



# FACULTY OF SCIENCE

Research lab instruments



# CONTENT

---

01

GC/US origin

02

Analog magnetic stirrer

03

pH meter

04

Oven

05

Conductance

06

Bransonic bath

07

Heating mantle

08

Spectrophotometer-UV

09

Tensiometer

10

Rocker vacuum pump

11

Analytical balance

12

Magnetic susceptibility  
balance

13

Circulator water bath

14

Precision shaking  
bath

15

Auto polarimeter

16

HPLC

17

Incubator

18

vortex mixer

19

Microscope

20

Muffle furnace  
High temperature

# CONTENT

---

21

Muffle furnace Low temperature

22

Gamma ray device

23

X-ray apparatus

24

FT-IR spectroscopy

25

Atomic absorption spectroscopy

26

Muffle furnace

01

# GC/US origin

**Gas chromatography** is a chromatographic technique that is suitable for the analysis of volatile and semi-volatile substances. GC instrument facilitates the vaporization of the analyte and its subsequent transport in the mobile phase (gas) through either packed columns or capillary columns containing the stationary phase.



# Analog magnetic stirrer

02



**A magnetic stirrer** is a device widely used in laboratories and consists of a rotating magnet or a stationary electromagnet that creates a rotating magnetic field. This device is used to make a stir bar, immerse in a liquid, quickly spin, or stir or mix a solution, for example. A magnetic stirring system generally includes a coupled heating system for heating the liquid

03

## pH meter

**pH meter** is an instrument used to measure the acidity or alkalinity of a solution - also known as pH. pH is the unit of measure that describes the degree of acidity or alkalinity. It is measured on a scale of 0 to 14.



## OVEN

04



**The oven** is used for high-volume thermal convection applications. This laboratory equipment provides uniform temperature throughout the chamber necessary for annealing, drying, sterilizing, and other industrial lab functions. Typical sizes are from one cubic foot (28 liters) to 32 cubic feet (906 liters) with temperatures that can reach 300°C (572°F).

05

# Conductivity meter

The **conductivity meter** allows us to measure the level of conductivity in solutions. Conductivity is the ability of materials (solutions, metals, or gases) to pass an electric current.



# Bransonic bath

06



**Bransonic baths** are used widely in the laboratory, light industrial, medical, and other specialty applications for cleaning instruments, removing contaminants, sample preparation such as degassing liquids, mixing and homogenization, dissolving solids, lysing, etc.

07

## Heating mantle

**Heating mantles** are used for heating or tempering organic liquids placed in reaction kettles, round-bottomed flasks, or relevant reaction vessels required for the boiling, evaporation, distillation, or extraction process.



## Spectrophotometer-UV

08



**UV-spectroscopy** is an analytical technique that measures the amount of discrete wavelengths of UV or visible light that are absorbed by or transmitted through a sample in comparison to a reference or blank sample. Ultraviolet-visible (UV-Vis) spectroscopy is a widely used technique in many areas of science ranging from bacterial culturing, drug identification, and nucleic acid purity checks and quantitation, to quality control in the beverage industry and chemical research.

09

# Tensiometer

a **Tensiometer** is a measuring instrument used to measure the surface tension ( $\gamma$ ) of liquids or surfaces. Tensiometers are used in research and development laboratories to determine the surface tension of liquids like coatings, lacquers, or adhesives. A further application field of tensiometers is the monitoring of industrial production processes like parts cleaning or electroplating.



# Rocker vacuum pump

10



**Vacuum pump** creates a partial vacuum for rotary evaporation, concentration, distillation, degassing solutions, gel drying, blotting, and freeze-drying; used with small vacuum ovens, filtration flasks, manifolds; motors can be oil-free.



11

# Analytical balance

An **analytical balance** is a class of balance designed to measure small mass in the sub-milligram range. The measuring pan of an analytical balance (0.1 mg resolution or better) is inside a transparent enclosure with doors so that dust does not collect and so any air currents in the room do not affect the balance's operation.



# Magnetic susceptibility balance

12

The **Magnetic Susceptibility Balance (MSB)** determines the magnetic properties of solids and liquids.

It can be used to measure a wide range of paramagnetic and diamagnetic materials.



13

# Circulator water bath

**Circulating water baths** reach and maintain desired water temperatures needed for the cooling or heating of samples and reagents both efficiently and reliably through the use of constantly circulating water.



# Precision shaking bath 14



**Shaking baths** are used with samples that require shaking during incubations. Features include orbital and/or reciprocal shaking, bath volume, and achievable temperature ranges. Shaking baths are designed for use with various sample types, including tissue culture and molecular biology reagents.

15

# Auto polarimeter



**Polarimeter** is used to measure the angle of rotation caused by passing polarized light through an optically active substance. Polarimeters are used in the chemical, pharmaceutical, and food industries for monitoring quality, purity, and concentration and indicating the progress of reactions and conversions.

# HPLC

16



**High-performance liquid chromatography (HPLC)**, is a technique in analytical chemistry used to separate, identify, and quantify each component in a mixture. It relies on pumps to pass a pressurized liquid solvent containing the sample mixture through a column filled with a solid adsorbent material.

17

# Incubator

An **incubator** is a device used to grow and maintain microbiological cultures or cell cultures.

The incubator maintains optimal temperature, humidity, and other conditions such as the CO<sub>2</sub> and oxygen content of the atmosphere inside. Incubators are essential for much experimental work in cell biology, microbiology, and molecular biology and are used to culture both bacterial and eukaryotic cells.



# Vortex mixer

18



A **vortex mixer** is a simple device used commonly in laboratories to mix small vials of liquid. Vortex mixers are quite commonplace in bioscience laboratories. In cell culture and microbiology laboratories they may be used to suspend cells. In a biochemical or analytical laboratory, they may be used to mix the reagents of an assay or to mix an experimental sample and a dilutant.

19

# Microscope

a **compound microscope** is used for viewing samples at high magnification (40 - 1000x), which is achieved by the combined effect of two sets of lenses: the ocular lens (in the eyepiece) and the objective lenses (close to the sample).



# Muffle furnace High temperature

20



The **Muffle Furnace** is mainly used for high-temperature sintering, annealing, and heat treatment applications. The maximum temperature can reach by this furnace is 1700°C and is primarily used for sintering applications.

21

# Muffle furnace Low temperature

The **Muffle Furnace** is mainly used for high-temperature sintering, annealing, and heat treatment applications. The maximum temperature can reach by this furnace is 1100°C and is primarily used for sintering applications.



# Gamma-ray device

22



the **gamma-ray device** used in an advanced lab to measure the value of gamma energy. The output pulses of the scintillation counter are investigated using the MCA-Box with CASSY and a computer. The total absorption peak and the Compton distribution are identified in the pulse-amplitude distribution generated with monoenergetic  $\gamma$  radiation.

23

## X-ray apparatus

An **x-ray apparatus** is used in the physics lab to determine the lattice constant for crystals. It contains a high-voltage system, X-ray tube, and experiment chamber are all contained within a radiation-proof housing. Designed as a school X-ray apparatus and fully protected equipment.



## FT-IR

24



**FTIR spectroscopy** is used to quickly and definitively identify compounds such as compounded plastics, blends, fillers, paints, rubbers, coatings, resins, and adhesives. It can be applied across all phases of the product lifecycle including design, manufacture, and failure analysis.

25

# Atomic absorption spectroscopy

**Atomic absorption spectroscopy (AAS)** and atomic emission spectroscopy (**AES**) is a spectroanalytical procedures for the quantitative determination of chemical elements by free atoms in the gaseous state. Atomic absorption spectroscopy is based on the absorption of light by free metallic ions. In analytical chemistry, the technique is used for determining the concentration of a particular element (the analyte) in a sample to be analyzed. AAS can be used to determine over 70 different elements in solution, or directly in solid samples via electrothermal vaporization, and is used in pharmacology, biophysics, archaeology, and toxicology research.



# Muffle furnace

26



The **Muffle Furnace** is mainly used for high-temperature sintering, annealing, and heat treatment applications.