

COLLEGE OF **SCIENCES**





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APPLIED PHYSICS & ASTRONOMY DEPARTMENT

Applied Physics and Astronomy Laboratories

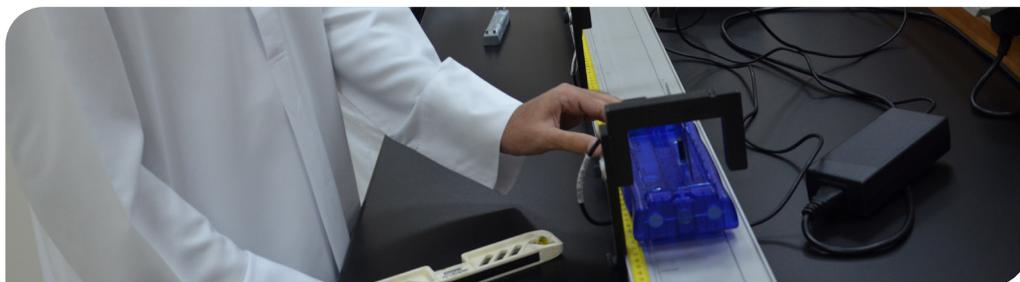
Lab Name	Location	Person in Charge	Programs Served	Courses Served
Physics Lab (1M)	M12-106	Sanoor Mannath	- College of Science - College of Engineering	- Physics 1 Lab - Physics 3 Lab
Physics Lab (2M)	M12-105	Sanoor Mannath	- College of Science - College of Medicine - College of Health Science	- Physics for Medical Science Lab - Physics for Medical Diagnostic Imaging lab
Physics Lab (3M)	M12-103	Bento Joseph	- College of Science - College of Engineering	- Physics 2 Lab - Electronics for Experimental Physics Lab
Physics Lab (4M)	M12-102	Faisal Alsane	College of Science	- Modern Physics Lab - Advanced Physics Lab
Computational Capabilities Lab	M12-106 B	Bento Joseph	College of Science	Computational Physics
Physics Lab (1W)	W12-214	Mariam Al Naqbi	- College of Science - College of Engineering	Physics 1 Lab
Physics Lab (2W)	W12-216	Mariam Al Naqbi	- College of Science - College of Engineering	Physics 1 Lab
Physics Lab (3W)	W12-218	Khadija Alhosani	- College of Science - College of Medicine - College of Health Science	- Physics for Health Science Lab - Physics for Medical Science Lab
Physics Lab (4W)	W12-220	Khadija Alhosani	- College of Science - College of Medicine - College of Health Science	- Physics for Health Science Lab - Physics for Medical Science Lab
Physics Lab (5W)	W12-213	Taghrid Abdallah	- College of Science - College of Engineering	Physics 2 Lab
Geoscience/ Geophysics Lab	W12-219	Abd Elmahmoud Elsamani	College of Science	- Stratigraphy and Structure Geology - Sedimentary Rocks and Sedimentology - Igneous and Metamorphic Rocks Petrology - Hydrogeology
Petrology (Microscopy) Lab	W12-221	Abd Elmahmoud Elsamani	College of Science	- General Geophysics - Exploration - Geophysics 1 - Exploration Geophysics 2
Radiation Lab	W12-213 A	Dr Hussein Elmehdi	College of Science/ Research lab	Teaching/Research lab
Spectroscopy Laboratory	W12-213 B	Dr. Hussain Al Awadhi	Research Lab	Research Lab

Lab Name	Location	Person in Charge	Programs Served	Courses Served
Research Lab	W12-213 C	Dr. Hafsa Khurshid	Research Lab	Research Lab

Applied Physics and Astronomy Lab Staff

#	Name	Title	Ext.	Email
1	Khadija Al Housani	Team Leader of Physics Labs Unit	065053466	kalhousani@sharjah.ac.ae
2	Taghrid Abdallah	Sr. Laboratory Officer-Physics	065053467	tabusheritah@sharjah.ac.ae
3	Sanoor Mannath	Sr. Laboratory Officer-Physics	065052480	smannath@sharjah.ac.ae
4	Bento Joseph	Laboratory Officer-Physics	065052466	bjoseph@sharjah.ac.ae
5	Faisal Abdullah Alsane	Laboratory Officer-Physics	065052408	falsane@sharjah.ac.ae
6	Maryam Al Naqbi	Laboratory Officer-Physics	065053469	malnaqbe@sharjah.ac.ae
7	Abd Elmahmoud Elsamani	Laboratory Officer-Geophysics	065053457	aelgaili@sharjah.ac.ae

PHYSICS LABORATORY (1M)



Location	Lab Staff in Charge	Contacts
M12-106	Sanoor Mannath	065052480

INTRODUCTION

This Laboratory is designed to teach students enrolled in the College of Engineering and College of Sciences. Experiments designed to teach the application of Physics fundamentals in kinematics, energy, collision, motion, properties of matter, rotational motion, basic optics and thermodynamics.

EQUIPMENT AND INSTRUMENTS

Measuring tools and devices, Electronic Timers, Force Tables, Air Tracks, Air Blowers, Frictionless Tracks, Trolleys, , Pasco Interface, Pasco sensors, CASSY Interface, Projectile Launcher, Ballistic Pendulum, Springs, Simple Pendulum, Calorimeter, Heaters, Electronic Balances, Linear Thermal Expansion Apparatus, Handheld Vacuum pump, Hot Plates.

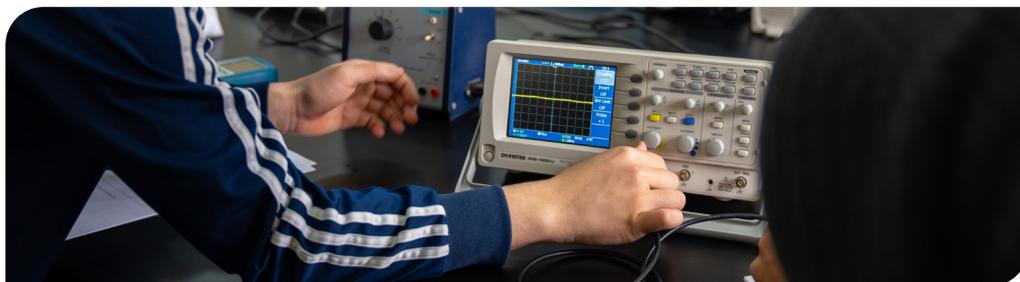
Rotational and circular motion apparatus, Thermal expansion apparatus, vibrating string and standing waves, Speed of sound apparatus and Young's Modulus apparatus, Optical Parts like mirrors, Lenses Prisms and gratings, and Spectrometers, Laser source.

EXPERIMENTS

- Measuring Devices and Density
- Equilibrium of Forces at Body Joints
- Free Fall Motion
- Motion in 2-D (Projectile)
- Friction
- Uniformly Accelerated Motion
- Newton's Second Law
- Conservation of Energy
- Conservation of Momentum
- Ballistic Pendulum

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- Uniform Circular Motion
 - Simple Harmonic Motion
 - Inertia of Different Object
 - Conservation of Angular Momentum
 - Young's Modulus
 - Hook's Law and SHM
 - Vibrating String and Standing Waves
 - Buoyant Force
 - Thermal Expansion
 - Speed of Sound in Solids and Air
 - Mirrors and Lenses
 - Light Interference
 - Spectrometer

PHYSICS LABORATORY (2M)



Location	Lab Staff in Charge	Contacts
M12-105	Sanoor Mannath	065052480

INTRODUCTION

This laboratory is designed to teach students enrolled in the College of Medical Sciences, College of Health Science and College of Science. Experiments designed to introduce the students about some of the applications of the concepts covered in Physics for Medical Sciences and Health Science with emphasis on motion, forces, balance and torque, basics of imaging modalities such as conventional X-rays, CT, PET, Magnetic Resonance Imaging, Ultrasound and Radiation Physics.

EQUIPMENT AND INSTRUMENTS

Measuring Tools and Instruments, Force Table Sets with Accessories, Frictionless Tracks, CASSY Software and CASSY Sensors, Linear Thermal Expansion Apparatus, Calorimeters, Heaters, Pasco Interface, Laser Source, Power Amplifier, Geiger Muller Tube, Radioactive Sources, Absorption Sheets of Different Materials and Thickness.

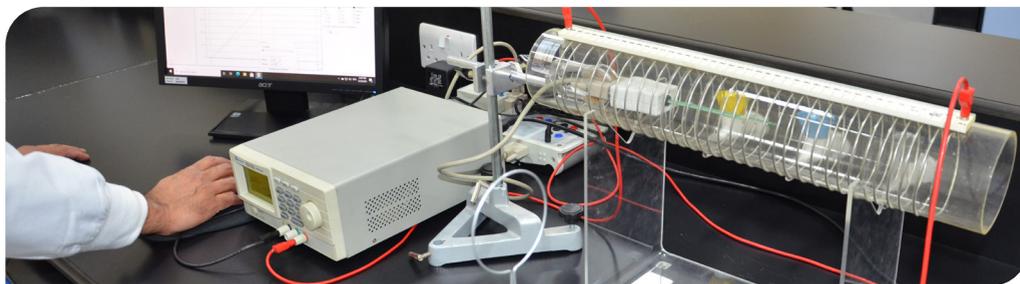
Power Supplies, Electric Field Mapping Apparatus, Solenoids, Circular Coils, Optical Benches, Spectrometers, Laser Beams, Double Slit and Gratings, Balmer Lamps, Two-Channel Oscilloscopes, (e/m) Apparatus, Tel-X-O meter Apparatus.

EXPERIMENTS

- Measuring Devices and Density
- Forces at Equilibrium
- Motion Along a Straight Line: Part A
- Motion Along a Straight Line: Part B
- Force of Buoyancy
- Heat Equivalence of Electrical Energy
- Linear Thermal Expansion
- Simple DC Circuits
- Magnetic Field Due to a Current Carrying Conductor

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- Reflection, Refraction and Total Internal Reflection
 - Electric Field (Uniform and Non-Uniform)
 - Capacitance and Dielectric
 - RC-Circuit
 - Oscilloscope and AC Signals
 - Spectrum of Hydrogen Atom (Optical Bench & Spectrometer)
 - Specific Charge of the Electron (e/m)
 - Penetration and Attenuation of X-ray
 - Ultrasound Waves
 - Radiation Detection and Absorption Measurements

PHYSICS LABORATORY (3M)



Location	Lab Staff in Charge	Contacts
M12-103	Bento Joseph	065052466

INTRODUCTION

This laboratory is designed to teach students enrolled in the College of Sciences and College of Engineering. Experiments designed to complement the concepts taught in the theoretical component of Physics 2, which focuses on electricity and magnetism.

This Laboratory is also to introduce the concept of electronic devices, including diodes, transistors, operational amplifier, logic gates, flip-flops, registers and counters, memories, switching and filtering to students. In addition to gaining experience with typical electronic circuits that are found in common applications, including the concept of design of their own projects.

EQUIPMENT AND INSTRUMENTS

Measuring meters, Rheostats, Resistance Boxes, DC and AC Power Supplies, electronic elements (capacitors, resistors, etc.), Resistivity Apparatus, Potentiometers, Switches, Meter Bridges, Stop Watches, electroplating apparatus, electric field mapping apparatus, High Current Power Supplies, CASSY software, CASSY sensors and Boxes (force, magnetic field, etc.), Magnets, Set of Conducting Loops, Pasco Interface, Pasco sensors, Coils, Transformers, Oscilloscopes, Induction Coils.

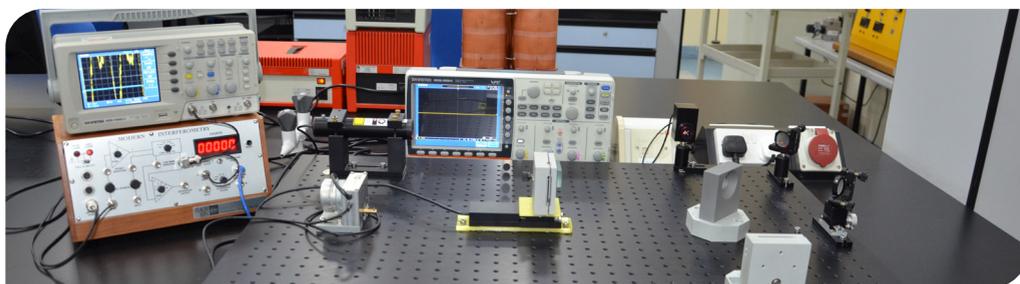
Diodes of different types, Rectifier Diodes, transistors, integrated Circuits, Breadboards, Dual Trace Triggered Oscilloscope, Function Generator, Zener Diodes, 78xx Voltage Regulator, 7-Segment Display, 7447 Decoder, 741 Operational Amplifier, 555 timers, 2114 RAM Chip, TTL 740x Chip, Potentiometers, Soldering Iron, Circuit Board Holders, Transistor Tester.

EXPERIMENTS

- Circuit Construction and Measurements
- Electric Field Mapping
- Resistivity
- Ohm's Law

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- Potentiometer
 - Bridge Measurement
 - Resistance-Capacitance Circuit
 - Kirchhoff's Laws
 - Electric Power Transfer
 - CRO (Cathode Ray Oscilloscope)
 - Magnetic Field and Magnetic Force
 - Electromagnetic Induction
 - Electronic Components
 - Filters and RCL Circuits
 - Diodes and Rectifier Circuits
 - Zener Diode and Voltage Regulator
 - Transistors
 - Operational Amplifier (741)
 - The 555 Timer
 - Logic Gates
 - Seven Segment Display and Decoders
 - Semiconductor Memories
 - Project

PHYSICS LABORATORY (4M)



Location	Lab Staff in Charge	Contacts
M12-102	Faisal Alsane	065052408

INTRODUCTION

This laboratory is designed to teach Advance level of experiments in Physics. It provides hands-on experience with experiments in Modern Physics and Advance Physics. The experiments cover advanced topics in physics such as Advanced Optics and Spectroscopy, Particle physics, Advanced Electricity and Magnetism, Cryogenics, Nuclear physics, Radiation Physics, Advanced thermodynamics that will help the students to expertise the advance physics topics and physics research.

EQUIPMENT AND INSTRUMENTS

High voltage and current Power Supplies, Light Transmitter and Receiver, Dual Trace Triggered Oscilloscope, Function Generator, Optical Benches, Spectrometers, Light Sources, Laser Beams, Double Slits, Balmer Lamps, Optical Instruments, Geiger – Muller Tube, Radiation Sources, (e/m) Apparatus, Tel-X-Ometer Apparatus, Pasco (h/e) Apparatus, Zeeman Effect Apparatus, Cadmium Lamp, Frank-Hertz Tube with Operating Unit, Oven with Temperature Controller, Modern interferometer, Muon physics apparatus, Noise fundamentals apparatus, Magnetic field and magnetic torque apparatus, Magnetic susceptibility apparatus, Fabry perot interferometer, Fourier methods apparatus, SQUID, digital spectrometer, Programmable Electromagnet, Comprehensive Heat Experiment Apparatus.

EXPERIMENTS

- Spectrum of Hydrogen Atom
- Oscilloscope and its Uses in Modern Physics Lab
- Speed of Light Measurement
- Specific Charge of Electron (e/m)
- Frank-Hertz Experiment
- Zeeman Effect

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- Radiation Detection and G-M Tube
 - Penetration and Attenuation of X-Rays
 - Absorption of Gamma and Beta
 - Michelson Interferometer
 - Photoelectric Effect
 - Electron Spin Resonance (ESR)
 - X-Ray Diffraction
 - Black Body Radiation
 - Modern interferometry
 - Muon physics
 - Noise fundamentals
 - Magnetic field and magnetic torque
 - Magnetic susceptibility
 - Fabry Perot Interferometer
 - Fourier methods
 - Super conductivity
 - Study of different spectrum using digital spectrometer

COMPUTATIONAL CAPABILITIES LABORATORY



Location	Lab Staff in Charge	Contacts
M12-106 B	Bento Joseph	065052466

INTRODUCTION

This laboratory caters for upper-level undergraduate students and researchers. The laboratory has a full set of networked Linux computers running the latest Ubuntu equipped with PC-based data acquisition and control. It has built linux cluster and to be used mainly for atomistic and band structure calculations. Examples of parallelized software available to users include NAMD, Gromacs and XMD for molecular dynamics, and wien2k for band structure calculations. A licensed proprietary copy of Maple 13.0 and Math Lab also runs on the cluster. Also included several modern open-source compilers like Fortran 90, C++, and C. The cluster is available to all University researchers and their collaborators with access to the University of Sharjah LAN.

EQUIPMENT AND INSTRUMENTS

- Parallel Computer Modules with Large Storage and Memory
- Software:
 - Parallelized Molecular Dynamics (XMD, NAMD, VMD, Gromacs, and Others)
 - Wien2k: Band Structure Calculations
 - Fortran, C, C++ Compilers, Python
 - Parallel Maple

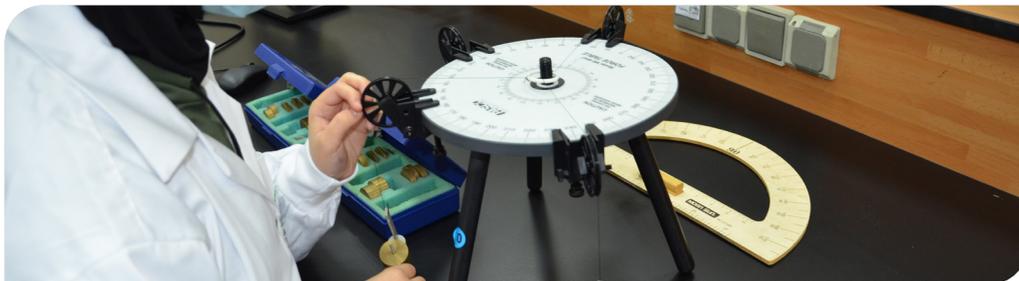
EXPERIMENTS

- Molecular Dynamics Simulations
- Other Modeling Experiments
- Atomistic Simulations
- Programming and simulations in Python

TESTS AND SERVICES

- Provide Computing Time to Clients
- Provide Access to Powerful Number Crunching Machine with Open-Source Software

PHYSICS LABORATORY (1W)



Location	Lab Staff in Charge	Contacts
W12-214	Mariam Rashed Al Naqbe	065053469

INTRODUCTION

This Laboratory is designed to teach students enrolled in the College of Engineering and College of Sciences. Experiments designed to teach the application of Physics fundamentals in kinematics, energy, collision, properties of matter and motion.

EQUIPMENT AND INSTRUMENTS

Measuring tools and devices, Electronic Timers, Force Tables, Air Tracks, Air Blowers, Frictionless Tracks, Trolleys, different Pasco sensors, Pasco Interface, CASSY Interface, Projectile Launcher, Ballistic Pendulum, Springs, Simple Pendulum, Calorimeter, Heaters, Electronic Balances, Linear Thermal Expansion Apparatus, Handheld Vacuum, Hot Plates.

EXPERIMENTS

- Measuring Devices and Density
- Equilibrium of Forces at Body Joints
- Free Fall Motion
- Motion in 2-D (Projectile)
- Friction
- Uniformly Accelerated Motion
- Newton's Second Law
- Conservation of Energy
- Conservation of Momentum
- Ballistic Pendulum
- Uniform Circular Motion
- Simple Harmonic Motion

PHYSICS LABORATORY (2W)



Location	Lab Staff in Charge	Contacts
W12-216	Mariam Rashed Al Naqbe	065053469

INTRODUCTION

This Laboratory is designed to teach students enrolled in the College of Engineering and College of Sciences. Experiments designed to teach the application of Physics fundamentals in kinematics, energy, collision, properties of matter and motion.

EQUIPMENT AND INSTRUMENTS

Measuring tools and devices, Electronic Timers, Force Tables, Air Tracks, Air Blowers, Frictionless Tracks, Trolleys, different Pasco sensors, Pasco Interface, CASSY Interface, Projectile Launcher, Ballistic Pendulum, Springs, Simple Pendulum, Calorimeter, Heaters, Electronic Balances, Linear Thermal Expansion Apparatus, Handheld Vacuum, Hot Plates.

EXPERIMENTS

- Measuring Devices and Density
- Equilibrium of Forces at Body Joints
- Free Fall Motion
- Motion in 2-D (Projectile)
- Friction
- Uniformly Accelerated Motion
- Newton's Second Law
- Conservation of Energy
- Conservation of Momentum
- Ballistic Pendulum
- Uniform Circular Motion
- Simple Harmonic Motion

PHYSICS LABORATORY (3W)



Location	Lab Staff in Charge	Contacts
W12-218	Khadija Alhousani	065053466

INTRODUCTION

This laboratory is designed to teach students enrolled in the College of Health Sciences, College of Medical Science and College of Sciences. The experiments that are direct applications of concepts covered error calculation, graphing and analyzing data, measuring devices and density measurements, application of equilibrium of forces at body joints, application of torque, motion, fluid dynamics, thermal and electrical properties of materials, basic optics.

EQUIPMENT AND INSTRUMENTS

Measuring Tools and Instruments, Geometrical Objects, Force Table Sets with Accessories, Torque Apparatus, Frictionless Tracks, CASSY Software and CASSY Sensors, Linear Thermal Expansion Apparatus, Calorimeters, Heaters, Balances, Pasco Interface, Laboratory Jacks, Power Supplies AC-DC, Electronic Elements, Geometrical Optical Sets, Laser Source.

EXPERIMENTS

- Measuring Devices and Density
- Equilibrium of Forces at Body Joints
- Relationship of Skeletal Muscles to Bones
- Motion Along a Straight Line (Constant Velocity & Constant Acceleration)
- Magnetic Field of Current Carrying Conductors
- Thermal Properties of Materials (Thermal Expansion & Specific Heat Capacity of Human Teeth)
- Static Fluid and the Force of Buoyancy
- Simple DC Circuits
- Reflection, Refraction and Total Internal Reflection

PHYSICS LABORATORY (4W)



Location	Lab Staff in Charge	Contacts
W12-220	Khadija Alhousani	065053466

INTRODUCTION

This laboratory is designed to teach students enrolled in the College of Health Sciences, College of Medical Science and College of Sciences. The experiments that are direct applications of concepts covered error calculation, graphing and analyzing data, measuring devices and density measurements, application of equilibrium of forces at body joints, application of torque, motion, fluid dynamics, thermal and electrical properties of materials, basic optics.

EQUIPMENT AND INSTRUMENTS

Measuring Tools and Instruments, Geometrical Objects, Force Table Sets with Accessories, Torque Apparatus, Frictionless Tracks, CASSY Software and CASSY Sensors, Linear Thermal Expansion Apparatus, Calorimeters, Heaters, Balances, Pasco Interface, Laboratory Jacks, Power Supplies AC-DC, Electronic Elements, Geometrical Optical Sets, Laser Source.

EXPERIMENTS

- Forces at Equilibrium
- Measuring Devices and Density
- Motion Along a Straight Line: Part A
- Motion Along a Straight Line: Part B
- Force of Buoyancy
- Heat Equivalence of Electrical Energy
- Linear Thermal Expansion
- Simple DC Circuits
- Magnetic Field Due to a Current Carrying Conductor
- Reflection, Refraction and Total Internal Reflection

PHYSICS LABORATORY (5W)



Location	Lab Staff in Charge	Contacts
W12-213	Taghrid Abdallah	065053467

INTRODUCTION

This laboratory is designed to teach students enrolled in the College of Sciences and College of Engineering. Experiments designed to complement the concepts taught in the theoretical component of Physics 2, which focuses on electricity and magnetism.

EQUIPMENT AND INSTRUMENTS

Measuring meters, Rheostats, Resistance Boxes, DC and AC Power Supplies, electronic elements (capacitors, resistors, etc.), Resistivity Apparatus, Potentiometers, Switches, Meter Bridges, Stop Watches, electroplating apparatus, electric field mapping apparatus, High Current Power Supplies, CASSY software, CASSY sensors and Boxes (force, magnetic field, etc.), Magnets, Set of Conducting Loops, Pasco Interface, Pasco sensors, Coils, Transformers, Oscilloscopes, Induction Coils.

EXPERIMENTS

- Circuit Construction and Measurements
- Electric Field Mapping
- Resistivity
- Ohm's Law
- Potentiometer
- Bridge Measurement
- Resistance-Capacitance Circuit
- Kirchhoff's Laws
- Electric Power Transfer
- CRO (Cathode Ray Oscilloscope)
- Magnetic Field
- Magnetic Force
- Electromagnetic Induction (Lenz's Law and Faraday's Law)

GEOSCIENCE /GEOPHYSICS EXPERIMENTAL LABORATORY



Location	Lab Staff in Charge	Contacts
W12-219	Abdelmahmoud Elsamani	065053457

INTRODUCTION

The laboratory of applied geophysics supports mainly three different courses: General Geophysics (1460223), Exploration Geophysics 1 (1460312), Exploration Geophysics 2 (1460313), which are offered to the students of the Petroleum Geosciences and Remote Sensing program. The scope of this laboratory is to get the students familiar with different geophysical methods, and their fields of applications. This includes a wide range of applications such as natural resources exploration, geotechnical and engineering applications, environmental, archeological and hydrogeological investigations. The laboratory will also support ongoing research related to Geophysics, geology engineering and environmental investigations.

EQUIPMENT AND INSTRUMENTS

The laboratory is equipped for using different geophysical methods mainly the near-surface seismic methods and the Ground Penetrating Radar. Different accessories are also available like Computers, computer software, measuring tapes, hammers.... etc. The main equipment available in laboratory of applied geophysics are:

- Geode 24-channel Seismograph with 24 geophones (4.5 Hz) and accessories.
- GSSI SIR4000 GPR system with 270 MHz and 400 MHz antennas.

EXPERIMENTS

The available equipment and accessories can be used for the following experiments:

- Seismic Refraction survey.
- Seismic Reflection survey.
- Multichannel analysis of surface waves survey.
- Ground Penetrating Radar (GPR) survey.

TESTS AND SERVICES

- Seismic Refraction survey.

The main Services and Applications is:

- Mapping of the bedrock.
- Map faults in the bedrock.
- Estimate the bedrock Rippability.
- Mapping geologic strata and anomalous conditions.
- Seismic Reflection survey.

The main Services and Applications is:

- Oil and gas exploration.
- Map faults in the bedrock.
- Mapping geologic strata and anomalous conditions.
- Ground water exploration.
- Tectonic studies.
- Earthquake hazard studies.

- Multichannel analysis of surface waves survey.

The main Services and Applications is:

- Soil compaction control.
- Pavement evaluation.
- Mapping subsurface stratigraphy.
- Alternative techniques for borehole seismic techniques.
- Profile shear stiffness vs. depth.
- Predict ground deformation under loading
- Assess integrity of concrete structures
- Assess Liquefaction potential

- Ground Penetrating Radar (GPR) survey.

The main Services and Applications is:

- Locate metallic and nonmetallic pipes and utility cables.
- Delineate underground storage tanks (metallic and nonmetallic).
- Map shallow groundwater tables and soil stratigraphy.
- Map shallow bedrock topography.
- Map subsurface voids and cavities.
- Characterize archaeological site.
- Map rebar in concrete structure.

PETROLOGY (MICROSCOPY) LABORATORY



Location	Lab Staff in Charge	Contacts
W12-221	Abdelmahmoud Elsamani	065053457

INTRODUCTION

The petrology Laboratory is the first lab of newly introduced program Petroleum Geoscience and Remote Sensing (PGRS) in the Physics department, The program has serious of applied courses which require space for laboratory experiments and teaching. Newly ordered 10 teaching microscopes for rock and mineral identification and several upcoming equipment's are expected to support these lab sessions.

The courses which will be served are the following

- 1460221-Stratigraphy and Structure Geology
- 1460220-Sedimentary Rocks and Sedimentology.
- 1460225 Igneous and Metamorphic Rocks Petrology
- 1460324 Hydrogeology

EQUIPMENT AND INSTRUMENTS

- 9 Teaching microscopes
- Attenberg method baths
- Sieving stacks with vibrating base
- Precise scales (4 digits)
- Rock specimens for demonstration and teaching
- Mineral specimens for demonstration and teaching
- Glassware
- Rock crushing equipment
- Geological Hammers
- Geological compasses
- Water Infiltration drums
- GPS meters

EXPERIMENTS

- Mineral identification with Microscopy (optical properties)
- Rocks identification with Microscopy (optical properties)
- Sieving and crushing rocks
- Rock density measurements
- pH and electrical conductivity in soils and rocks
- Grain size distribution and separation of sand silt and clay
- Rocks and minerals physical properties (in specimens) like streak color, cleavage hardness, magnetism, acid reaction, mineral color.
- Infiltration tests in soil

TESTS AND SERVICES

- Grain size distribution analysis in rocks and soils
- Report on Petrology of Rocks with microscope identification
- Infiltration test in soils and sediments
- Reporting mineralogy content in rocks

RADIATION LABORATORY



Location	Lab Staff in Charge	Contacts
W12-213 A	Dr. Hussein Elmehdi	065052359 / 3016

INTRODUCTION

This Laboratory is utilized for teaching courses related to the nature and applications of radiation sources such as X-ray, and nuclear radiation sources, as well as, for research into topics related to radiation, radiobiology and environmental studies.

EQUIPMENT AND INSTRUMENTS

X-ray fluorescence and X-ray diffraction equipment in addition to Scintillation detectors.

EXPERIMENTS

- X-ray attenuation
- X-ray Spectrometry
- X-ray diffraction
- Radiography
- Gamma spectroscopy

SPECTROSCOPY LABORATORY



Location	Lab Staff in Charge	Contacts
W12-213 B	Dr. Hussain Al Awadhi	065052355

INTRODUCTION

The Spectroscopy Laboratory focuses on investigating intrinsic properties of novel and new semiconductors. Photo-modulation reflectivity and transmission, and photoluminescence are employed to determine the band-gap and other properties of semiconductors at temperatures down to 6K. Most of the work has been concentrated on II-VI binary, ternary, and quaternary compound semiconductors and specially diluted magnetic semiconductors in which some of the group II atoms are replaced by transition metal atoms like Mn, Fe, Co and V.

EQUIPMENT AND INSTRUMENTS

- Liquid Nitrogen and Closed Cycle Helium Cryostats for Low Temperature Measurements
- Computer Controlled Spectrometers and Mono chromator With Multiple Gratings Optimized for Different Spectral Regions
- Solid State Detectors That Cover the Spectral Region From UV to IR
- Different Lasers
- Lock-in Amplifier for Low Level Signal Detection

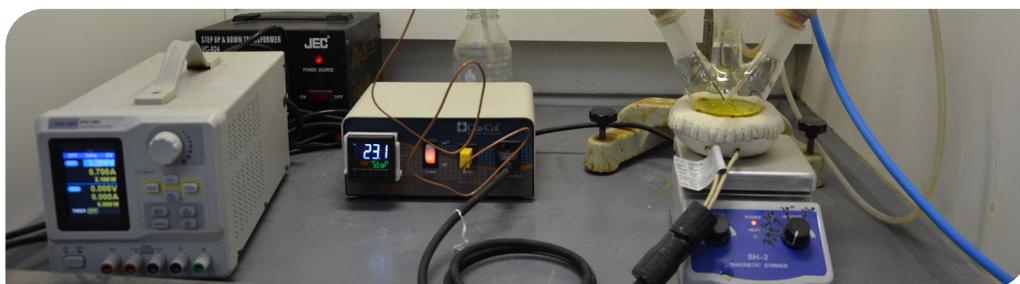
EXPERIMENTS

- Reflectivity, Absorption and Transmission in the Range of 300-1700nm
- Photoluminescence using Blue, Green and Red Lasers
- Bandgap Measurement of Semiconductors at Low Temperatures

TESTS AND SERVICES

- Reflectivity, Absorption and Transmission of Solids and Liquids in the Range of 300-1700nm (Around Room Temperature)
- Reflectivity, Absorption and Transmission of Solids at Low Temperature (Down to 6K)

RESEARCH LABORATORY



Location	Lab Staff in Charge	Contacts
W12-213 C	Dr. Hafsa Khurshid	065053420

INTRODUCTION

Materials synthesis lab- The focus of this lab is to synthesize Iron-gold nano rods, Iron oxide and nickel oxide nanoparticles that can be used for a wide range of applications.

EQUIPMENT AND INSTRUMENTS

- Electronic weighing balance
- Fume hood
- Bath Sonicator
- Desiccator
- Small Refrigerator
- Lab glass wares
- Hot plate
- Temperature controller
- Step up and step-down stabilizer
- DC power supply

EXPERIMENTS

- Synthesis of iron-gold nano rods by electrochemical deposition
- Synthesis of iron oxide and nickel oxide nanoparticles
- Functionalization of Iron oxide nanoparticles by FITC

TESTS AND SERVICES

The iron-gold nano rods, iron oxide and nickel oxide nanoparticles are being synthesized in the lab, they will be used for bio-medical, and optoelectronic applications as all these nanoparticles show high biocompatibility and optical properties. These particles are very safe, non-toxic, and non-radioactive.