Yarmouk University

**Faculty of Science**

# Physics Department Research Labs and Devices

The Department of Physics at the Faculty of Science contains several research labs and devices.

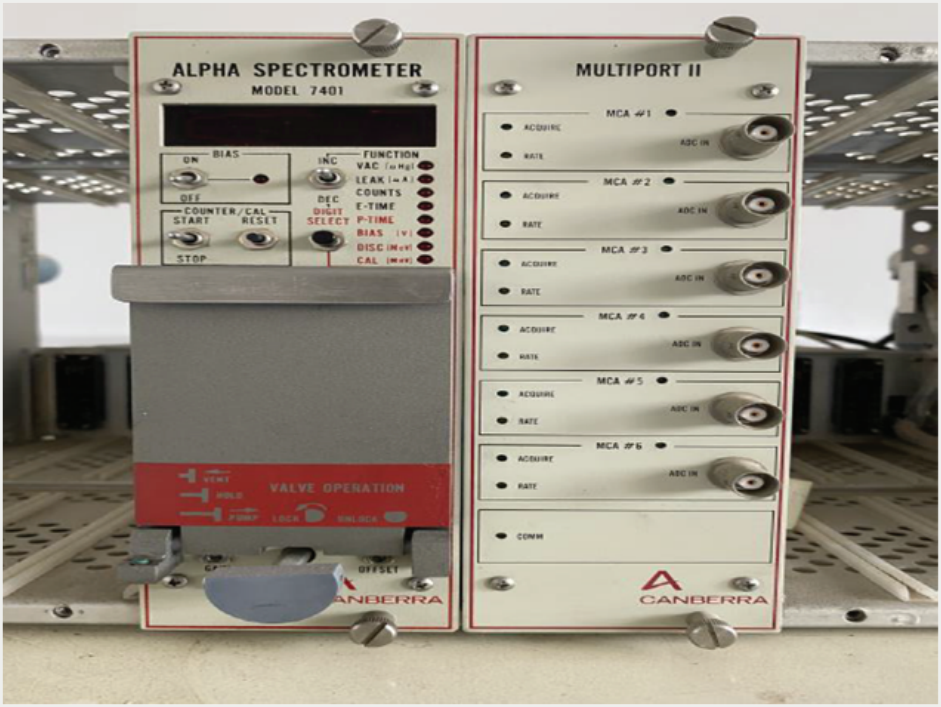
# Alpha Spectroscopy lab

**Responsible Person: Dr. Ali Almomani**
**(ali.almomani@yu.edu.jo)**

## Laboratory Overview:

The lab has an Alpha Spectroscopy detector which can be used to detect the alpha emitters in different samples including soil, plants, food and water.

The researcher can measure his samples on an alpha spectrometer and analyze the results after preparing his samples in the laboratories of the Jordan Atomic Energy Commission, due to the lack of a radiochemistry laboratory at the university. A number of graduate students used the device to measure and analyze their own samples as part of their master's theses.



# Gamma-ray Spectroscopy Lab

**Researchers: Prof. Anas M. Ababneh**
**ababneha@yu.edu.jo**

## Overview:

The gamma-ray spectroscopy performs low radioactivity measurements for environmental radioactivity monitoring and assessment of radiation health risks. Moreover, Monte Carlo simulation calculations is being used currently in the lab to achieve higher accuracy.

## Equipment:

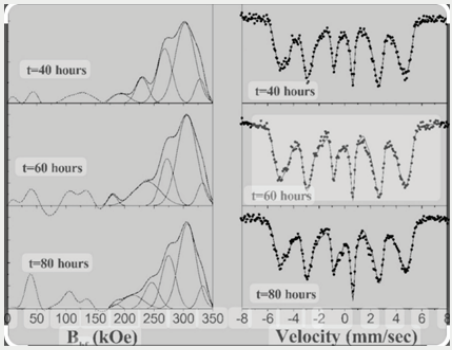
Hyper Pure Germanium (HPGe) with multichannel analyzer and Genie 2000 software. A number of PCs are available to carry Monte- Carlso simulations.

# The Mössbauer Lab

**Researchers: Prof. Abdel-fatahLehlooh**
**aflehlooh@yu.edu.jo**

## Overview:

Mössbauer spectroscopy, which is named after Rudolf Mössbauer, is an effective physics method for accurately measuring energy levels in atomic nuclei. Researchers can examine local atomic environments, chemical bonding, and magnetic interactions in materials containing Iron by taking advantage of the Mössbauer effect of Fe 57 isotope. Since being created in the late 1950s, Mössbauer spectroscopy has been utilized in various fields like materials science, geology, biology, geology, mineralogy and physics where it assists in identification of iron phases in solids and offers info on the local electronic and magnetic fields around the Iron nucleus. Hence, MS is very helpful in probing solids on the atomic level.



# Environmental Physics Lab

**Research group:**
**Dr. KhadeejehHamasha/ khamasha@yu.edu.jo**

## Laboratory Overview:

The Lab has an aethalometer AE33 instrument that can be used to measure the concentration of the black carbon in the air at 7 different wavelengths. Also the lab contain CO2 meter and Ozone meter that can be used to measure CO2 and ozone concentrations in the air with different situation.

Researcher can use this lab to measure the pollution by carbon and ozone with weather parameters(using weather station).

# Computational material science Laboratory

**Responsible Person:**
**Prof. Abdallah Qteish, aqteish@yu.edu.jo**
**Dr. Abdullah Al-Sharif, alsharif@yu.edu.jo**
**Dr. Abdullah Shukri, ashukri@yu.edu.jo**

## Methodology and research:

First-principles investigations of the various properties of solid states materials, by using advanced computational techniques.

## Computational facilities:

Del server (equipped with 40 CPU's and 2 P100 GU)

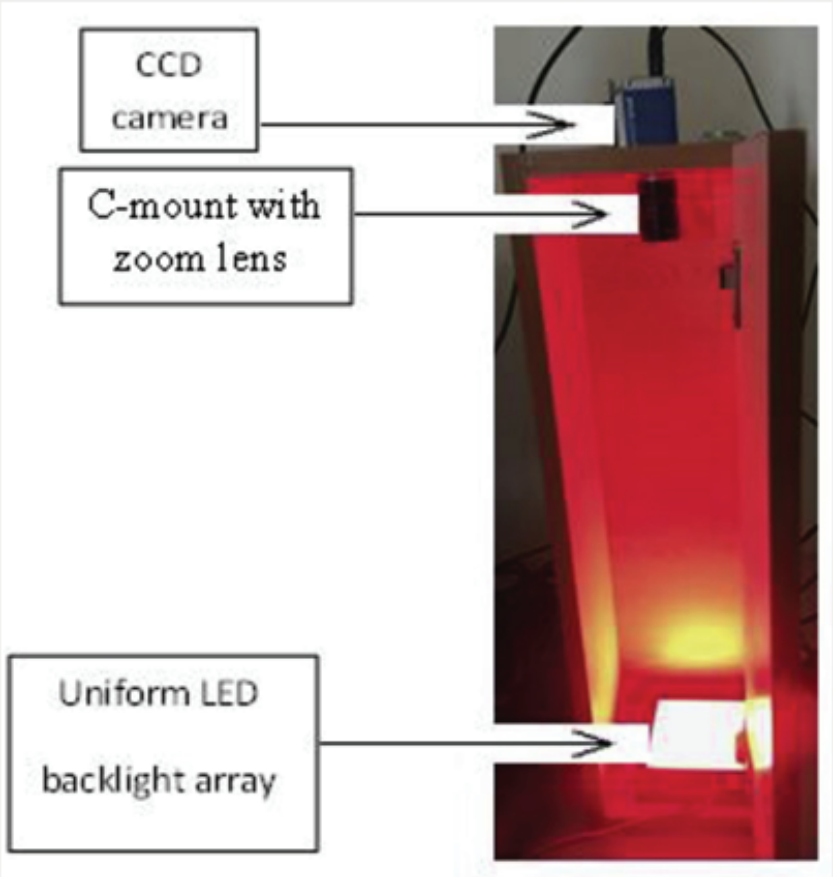
# Charge-coupled-device (CCD) camera with a diffusing-light emitting diode (LED) RGB surface.

**Contact person: Dr. Molhem Eyadeh/ molhem.e@yu.edu.jo**

## The principle of the device:

This device images two-dimensional samples, including gel dosimeters at different wave lengths including the colors of the visible spectrum before and after being irradiated with ionizing irradiation such as X-rays. The images are two-dimensional distribution radiation doses used to confirm planned radiation doses for patients with cancer tumors.

Many scientific papers have been published based on the use of theaforementioned device, and work is still underway to use it for new and developed types of gel dosimeters including the radio-chromic and polymer gel dosimeters.



# Shimadzu UV-2450

**Contact person: Dr. RiadAbabneh/ riada@yu.edu.jo**

## Description:

This instrument can calculate the optical properties including Transmittance, Reflectance, and Absorbance using films or solution. It can also calculate the band gap, urbach energy, Extintion coefficient, and absorption coefficient as result from these data. Note: there are extra useful kit to use.

# Shimadzu RF-5301 PC fluorophotometer

**Contact person: Dr. RiadAbabneh/ riada@yu.edu.jo**

## Description:

This powerful device is ideal for examining a wide range of optical properties, including fluorescence intensity, emission spectra, and excitation spectra