

**Approval: 6<sup>th</sup> Senate Meeting**

**Course Name** : Electromechanics  
**Course Number** : EE 201  
**Credit** : 2.5-0.5-0-3  
**Prerequisites** : IC 160 Electrical System around Us  
**Students intended for** : UG  
**Elective or Core** : Core for EE, Elective for CSE/ME  
**Semester** : Even  
**Preamble:**

The basic objective of this course is to introduce the fundamental theory and mathematics for the analysis of electromechanical devices with specific emphasis on the theory of rotating electric machines. The students will be able to extend these fundamental principles into a way of thinking for problem solving and applications in real world problems. The course will also introduce non-traditional special electrical machines and their applications.

**Course Outline:**

Electromechanics course aims to develop deep understanding and implementation of electrical machines and transformers concepts. The course will introduce basic principles, characteristics, operation and application of electromechanical devices. Introduction to special electrical machines with application will be presented.

**Course Modules:**

**Circuits:** AC circuits - 1-phase & 3-phase (review); magnetic circuits. (2 lectures)

**Transformers:** 1-phase and 3-phase, auto-transformers, harmonics, special multiphase transformers and their applications. (8 lectures)

**Basic principles of electro mechanical energy conversion and rotating machines** (3 lectures)

**Synchronous Machines:** Construction, characteristics, regulation, V-curves, parallel operation and power system interfacing. (10 lectures)

**Induction machines:** 3-phase and 1-phase machine construction, characteristics, starting, braking and speed control, induction generators and applications. (10 lectures)

**Special machines:** Construction, characteristics and applications of a few special machines, such as, BLDC machine, PM machine, SRM, hysteresis motor, stepper motor, linear induction motor and their applications. (9 lectures)

**Text Books:**

1. Kosow, I. L. , Electric Machinery & Transformers, PHI, India
2. Nagrath I. J. and Kothari D. P., "Electrical Machines", 3rd Ed., Tata McGraw-Hill Publishing Company Limited.
3. Venkatratnam K., Special Electrical Machines, University Press, India

**Reference Books:**

1. Fitzgerald A. E., Kingsley C. and Kusko A., "Electric Machinery", 6th Ed., McGraw-Hill International Book Company.
2. Say M. G., "The Performance and Design of Alternating Current Machines", CBS Publishers and Distributors.