

EEED Training Facilities

Laboratories and Shops of EEED at a glance

4.0 Electrical & Electronic Engineering Department

There are 9 Labs & Shops in this Department: Electrical Demonstration Lab, Electrical Machines & Power System Lab, Power Electronics & Drive Control Lab, Electronics Lab, Electrical Measuring and Testing Lab, Power Generation & Distribution Lab, Electrical Winding & Maintenance shop, Electrical Substation, Electrical Measuring & Calibration Lab.

Electrical Demonstration Lab houses one lecture theatre surrounding by various training aids.

Demonstration items include 4 Nos Motor Generator Set

- Wound Rotor Induction Motor to DC Generator Trainer Set.
- DC Motor to AC Generator Trainer Set.
- Squirrel Cage Induction Motor to DC Generator (Dynamometer) Trainer Set.
- Synchronous Motor (three Phase) to AC Generator Trainer Set.

LVHVAC: Heating, Ventilation, Air Conditioning & Refrigeration.

Lab Volt Item:-

- Synchronizing Module.
- Different Types of Protective Relay.
- Different Types of Motor Module.
- Different Types of Motor Starter Module.
- Ac & DC Variable Speed Drive.
- Data Acquisition & Control Interface – 02 No.
- Distribution Bus, Fault able Transmission Line, Fault able Transformers & Transmission Grid.
- LV Synchronizing Panel, Changeover Switch & Air Circuit Breaker (ACB) using synchronous Generator with facilities for parallel operation & synchronization of generated power With PDB 415 Volt Bus
- Study of different types of cable characteristics by using Cable display board.

4.1 ► Electrical Demonstration Lab



Training facilities of Electrical Machines & Power System Laboratory include:

- Different Types of AC Motors & Motor Control devices
- Different Types of DC Motors & Motor Control devices
- Test benches for study of no – load & full – load Characteristics of Motors
- Electro – Magnetic break System
- Assembly/ disassembly practice bench of different types of Motors.
- Electrical three phase distribution transformer & protective devices.
- Power distribution switchgear components & their test facilities.
- On line capacitor bank for power factor correction.
- Industrial & domestic wiring circuit boards for open & conduit wiring practice using wide range of circuit components.
- Circuit boards of common electric devices.
- Electrical Safety demonstration boards.
- Practice on Variable Voltage & Variable Frequency Drive for AC Motor.
- Power supply to different types of AC Motors starting & control system by using Trunking bus bar.
- DC Power supply to Vacuum Circuit breaker's control Circuit by using power supply unit.



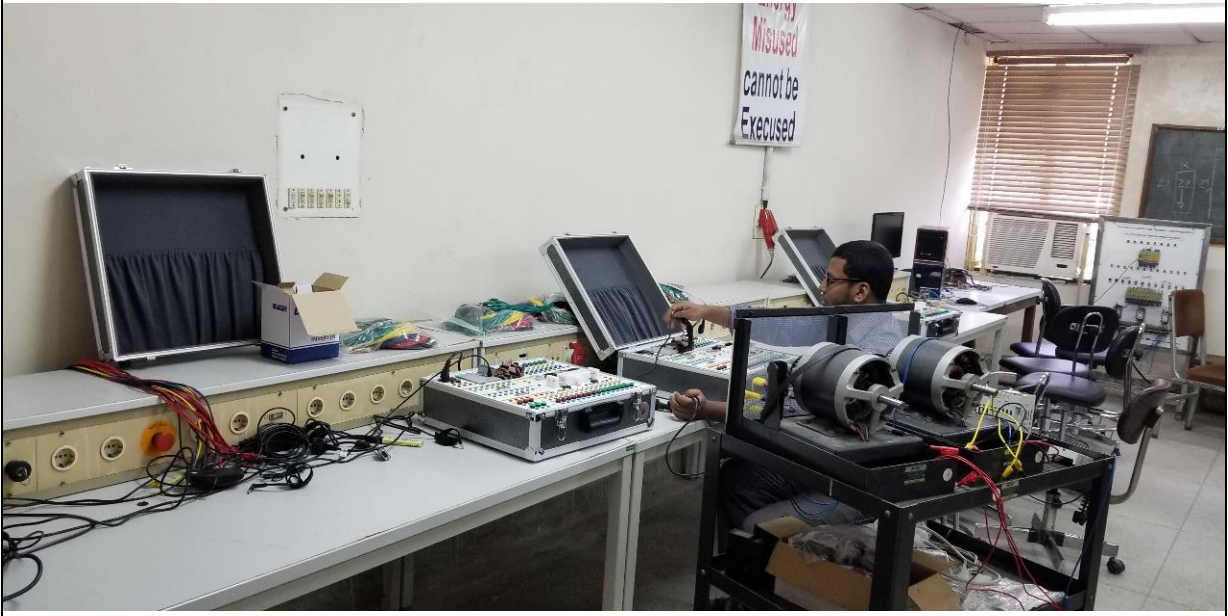
4.3 ► Power Electronics & Drive Control Lab

The Laboratory is equipped with wide range of latest model training equipment related to high power electronics for controlling Industrial drives. Some of the major equipment of the laboratory are,

- Drive Control electronics using phase fired thyristor circuits
- Control circuit using MOSFET semiconductors
- Frequency inverter type AC motor speed control
- Electric generator & distribution transformer with facilities for parallel operation & synchronization of generated power to common grid
- practice on motor, generator & transformer working principle, construction & operation characteristics by using Training Modules.
- Practice on different types of circuit characteristics by using resistive Load, Inductive Load, Capacitive Load & Measuring Instrument Training Modules.
- Practice on different types of AC motor breaking system by using Plugging & Dynamic Breaking Module.
- Study of different types of AC motor characteristics by using Cut way view of Motor.
- Study of different types of cable characteristics by using Cable display board.



The Laboratory is equipped with modern latest training modules for hands – on Practice on basic & advanced electronic circuits. The facility includes DC power regulation training set – up, Portable Modern PLC training kit supplied by KOICA, PLC Controlled Motor Operated Panel, Static inverter uninterrupted power supply etc.



Electrical Measuring and Testing Laboratory is equipped with:

- Transformer Oil dielectric strength testing set
- Different types of fault finding Practice in AC motor control circuit by using fault finding Trainer
- High Voltage Cable Insulation Testing by using High Voltage Cable Testing Set
- Very low range voltage, current & resistance measure by using 8845A Precision Multimeter
- Very high range Insulation resistance measure by using Tera ohm Measurement – 10 KV
- Circuit leakage current measure by using 360 Leakage Clamp Meter. Designed for non-invasive testing for leakage current in insulation without the need to power down or disconnecting the installation equipment.
- Machine body temperature at any condition measure by using Infrared Thermometer
- DC motor Armature Winding continuity measure by using Growler
- Transformer bussing temperature, Motor winding temperature measure & Machine Condition Monitoring by using Thermal Imager

4.5 ► Electrical Measuring and Testing Lab

- We can use a gauss meter to measure the strength of the magnetic field around power lines. We can also use a gauss meter to measure the strength of the ambient magnetic field in our house by using Gauss Meter
- Machine Condition Monitoring by using Stethoscope. Stethoscope is a high quality, sensitive instrument enabling the determination of troublesome machine parts by the detection of machine noises or vibrations.



Power Generation & Distribution Laboratory is equipped with:

- One Diesel Engine Generator – 22.5 KVA which operated in training & emergency Power Supply purpose.
- LV Synchronizing Panel, Changeover Switch & Air Circuit Breaker (ACB) using Diesel Engine Generator – 22.5 KVA with facilities for parallel operation & synchronization of generated power With PDB 415 Volt Bus
- Old version uninterruptible power supply (UPS) using DC Motor Generator Set
- HV & LV Panel Board (for Practice), Rechargeable battery rack & Battery charger etc.



4.6 ► Power Generation & Distribution Lab

Electrical Winding & Maintenance shop is equipped with:

- Motor rewinding facilities & Practice.
- Coil making facilities which can be used in Motor rewinding.
- Auto Oven (Automatic Heating chamber) is used for drying & heating Motor & other Electrical Machine.



4.7 ► Electrical Winding & Maintenance shop

Electrical Substation is equipped with:

- Three phase Power transformer – 750 KVA using to power supply & Training Purpose.
- Vacuum Circuit Breaker with 11KV Switchgear, IDMT Relay, CT, PT & other accessories using for Training Purpose.



4.8 ► Electrical Substation

Electrical Measuring & Calibration Lab is equipped with:

- Transformer bussing temperature, Motor winding temperature measure, Instrument Calibration & Machine Condition Monitoring by using Thermal Imager
- AC/ DC Circuit Current measure & Instrument Calibration by using Series AC/DC Clamp on meter
- Circuit leakage current measure & Instrument Calibration by using 360 Leakage Clamp Meter
- Insulation resistance measure & Instrument Calibration by using Megger
- Very low range voltage, current, resistance measure & Instrument Calibration by 6.5 Precision Digital Multimeter
- Machine body temperature at any condition measure & Instrument Calibration by using 60 series Infrared Thermometer
- NPN, PNP & other transistor testing by Digital transistor Checker
- We can use a gauss meter to measure the strength of the magnetic field around power lines. We can also use a gauss meter to measure the strength of the ambient magnetic field in our house by using Gauss Meter
- DC motor Armature Winding continuity measure by using Growler
- Electric Circuit Cable fault finding by using Cable fault locator
- A Tesla meter is a device (magnetometer) used to measure magnetic inductance or magnetic field strength in a non-ferromagnetic medium. Tesla meters are used to measure the electromagnetic field of power lines, household appliances and industrial devices
- A Integrating sound level meter is a measuring instrument used to assess noise or sound levels by measuring sound pressure. Often referred to as a sound pressure level (SPL) meter, decibel (dB) meter, noise meter or noise dosimeter, a sound level meter uses a microphone to capture sound.
- Underground Cable fault finding by using Cable fault Finder. A Time Domain Reflectometer (TDR) sends a short-duration low energy signal (of about 50 V) at a high repetition rate into the cable. This signal reflects back from the point of change in impedance in the cable (such as a fault). TDR works on the similar principle as that of a RADAR.
- Power and energy loggers are used for conducting three phase energy and load studies to discover where savings are possible. With the Fluke Energy Analyze Plus software, it's possible to create detailed power quality and energy reports to focus in on the problem areas. Depending on the model, the energy- logger can measure up to 3000 A in different ranges. In addition to the current measurement, the energy-logger also measures other parameters such as voltage, active power, apparent power, apparent energy, reactive power, power factor and frequency. The measured values can be stored in intervals in the energy-logger. Furthermore, the measured values can be stored. Energy Logger
- Three Phase Power Calibrator Three power phases in a single easy-to-use instrument. The Fluke Calibration 6003A Three Phase Electrical Power Calibrator is the most cost-effective way to get the superior accuracy and performance of three independent phases in one instrument. It is an ideal solution for calibration laboratories, electronics manufacturers, electric utility meter shops, and other organizations that manufacture and maintain energy meters, power quality analyzers, and similar tools.
- Very high range Insulation resistance measure & Instrument Calibration by using High Voltage Insulation Tester

- Bearing fault at any condition measure & Instrument Calibration by using Detection of an antifriction bearing faults is one of the most challenging tasks in bearing health condition monitoring, especially when the fault is at its initial stage. The defects in bearing unless detected in time may lead to malfunctioning of the machinery. The defects in the rolling element bearings may come up mainly due to the following reasons; improper design of the bearing or improper manufacturing or mounting, misalignment of bearing races, unequal diameter of rolling elements, improper lubrication, overloading, fatigue and uneven wear. This paper presents a detailed of the different detection techniques used for measuring rolling bearing defects. From in depth study, four different methods for detection and diagnosis of bearing defects; they may be broadly classified as vibration measurements, acoustic measurements, temperature measurements and wear debris analysis have been identified. It is observed that the vibration analysis is most commonly accepted technique due to its ease of application. Bearing fault detector
- Magnetic Contractor Current Capacity, Circuit Breaker Current Capacity, different types of Relay checking & Calibration by using Relay tester



Some Important Labs & Major Equipment of Electrical & Electronic engineering Department

Academic Building -02 (3rd Floor)

	Name of the Lab	Major Equipment
1.	Electrical Measuring & Calibration Lab (EEED)	Thermal Imager, Series AC/DC Clamp on meter, 360 leakage clamp on meter, Megger, 6.5 Precision Digital Multimeter, 60 series infrared Thermometer, Digital transistor Checker, Gauss meter, Cable fault locator, Growler – Armature Winding Tester, Tesla Meter, Integrating Sound Level Meter, Cable Fault Finder, Energy Logger, Three Phase Power Calibrator, High Voltage Insulation Tester, Bearing fault detector, Relay tester.

Academic Building-01 (2nd & 3rd Floor)

	Name of the Lab	Major Equipment
	Electrical Machines & Power System Lab	<ol style="list-style-type: none"> 1. Different Types of AC & DC Motors 2. Power Factor Improvement Plant – 02 Nos 3. Vacuum Circuit Breaker, Minimum Oil Circuit Breaker 4. Different Types of Motor Starting & Control Panel 5. Variable Voltage & Variable Frequency Drive 6. Different Types of Electrical Wiring Panel 7. Different Types of Power Supply Unit. 8. Different Types of Dissectible machine 9. Three Phase Power Transformer for Practice 10. Trunking Bus bar
	Power Electronics & Drive Control Lab	<ol style="list-style-type: none"> 1. Different Types of Motor Module 2. Different Types of Resistive Load Module 3. Different Types of Inductive Load Module 4. Different Types of Capacitive Load Module 5. Thyristor Module 6. Different Types of Transformer Module 7. Different Types of Measuring Instrument Module 8. Plugging & Dynamic Breaking Module 9. Different Types of Cut way view of Motor 10. Different Types of Cable display board. 11. Different Types of Transformer
	Electrical Demonstration Lab	<ol style="list-style-type: none"> 1. 4 Nos Motor Generator Set <ol style="list-style-type: none"> a) Motor test Bench – 01 Wound Rotor Induction Motor to DC Generator Trainer Set Input AC : 0 ~ 208 Volt, 3 phase Model : CPE – ER 1603T Origin : Chungpa, Korea b) Motor test Bench – 02 DC Motor to AC Generator Trainer Set Input DC : 0 ~ 120 Volt Model : CPE – ER 1604T Origin : Chungpa, Korea c) Motor test Bench – 03 Squirrel Cage Induction Motor to DC Generator (Dynamometer) Trainer Set Input AC : 0 ~ 220 Volt, 3 phase Model : CPE – ER 1609T Origin : Chungpa, Korea

		<p>d) Motor test Bench – 04 Synchronous Motor (three Phase) to AC Generator Trainer Set Input AC : 0 ~ 208 Volt, 3 phase Model : CPE – ER 1607T Origin : Chungpa, Korea</p> <p>2. LVHVAC: Heating, Ventilation, Air Conditioning & Refrigeration, 1 Lot of Maintenance Tools, Type : 3431 – 05, Lab Volt – 02 Nos</p> <p>3. Lab Volt Item</p> <p>a) Synchronizing Module b) Different Types of Protective Relay c) Different Types of Motor Module d) Different Types of Motor Starter Module e) Ac & DC Variable Speed Drive f) Data Acquisition & Control Interface – 02 No g) Distribution Bus, Fault able Transmission Line Fault able Transformers & Transmission Grid h) LV Synchronizing Panel, Changeover Switch & Air Circuit Breaker (ACB)</p>
	Electrical Measuring and Testing Lab	Transformer Oil testing set, Fault Finding Trainer, High Voltage Cable Testing Set – 120 KV DC, Stethoscope, Gauss Meter, Thermal Imager, 8845A Precision Multimeter, Growler – Armature Winding Tester, Tera ohm Measurement – 10 KV, 360 Leakage Clamp Meter, Infrared Thermometer
	Electronic Lab	<p>1. PLC Training Kit, Portable PLC Training Kit Model : CPS – 3770, Origin : Chungpa, Korea</p> <p>2. PLC Controlled Motor Operated Panel AC 100 – 240 Volt, 50/60 Hz, 11 VA Model : Zen 20C1AR – A – V2, Origin : Omron</p> <p>3. Three Phase Inverter Input : 380 ~ 480 Volts, 3.6 Amps, 3 Phase, 50/ 60 Hz, 1 HP, 0.74 KW Output : 0 ~ 480 Volts, 2.5 Amps, 1.9 KVA, 3 Phase, 0.1 ~ 400 Hz Type : SV008iG5A – 4, Origin : Korea</p> <p>4. Static inverter uninterrupted power supply</p> <p>5. DC power regulation training set – up</p>

Behind Academic Building-01 (Ground Floor)

Name of the Lab	Major Equipment
Power Generation & Distribution Lab	<p>1. LV Synchronizing Panel, Changeover Switch & Air Circuit Breaker (ACB)</p> <p>2. Diesel Engine Generator – 22.5 KVA</p> <p>3. DC Motor Generator Set (for Practice) – 02 Nos</p> <p>4. Panel Board (for Practice)</p> <p>5. Rechargeable battery rack & Battery charger</p>
Electrical Winding & Maintenance shop	<p>1. Motor rewinding facilities</p> <p>2. Coil making machine</p> <p>3. Auto Oven (Automatic Heating chamber)</p>
Electrical Substation	<p>1. Transformer – 750 KVA</p> <p>2. Vacuum Circuit Breaker</p> <p>3. Low Voltage(400) & High Voltage(11KV) Switchgear</p> <p>4. IDMT Relay</p>

Technical Assistance & Consulting Service Facilities

TICI maintains a technical service pool consisting of highly qualified foreign trained personnel having long experience of working in heavy industries. Areas of specialized technical services offered by TICI at present are as follows:

Electrical and Electronic Engineering

Troubleshooting & repair of electrical & electronic control system & devices.

Testing & calibration of electrical & electronic equipment.

Electrical inspection of industries, sub-station & generators.

High voltage test of electrical cables & machines.

Identification of cable fault.

Transformer oil & electrical insulation oil test.

Maintenance service of electrical safety & protective devices.

Investigation/survey of electrical incidence, fire, etc.



Electrical Inspection Service At HKD International, CEPZ, Chattogram



Electrical Inspection Service At HKD International, CEPZ, Chattogram