

1. GENERAL INTRODUCTION TO CLINICAL PHARMACY:

- a. Introduction to clinical pharmacy and related terms, definition, basic components, comparison with other clinical fields, scope of services.
- b. Guidelines (General guidelines for Clinical Pharmacy Practice)
- c. Patient counseling compliance
- d. Laboratory Data interpretation
- e. Electrolytes management
- f. Clinical literature evaluation
- g. Drug interactions
- h. Medication errors

2. DISEASE MANAGEMENT:

Disease management should be covered by considering aspects like diseases definition, etiology, pathogenesis, clinical presentation, diagnostic work out (briefly), pharmacotherapy.

MODULES:

- Unit I: Cardiovascular unit (hypertension, ischemic heart diseases e.g. angina pectoris, MI, Heart failure).
- Unit II: Pulmonary unit (Asthma e.g. acute, chronic, status asthmaticus, childhood asthma, Pneumonia, COPD includes emphysema & chronic bronchitis)
- Unit III: Gastroenterology unit [ulcer, liver cirrhosis, portal hypertension, hepatitis, diarrhea, inflammatory bowel disease (IBD)].

3. PATIENT PROFILE & PATIENT COUNSELING:

- a. Patient disease profile
- b. Taking case history
- c. Drug profile of at least 25 Important Medications e.g. Adrenaline, Aminoglycosides, Anti-TB Drugs, Antiepileptics, Atropine, Benzodiazepines, Cephalosporins, Chlorpheniramine, Cimetidine, Digoxin, Dobutamine, Dopamine, Fluroquinolone, Furosemide, Lactulose, Macrolides, Metoclopramide, Morphine/Pethedine, Nifedipine, NSAIDS, ORS, Penicillins, Prednisolone, Salbutamol, Vancomycin.
- d. Patient Counseling

4. CLINICAL TRIALS OF DRUG SUBSTANCES: Designing of clinical trials, types of trials, Choice of patients, exclusion of patients and monitoring a clinical trial.**5. EMERGENCY TREATMENT: For example, Cardiopulmonary resuscitation (CPR), Cold Blue.****6. DRUG INTERACTIONS: Mechanism, Physiological factors affecting interaction, Types and level of drug interactions, Role of pharmacist in evaluating drug interaction & its management.****7. PHARMACOVIGILANCE:**

- a. Scope, definition and aims of Pharmacovigilance

- b. Adverse Drug Reactions and Side Effects: Classification, Excessive pharmacological response, Idiosyncrasy, Secondary pharmacological effects, Allergic drug reactions, Detection, Management of ADR, reporting of ADR in light of international health monitoring system.

8. PHARMACOTHERAPY PLAN:

I. Development, Implementation and Monitoring of Drug Therapy Plans:

- a. Pharmacist work up of drug therapy (PWDT)
- b. Documentation of Pharmacotherapy Plan
 - SOAP note
 - CORE Pharmacotherapy Plan
 - PRIME Pharmacotherapy problems
 - FARM note
- c. Implementation of Drug Therapy Plan
- d. Monitoring of Pharmacotherapeutic plan
- e. Pharmaceutical care plan as ongoing process
- f. Importance of drug therapy plan in today's pharmacy practice

II. Pharmacotherapy Decision-Making:

- A. Pursue the role of drug therapy practitioner over that of drug therapy advisor.
- B. Participate in pharmacotherapy decision-making by:
 - a. Identifying opportunities for decision-making.
 - b. Proactively engaging decision-making opportunities.
 - c. Formulating decision rationale that is the result of rigorous inquiry, scientific reasoning, and evidence.
 - d. Pursuing the highest levels of decision-making.
 - e. Seeking independence in making decisions and accepting personal responsibility for the outcomes to patients resulting from one's decisions.
 - f. Personally enacting decisions

9. DRUG INDUCED DISEASES:

10. UTILIZATION OF CLINICAL DRUG LITERATURE: Introduction, Drug literature selection, Drug literature evaluation and Drug literature communication.

11. ONLINE PHARMACEUTICAL CARE SERVICES AND GLOBALIZATION:

12. PROVISION OF PHARMACEUTICAL CARE IN MULTIPLE ENVIRONMENTS:

Professionalism, physical assessment, body substance precautions and the relationships between culture, race and gender to pharmaceutical care.

PHARMACY PRACTICE-IV (CLINICAL PHARMACY-I) (Practical)

Paper 6

Marks 100

1. PHARMACY PRACTICE-V (CLINICAL PHARMACY-I) (PRACTICAL)

- Clerkship in the Clinical Setting. A report related to Clinical Pharmacy Practices will be completed by the students and will be evaluated by the external examiner.

- 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.).