Department of Electrical and Control Eng.

Lab 201

Electrical Machines

Capacity: 20 Students

The electric machines laboratory provides the opportunity to understand and examine the behavior of converting electrical energy to mechanical energy and vice versa and understand the classical electrical machines to drive several mechanical loads as well as synchronizing generators to be connected on a single local network. Also it includes modules of power electronic devices and scopes suitable to build power electronic circuits and demonstrate device control and performance. Furthermore, basic converter and inverter drive sets are available to be applied with different machine types.

LABORATORY EQUIPMENTS

- D.C. machine with measurement unit.
- DC compound motor
- 3Φ Slip ring induction motor
- 3Φ Induction motor squirrel cage induction motor
- 1Φ Induction motor capacitor start
- 3Φ Synchronous machine
- Transformer.
- Power pack.
- DC power supply.
- Synchronizing device.
- Synchronizing unit.
- Power electronics components and panels.
- 3Φ Passive loads (Capacitive Loads, Inductive Loads and Resistive Loads).
- 3Φ Load switch.
- Wye/Delta Switch.
- Shunt regulator.
- Revolution counter.
- Tachometer generator.
- Power factor meter.
- Multimeters.
- Wattmeters.

MAJOR EXPERIMENTS

- ✓ Obtaining different characteristics of the DC separately excited generator.
- ✓ Observing the load sharing between two DC separately excited generators when connecting in parallel to supply a common load.
- ✓ Obtaining the external characteristics of the DC compound generator.
- ✓ Studying different characteristics of the DC shunt motor.
- ✓ Studying different characteristics of the DC series motor.
- ✓ Understanding different methods of DC motors speed control.
- ✓ Determining the equivalent circuit parameters of a transformer by short circuit and open circuit tests.
- ✓ Studying different characteristics of 3Φ squirrel cage induction motor.
- ✓ Studying different characteristics of 3Φ slip ring wound rotor induction motor.
- ✓ Demonstrating the open circuit, short circuit and loading characteristics of synchronous alternator.
- ✓ Performing parallel operation of Synchronous Generators.
- ✓ Studying different characteristics of synchronous motor.

The Laboratory Serves the Following Courses

Course No.	Course Title	Semester
EE321	Electrical Machine 1	5
EE322	Electrical Machine 2	6
EE328	Electrical Power & Machines	6
EE328	Electrical Machines	7
EE422	Electrical Machine 3	7
EE521	Special Electrical Machines	9