Yarmouk University

Faculty of Science

Earth Sciences Department Research Labs and Devices

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

Scanning Electron Microscope Lab

Location

G 109 - Ibn Sina Building - Faculty of Science

Contact Information

Hadeel Herzallah
Email: hadeel.herzaallah@yu.edu.jo
Tel. 2926
0779142009

Lab Overview

The scanning electron microscope is a crucial device at the university, serving the different faculties of the university and the local community, as it produces images of different samples at high magnifications and accuracy with the possibility of analyzing elements.

Services

-It is used for educational purposes and serves several courses in geology, including: Minerals, microfossils, geochemistry, and rocks of all kinds. In addition to courses in other departments such as microtechnologies in life sciences.

- It is used for research purposes to create digital images coupled with quantitative and qualitative analysis.

Devices

Scanning Electron Microscope + Digital Edax Syste
Carbon Coater
Coating samples with carbon for use in electron microscope analysis

Name and model

Scanning Electron Microscope + Digital Edax System (FEI Quanta 200)

Specifications

- The Quanta Scanning Electron Microscope (SEM) produces enlarged images of a variety of specimens, achieving magnifications of over 100 000x providing high resolution imaging, and the ability to combine the technique with X-ray microanalysis.

- The electron beam in this instrument is generated by a conventional tungsten filament electron source.

- The Quanta is equipped with standard Secondary Electron (SE) and Back Scatter Electron (BSE) detectors, in addition to an Energy Dispersive X-ray Analysis (EDS) detector and an internal TV camera.

- Accelerating voltage between 200 V and 30 kV

- High Vacuum mode. In these modes the column is under high vacuum, and the specimen chamber is at a high pressure range. Digital scanning provides a completely digital image, and image capture is performed by scanning one frame a time at a High resolution of pixel format.

Areas of use

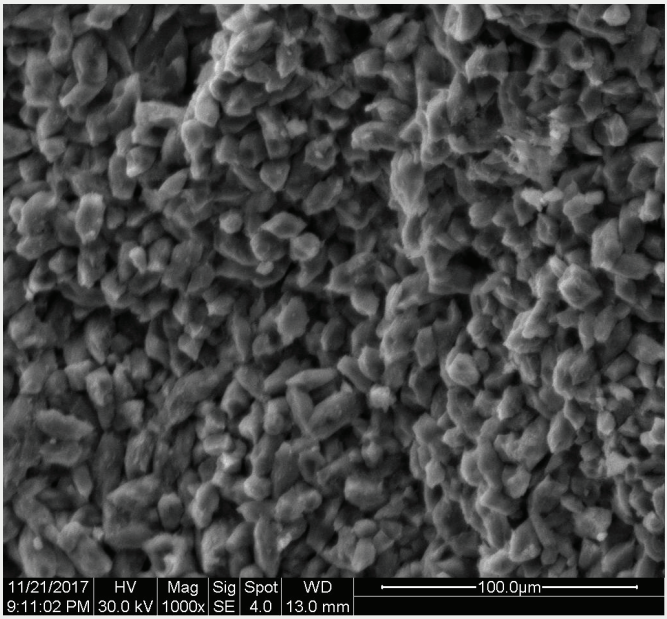
Produces images of different samples at high magnifications and resolutions with the ability to analyze elements of different samples

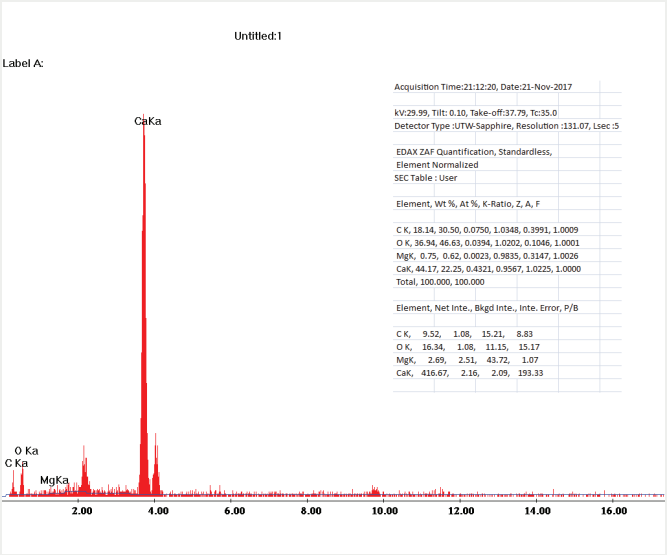
Sample types

Dry solids for samples from different fields:

Geological, chemical, engineering, archaeological and biological samples

Sample analysis





Grain Size Analyzer Lab

Location

G.213 - Ibn Sina Building - Faculty of Science

Contact Information

Abed Alraheem Salah Alsuliman
abdalraheem.s@yu.edu.jo
+962 776188580

Lab Overview

Research Lab

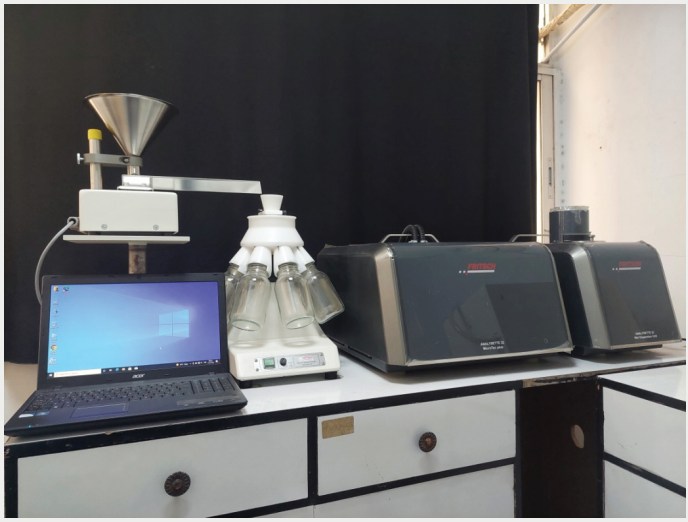
Services

-The ANALYSETTE 22 MicroTec is the ideal Laser Particle Sizer for the determination of the particle size distributions of powdery samples and of solids in suspensions

-The automatic rotary sample divider with auto feeder is used to divide coal, ore, rock, gravel, cement clinker and any kind of solid material powder.

Devices present in the lab

- Laser Particle Analyzer (LPA)
- Rotary Cone Sample Divider



Name and model

Laser Particle Analyzer (LPA)
(Model Analysette 22 MicroTec Plus)

Specifications

1. The Analysette 22 MicroTec plus is a compact laser particle measurement instrument, useful in conventional measurement applications in the range of 0.08 µm to 2000 µm.

2. The system is modular and practical; in addition, it facilitates and speeds up dry and wet dispersion.

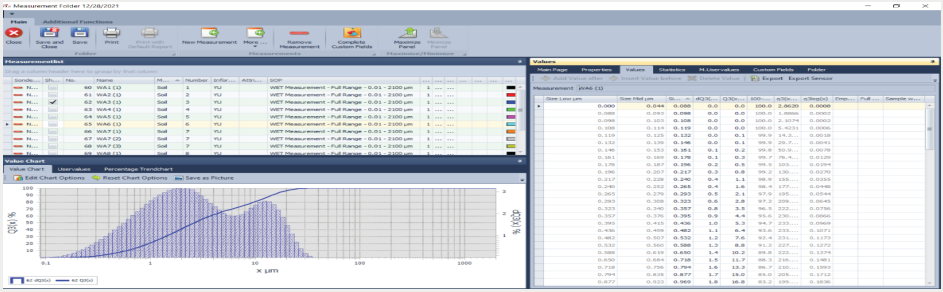
Use

Geological analysis
Environmental Analysis
Pharmaceutical industry
Others

Type of samples

Dry and Wet
(e.g.: Soil, Rock and others)

Samples of analysis



Name and model

Rotary Cone Sample Divider
(Model: LABORETTE 27)

Specifications

1. No. of sub-samples: 8
2. Capacity (maximum sample quantity): 4,000 ml.
3. Sample glass capacity: 500 ml.
4. Division (Unit): Dry

Use

Geological analysis
Environmental Analysis
Pharmaceutical industry
Others

Type of samples

Dry and Wet
(e.g.: Soil, Rock and others)

Geological Workshop

Location

AA9 - Ibn Sina Building - Faculty of Science

Contact Information

Ghosoun Zaiter
Email :- ghosoun.j@yu.edu.jo
Tel. 2934

Lab Overview

- The geology workshop laboratory is used by academic researchers, graduate students, and field geology students to make different rock microscope slides using cutting devices, polishing materials, and gluing.

- The laboratory is used to grind different types of samples for use in various analyses.

- The lab is used to sift wet and dry samples.

- It is used to press soft samples for use in various analyses

Services

Making rock microscope slides and grinding and sieving samples.

Devices

- Slicing and grinding machine, model 1 23 02.

- Lapro slab saw, model 18 IN 11-1360-250.

- Mill lab vibrating cup model pulversett3, 9phase-2sp.

- N-mounting press , model 20-1320-220.

- Polishing machine, model N38-1444-250 thin section.

- Desiccators with tube (outlet) and stop cock.

- Analytical sieve shaker.

Name and model

Slicing and grinding machine, model 1 23 02

Specifications

This device has two parts, one for cutting small samples, and one for thinning the slug thickness of a single sample up to a certain limit.

Areas of use

Geology, Archaeology

Sample types

Solid

Name and model

Lapro slab saw, model 18 IN 11-1360-250

Specifications

This device specializes in cutting large samples.

Areas of use

Geology, Archaeology

Sample types

Solid

Name and model

Mill lab vibrating cup model pulversett3, 9phase-2sp

Specifications

This device specializes in grinding different rock samples for use in various analyses.

Areas of use

Geology, Archaeology, Biology

Sample types

Solid

Name and model

N-mounting press , model 20-1320-220

Specifications

This device specializes in pressing soft samples for use in various analyses.

Areas of use

Geology, Archaeology, Biology

Sample types

Solid disintegrating

Name and model

Polishing machine, model N38-1444-250 thin section

Specifications

This machine specializes in polishing large specimens for display purposes in museums and offices.

Areas of use

Geology

Sample types

Solid

Name and model

Desiccators with tube (outlet) and stop cock

Specifications

This device specializes in cooking soft and loose rock samples to make slides out of them.

Areas of use

Geology

Sample types

Disintegrated - soft

Name and model

Analytical sieve shaker

Specifications

This device specializes in sieving and separating samples into different sizes.

Areas of use

Geological and ecological

Sample types

Disintegrated - soft

Rainfall Simulator

Overview

- Rainfall simulation is a method used worldwide to assess the generation of overland flow, soil erosion, infiltration, and related processes, such as soil sealing, crusting, splash, and redistribution of solids and solutes by raindrop impact.

- Data obtained from these simulations are of great significance for both the analysis of simulated processes and input data for hydrological modeling.

- Rainfall simulators are an excellent education tool that allows students to visually observe the hydrological and such as runoff generation, infiltration rate, soil erosion and ...ect.

Advantages

• The ability to take many measurements quickly without having to wait for natural rain.

• Able to work with constant controlled rain, thereby eliminating the erratic and unpredictable variability of natural rain.

• It is usually quicker and simpler to set up a simulator over existing cropping treatments than to establish the treatments on runoff plots.

Applications

• Hydrological Modelling

• Studies of relative erodibility

• Studies of soil infiltration and soil hydrology

• flow characteristics

• Sediment transport

• Experimental geomorphology

• Relative protection afforded by different plant densities

Atomic Absorption Spectrophotometer Unit

Location

G 310 - Ibn Sina Building - Faculty of Science

Contact Information

Safaa Khashashneh
Email: Safaa@yu.edu.jo
Tel:02/7211111-2956

Name and model

novAA 800D Atomic Absorption Spectrometry (AAS) instrument
offered by Analytik Jena

Services

The novAA 800 D which is used for heavy metal determination and other important elements such as Ca ,Mg ,K ,Na ,Fe ,Cu ,Si ,Al, Mn ,Zn ,Pb ,Cr ,Cd, Co, Ag, and other elements, and covers the complete range of AAS applications from flame to graphite furnace in one instrument making it the perfect system for laboratories with moderate sample loads, interested in both, the high and the low concentration ranges and main focus on cost-effectiveness and ease of use.

Areas of use

The unit serves departments of Geology and Chemistry, Botany, Biochemistry, Civil Engineering, Chemical Engineering, food analysis labs and government institutions which care about health, water analysis and environment, this unit introduce service to researchers inside and outside the university to analyze their different type of samples, which help them in their research.

Sample types

Water, soil , rock , plant and heavy metal assessments.

Sample analysis

Concentration of Copper in soil samples

Instrument: Atomic Absorption Spectrometer

Blank (deionized water) Absorbance				
	-0.001	0.000	0.000	
	0.000	0.001	0.004	
	-0.001	-0.001	-0.001	
	0.000	0.000	0.000	
Average	0.000		LOD (ppm)	0.109
Std.dev.	0.001		LOQ (ppm)	0.363

Note: We have chosed the first three standards which they are close in concentration to unknowns in order to make LOD & LOQ more better.

Std. Conc.	Abs. 1	Abs.2	Abs.3	Abs.
0.1	0.004	0.006	0.006	0.005
0.25	0.009	0.01	0.01	0.010
0.5	0.018	0.02	0.019	0.019
1	0.025	0.027	0.027	0.026
3	0.102	0.099	0.102	0.101
5	0.175	0.174	0.176	0.175
10	0.352	0.356	0.353	0.354

Cu					
Samples	Abs. 1	Abs.2	Abs.3	Abs.	Conc. ppm
1	0.016	0.016	0.016	0.016	0.421
2	0.022	0.024	0.022	0.023	0.596
4	0.02	0.02	0.019	0.020	0.518
5	0.011	0.013	0.012	0.012	0.316
6	0.01	0.011	0.012	0.011	0.289
7	0.016	0.017	0.017	0.017	0.439
8	0.018	0.019	0.018	0.018	0.482
9	0.008	0.01	0.01	0.009	0.246
10	0.013	0.012	0.012	0.012	0.325
11	0.017	0.016	0.017	0.017	0.439

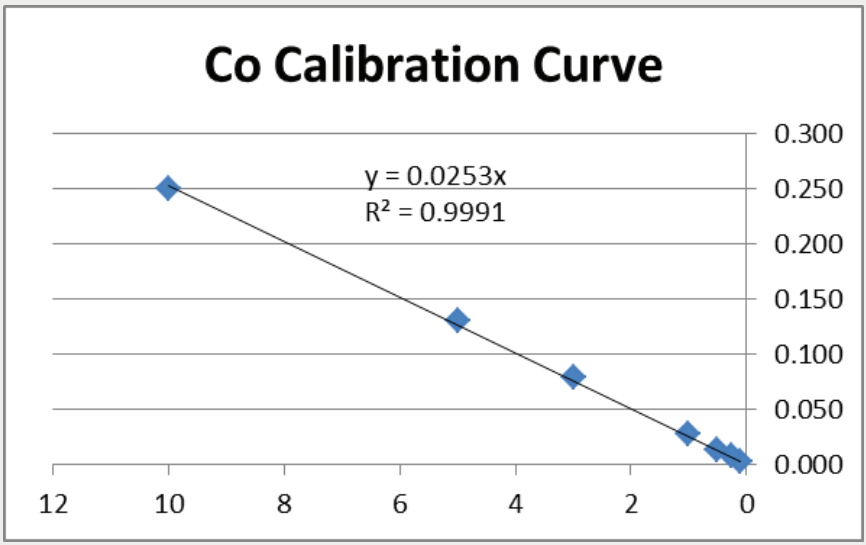
Concentration of Co in soil samples

Instrument: Atomic Absorption Spectrometer

Blank (deionized water) Absorbance				
	-0.002	0.000	-0.001	
	0.001	0.000	0.000	
	0.000	0.000	0.000	
	0.000	-0.001	-0.001	
Average	0.000		LOD (ppm	0.093
Std.dev.	0.001		LOQ (ppm	0.311

Std. Conc.	Abs. 1	Abs.2	Abs.3	Abs.
0.1	0.003	0.003	0.003	0.003
0.25	0.008	0.007	0.008	0.008
0.5	0.014	0.013	0.014	0.014
1	0.028	0.027	0.027	0.027
3	0.079	0.08	0.079	0.079
5	0.131	0.131	0.129	0.130
10	0.25	0.251	0.249	0.250

Co					
Samples	Abs. 1	Abs.2	Abs.3	Abs.	Conc. ppm
1	0.006	0.006	0.006	0.006	0.160
2	0.006	0.006	0.006	0.006	0.160
4	0.008	0.008	0.007	0.008	0.227
5	0.006	0.005	0.006	0.006	0.147
6	0.006	0.006	0.006	0.006	0.160
7	0.006	0.007	0.006	0.006	0.173
8	0.009	0.009	0.009	0.009	0.280
9	0.006	0.006	0.006	0.006	0.160
10	0.013	0.012	0.012	0.012	0.413
11	0.009	0.01	0.009	0.009	0.293



Ion Chromatography Unit

Location

G 310 - Ibn Sina Building - Faculty of Science

Contact Information

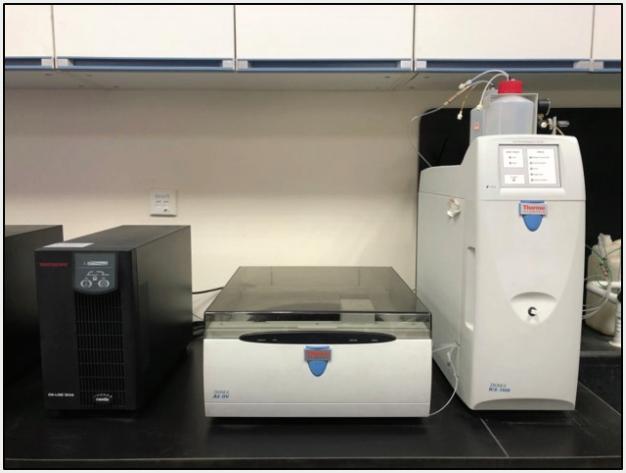
Safaa Khashashneh
Email: Safaa@yu.edu.jo
Tel:02/7211111-2956

Name and model

DIONEX IC1600
offered by Thermo Fisher Scientific

Services

Ion chromatography is used for water chemistry analysis. It's able to measure concentrations of major anions, such as fluoride, chloride, nitrate, nitrite, and sulfate, as well as major cations such as sodium, potassium, calcium, and magnesium in low concentration range.



Areas of use

This unit introduces service to researchers inside and outside the university to analyze their different type of samples which help them in their research.

Sample types

Some typical applications of ion chromatography include:

In drinking water analysis for pollution and other constituents, determination of water chemistries in aquatic ecosystems, determination of salts content in soil and sediments.

Sample analysis

Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11
Sample #	FLORIDE (mg/l)	FLORIDE (mg/kg)	CHLORIDE (mg/l)	CHLORIDE (mg/kg)	NITRITE (mg/l)	NITRITE (mg/kg)	NITRATE (mg/l)	NITRATE (mg/kg)	PHOSPHATE (mg/l)	PHOSPHATE (mg/kg)
14	0.963	4.815	50.7272	253.636	0.0746	0.373	8.1185	40.5925	0.3373	1.686
16	0.3586	1.793	14.5036	72.518	0.0209	0.1045	7.0914	35.457	0.01176	0.058
23	2.3731	11.8655	17.4854	87.427	0.0265	0.1325	4.4961	22.4805	0.0655	0.327
18	0.5173	2.5865	22.0352	110.176	0.0265	0.1325	9.6267	48.1335	0.1528	0.76
7	0.6764	3.382	29.5373	147.6865	0.081	0.405	16.1436	80.718	0.115	0.57
19	0.6303	3.1515	15.9994	79.997	0.0259	0.1295	7.2988	36.494	0.0328	0.16
21	2.5447	12.7235	19.7495	98.7475	0.0341	0.1705	5.7487	28.7435	0	
22	3.3377	16.6885	35.0882	175.441	0.0961	0.4805	12.4198	62.099	0.1065	0.532
20	3.7214	18.607	12.0615	60.3075	0	0	5.6371	28.1855	0	