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# CHEMISTRY FOR PHARMACY LAB

## INTRODUCTION

This course covers experiments on qualitative and quantitative aspects of chemistry as applied to medicine and health science, such as separation, identification, purification, and synthesis procedures.

## EQUIPMENT AND INSTRUMENTS

- Analytical Balances
- Top Loading Balances
- Hot Plates and Stirrer
- Oven
- Ice Flaking Machine
- Water Bath
- Centrifuge
- Vacuum Pump
- Separatory Funnel
- Melting Point Apparatuses

## EXPERIMENTS

- Safety Regulations and Measurements
- Qualitative Analysis of Anions (Exp.1)
- Qualitative Analysis of Cations (Exp. 2)
- Quantitative Analysis: Acid – Base Titration (Exp.3)
- Paper Chromatography (Exp.4)
- Isolation of Caffeine From Tea Leaves (Exp. 5)
- Synthesis of Aspirin (Exp. 6)
- Purification by Recrystallization (Exp, 7)
- Oxidation of Alcohols: Preparation of Benzoic Acid (Exp. 8)
- Identification of Alcohols and Phenols (Exp. 9)
- Identification of Aldehydes and Ketones (Exp. 10)
- Properties of Carboxylic Acids and Esters (Exp. 11)

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## MEDICINAL CHEMISTRY IA

### INTRODUCTION

This course introduces the basic concepts of medicinal chemistry, including study of the molecular and chemical structures of organic pharmaceuticals using molecular models, preparation of some active ingredients, functional groups reactions and identification of organic compounds such as amine, aldehyde, ketones, alcohols, esters and phenols.

### EQUIPMENT AND INSTRUMENTS

- Analytical Balances
- Hot plates and Stirrers
- Rotatory Evaporators and Vacuum Pumps
- Distillation Apparatuses
- Melting Point Apparatuses
- Water Baths
- Ultrasonic Bath
- Ovens

### EXPERIMENTS

- Molecular Models and Stereochemistry
- Oxidation of Benzyl Alcohol
- Preparation of Aspirin
- Identification of Functional Groups(Amine, Aldehydes, Ketones, Alcohols, Esters and Phenols)

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## MEDICINAL CHEMISTRY IB

### INTRODUCTION

This course is concerned with the theory and practice of the preparation of some of the active ingredients in pharmaceutical preparation and classical and instrumental methods for the separation, identification and quantitative analysis of chemical substances. Satisfactory completion of this course affords students a working knowledge of analytical instrumentation typically employed in pharmaceutical and biochemical research laboratories. It also provides students with an appreciation of the relative strengths and limitations of different instrumental-based analysis methods.

### EQUIPMENT AND INSTRUMENTS

- UV-VIS Spectrophotometer
- GC-MSMS
- GC-FID and GC-ECD
- HPLC-UV
- Analytical Balances
- Hot Plates and Stirrers
- Rotatory Evaporators and Vacuum Pumps
- Polarimeters
- Distillation Apparatuses
- Melting Point Apparatuses
- Water Baths
- Ultrasonic Bath
- Ovens

### EXPERIMENTS

- Methyl Salicylate Preparation
- Drugs Mixture Separation Using TLC
- Determination of Paracetamol Concentration Using Spectrophotometer
- Separation of Caffeine and Paracetamol Mixture Using HPLC
- Separation and Identification of Hydrocarbon Mixture Using GC-FID and GC-MSMS

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## TESTS AND SERVICES

- Development and Validation of Analytical Methods for Analysis of Active Ingredients
- Related Substances Analysis
- Routine Quality Control of Pharmaceutical Products

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## MEDICINAL CHEMISTRY IIA

### INTRODUCTION

The practical part of the course covers experiments on the synthesis of organic compounds and drugs using different analysis and purification techniques and includes synthesis of chiral drugs and the techniques used in the separation of enantiomers.

### EQUIPMENT AND INSTRUMENTS

- Analytical Balances
- Top loading Balances
- Hot Plates and Stirrer
- Oven
- Water Bath
- Thermometer
- Centrifuge
- GC/MS
- GC/FID
- Vacuum Pump
- UV-Vis Spectrophotometer
- Polarimeter
- Ice Flaking Machine
- Reflux Apparatus
- Melting Point Apparatus
- Separator Funnel
- Rotatory Evaporator
- UV Cabinet
- Thin Layer Chromatography Tanks

### EXPERIMENTS

- The Resolution of ( $\pm$ )- $\alpha$ -Methylbenzylamine
- Synthesis of P-Aminobenzoic Acid, PABA
- Introduction to Spectroscopic Methods
- Nitrating Methyl Benzoate: Electrophilic Aromatic Substitution
- Isolation and Identification of Casein

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## TESTS AND SERVICES

- To Have Preliminary Idea About the Active Ingredients and Their Concentration in the Drug Dosage Forms
- Toxic Elements Detection and Measurement in Food, Water, Soil and Other Specimens (With the Help of ICP)

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## MEDICINAL CHEMISTRY IIB

### INTRODUCTION

The practical part of this course deals with experiments on the synthesis of pharmaceutical organic compounds and detection of their purity, stability and biological activity. Experiments to study the chemical and pharmaceutical properties of pharmaceutical drugs are also included in this course in addition to the application of molecular modeling to study the three-dimensional structures of drugs and their structure activity relationship (SAR).

### EQUIPMENT AND INSTRUMENTS

- Analytical Balances
- Top loading Balances
- Hot Plates and Stirrer
- Oven
- Water Bath
- Thermometer
- Centrifuge
- GC/MS
- GC/FID
- Vacuum Pump
- UV-Vis Spectrophotometer
- Polarimeter
- Ice Flaking Machine
- Reflux Apparatus
- Melting Point Apparatus
- Separator Funnel
- Rotatory Evaporator
- UV Cabinet
- Thin Layer Chromatography Tanks

### EXPERIMENTS

- Synthesis of Sulfasalazine
- Determination of the Free Salicylic Acid Concentration in Aspirin... by Forming Fe<sup>3+</sup> Complexes.
- Synthesis of Propranolol
- Synthesis and Chemical Analysis of Penicillins
- Determination of Oil/Water Partition Coefficient of Mandelic Acid

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- Isolation and Identification of DNA from Yeast
  - Structural Data: The Bases for Molecular Modeling

### **TESTS AND SERVICES**

- To Have Preliminary Idea About the Active Ingredients and Their Concentration in the Drug Dosage Forms
- Toxic Elements Detection and Measurement in Food, Water, Soil and Other Specimens (With the Help of ICP)