

THIRD PROFESSIONAL

FIRST SEMESTER

PHARMACY PRACTICE-IIA (Dispensing Pharmacy) [Theory]

PHARM 510

Cr. Hr. 03

- 1. BASIC PRINCIPLES OF COMPOUNDING AND DISPENSING INCLUDING:** Fundamental operations in Compounding, Containers and closures for Dispensed Products, Prescription-Handling (Parts of Prescription, Filling, Interpretation, Pricing) and Labelling of Dispensed Medication.
- 2. EXTEMPORANEOUS DISPENSING OF:** Solutions, Suspensions, Emulsions, Creams, Ointments, Pastes and gels, Suppositories and pessaries, Powders and granules and Oral unit dosage form.
- 3. PHARMACEUTICAL INCOMPATIBILITIES:** Types of Incompatibilities, Manifestations, Correction and Prevention with reference to typical examples.

PHARMACY PRACTICE-IIA (Dispensing Pharmacy) [Practical]

PHARM 510

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. Practical introduction to prescription handling, interpretation, filling and labeling.

Mixtures: Dispensing of simple mixtures containing soluble substances only, mixtures containing diffusible substances, in-diffusible substances and mixtures forming precipitate.

Powders: Dispensing of simple powders, compound powders and effervescent powders for external use.

Incompatibility: Practical importance of Incompatibilities.

Ointments and Creams: Dispensing of iodine and Methyl salicylate ointment. Dispensing of cold cream and vanishing creams.

Cosmetics: Lipstick, talcum powder, after shave lotion, shaving cream.

Note: A minimum of 20 practicals will be conducted).

Health Science Research Project: In the area of health care system, community pharmacy. Establishment of DIC, PCC.

PHARMACEUTICAL CHEMISTRY-III (Pharmaceutical Analysis) [Theory]

PHARM 511

Cr. Hr. 03

NOTE: The topics will be taught with special reference to their Pharmaceutical Applications. The quantitative and qualitative analysis of drugs and drug products utilizing the instrumental techniques and titrimetric techniques.

- 1. SPECTROSCOPIC METHODS:** Theory, Instrumentation and Pharmaceutical Applications of the following Spectroscopic Methods:
 - a. Atomic Absorption and Emission Spectroscopy
 - b. Molecular Fluorescence Spectroscopy
 - c. Flame Photometry
 - d. I.R. Spectroscopy
 - e. Mass Spectroscopy
 - f. NMR Spectroscopy
 - g. U.V./Visible Spectroscopy
- 2. CHROMATOGRAPHIC METHODS:** Column Chromatography, Thin Layer Chromatography, Gas Liquid Chromatography, HPLC, LCMS, GCMS, Capillary Electrophoresis.

PHARMACEUTICAL CHEMISTRY-III (Pharmaceutical Analysis) [Practical]

PHARM 511

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. determination of the purity and composition of the unknown drugs by using at least each of the above techniques. (A minimum of 10 practicals will be conducted).

PHARMACOLOGY & THERAPEUTICS-IIA [Theory]

PHARM 512

Cr. Hr. 03

- 1. DRUGS ACTING ON CENTRAL NERVOUS SYSTEM:**
 - a. Sedatives & Hypnotic
 - b. Anxiolytics, antidepressants and antimanic drugs
 - c. Antiepileptics
 - d. Antiparkinsonian and drug used in other neurodegenerative diseases.
 - e. Antipsychotics
 - f. Opioid analgesics
 - g. Therapeutic gases (Oxygen, Carbon-dioxide, Nitric oxide and Helium.
 - h. Cerebral Stimulants, Medullary stimulants, Spinal Cord Stimulants.
 - i. Anesthetics: General and local
- 2. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS:** Disease modifying drugs, antirheumatic drugs, non-opioid analgesics and drugs used in the treatment of gout.

PHARMACOLOGY & THERAPEUTICS-IIA [Practical]**PHARM 512****Cr. Hr. 01**

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

- To study the convulsant effects of strychnine and picrotoxin in frogs and to determine the site of action.
- To identify the unknown (convulsant) drug and determine its site of action.
- To study the effects of Adrenaline on Human Eyes.
- To study the effects of Pilocarpine on Human Eyes.
- To study the effect of Homatropine on Human Eyes.
- To identify and observe the effects of unknown drugs on Human Eyes.
- To study the effects of local anaesthetic drugs on human and the nerve plexus of frog.
- To identify and differentiate the effects of unknown drug on human and the nerve plexus of frog.
- To demonstrate the effects of Acetylcholine on the Rectus abdominus muscle of frog and competitive pharmacological antagonism by Neuromuscular blocking agent e.g. Gallamine.
- To identify the unknown drug by performing pharmacological competitive antagonism on Rectus abdominus muscle of Frog.
- To study the anti-coagulant effects of Heparin and oral anti-coagulants on Rabbits.
- To identify the unknown anticoagulant drug using Rabbits.
- To demonstrate the Graded Dose-Response curve of Acetylcholine on Rabbit intestine.
- To identify unknown concentration of Acetylcholine from Graded Dose-Response curves.
- To demonstrate the general anesthetic effect on rabbits.
- To demonstrate the effect of sedatives and hypnotics on rabbits.
- To demonstrate the anti-nociceptive (analgesic) effect on mice.
- To demonstrate antidepressant effect in rats (forced swimming test, tail suspension test, Yohimbine lethality test).

Note: A minimum of 10 practicals should be conducted)

PHARMACOGNOSY-IIA (Advanced) [Theory]**PHARM 513****Cr. Hr. 03**

- 1. SEPARATION AND ISOLATION OF PLANT CONSTITUENTS:** Introduction and use of spectroscopic and chromatographic techniques for the identification of natural products. Description and interpretation of ultraviolet, infrared, mass, nuclear magnetic resonance ($^1\text{H-NMR}$ and $^{13}\text{C-NMR}$) spectra and other advance techniques to elucidate the structure of natural products.
- 2. CARBOHYDRATES AND RELATED COMPOUNDS:** Introduction and classification of carbohydrates, sugars as adjuvant in drugs, role of impurities in sugar substances.
 - a. Sucrose and Sucrose containing drugs: Sucrose, Dextrose, Liquid glucose, Fructose, Lactose, Xylose, Caramel, Starch, Inulin, Dextrine etc.
 - b. Cellulose and Cellulose Derivatives: Powdered cellulose, Microcrystalline cellulose, Methyl cellulose, Sodium Carboxy-methyl cellulose.
 - c. Gums and Mucilage: Tragacanth, Acacia, Sodium Alginate, Agar, Pectin.

3. **ALKALOIDS:** Introduction, Properties, Classification, Function of alkaloids in plants, Methods of extraction and identification tests.
 - a. Pyridine-Piperidine Alkaloids: Areca nut, Lobelia.
 - b. Tropane Alkaloids: Belladonna, Hyoscyamus, Stramonium.
 - c. Quinoline Alkaloids: Cinchona.
 - d. Isoquinoline Alkaloids: Ipecacuanha, Opium.
 - e. Indole alkaloids: Rauwolfia, Catharanthus, Nux vomica, Physostigma, Ergot.
 - f. Imidazole alkaloids: Pilocarpus.
 - g. Steroidal alkaloids: Veratrum.
 - h. Alkaloidal amines: Ephedra, Colchicum.
 - i. Purine Bases: Tea, Coffee.

4. **GLYCOSIDES:** Introduction, classification, chemistry, extraction, isolation and medicinal uses of:
 - a. Cardioactive glycosides: Digitalis, Strophanthus and White squill.
 - b. Anthraquinone glycosides: Cascara, Aloe, Rhubarb, Cochineal & Senna.
 - c. Saponin glycosides: Glycyrrhiza, Sarsaparilla.
 - d. Cyanophore glycosides: Wild cherry.
 - e. Isothiocyanate glycosides: Black mustard.
 - f. Lactone glycosides: Cantharide.
 - g. Aldehyde glycosides: Vanilla.
 - h. Miscellaneous glycosides: Gentian, Quassia, Dioscorea.

5. **PLANT STEROIDS:** Introduction, extraction, isolation, nomenclature, sources and uses of bile acids, plant sterols, steroidal saponins, steroid hormones, withanolides and ecdysons.

6. **LIPIDS:** Introduction, classification, source, active constituents and pharmacological uses of:
 - a. Fixed Oils: Castor oil, cotton seed oil, olive oil, peanut oil, sun flower oil, corn oil, coconut oil, almond oil, linseed oil, mustard oil, sesame oil and soybean oil.
 - b. Fats and Related Compounds: Theobroma oil and Lanolin.
 - c. Waxes: Bees wax, carnauba wax, spermaceti and Jojoba oil.

PHARMACOGNOSY-IIA (Advanced) [Practical]
PHARM 513 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. Extraction of the active constituents of crude drugs and chemical tests for their identification. Isolation and separation of active constituents of crude drugs by paper and thin layer chromatography.

Also include the following experiments:

- Determination of Iodine value; Saponification value and unsaponifiable matter; ester value; Acid value.
- Chemical tests for Acacia; Tragacanth; Agar; Starch; Lipids. (castor oil, sesame oil, shark liver oil, bees wax); Gelatin.

(Note: A minimum of 10 practicals will be conducted)

PATHOLOGY [Theory]

PHARM 514

Cr. Hr. 03

1. **SCOPE OF PATHOLOGY & CONCEPT OF DISEASES:**
2. **DEFINITION AND TERMINOLOGY:** Ischemia, Hypoxia, Necrosis, sInfarction, Atrophy, Hypertrophy, Hyperplasia, Metaplasia, Aplasia, Anaplasia.
3. **RESPONSE OF BODY TO INJURY AND INFECTION:** Acute and Chronic inflammation, Immunity, Allergy, Hyper Sensitivity.
4. **SPECIFIC DISEASES:** Ulcer (Peptic, Duodenal), Hypertension, Leukemia or Blood Cancer (Malignant Carcinoma, Sarcoma & Lymphomas), Diagnosis and treatment of Cancer in general, fate, survival and prognosis with tumors.

PATHOLOGY [Practical]

PHARM 514

Cr. Hr. 01

1. **STUDY OF PATHOLOGICAL SLIDES OF VARIOUS PATHOLOGICAL CONDITIONS:**
Acute inflammation, Chronic inflammation, Chronic specific inflammation, Different types of Degeneration, Thrombosis, Embolism, Infarction, Necrosis, Gangrene, Hyperplasia, Metaplasia, Pigmentation, Calcification, CVC, Papilloma, Adenoma, Chondroma, Fibroma, Leomyoma, Neofibroma, Squamous Cell Carcinoma, Basal Cell Carcinoma, Transitional Cell Carcinoma, Adenocarcinoma, Fibrocarcinoma, Rhadomyo sarcoma, Leomyo sarcoma, Lymphosarcoma, Liposarcoma, Reticular Cell Sarcoma, Hodgkins disease, Breast Carcinoma, Osteogenic Sarcoma, Osteoclastoma, Hapatitis, Diabetes.
2. **EXAMINATION OF DIFFERENT BODY FLUIDS IN VARIOUS PATHOLOGICAL CONDITIONS:**
Urine Complete Examination, Stool Examination, Blood Complete Examination, Semen Examination, Cerebrospinal Fluid Examination, Pericardial Fluid Examination, Pleural Fluid Examination, Ascitic Fluid Examination, Blood Sugar, Blood Urea, Blood Cholesterol etc.
3. **TESTS FOR VARIOUS SPECIMENS OF CLINICAL IMPORTANCE:**
Techniques of Clinical Blood Examination for various disases, Gastric Analysis, Tests for liver function, Renal function test, Tests for endocrine abnormalities, Biopsies and cytologic techniques.

SECOND SEMESTER

PHARMACY PRACTICE-IIB (Community, Social & Administrative Pharmacy)

PHARM 515

Cr. Hr. 03

1. **DEFINITIONS AND BACKGROUND:**
2. **PUBLIC HEALTH AND COMMUNITY PHARMACY:** Epidemiology & its Control, Epidemiological methodology with a focus on specific disease states, Pharmacoepidemiology