

SECOND SEMESTER

PHARMACEUTICS-VIIB (Pharmaceutical Technology) [Theory]

PHARM 715

Cr. Hr. 03

1. NOVEL GIT DRUG DELIVERY SYSTEM:

- a. Oral Osmotic Pumps
- b. Ion-Exchange Controlled DDS
- c. pH-Controlled DDS
- d. Bio/mucoadhesive DDS
- e. Floating DDS

2. DRUG CARRIER SYSTEM:

- a. Liposomes
- b. Niosomes

3. TARGETED DRUG DELIVERY SYSTEM:

- a. Active Drug Delivery System
- b. Passive Drug Delivery System

4. PHARMACEUTICAL BIOTECHNOLOGY:

- a. Introduction to Biotechnology: Genetics/Genomics, Proteomics, Biomolecular target Identification, Pharmacogenomics, Gene therapy and Nucleic acid therapeutics.
- b. Techniques Used in Pharmaceutical biotechnology: PCR, DNA Sequencing, Affinity Protein Purification.
- c. Fundamentals of Genetic Engineering and its Application in Medicine.
- d. Pharmaceutical Recombinant therapeutic Proteins, Growth factors, Therapeutic antibodies, High-throughput screening of putative therapeutic compounds.
- e. Biotechnological aspects in the product development.
- f. Principle, Synthesis and Application of Monoclonal Antibodies.
- g. Immobilized Enzymes and their application in Medicine.

PHARMACEUTICS-VIIB (Pharmaceutical Technology) [Practical]

PHARM 715

Cr. Hr. 01

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 requirements, e.g. Various techniques to develop the formulation, Granulation technology, Study of drug delivery systems, Biotechnological aspect of product development. (Note: A minimum of 10 practicals will be performed).

PHARMACY PRACTICE-VIB (ADVANCED CLINICAL PHARMACY-II) [Theory]

PHARM 716

Cr. Hr. 03

1. PHARMACEUTICAL CARE, ITS SCOPE, MANAGEMENT AND APPLICATIONS:

2. CLINICAL THERAPEUTICS:

General Strategy: Terminology of Disease. Management and treatment. Drug selection.

3. DISEASE MANAGEMENT:

- Unit VIII : Oncology Unit (Types of tumors, Introduction to Oncological diseases e.g., Prostate cancer, Breast cancer, Lungs cancer)
- Unit IX: Nephrology Unit (Renal failure, nephrotic syndrome)

- Unit X: Hematology Unit (Bleeding disorders/coagulopathies/ clotting disorders e.g. thrombocytopenia, hemophilia, Vit. K deficiency, Anemia)
4. **CLINICAL TOXICOLOGY:**
 - a. General information. Role of pharmacist in treatment of poisoning and general management of poisoning & over dosage. Role and status of Poison Control Centre.
 - b. Antidotes and their mechanism of action.
 5. **SAFE INTRAVENOUS THERAPY & HAZARDS OF I.V. THERAPY:**
 6. **NON-COMPLIANCE:** Definition, introduction and importance, Extent of non-compliance, Methods of assessment, Reasons for non-compliance, Strategies for improving compliance.

PHARMACY PRACTICE-VIB (ADVANCED CLINICAL PHARMACY-II) [Practical]
PHARM 716 Cr. Hr. 01

- Clerkship in the Clinical Setting. A project Related to Clinical Pharmacy Practices will be completed by the students and will be evaluated by the external examiner.
- Students are required to take/present verbal presentation, communication, written and problem-solving skills, critical analysis of data and provision of care through a weekly conference and projects.

PHARMACY PRACTICE-VIIB (FORENSIC PHARMACY)
PHARM 717 Cr. Hr. 03

1. **THE PHARMACY ACT 1967:**
2. **CONTROL OF NARCOTICS SUBSTANCES ACT 1997:** Laws relating to Narcotic drugs and psychotropic substances.
3. **THE POISONS ACT 1919:**
4. **THE FACTORIES ACT 1934:**
5. **SHOPS AND ESTABLISHMENTS ORDINANCE 1969 WITH RULES:**

PHARMACY PRACTICE-VIIIB (Pharmaceutical Management & Marketing)
PHAM 718 Cr. Hr. 03

1. **MARKETING MANAGEMENT:**
 - a. Ethical consideration of Pharmaceutical Marketing
 - b. Difference between Pharmaceutical Marketing and Consumer Marketing
 - c. Major stakeholders within pharmaceutical market environment.
 - d. Marketing Research (Process and Methodology)
 - e. Market Analysis Techniques 3Cs (Customer analysis, Company analysis, competitors analysis)
 - f. Evaluating the marketing performance (audit tools and audit process)
 - g. Designing sales force structure, sales force size and sales quota
 - h. Marketing channels, Promotion and Advertising and Salesmanship.
2. **SALES MANAGEMENT:** Personnel, Buying, Receiving, Pricing, Sales promotion and Customer Services.

3. **BUSINESS DEVELOPMENT MANAGEMENT:** General principles, strategies, short and long term planning and objectives.
4. **BUSINESS COMMUNICATION:** Importance and benefits of business communication, components of communication, concept and problems of communication, 7C's of communications.
5. **STRATEGIES FOR SUCCESSFUL BUSINESS AND GLOBAL MEETINGS:** Background information on groups, purpose and kinds of meetings, solving problems in meetings, leadership responsibilities in meetings, participant's responsibilities in meetings.

PHARMACEUTICAL CHEMISTRY-IVB (Medicinal Chemistry) [Theory]

PHARM 719

Cr. Hr. 03

NOTE: The topics will be taught with special reference to their Pharmaceutical Applications.

1. **GENERAL PROPERTIES, CHEMISTRY BIOLOGICAL ACTION, STRUCTURE ACTIVITY RELATIONSHIP AND THERAPEUTIC APPLICATIONS OF FOLLOWING:**
 - a. **Sulphonamides:** Prontosil, sulphanilamide, Sulphapyridine, sulphadimidine, Sulfamethoxazole, Sulfadiazine and Sulfafurazole.
 - b. **Antimalarials:** 4-Aminoquinolines, 8-Aminoquinolines, 9-Amino acridines, Biguanides, Pyrimidine analogues, Mefloquine and Cinchona alkaloids.
 - c. **Diuretics:** Mercaptomerin, Meralluride, Thiazides, Spironolactone, Theophylline, Furosemide, Acetazolamide, Ethacrynic acid and Triameterene.
 - d. **Antitubercular Drugs:** Ethambutol, Isonicotinic acid, Hydrazid, Rifampacin, Thioguanine, Pyrazinamide, cycloserine, Ethunamide, Cytarabine, 5-Flourouracil and Dacarbazine.
 - e. **Antiviral Drugs:** Acyclovir, Tromantadine Hydrochloride and Ribavirin.
 - f. **Immunosuppressant Agents:** Azathioprine and Cyclosporin.
 - g. **Antibiotics:** Penicillins, Cephalosporins, Streptomycin, Chloramphenicol, Tetracyclines, Kanamycin and Erythromycin.

PHARMACEUTICAL CHEMISTRY-IVB (Medicinal Chemistry) [Practical]

PHARM 719

Cr. Hr.: 01

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. Estimation of functional groups; Carboxylic, Hydroxy, Amino and Nitro groups; Determination of Molecular weights of Organic Compounds. Synthesis of Paracetamol, Salicylic Acid, Methyl salicylate, Azobenzene, Benzoic Acid, 5-Hydroxy-1, 3-benzoxazol-2-one, Aspirin, P-nitrosophenol, 3-nitrophthalic acid, o-Chloro-benzoic acid. Assay of the Drugs like Sulpha drugs, Aspirin, Paracetamol, Benzyl Penicillin. Inorganic Preparations (Note: A minimum of 10 practicals will be conducted).

NOTE: Upon completion of recognized Pharm.D. degree, a pharmacy graduate is required to undergo residency based training for a period of 1 year in any area; at public or private Hospital, Pharmaceutical Industry, Community Pharmacy, Pharmaceutical Marketing, Research & Development and Public health recognized by the Pharmacy Council of Pakistan. The objective of the residency is to undergo a planned training on aspects of pharmacy practice under the supervision of a registered pharmacist.