. Pharmaceutics-IV
(Physical Pharmacy)

Theory 36 Hours.

UNIT I

1. Matter State and Selected Properties: State of matter, change in the state of matter, latent heats and vapor pressure, sublimation- critical point, eutectic mixtures, aerosols-inhalers, relative humidity, liquid complexes, liquid crystals, solids crystalline and amorphous, polymorphism, phase rule, phase diagram for water, phenol in water, Azeotropic mixtures and distillation of Azeotropic mixtures
2. Micromeritics and Powder Rheology: Particle size and distribution, average particle size, number and weight distribution, particle number, methods for determining particle size, optical microscopy, sieving, sedimentation. Particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness and flow properties.
3. Surface and Interfacial Phenomena: Liquid interface, surface and interfacial tensions, surface free energy, measurement to surface and interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB classification, solublisation, detergency adsorption at solid interfaces, solid-gas and solid liquid interfaces, complex films, electrical properties of interface.
4. Buffer Equation and Buffer Capacity: Buffer equation and buffer capacity in general, buffer in pharmaceutical systems preparation, stability, isotonic solutions, measurement of tonicity, calculations and methods of adjusting tonicity.

UNIT II

1. Viscosity and Rheology : Newtonian systems, Law on flow, kinematic viscosity, effect of temperature, non Newtonian system, pseudoplastic, dilatant, plastic, thixotropy, thioxtropy in formulation, determination of viscosity, capillary, falling ball, rotational viscometers.

6. Complexation : Classification of complexes, methods of preparation and analysis, applications.
7. Colloidal Dispersions: Definition, types, properties of colloids, protective colloids, applications of colloids in Pharmacy.
8. Suspensions and Emulsions: Interfacial properties of suspended particles, settling in suspensions, theory of sedimentation, effect of Brownian movement, sedimentation of flocculated particles, sedimentation parameters, wetting of particles, controlled flocculation, flocculation in structured vehicles, rheological considerations, emulsions types, theories, physical stability.
9. Kinetics and Drug Stability: General consideration and concepts, half life determination, influence of temperature, light, solvent, catalytic specifies and other factor, accelerated stability, expiration.

Practical : 36 hours

1. Determination of particle size, particle size distribution and surface area using various methods of particle size analysis.
2. Determination of derived properties powders like density, porosity, compressibility, angle of repose etc.
3. Determination of surface/interfacial tension, HLB value and critical micellar concentration of surfactants.
4. Study of rheological properties of various types of systems using different viscometers.
5. Study of different types of colloids and their properties.
6. Preparation of various types of suspensions and determination of their sedimentation parameters.
7. Preparation and stability studies of emulsions.
8. Determination of half life, rate constant and order of reaction.

Accelerated stability testing, shelf life determination.

eparation of pharmaceutical buffers and determination of buffer capacity.

B.Pharm 4TH Semester

1.4.2: Pharmaceutical Chemistry-IV

Theory 36 Hours.

UNIT-I

1. Polynuclear hydrocarbon: Structure, nomenclature, synthesis, properties and chemical reactions of the following: Diphenyl methane, Triphenylmethane, Naphthalene, Anthracene, Phenathrene, napthacene. Structure and use of menadione, Dithranol, Propananol, tolnaftate, suramin, phenolphthalein and crystal violet.
2. Carbonyl Chemistry with special reference to following reactions alongwith mechanism.

   Wolf Kishner reduction, Rosenmund reduction, Michel addition, M.P.V. reaction, Beckman rearrangement, D.C.C. oxidation of alcohol, Mannich reaction, Darzen's reaction etc.

UNIT-II

3. (a) Classification of Hetrocyclic compounds and nomenclature.

   (b) Preparation, properties, aromaticity and important chemical reactions of pyrrole, furan, thiophene and pyridine.

   © Structure and use of Nikethamide, INH, Dilaxamide fuorate, benzhexol tryhexphenidyl.
4. (a) Preparation and properties and important reactions of pyrazole, imiddazole, oxazole, isoxazole, thiazole pyrimidine, indole, quinoline, isoquinoline, acridine and phenothiazine, azepines structure and nomenclature.

(b) Structure and use of chloroquine, metronidazole, phenytoin, thiabendazole, pyrimethamine, Diethyl carbamazine, chlorpromazine, mepacrine, imipramine.

Practical : 36 hours

1. Synthesis of at least three organic compounds in one step.
2. Synthesis of at least three organic compounds involving two steps.
3. Quantitative estimation of Phenolic OH, COOH, Aldehyde and alcoholic groups.
4. Acid value, iodine value and saponification value.
5. Any other experiments to substantiate theory.

B.Pharm 4TH Semester

1.4.3: Pharmacognosy-II

Theory 36 Hours.

UNIT-I

1. Detailed methods of cultivation of the following drugs: Senna, Cinchona, Isapgol, Cardamom, Opium, Ergot.

2. Study of morphological, microscopical and cell wall constituents of crude drugs.

   (a) Study of cell wall constituents and cell inclusions.
   (b) Study of morphology and microscopy of different plant parts.
   Leaf- Datura, Senna. Bark- Cinnamon, cinchona. Wood- Quassia.

   Stem- Ephedra, Root- Rauwolfia, Liquorice. Rhizome- Ginger, Podophyhum

   Flower- Clove. Fruits- Corriander, Fennel. Seeds- Isapgol, Nuxvomica.

3. Study of drugs containing resins and resin combination, Tannins and fixed oils-chemistry, chemical constituents and use.

UNIT-II

4. Volatile oils- General methods of extraction from plants, study of volatile oils of Mentha, coriander, cinnamon, cassia, Lemonpeel, orange peel, Lemongrass, Citronella, caraway, Dill, Clove, Fennel, Nutmeg, Eucalyptus, chenopodium, cardamom, , Musk, sandal wood etc.
5. Study of fibres of plant origin used in surgical dressing and related products.
6. Pharmaceutical aids like Talc, diatomite, Kaolin, Bentonite, gelatin, Agar and natural colours.
7. Role of medicinal and aromatic plants in national economy. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India.

Practical : 36 hours

1. Identification of crude drugs mentioned in theory.

2. Microscopic studies of at least seven selected drugs mentioned in the theory.

3. Identification of fibres and pharmaceutical aids.

B.Pharm 4TH Semester

1.4.4: Pharmaceutical Microbiology

Theory 36 Hours.

UNIT-I

1. Introduction to the scope of microbiology.
2. Structure of bacterial cell.
3. Classification of microbes and their taxonomy. Actinomycetes, bacteria, rickettsiae, spirochetes and viruses.
4. Identification of Microbes: Stains and types of staining techniques, Electron microscopy.
5. Nutrition, cultivation, isolation of bacteria, actinomycetes, fungi, viruses, etc.

UNIT-II

6. Control of microbes by physical and chemical methods.
   a. Disinfection, factors influencing disinfectants, dynamics of disinfection, disinfectants and antiseptics and their evaluation.
   b. Sterilization, different methods, validation of sterilization methods and equipments.
   c. Clean Area Classification.
7. Sterility testing of all pharmaceutical products, preservative efficacy.
8. Microbial assays of antibiotics and vitamin B_{12}

Practicals 36 hours

Experiments devised to prepare various types of culture media, sub-culturing of common aerobic and anaerobic bacteria, fungus and yeast, various staining methods, various methods of isolation and identification of microbes, sterilization techniques and their validation. evaluation of antiseptics and disinfectants, testing the sterility of pharmaceutical products as per I.P. requirements, microbial assay of antibiotics and vitamin B_{12}

B.Pharm 4TH Semester

1.4.5: Professional Communication and Seminar/Group Discussion.

Theory 36 Hours.

UNIT-I

1. English Grammar: Parts of Speech, Articles, Preposition, Tenses, Active- Passive, Direct- Indirect, Thinking exercise. How to avoid translation.
2. Reading Comprehension: Speed reading, scanning and swimming.
3. Working on accept neutralization, pauses, stresses, non words, voice modulation, eye contract for small and large groups.
4. Presentation techniques:- Tips: Placard preparation, various types of presenters, Dos and Don'ts of presentation.
5. Importance of hand movements, Body language, facial expression grooming.
6. Etiquettes and manners, Table manners.
7. Debates and Reverse Debates.
8. Listening Exercise, Different levels of listenings.
9. Personality types, know your personality and personality impact.
10. Behavioral Skills:
    - Logic thinking.
    - Motivating factors.
    - Non verbal communication.
    - Discussion making factors.

UNIT-II

11. Written Skills:

- Proposal writings formats
- Report writings
- Business letters
- Applications
- Covering letters
- Curriculum Vitae Designing.

12. Productivity, Time Management simulation exercise.

13. Leadership skills.

14. Team work 'BSC- Boss, Subordinates and Colleagues

15. Group Discussions (GD) and Tips.

16. Corporate behaviour, corporate expectation, office equipments.

17. Extempore Communication.

18. Interview Tips:-

- What student is supposed to do before the interview, during the interview, after the interview and on the day of interview?
- Various questions that may be asked in an interview.
- Model interviews (video-Shooting and displaying optional)

19. Exit Interview.