SEMESTER	***DEPARTMENT***	***COURSE TITLE***
Sixth	*Power Engineering*	*AC Machines*
COURSE CODE	***HOURS:*** 3	***COURSE SPECIFICATIONS***
EP601	***UNITS:*** 3	*Theoretical Content*

1. ***Know the Construction and Operation of 3-Phase Squirrel-Cage and Slip-Ring Motors.***

- Explain the three phase induction motor:
  Internal construction. Types of rotors. Production of rotating magnetic field. Synchronous, speed and slip.
- Understand the difference between a Squirrel Cage and a Wound rotor.

2. ***Examining the Relationship between Torque and Speed.***

- Understand the difference winding methods of the two types of rotors. Protection of wires.
- Alignment and bearing testing methods.
- Measurement aspects of Torque and Speed parameters and instruments used for the purpose.

3. ***Conduct Tests to Determine the Equivalent Circuit Constants and Efficiency.***

- Derive the equivalent circuit of the machine.
- Define the parameters of the circuit and know how to do the open circuit and short circuit tests.
- Do tutorial exercises on the subject.

4. ***Conduct Tests of Different Methods of Starting 3-Phase Motors.***

- Understand the different starting methods used in small and large size motors
- Star-delta and autotransformer methods & requirements.

5. ***Understand the Construction of Operation for Synchronous Generators. Ability to Control the Generated Voltage and Frequency. Understanding the Parallel Operation.***

- Explains the synchronous generators:

Internal construction. Theory of operation. Armature windings and generated voltage.

- Variation of voltage and frequency.
- Open- circuited test and short-circuited test. Synchronous reactance and equivalent circuit.
- Phasor-diagram and power-angle characteristics.
- Voltage regulation.
- Parallel operation.

6. Understands the Construction and Theory of Operation of Single-Phase Induction Motors and Stepper Motors.

Describe the:

- Single-phase induction motors and stepper motors. Internal construction.
- Defines types of single phase induction motors.
- Starting methods. Forward and backward fields.
- Principles of operation.

References:

1- ***Elements of power system,*** by W. Stevenson.

2- ***Power System Analysis***, John Grainger and William D. Stevenson JR. 1994