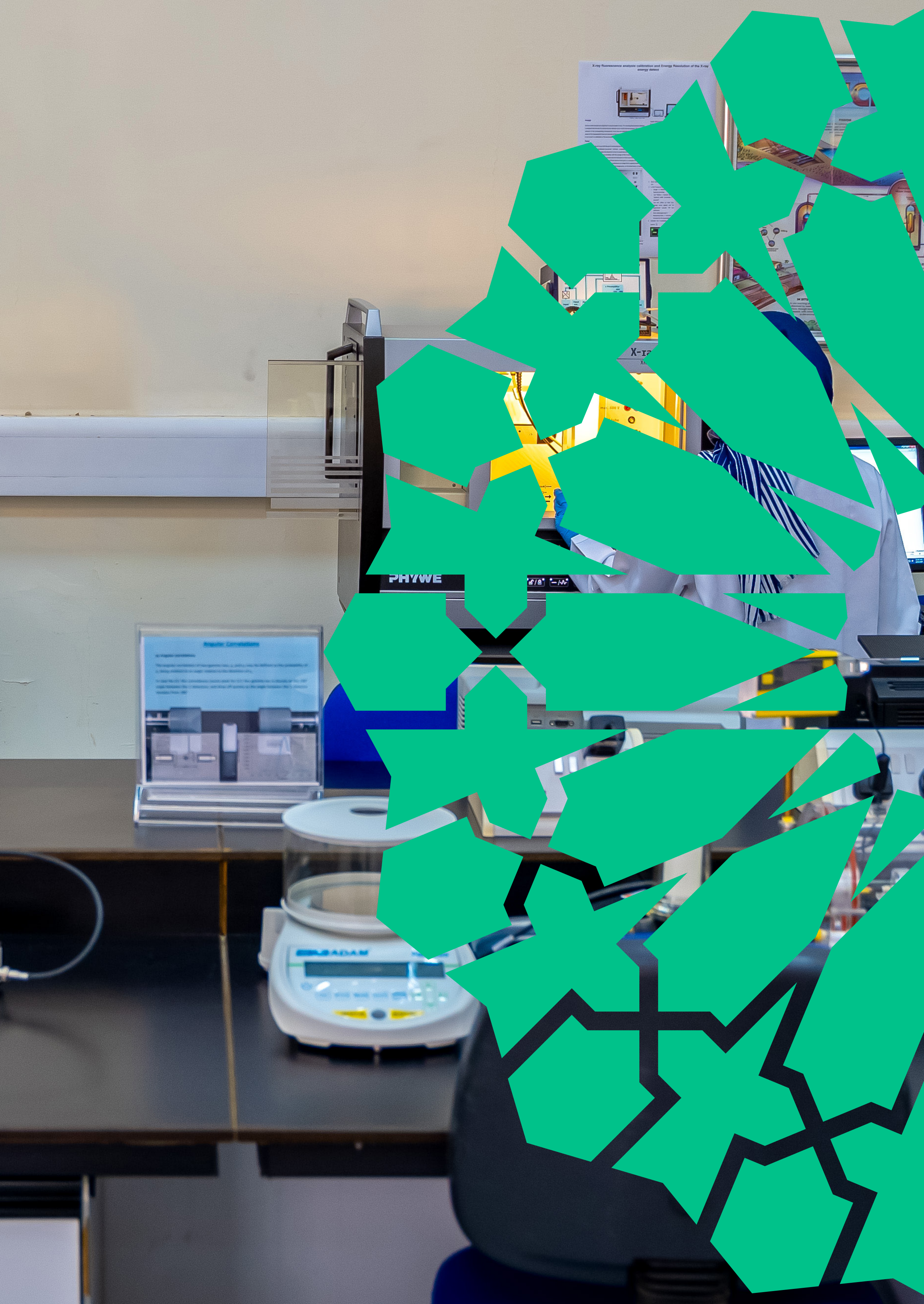
COLLEGE OF
ENGINEERING


PHYWE
ADAM

ELECTRICAL & ELECTRONICS ENGINEERING DEPARTMENT

Electrical and Electronics Engineering Laboratories

Lab Name	Location	Person in Charge	Programs Served	Courses Served
Circuit Analysis Laboratory I&II	M12-107	- Sol Andrew Domingo - Alya Alhammadi	Electrical Engineering Sustainable & Renewable Energy Engineering Industrial Engineering & Management Mechanical Engineering	Circuit Analysis I Circuit Analysis II Applied Electronics Circuits Applied Electronics Lab for SREE
Applied Electronics Circuit Lab (Industrial Engineering+ SREE)	M12-108	- Mohammad Saad Suleiman - Imtinan Attili - Noorul Misbah Khanum	Electrical Engineering Computer Engineering Industrial Engineering & Management Sustainable & Renewable Energy Engineering Mechanical Engineering	Circuit Analysis I Circuit Analysis II Applied Electronics Circuits Applied Electronics Lab for SREE
Electromechanical Systems Laboratory Electric Power Engineering Laboratory	M12-113	- Mohammad Saad Suleiman - Alya Alhammadi	Electrical Engineering Sustainable & Renewable Energy Engineering	Electromechanical System Electric Power Engineering Lab Circuit Analysis II Electric Power for SREE
Electronic Circuits Laboratory Fundamentals of electronics Lab	W12-123	- Imtinan Attili - Noorul Misbah Khanum	Electrical Engineering Sustainable & Renewable Energy Engineering	Electronic Circuits Applied Electronics Circuits Applied Electronics Lab for SREE Fundamentals of Electronics Circuit Analysis I
Feedback Control Systems Laboratory Instrumentation and Measurement Laboratory	M12-115	- Obaida Abu Bader - Imtinan Attili - Alya Alhammadi	Electrical Engineering	Feedback Control Systems Instrumentation and Measurement
Printed Circuit Board Workshop (PCB)	M12-116	- Sol Andrew Domingo	Electrical Engineering Computer Engineering	General
Multimedia Technology Laboratory Programmable Logic Controller(PLC) Laboratory	M12-118	- Obaida Abu Bader - Noorul Misbah Khanum	Electrical Engineering Computer Engineering Industrial & Management Engineering	Programmable Logic Design Multimedia Technology Lab Introduction to ECE Lab Industrial Automation
Telecommunication Systems I Laboratory	W12-122	- Obaida Abu Bader	Electrical Engineering Computer Engineering	Telecommunication Systems I

Lab Name	Location	Person in Charge	Programs Served	Courses Served
Senior Design Project I & II Laboratory	W12-115 M12-140	- Imtinan Attili - Noorul Misbah Khanum - Sol Andrew Domingo	Electrical Engineering Computer Engineering	Senior Design Project I & II
Power electronics lab	W12-105	- Mohammad Saad Suleiman	Electrical Engineering Sustainable & Renewable Energy Eng.	Power electronics lab

Electrical Engineering lab Staff

#	Name	Title	Ext.	Email
1	Obaida Abu Bader	Sr. Lab Engineer	065052488	obaida@sharjah.ac.ae
2	Imtinan Basem Attili	Lab Engineer	065053493	iattili@sharjah.ac.ae
3	Sol Andrew C. Domingo	Lab Engineer	065052938	sdomingo@sharjah.ac.ae
4	Noor ul Misbah Khanum	Lab Engineer	065053429	nkhanum@sharjah.ac.ae
5	Mohammad Saad Suleiman	Lab Engineer	065052449	msuleiman@sharjah.ac.ae
6	Alya Alhammadi	Lab Engineer	065052412	Alya.alhammadi@sharjah.ac.ae

CIRCUIT ANALYSIS I LABORATORY

Location	Lab Staff in Charge	Contacts
M12-107	Sol Andrew C. Domingo	065052938
	Alya Alhammadi	065050412

INTRODUCTION

Electrical Circuit Analysis I Laboratory is one of the most important lab in the Electrical Engineering Department. This laboratory provides students with an understanding of the basic principles of Electrical Engineering. In addition, it enables students to use testing and measuring instruments such as function generators, oscilloscope, and digital multi-meter to analyze DC and AC circuits by using different analysis techniques. These include Ohm's Law, KCL, KVL, nodal analysis, mesh analysis, Thevenin's and Norton's theorems as well as the transient analysis of RL and RC circuits. PSPICE Cadence software is also introduced for DC and AC circuits and transient analysis.

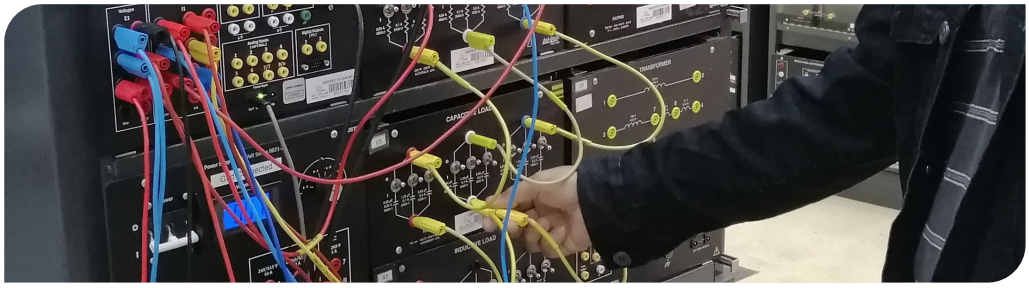
EQUIPMENT AND INSTRUMENTS

- Pro's KitMT-1820 Digital Multimeter
- ETS-7000 Digital Analog Training System
- ESCORT EDM-1635 Digital Multimeter
- PEAK ATLAS DCA Model DCA55 Component Analyzer
- TINSLEY LCR Data Bridge
- TTi LCR400 Precision Bridge
- Rigol DG1032Z Arbitrary Function Generator 2 Channel /30MHz / 200MSa/s
- Rigol DS4012 Digital Oscilloscope 2 Channel / 100MHz / 4GSa/s
- Simulators: Microsim, ORCAD Cadence PSpice Circuit Simulator
- TTi 354T Triple Power Supply 2 x 0-35VDC / 3.3-5.5 VDC 4A
- Desktop Computer Core i5
- Analogue Multi-Tester
- Wire Strippers and Pliers

EXPERIMENTS

- Introduction to Circuit I Lab
- Introduction to ORCAD Cadence PSPICE – Part I (DC Analysis)
- Voltage Division Rule (VDR) and Current Division Rule (CDR)
- Kirchhoff's Laws and Nodal Analysis
- Superposition for DC Circuits
- Thevenin's and Norton's Equivalents of DC Circuits
- The Function Generator and Oscilloscope
- Introduction to ORCAD Cadence PSPICE – Part II (Transient Analysis)
- Transients in RC Circuits
- Phasor Domain Measurements for AC Circuits
- Introduction to ORCAD Cadence PSPICE – Part III (AC Analysis)

CIRCUIT ANALYSIS II LABORATORY



Location	Lab Staff in Charge	Contacts
M12-107	Sol Andrew C. Domingo	065052938

INTRODUCTION

Electrical Circuit Analysis II Laboratory helps students to understand AC circuits analysis studied in the corresponding theoretical course. Through this laboratory, students become familiar with AC measurements, and are able to measure voltages, phase angles, resonance frequencies and bandwidth for circuits that consist of resistors, capacitors and inductors. They also investigate the frequency response of low pass, high pass, band pass and band stop filters. In addition, they investigate the Three-phase circuits and applications of transformers and its characteristics.

EQUIPMENT AND INSTRUMENTS

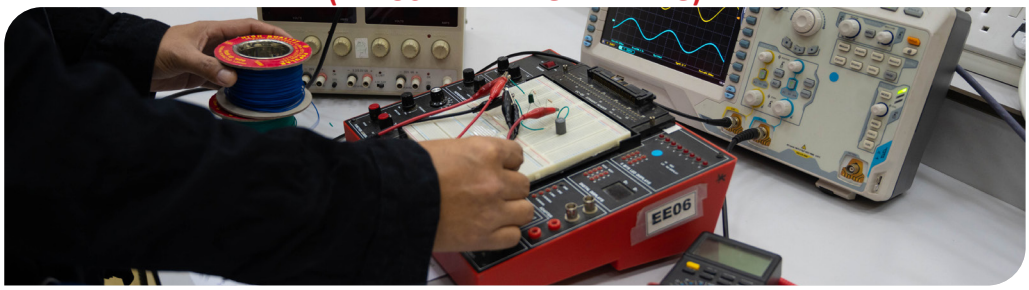
- ETS-7000 Digital Analog Training System
- ESCORT EDM-1635 Digital Multimeter and KYURITSU Model 1009
- PEAK ATLAS DCA Model DCA55 Component Analyzer
- TINSLEY LCR Data Bridge
- TTi LCR400 Precision Bridge
- Rigol DG1032Z Arbitrary Function Generator 2 Channel /30MHz / 200MSa/s
- Rigol DS4012 Digital Oscilloscope 2 Channel / 100MHz / 4GSa/s
- Simulators: LabVolt Simulation Software, ORCAD Cadence PSpice Circuit Simulator
- TTi 354T Triple Power Supply 2 x 0-35VDC / 3.3-5.5 VDC 4A
- Desktop Computer Core i5
- Analogue Multi-Tester
- Wire Strippers and Pliers

EXPERIMENTS

- PSpice AC Circuit Analysis
- Two-Port Networks (Orcad Cadence PSpice)
- Power in AC Circuits

- Single Phase Transformer
- Power Factor Correction
- Parallel and Series Resonance
- Three-Phase Y- Δ Connection Circuit
- Low-Pass and High-Pass Filter Design
- Three-Phase Δ-Connection Circuit
- Band-Pass and Band-Stop Filters (PSpice)
- Two-Port Network

APPLIED ELECTRONICS CIRCUITS LABORATORY (INDUSTRIAL ENGINEERING)



Location	Lab Staff in Charge	Contacts
M12-108	Noorul Misbah Khanum	065053429
	Imtinan Attili	065053493

INTRODUCTION

The Applied Electronics Circuits Laboratory is designed to introduce and enable industrial engineering students to comprehend the main characteristics of electronic devices. This Laboratory applies the theoretical principles of the applied electronics circuits course. In addition, it enables students to use testing and measuring instruments such as function generators, oscilloscopes and digital multimeters to analyze DC and AC circuits by using different analysis techniques. These include basic DC Circuits, General DC circuit analysis, Transient Circuits, Basic AC Circuits, Diodes and their applications, Operational Amplifiers, Basic Combinational Circuits, Decoders and Multiplexers.

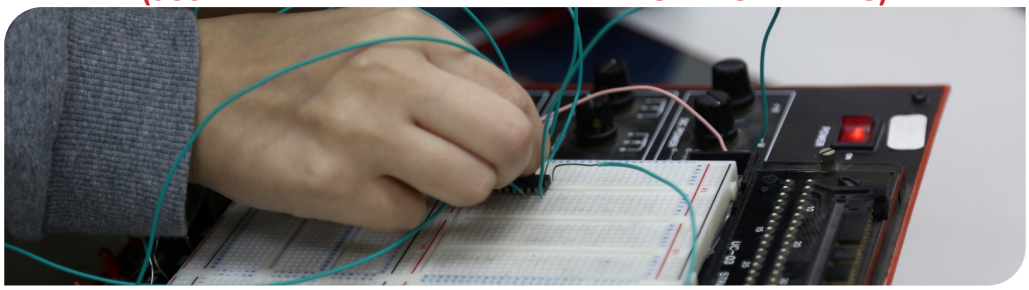
EQUIPMENT AND INSTRUMENTS

- Pro's KitMT-1820 Digital Multimeter
- ETS-7000 Digital Analog Training System
- ESCORT EDM-1635 Digital Multimeter
- PEAK ATLAS DCA Model DCA55 Component Analyzer
- TINSLEY LCR Data Bridge
- Rigol DG1032Z Arbitrary Function Generator 2 Channel /30MHz / 200MSa/s
- Rigol DS4012 Digital Oscilloscope 2 Channel / 100MHz / 4GSa/s
- TTi 354T Triple Power Supply 2 x 0-35VDC / 3.3-5.5 VDC 4A
- CAUVIN ARNOUX C.A. 5000 Analogue Multi-Tester
- Wire Strippers and Pliers
- Software: Tinker-CAD

EXPERIMENTS

- Simple DC Measurements and Analysis
- Using Function Generator & Oscilloscope and Study of Charging/Discharging of a Capacitor
- Diode Circuits
- Operational Amplifiers
- Digital Logic Circuits

APPLIED ELECTRONICS CIRCUITS LABORATORY
(SUSTAINABLE AND RENEWABLE ENERGY ENGINEERING)



Location	Lab Staff in Charge	Contacts
M12-108	Mohammad Saad Suleiman	065052449
	Noorul Misbah Khanum	065053429
	Imtinan Attili	065053493

INTRODUCTION

The Applied Electronics Circuits Laboratory is designed to introduce and enable SREE students to comprehend the main characteristics of electronic devices such as diodes and transistors. It also introduces the circuit simulator SPICE and its usage to carry out DC, AC & transient analysis. Practical circuits are built to test bipolar transistor, MOSFET transistors and operational amplifier circuits under DC and AC conditions as well as small signal amplifiers.

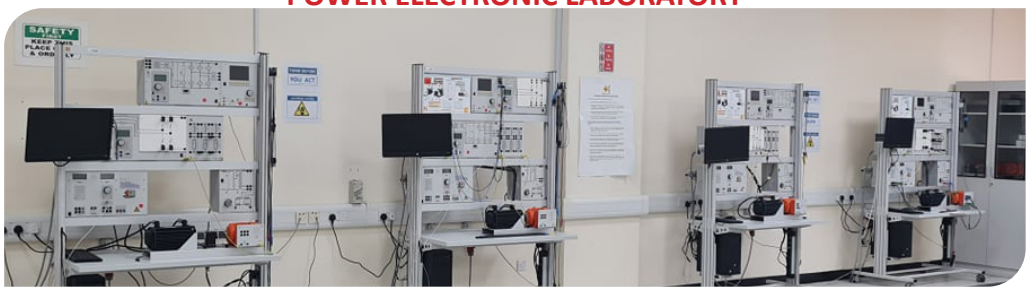
EQUIPMENT AND INSTRUMENTS

- Pro's KitMT-1820 Multimeter
- ETS-7000 Digital Analog Training System
- ESCORT EDM-1635 Multimeter
- PEAK ATLAS DCA Model DCA55 Component Analyzer
- TINSLEY LCR Data Bridge
- TTi LCR400 Precision Bridge
- Rigol DG1032Z Arbitrary Function Generator 2 Channel /30MHz / 200MSa/s
- Rigol DS4012 Digital Oscilloscope 2 Channel / 100MHz / 4GSa/s
- Simulators: ORCAD Cadence SPICE Circuit Simulator
- TTi 354T Triple Power Supply 2 x 0-35VDC / 3.3-5.5 VDC 4A
- Desktop Computer Core i5
- CAUVIN ARNOUX C.A. 5000 Analogue Multi-Tester
- Wire Strippers and Pliers

EXPERIMENTS

- Introduction to Applied Electronics Lab
- Introduction to Spice: DC and AC Analysis
- Function Generator and Oscilloscope
- Diode Characteristics Measurements and Applications
- BJT Characteristics and Biasing
- MOSFET Characteristics, Biasing and Applications
- Single Stage BJT Amplifier
- Single Stage MOSFET Amplifier
- PSPICE Simulation of BJT Amplifier Frequency Response
- BJT Amplifier Frequency Response
- Linear Operational Amplifier Circuits
- Spice Simulation of a DC to DC converter

POWER ELECTRONIC LABORATORY



Location	Lab Staff in Charge	Contacts
W12-105	Mohammad Saad Suleiman	065052449

INTRODUCTION

This Laboratory is versatile and its flexible training system covers many topics in power electronics application. The equipment support power electronics measurement program for multiple student and small research projects. The program converters are divided into two main sections: line-commutated - Thyristors based converters and self-commutated IGBTs or MOSFETs based converters.

EQUIPMENT AND INSTRUMENTS

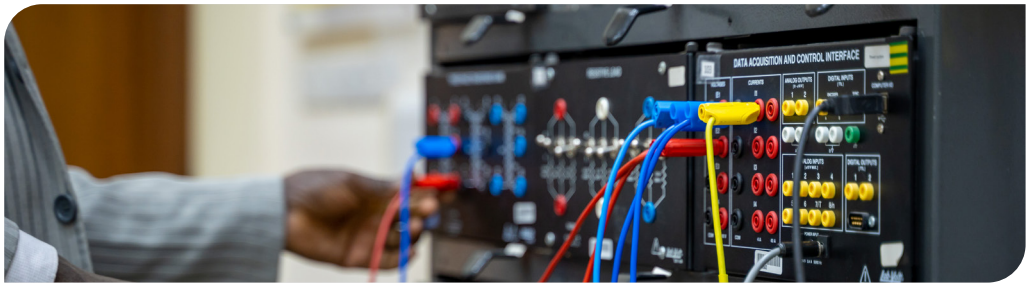
- Line-Commutated Power Converter Circuits
- Three-Phase Isolating Transformers
- Power Electronics Load Set, 300 W
- Self-Commutated Converter Circuits 300W
- Convertor Drive with DC Motor 300W
- Servo Machine Test System
- Variable ISOL. Transformer Exciter
- Three-Phase Synchronous Motor
- Analogue\Digital Multimeter
- Tacho Generator

EXPERIMENTS

- Fundamentals of the Power Electronics Switching Elements (DIODE, SCR, TRIAC, IGBT, MOSFET)
- Diode Rectification
- Controlled Rectification: Single Phase-Control, Full-Wave Control, Burst Firing Control, Pulse Pattern Control
- Principles of Inverter Operation

- Control Principles: Pulse-Width Modulation
- Modulation of Low-Frequency AC Voltage with Pulse-Width Modulation
- Control Characteristics and Operating Graphs
- Frequency Analysis and Examination of Harmonics
- DC Chopper Controllers in 1-, 2- and 4-Quadrant Operation
- Torque-Speed Characteristics of IM
- Induction Motor V/F Control
- Induction Motor Slip Compensation Control
- Induction Motor Vector Control
- DC Motor Speed Control
- DC Motor Braking

ELECTROMECHANICAL SYSTEMS LABORATORY



Location	Lab Staff in Charge	Contacts
M12-113	Mohammad Saad Suleiman	065052449

INTRODUCTION

The Electromechanical Systems Laboratory offers hands-on experience with relevant aspects of single and three phase transformers, DC motors and generators, single phase and three phase AC motors.

EQUIPMENT AND INSTRUMENTS

The Lab Volt computer-based electromechanical system runs in conjunction with an IBM-compatible computer consisting of different modules connected to the computer through Data Acquisition Interface with full virtual instruments (voltmeters, ammeters, power meters, an oscilloscope and a phasor analyzer); the system has data storage and graphical presentation facilities. The modules included in the system are:

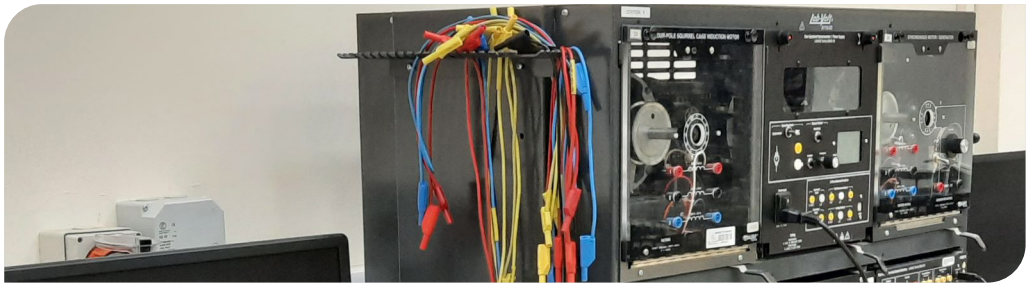
- Single-Phase Transformer Modules
- Three-Phase Transformer Modules
- Resistive, Inductive and Capacitive Power Load Modules
- Four-Quadrant Dynamometer/Power Supply
- Separately-Excited, Series Shunt and Compound DC Motors Module
- Single-Phase Induction Motor Modules
- Three-Phase Squirrel-Cage Induction Motor Module
- Three Phase Wound Rotor Induction Motor Three-Phase Synchronous Motor
- Three-Phase Synchronous Generator Module
- Synchronous Motor Starter Module
- Wattmeter/VAR Meter Module

EXPERIMENTS

- Autotransformer
- Transformer Regulation

- Open and Short Circuit Transformer Test
- Three phase Transformer Connections
- Prime Mover operation
- Dynamometer operation
- Separately Excited, Series Shunt and Compound DC Motors
- Three-Phase Squirrel-Cage Induction Motor
- Single-Phase Induction Motor
- Three-Phase Synchronous Motor
- Three-Phase Synchronous Generator

ELECTRIC POWER ENGINEERING LABORATORY



Location	Lab Staff in Charge	Contacts
M12-113	Mohammad Saad Suleiman	065052449
	Alya Alhammadi	065050412

INTRODUCTION

The Electric Power Engineering Laboratory provides hands-on experience with relevant aspects of DC systems, single and three phase AC power systems, transformers, three phase AC generator and motors.

EQUIPMENT AND INSTRUMENTS

The Lab Volt computer-based electromechanical system runs in conjunction with an IBM-compatible computer consisting of different modules connected to the computer through Data Acquisition Interface with full virtual instruments (voltmeters, ammeters, power meters, an oscilloscope and a phasor analyzer); the system has data storage and graphical presentation facilities. The modules included in the system are:

- Single-Phase Transformer
- Resistive, Inductive and Capacitive Power Loads
- Prime Mover
- Dynamometer
- Separately-Excited, Series Shunt and Compound DC Motors
- Three Phase Wound Rotor Induction Motor
- Wattmeter/VAR Meter
- Three-Phase Squirrel-Cage Induction Motor
- Three-Phase Synchronous Generator
- Voltmeter/Ammeter
- DC Motors

EXPERIMENTS

- AC Voltage and Current-Part I
- AC Voltage and Current-Part II
- Watt VAR Volt-Ampere and Power Factor
- Three-Phase Star-Star Circuit
- Three-Phase Star-Delta Circuit
- Three-Phase Power Measurements
- Transformer Regulation
- Prime Mover operation
- Dynamometer operation
- Three-Phase Squirrel Cage Induction Motor
- Separately Excited DC Motor

ELECTRONIC CIRCUITS LABORATORY

Location	Lab Staff in Charge	Contacts
W12-123	Imtinan Attili	065053493
	Noorul Misbah Khanum	065053429

INTRODUCTION

The Electronic Circuits Laboratory is designed to enable students to comprehend the main applications of electronic devices such as BJT transistors and MOSFET transistors as well as composite devices such as Op Amps. Practical circuits are built and investigated under DC and AC conditions in the lab and are also examined through simulations using AC sweep, transient analysis, DC sweep and parametric Sweep. Some of the applications examined include: BJT and MOS Amplifiers, Filters, Oscillators (relaxation and sinusoidal), A/D converters and D/A converters.

EQUIPMENT AND INSTRUMENTS

- ETS-7000 Digital Analog Training System
- Rigol DG1032Z Arbitrary Function Generator 2 Channel /30MHz / 200MSa/s
- Rigol DS4012 Digital Oscilloscope 2 Channel / 100MHz / 4GSa/s
- EX354RT Tripple Power Supply 300W
- Desktop Computers Core i5
- LCR Data Bridge
- Pro's KitMT-1820 Multimeter
- ESCORT EDM-1635 Multimeter
- Simulators: ORCAD Cadence Simulator, PSpice Simulator
- PEAK ATLAS DCA Model DCA55 Component Analyzer
- CAUVIN ARNOUX C.A. 5000 Analogue Multi-Tester
- Wire Strippers and Pliers

EXPERIMENTS

- Review on Cadence AC and Transient Analysis
- Multi-Stage and feedback Amplifier circuit
- Frequency Response of CE BJT Amplifier
- Linear Op Amp Circuits
- Active Filters
- Applications of OPAMPs
- Wein Bridge Oscillator
- D/A Converters
- A/D Converters

FEEDBACK CONTROL SYSTEMS LABORATORY

Location	Lab Staff in Charge	Contacts
M12-115	Obaida Abu Bader	065052488
	Alya Alhammadi	065052412

INTRODUCTION

The Feedback Control Systems Laboratory covers the practical aspects of control systems analysis and design through the lab experiments. Topics vary and include modeling of Servo System, Inverted Pendulum, Magnetic Levitation System and use of MATLAB and SIMULINK for analysis and design of control systems.

The lab also has process control module where all well-known controllers (P, PI, and PID) can be implemented with the help of computer interfaced with it.

EQUIPMENT AND INSTRUMENTS

- Personal Computers with MATLAB\ SIMULINK Package
- Modular DC Servo System (FEEDBACK MS150)
- Inverted Pendulum System (PYTRONIC Pendulum Control System)
- Magnetic Levitation System (FEEDBACK 33-210)
- Process Control Module (PYTRONIC PCT-100)
- Rhode & Schwarz HM01002MAX Digital Oscilloscope
- K&H7000 A/D Trainer
- KADET DIGITAL ANALOG TRAINING SYSTEM
- Multimeters
- Computer Set (CPU & Monitor)
- Matlab 2020
- LabVIEW 2016

EXPERIMENTS

- MATLAB and SIMULINK for Control Systems
- DC Motor Characteristics

- Speed Control System of DC Motor
- Position Control System of DC Motor
- Frequency Response Analysis using MATLAB
- Root Locus Design GUI and SISO DESIGN TOOL
- Control of Magnetic Levitation System
- Control of Inverted Pendulum System
- Process Control Application (Flow Control, Level Control, Pressure Control, and Temperature Control)

INSTRUMENTATION AND MEASUREMENTS LABORATORY

Location	Lab Staff in Charge	Contacts
M12-115	Obaida Abu Bader	065052488
	Imtinan Attili	065053493

INTRODUCTION

The Instrumentation and Measurements Laboratory covers the practical aspect of engineering instrumentation through lab experiments. Topics vary and include LabVIEW programming, data acquisition interfacing, determination of dynamic behavior of typical sensors, signal conditioning circuits, instrumentation amplifiers, experiments on temperature, position and force measurements.

EQUIPMENT AND INSTRUMENTS

- Personal Computers LabVIEW 2016 Package
- Data Acquisition NI-USB-6215
- Different Types of Sensors: Thermocouples, Thermistors, etc.
- LabVolt Transducer Fundamental Board
- DIGIAC 1750 Transducer and Instrumentation Trainer
- Rhode & Schwarz HM01002MAX Digital Oscilloscope
- K&H7000 A/D Trainer
- KADET DIGITAL ANALOG TRAINING SYSTEM
- Multimeters
- Personal Computers
- Matlab 2020
- LabVIEW 2016

EXPERIMENTS

- Introduction to LabVIEW
- Modular Programming using LabVIEW
- Structures in LabVIEW: Loops, case and sequence structures

- LabVIEW Arrays and Clusters
- Data Acquisition interface using LabVIEW
- Opamps DC Characteristics
- Temperature Sensors
- Variable Capacitor and Strain Gauge
- Light Sensors
- Linear Variable Differential Transformer

PRINTED CIRCUIT BOARD WORKSHOP (PCB)

Location	Lab Staff in Charge	Contacts
M12-116	Sol Andrew C. Domingo	065052938

INTRODUCTION

In this workshop, the students are able to learn the procedure of making both single-sided and double-sided PCBs. Students start by drawing circuit diagrams using any suitable PCB layout software. Then they produce a drawing which is later on printed and transferred into a photo-resistant layer after exposure to UV light for a few minutes. The subject PCB is etched in a container pan with etching chemical solutions. Finally, holes are drilled for provisions on fixing and soldering the components.

The PCB workshop is of great importance to students for their senior design projects and also useful for students who are working on projects related to certain courses.

EQUIPMENT AND INSTRUMENTS

- Computer Set
- Layout Software
- PCB Board
- Etching Chemicals
- Etching Tank
- PCB Cutter
- Drilling Machine and Drill Bits
- Etching Pan
- Acetate Printing Material or Equivalent
- Laser Printer
- UV Exposure Machine
- Soldering Machine
- Wire Strippers and Pliers

PROGRAMMABLE LOGIC CONTROLLER (PLC) LABORATORY

Location	Lab Staff in Charge	Contacts
M12-118	Obaida Abu Bader	065052488

INTRODUCTION

PLC Laboratory based on Siemens SIMATIC S7-200 is designed to reinforce the theoretical components covered in the course. This laboratory provides students with an understanding of the basic principles of Relay Logic and PLC (Programmable Logic Controllers) control; ladder programming and input/output operations; manipulate data using PLC instruction sets.
Students will have the opportunity to apply their knowledge of programmable logic controller hardware and ladder logic to solve the system problems.

EQUIPMENT AND INSTRUMENTS

- PLC-200 PLC Trainer

EXPERIMENTS

- Introduction to SIMATIC S7-200 Development
- Basic PLC Ladder Programming
- Basic Control Circuits (Light Control, DC Motor Control)
- Programming a Counter (Car Parking System)
- Programming a Timer (Traffic Light Control, Tank Filling Control)
- Drive and Interface Multiplexing 7-Segment Display
- Various Industrial Controller Based on S7-200

MULTIMEDIA TECHNOLOGY LABORATORY

Location	Lab Staff in Charge	Contacts
M12-118	Obaida Abu Bader	065052488
	Noorul Misbah Khanum	065053429

INTRODUCTION

This Laboratory provides a hands-on experience with MATLAB in signals and systems including audio and image signals. Topics include sampling, quantization, sampling rate conversion, spectral analysis, compression, filtering, basic techniques in audio and image processing.

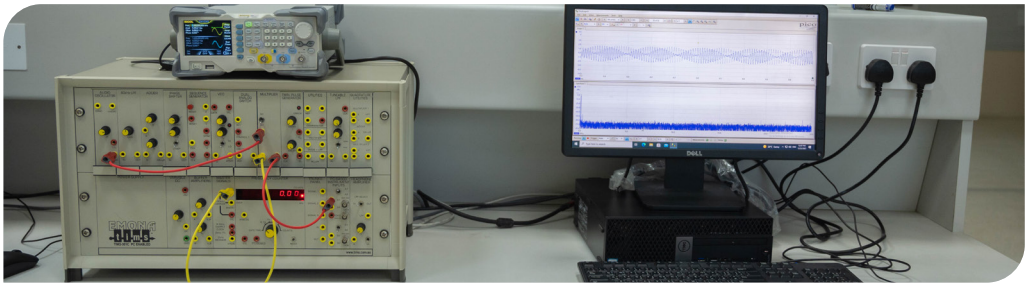
EQUIPMENT AND INSTRUMENTS

- Computers with licensed MATLAB Package provided by the university.

EXPERIMENTS

- Generate and Plot Different Types of Discrete-Time Signals in Time Domain
- Perform Elementary Operations (Add, Shift, Compress, and Flip) on Discrete-Time Signals
- Computation of DFT (Discrete Fourier Transform) using FFT Algorithms
- Design of Butterworth and Elliptic (LPF, HPF, BPF, and BSF) Digital IIR Filter
- Read, Play, and Write Sound Signals (Audio Files) using MATLAB
- Perform Elementary Operations (Shift, Compress and Concatenate) on Sound Signals
- Familiarization with Image Operations and Tools in MATLAB
- Using MATLAB to Perform Certain Geometric Operations like Resizing, Rotation, Shifting, Concatenating and Cropping

TELECOMMUNICATION SYSTEMS I LABORATORY



Location	Lab Staff in Charge	Contacts
M12-122	Obaida Abu Bader	065052488

INTRODUCTION

The Telecommunication Laboratory bridges the gap between the theoretical concepts of telecommunication subjects and the practical experience required in the telecommunication industry.

The Laboratory`s experiments are designed to cover the Analogue and Digital telecommunications principles explained in the lectures in the telecommunication systems courses. The experiments deal with the analogue communication basics such as filtering, amplitude modulation, frequency division multiplexing, frequency modulation, pulse amplitude modulation, pulse code modulation and digital signal modulation techniques such as: PSK, FSK, DPSK, QPSK, and QAM. MATLAB and Simulink are also used to simulate different telecommunication systems.

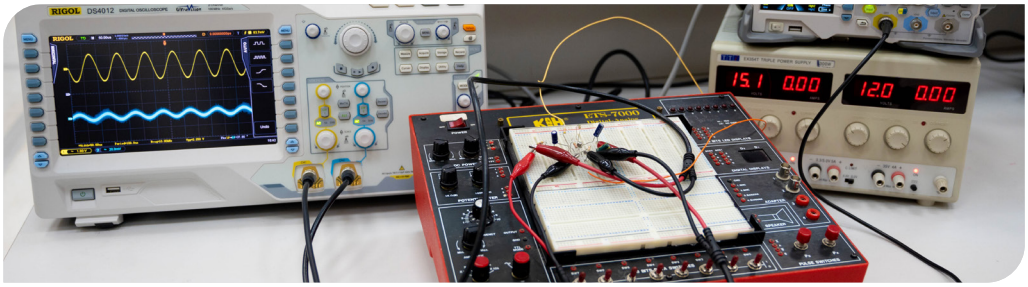
EQUIPMENT AND INSTRUMENTS

- EMONA TIMS Telecommunication-Signal & System Module
- Emona Telecoms-Trainer 101
- TutorTimsAdvanced-EMONA_ software
- Lab-Volt Digital Communication (1) + (2) Board
- Spectrum Analyzer 1.8 GHz, Tektronix 2711
- Dual trace Digital Real Time Oscilloscope 100 MHz Tektronix TDS 3012
- Function Generator 11 MHz, Tektronix CFG280
- Function Generator DG1032Z
- Dual Power Supply 0-30 V, 0-2.5 A, Metrix AX502
- Metrix MX 553 Bench Digital Multimeter
- Computer Set (CPU & Monitor)
- Matlab 2020

EXPERIMENTS

- Amplitude Modulation\ Demodulation (DSBSC)
- Amplitude Modulation\ Demodulation (DSB-LC)
- ASK- Modulation\ Demodulation
- FSK- Modulation\ Demodulation
- PSK- Modulation\ Demodulation
- QPSK – Modulation\ Demodulation
- Envelope Detection
- FM Modulation\ Demodulation
- Line-Coding Encoding
- Signal Sampling & Reconstruction
- PCM Encoding- Decoding
- PAM & TDM- Modulation & Demodulation
- PCM TDM & PWM- Pulse Width Modulation

FUNDAMENTAL OF ELECTRONICS LABORATORY



Location	Lab Staff in Charge	Contacts
W12-123	Imtinan Attili	065053493

INTRODUCTION

The Fundamental of Electronics Laboratory is designed to enable students to comprehend the main characteristics of electronic devices such as silicon diodes, Zener diodes, MOSFET and BJT transistors. In addition to the characteristics, the lab introduces some applications to these electronic devices which include: amplifiers, rectifiers as well as digital gates. In addition to the practical implementations under DC and AC conditions in the lab, students are also required to examine the circuits using Cadence simulation software. Simulation techniques students learn include: DC sweep, parametric sweep, AC sweep and transient analysis.

EQUIPMENT AND INSTRUMENTS

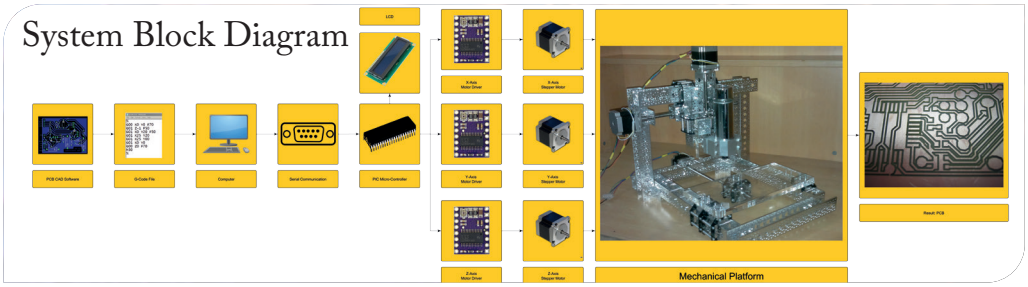
- ETS-7000 Digital Analog Training System
- Rigol DG1032Z Arbitrary Function Generator 2 Channel /30MHz / 200MSa/s
- Rigol DS4012 Digital Oscilloscope 2 Channel / 100MHz / 4GSa/s
- EX354RT Tripple Power Supply 300W
- Desktop Computers Core i5
- LCR Data Bridge
- Pro's KitMT-1820 Multimeter
- ESCORT EDM-1635 Multimeter
- Simulators: ORCAD Cadence Simulator, PSpice Simulator
- PEAK ATLAS DCA Model DCA55 Component Analyzer
- CAUVIN ARNOUX C.A. 5000 Analogue Multi-Tester
- Wire Strippers and Pliers

EXPERIMENTS

- Diode Characteristic
- Full Wave Rectification

- MOS Transistor Characteristic and Biasing
- BJT Transistor Characteristic and Biasing
- Single Stage BJT Amplifier
- Single Stage MOS Amplifier
- PSPICE Simulation of BJT Amplifier
- Bipolar Transistor as Switching Elements
- CMOS Logic Gates

SENIOR DESIGN PROJECT I & II LABORATORY



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INTRODUCTION

The Electrical Engineering Department offers a project room reserved for senior and junior students for their projects. This room may also be used by students for their course projects. The department provides the needed equipment for various projects and meets student requests for any additional equipment as needed.

Subjects of students› projects are usually linked to research interests in the department or technical problems offered by local industries. In both cases, small groups of students work together to design, build, refine and test complete hardware and/or software systems.

EQUIPMENT AND INSTRUMENTS

- Digital Multimeters
- ETS-7000 Digital Analog Training System
- Rigol DG1032Z Arbitrary Function Generator 2 Channel /30MHz / 200MSa/s
- Rigol DS4012 Digital Oscilloscope 2 Channel / 100MHz / 4GSa/s
- Simulators: ORCAD Cadence PSpice Circuit Simulator
- TTi 354T Triple Power Supply 2 x 0-35VDC / 3.3-5.5 VDC 4A
- ESCORT Dual Display LCR Meter
- Soldering Machine
- Hardware Tools