EE226	AC MACHINES	L	T	P	C	Int	Ext
		3	-	-	3.0	30	70

Semester IV [Second Year]

COURSE OBJECTIVES:

1. To provide students with strong foundation on the classification, construction, performance, testing and applications of Transformers and Induction Motors
2. To enable the students to have a fair knowledge about construction, working principle, operation and applications of Transformers and Induction Motors

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Apply the concepts of constructional and operational features to determine efficiency, regulation and operational performance of transformers
2. Illustrate the three phase transformers connections and parallel operation
3. To sketch the operational characteristics and equivalent circuits of poly phase induction motors from their construction and operation
4. To design starters, speed control mechanisms of induction motors and to describe the operation and applications of induction generators
5. Evaluate the performance of 1-ph induction motors

UNIT I *Text Book - 1, 2* [CO:1] **(12)**

Transformers: Constructional features of transformers, methods of cooling - EMF equation - no load and load phasor diagram - equivalent circuit of single phase transformers. Regulation - losses - efficiency and all day efficiency. Testing of transformers: OC & SC tests - Sumpner's test.

UNIT II *Text Book - 1, 2* [CO:2] **(12)**

Auto transformers, Parallel operation of Single Phase Transformers and its load sharing. 3-phase transformer windings and its connections. Open delta - Scott connected transformers - 3 phase to 2 phase conversion. Tap changing in transformers.

UNIT III *Text Book - 1, 2* [CO:3] **(12)**

Poly Phase Induction Motors: Rotating magnetic field in two phase & three phase systems - construction and operation of 3-phase induction motors. Torque equation and torque slip characteristics - equivalent circuit. Power losses - Efficiency, Testing of induction motors - No load and Blocked rotor Tests, Circle Diagrams.

UNIT IV *Text Book - 1, 2* [CO:4, 5] **(12)**

Types of starters - Speed control of 3-Phase Induction motors- Voltages control, Supply Frequency Control(V/f), Rotor resistance control, Pole changing and Cascaded method. Crawling and Cogging -Double cage rotors - Induction generators and their applications.

Single Phase Induction Motors: Double field revolving theory - starting methods Split phase - capacitor start and run -shaded pole motors -characteristics and their applications. Equivalent Circuits of single phase induction motors.

LEARNING RESOURCES:

TEXT BOOK(s):

1. Electric Machinery by P.S. Bhimbra, Khanna Publications 7th edition

2. Electric Machines by I.J. Nagrath & D.P.Kothari, TataMcGraw Hill, 7th Edition.2005

REFERENCE BOOK(s):

1. Langsdorf ,'Theory of Alternating Current Machinery', Tata McGraw-HillCompanies,2nd edition
2. P.C. Sen John, 'Principles of Electrical machines and power electronics' Wiley & Sons 2003
3. Irving L. Kosow, 'Electrical Machinery & Transformers', PHI
4. J.B.Gupta 'Theory of performance of electrical machines', S.K.Khataria& Son's Publications
5. S.K.Battacharya,'Electrical machines', TataMcGraw Hill, 3rd edition
6. B.L.Theraja,A.K.Theraja,'A Text book of Electrical technology Volume-II' S.Chand

WEB RESOURCES:

1. https://archive.nptel.ac.in/courses/108/105/108105131/
2. www.electrical4u.com/electrical-transformer/three-phase-transformer.php