# Pharmaceutics and Pharmaceutical Technology Laboratories

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<tr>
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<th>Person in Charge</th>
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<td>M12-127</td>
<td>Dr. Shireen Audeh, Dr. Amira Mahrous</td>
<td>College of Pharmacy</td>
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<td>Pharmaceutics B</td>
<td>M12-127</td>
<td>Dr. Shireen Audeh, Dr. Amira Mahrous</td>
<td>College of Pharmacy</td>
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<td>Pharmaceutics 1A</td>
<td>M12-024</td>
<td>Dr. Shireen Audeh, Dr. Amira Mahrous</td>
<td>College of Pharmacy</td>
<td>Pharmaceutics 1A</td>
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<td>Pharmaceutics 2A</td>
<td>M32-G40</td>
<td>Dr. Mariame Ali, Dr. Shireen Audeh, Dr. Amira Mahrous</td>
<td>College of Pharmacy</td>
<td>Pharmaceutics 2A</td>
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<td>Pharmaceutics 1B</td>
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INTRODUCTION
The goal of the Laboratory is to provide students with the necessary skills in performing pharmaceutical calculations and to promote student’s learning by performing full experimental work on physical pharmacy topics covered in this course such as partition phenomena, phase equilibria and solubility. This lab will provide the students with practical training in formulation of oral liquid dosage forms such as syrups, effervescent solutions, infusions, decoctions, washes, elixirs and aromatic waters.

EQUIPMENT AND INSTRUMENTS
- Pycnometer
- UV Spectrophotometer
- Separating Funnel
- pH Meter
- Thermometers

EXPERIMENTS
- Pharmaceutical Calculations – Density, Specific Gravity and Specific Volume of Liquids
- Preparation of Pharmaceutical Buffered Solutions and Determination of Buffer Capacity
- Preparation of Simple Syrup, Effervescent Solutions and Drought
- Preparation of Cough Syrup, Infusion of Senna
- Preparation of Strong Iodine Solution (Lugol’s Solution), Washes and Aromatic Waters
- Determination of Critical Solution Temperature of Phenol/ Water System
- Phase Diagram of Three Component Mixture System
- Determination of Partition Coefficient of Iodine Between Two Immiscible Phases
- Determination of the Effect of Temperature and Electrolytes on the Solubility of Benzoic Acid
INTRODUCTION
The goal of the Laboratory is to promote student’s learning by performing full experimental work on physical pharmacy topics covered in this course such as determination of colligative properties of pharmaceutical solutions, measurement of surface and interfacial tension of disperse systems, use of surfactants in micellar solubilization, determination of rheological properties of pharmaceutical preparations and determining optical and electric properties of colloids.

EQUIPMENT AND INSTRUMENTS
- Osmometer
- Stalagmometers
- Brookfield Viscometer
- Microscope

EXPERIMENTS
- Determination of Colligative Properties of Solutions – Osmotic Pressure
- Effect of Adding Hypotonic or Hypertonic Solutions on Red Blood Cells
- Determination of Colligative Properties of Solutions – Freezing Point and Boiling Point
- Determination of Surface Tension and Interfacial Tension Between Two Immiscible Phases
- Determination of Critical Micelles Concentration of Surfactants
- Micellar Solubilization of Water-Insoluble Drugs
- Adsorption of Oxalic Acid on Charcoal
- Preparation and Characterization of Colloids
- Determination of Rheological Properties and Behavior of Different Pharmaceutical Dosage Forms
INTRODUCTION
The goal of the Laboratory is to provide students with practical training in formulating and preparing dosage forms such as suspensions, emulsions, microemulsions, gels, ointments and suppositories. Students will be able to interpret, calculate, extemporaneously prepare these dosage forms and apply basic scientific principles to the art and technology of formulation.

EQUIPMENT AND INSTRUMENTS
- Brookfield Viscometer
- Centrifuge
- Conductometer
- Microscope
- Suppositories Molds
- Ice Maker

EXPERIMENTS
- Formulation and Characterization of Suspensions
- Physical Stability Testing of Suspensions
- Formulation and Characterization of Emulsions
- Formulation of Microemulsions, Physical Stability of Emulsions
- Formulation of Gels
- Formulation of Cosmetic Creams
- Formulation of Medicated Creams
- Formulation of Ointments
- Formulation of Suppositories (Oily Bases)
- Formulation and Characterization of Suppositories (Hydrophilic Bases)
- Formulation of Pessaries
INTRODUCTION
The goal of the Laboratory is to provide students with practical training in performing bioequivalence studies. The lab offers hands on training on how to design, perform, analyze and interpret results and write reports of bioequivalence studies. The lab also aims to complement the core course in providing essential knowledge regarding fundamental factors affecting pharmacokinetics parameters of drug by using means of practice problem, computer simulation program and group project work.

EQUIPMENT AND INSTRUMENTS
- HPLC
- Centrifuges
- Vortex
- Centrifuge Tubes
- Bath Shaker
- UV Spectrophotometer
- USP Dissolution Tester
- Freezer
- WinNonlin Software
- SPSS Software

EXPERIMENTS
- Identify and Differentiate the Characteristics of Zero and First Order Kinetics
- Determine the Rate Constant of Reaction and Initial Concentration of Reactants
- Application of WinNonlin as a Tool to Determine Pharmacokinetics Parameters of a Given Set of Drug Plasma Concentration Over Time Data
- Comparison of Pharmacokinetic Parameters of Two Marketed Product of Paracetamol Following a 500 mg Single Dose in Healthy Adult Volunteers under Fasted and Fed Conditions. The Bioequivalence Study was Approved by the Ethical Committee in the University
- Comparison of Pharmacokinetic Parameters of Two Marketed Dosage Forms of the Same Active Ingredient
INTRODUCTION
The goal of the Laboratory is to provide students with practical training on how to formulate and characterize different solid dosage forms such as powders, tablets and capsules. The lab is designed to teach the students formulation principles where the physicochemical properties of the drug and excipients may influence the formulation, component compatibility, manufacturing, bioavailability and stability of the final dosage form.

EQUIPMENT AND INSTRUMENTS
- Korsch Tablet Press Machine
- Kaleva Spray Coating Machine
- V-Blender
- Sieve Shakers/ Retsch Sieves
- Disintegration Testing Apparatus
- Dissolution Apparatus USP
- Friability Testing Apparatus
- Thickness and Hardness Apparatus
- Flow Meter
- Tapped Density tester
- Capsule Filling Machine
- Lyophilizer
- Malvern Zeta Sizer
- Stability Chamber
- UV-Spectrophotometer
- Magnetic Hot Plate
- Desiccator
- Oven
- Centrifuge
- Weighing Scale
- Thermometer
EXPERIMENTS

- Determination of Powder Flow Properties
- Determination and Characterization of Particle Size of Powders
- Preparation and Quality Control Testing of Effervescent Granules
- Formulation, Preparation and Quality Control Testing of Paracetamol Capsules
- Formulation, Preparation and Quality Control Testing of Immediate Release Paracetamol Tablets
- Formulation, Preparation and Quality Control Testing of Sustained Release Paracetamol Tablets
- Formulation, Preparation and Quality Control Testing of Tablets Prepared by Wet Granulation
- Effect of Compression Forces on Tablet Properties
- Tablet Coating using Spray Coating Technique
- Detection and Characterization of Tablet Defects