



College of Engineering

> labs

Labs

Computer Labs

Al Ain Campus

First floor 32

Abu Dhabi Campus

Ground floor 24

2nd floor 24

Description

This lab is dedicated to meeting the teaching and learning needs of faculty and students. The lab provide a variety of programs that support the following courses:

- Introduction to Programming
- Object – Oriented Programming
- Data Structures & Algorithms
- Network Lab
- Computer Aided Analysis & Design
- Software Evolution & Maintenance
- Database System

The student will learn the basic concepts of databases, which include database system architecture; entity-relationship model; hierarchical, network, and relational data models; functional dependencies and normal forms. Design, implementation, and optimization of SQL query languages with basic relational algebra; and security and integrity.

- Web Development

The student will learn the basics programming and scripting languages for the Web development. It covers basic concepts of the World Wide Web (WWW), HTML 5, CSS 4, JavaScript 1.8, XML, and PHP 7. The course starts with a general introduction about the fundamentals of WWW and the web programming tools.

- Software Design & Development

The student will learn the knowledge, understanding, skills and values to solve problems through the creation of software solutions. The course introduces students to the nature of

software design, design process, agile-based design, architectural design and distributed architecture. It also introduces popular design frameworks, such as object-oriented design, function-oriented design, and aspect-oriented design.

Installed Software

- MS Project
- MS Visio
- Visual Studio
- NetBeans IDE
- JGrasp
- NetBeans IDE
- Cisco Packet Tracer
- AutoCAD
- Eclipse
- UML Lab
- Oracle JInitiator
- Notepad++
- XAMPP
- IBM Rational Rose

Physics Lab

Al Ain Campus
First floor

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Abu Dhabi Campus
Ground floor

24

Description

This lab designed to teach students the fundamentals for both physics1 and physics 2

- **Physics 1**

The student learn about the physical phenomena using appropriate devices, and they learn how to record and analyze the measurements for each experiment. For example, they can calculate the gravity acceleration (g) practically, investigate Newton's 2nd law and the principle of conservation of energy.

- **Physics 2**

The student learn about the concepts taught in the theoretical component of Physics 2, which focuses on electricity and magnetism. For example, Students learn how to build basic circuits, perform simple circuitry measurements, and investigate Ohm's law and resistance capacitance circuits. Students also learn about magnetic fields and Faraday's law.

Equipment and Instruments

- Digital Analog Training System ETS-7000
- Inductor various values
- Micrometer Caliper
- Stainless Steel Digital Vernier Caliper
- Free-Fall Apparatus
- Adam scale (adam scales ACB plus- 600H)
- Force Table
- Hooke's law apparatus complete
- Rheostat
- Inclined plane & friction board
- Galvanometer
- Potentiometer Two wire with jockey
- Van Graff Motor Driven
- Demonstration induction Coil
- Calorimeter Aluminum
- Pulley large with universal Clamp
- Resistance box single dial
- Pendulum bob
- Capacitance Substitution Box
- Plug Switch Two way
- Decade resistance box
- Triple DC POWER Supply
- Digital Multi-meter
- Analog Multi-meter
- Induced Current Apparatus
- Knife Switch
- Timer (IEC)
- Freefall apparatus timer
- Circular Motion Kit
- Projectile Kit
- Resistors various values
- Capacitor various values

Electronic Lab

Al Ain Campus
First floor

24

Abu Dhabi Campus
Ground floor

24

Description

In Electronic Lab, students learn all about the electrical and electronic principles .they learn how to use testing and measuring instruments including function generators, oscilloscopes, and digital multimeter DMM. The students learn the concepts of the electrical and electronic circuits by using special trainer and panels that allow them to work easily. They also have an

experience to design circuits using discrete components. LTSPICE software is introduced for DC and AC circuits and transient analysis.

Equipment and Instruments

- Digital Analog Trainer System
- Electrical & Electronic System Trainer Model- XPO-CT Maste
- Digital Storage Oscilloscope
- Digital function generator
- Digital Spectrum analyzer
- Digital Multi-Meter
- Advance DC to DC Converter Panel
- OP AMP Parameter Measurement panel
- JEET, MOSFET & IGBT Panel
- Switch Mode power supply Panel
- Application of OP-AMP Experimental Panel
- Rectifier / Filter experiment panel
- Transistor panel for FET amplifier, differential amplifier, Push-Pull amplifier, turned RF amplifier, RC coupled amplifier
- Multi-vibrator & Oscillator Experiment Panel
- Rectifier / Filter panel
- RF Filter Module: Passive/ Active/ M Derived Filter Panel
- Transistor panel for H parameters, Thermal stability, CB/CC/CE
- Digital IC Tester
- Logic gates IC's
- Resistive, Inductive and Capacitive Power Loads
- Bread boards
- The KL-200 Linear Circuit Lab

Network Lab

Al Ain Campus
First floor

21

Abu Dhabi Campus
Ground floor

24

Description

The main aim of Network lab is to teach students the practical aspects of network topologies and network operating systems. They also learn about the devices that used to build these networks. In addition to that student learn all about Local Area Network (LAN) , wide area network (WAN), the setup of network services, DHCP, DNS, peer to peer and server based networking, switch setup and VLANs, the basics of IP addressing, sub netting and router configuration. They simulate and build Networking topologies using cisco packet tracer. Students will also learn how to configure the basic network commands on a real router.

Equipment and Instruments

The lab consists of the following hardware and software required to meet the above objectives

1. Hardware

- Cisco 1941 router
- Cisco catalyst 2950 Switch
- Cables and RJ-45 Connectors
- Modular crimping Tool
- Cable tester
- 24 PC's
- Network Cable
- TP-Link (Wireless Router)
- Console USB Cable
- Network analysis tablet
- 42U Rack Cabinet, Power Extensions & Fans

2. Software

- Labview
- Matlab R2020b
- JGrasp
- LTSpice
- Packet Tracer
- Wire Shark
- Putty
- Logisim
- GNS3 1.5.3

Communication lab

Al Ain Campus

First floor

14

Abu Dhabi Campus

Ground floor

24

Description

In this lab, students cover the Analogue and Digital communications principles that explained in the lectures of communication courses. The lab focuses on training the students in both analog and digital transmission/reception of signals. The students learn the concepts of the circuits for analog and digital modulations using special panels that allow them to understand the theoretical basics of communication easily.

Equipment and Instruments

- Master Unit Communication System Training (XPO-COM)
- FM Modulator and Demodulator panel
- ASK, FSK, PSK Modulator/Demodulator panel
- PCM Modulator/ Demodulator panel
- AM, DSB-SCC SSB Modulator/ Demodulator panel
- Digital Storage Oscilloscope
- Digital function generator

- Spectrum analyzer Digital SA2018
- Frequency Counters

Embedded Lab

Al Ain Campus		Abu Dhabi Campus	
First floor	10	Ground floor	24

Description

This lab designed to teach computer-engineering students the fundamentals for both Embedded System course and Microprocessor and Assembly Language course.

In Embedded course, students learn how to design a computer system to perform one or few dedicated functions with a real-time computing constrains.

The Microprocessor and Assembly Language Laboratory provides students with practical experience in programming using the Assembly Language on Intel 8086 microprocessor emulator (emu8086).

Equipment and Instruments

1. Hardware

- 24 PC's
- FPGA 3S 400
- Altera DE1 Development and Educational Board.
- TL866 universal programmer
- Digital Circuit Board
- Spartan-3E Starter Board
- Virtex-II PRO (V2-Pro) development system

2. Software

- emu8086 software.
- Quartus Prime Pro 18.0

Civil Engineering Labs

Materials Lab

Al Ain Campus		Abu Dhabi Campus	
Ground floor	10	Ground floor	10

Description

The Materials laboratory in the Civil Engineering Department is supported with modern facilities, equipment and machines meeting the highest standards. The laboratory features wide range of experimental tests to evaluate mechanical and physical properties of different construction materials, which links between experimental and real life application. The following is a list of the major equipment in the laboratory:

Equipment

- Fully Automatic 3000kN Compression Machine for Testing Cubes and Cylinders
- Compression Frame Jig Assembly
- Flexural Testing Machine with 100 kN Capacity for Testing Beams, Kerbs & Flagstone
- Splitting Test set
- Concrete Mixer (Drum Type)
- Concrete Mixer (Pan Type)
- Drying Oven
- Specific Gravity Test Set
- Full set of ASTM Woven Wire Mesh Sieves (Coarse & Fine) and Sieve Shaker
- Vicat Test Set
- Slump Test Set
- Air Entrainment Meter
- Cement Mortar Mixer
- Schmidt Hammer
- Vibrating Table
- Concrete Cubic and Cylinder molds
- Beam Molds
- Curing Tank with Thermostat Controlled Heater

Geotechnical Engineering Lab

Al Ain Campus

Ground floor

10

Abu Dhabi Campus

Ground floor

10

Description

The Geotechnical Laboratory in the Civil Engineering Department contains state of the art machines accommodating most of the laboratory and field testing of soil. Several analysis and tests can be performed on different soil types meeting the local and international standards. Following is the list of the main equipment in the laboratory:

Equipment

- Fully Automated Triaxial system
- Consolidation test full set
- Digital Direct/Residual Shear Apparatus complete with lever loading assembly

- Falling Head Permeability Test Set.
- Constant Head Permeability Test Set.
- Shrinkage Limit Test Set
- Liquid Limit Device
- Plastic Limit Test Set.
- Full set of ASTM Woven Wire Mesh Sieves (Coarse & Fine) and Sieve Shaker
- Soil Drying Oven
- CBR & Marshall Testing Machine with Load Ring
- Marshall- CBR Universal Sample Extruder
- Sand Pouring Apparatus, BS
- Sand Density Cone Set, ASTM
- Standard Proctor compaction test
- Modified Proctor compaction test
- Automatic Soil Compactor, ASTM
- Hydrometer Test Set.
- Speedy Moisture Tester
- Cement Mortar Mixer
- Riffle Boxes

Fluid Mechanics and Hydraulics Lab

Al Ain Campus

Ground floor

10

Abu Dhabi Campus

Ground floor

10

Description

The Fluid Mechanics and Hydraulics Laboratory in the Civil Engineering Department is equipped with modern instruments and apparatuses used to investigate various hydraulic phenomena with both physical and computer models, demonstrating civil engineering design principles for pipe networks, open channel systems and many of other fluid mechanics applications. Following is the list of the main equipment in the laboratory:

Equipment

- Hydrostatics and Properties of Fluids Bench
- Flow Measurement Apparatus
- Impact of Jets Apparatus
- Bernoulli's Theorem Apparatus
- Reynolds Number and Transitional Flow Apparatus
- 2.5 Meter Flow Channel
- Fluid Friction Apparatus
- Digital Hydraulic Bench
- Variable Series And Parallel Centrifugal Pump Set

Surveying Lab

Al Ain Campus		Abu Dhabi Campus	
Ground floor	15	Ground floor	15

Description

The Surveying Laboratory in the Civil Engineering Department contains measuring instruments for distances, elevations and vertical and horizontal angles. It is also equipped with updated surveying devices for performing leveling and transverse surveys as well as applying corrections to geodetic observations and location determination using GPS.

Equipment

- Total Station
- Optical and Laser Theodolites
- Automatic Level
- Rotating Laser Level
- GRX2 GNSS System-Rover Kit : (GPS + GLONASS)
 - GRX2 GNSS Receiver
 - Rover: GRX2 with Internal Digital UHF
- Tripods, wooden and aluminum
- Leveling Rods
- Odometer Wheels
- Measuring tapes
- Ranging Poles

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