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|---|---|---|---|---|---|
| **Semester:** | 5 | | | | |
| **Course Code:** | EE3800 | | | | |
| **Course Name:** | Electrical Power and Machines | | | | |
| **Credit Value:** | 3 (Notional hours: 150) | | | | |
| **Pre-requisites:** | None | | | | |
| **Core/Optional** | Core | | | | |
| **Hourly Breakdown** | **Lecture** | **Tutorial** | **Practical** | **Assignment** | **Independent Learning & Assessment** |
| | 30 | 6 | 18 | - | 96 |

**Course Aim:** To provide knowledge on electrical machines so that the students will be able to select electrical machines appropriately based on different applications.

**Intended Learning Outcomes:**
At the end of this course, students should be able to:

- **analyse** electric power and energy requirements for the demand side.
- **analyse** equivalent circuits of transformers for different applications.
- **analyse** equivalent circuits and torque/speed characteristics of different dc machines.
- **analyse** equivalent circuits and torque/speed characteristics of different induction machines.
- **analyse** equivalent circuits and torque/speed characteristics of synchronous machines and special motors.

**Course Content:**

- **Electric Power and Energy**

Power and energy, tariff, harmonics, power factor and correction, line losses and reactive power compensations, demand side management.

- **Transformers**

Power transformer construction, transformers for polyphaser systems, three phase transformers, parallel operation, transient inrush current, variable frequency operations, special transformer devices, auto transformers, and saturable reactors.

- **Direct Current Machines**

Magnetic system of a dc machine, armature windings, internal torque, performance of generators and motors, armature reaction and commutation, permanent magnet motors, solid state drives.

- **Induction Machines**

Three-phase induction motors, equivalent circuit, steady state operation, torque-speed characteristics, starting, speed control and braking methods, induction generators, linear induction

motors.
Single-phase induction motors, equivalent circuit, starting methods, solid state drives.

- **Synchronous Machines**

Three phase synchronous machines, steady state operation, torque production, motor power factor, magnetic saturation, permanent magnet and hysteresis motors, salient-pole machines, stepping motors, solid state drives.

**Teaching /Learning Methods:**
Lectures, Tutorials, and Practical Work

**Assessment Strategy:**

| Continuous Assessment<br>40% | Final Assessment<br>60% | | |
|---|---|---|---|
| Details:<br>Assignments/ Practical work/quizzes 40% | Theory (%)<br>60 | Practical (%) | Other (%) |

**Recommended Reading:**

- Stepen J. Chapman, "Electric Machinery Fundamentals", 3rd Edition, McGraw-Hill International Editions, 1999
- Theodore Wildi, "Electrical Machines, Drives and Power Systems", 6th Edition, Pearson, 2005