Course code	Course name	L-T-P-Credits	Year Of Introduction
EE216	**ELECTRICAL ENGINEERING**	3-0-0-3	2016

Prerequisite : Nil

Course objectives
To introduce the fundamental concepts of transformer, alternator, DC machine, induction motor and indicating instruments

Syllabus
Transformers- Principle of operation & different types, DC generator, DC Motor, Alternators in detail, Concepts of three phase Induction motor and types, Principle of Indicating instruments.

Expected outcome
The students will
    i.   Get the basic idea of Electrical engineering.
    ii.   Be able to differentiate between the types of motors and transformers
    iii.   gain information about the function of various measuring instruments and using them

Text Books
1. E. Hughes, Electrical & Electronic Technology, 8th ed., Pearson Education, Delhi, 2002.
2. B.L. Theraja and A.K. Theraja, AC and DC machines Volume II

Reference books

1. Del Toro V, Electrical engineering fundamentals, 2/e. Prentice Hall India. Eastern Economy Edition. 1998.
2. E. W. Golding and F. G. Widdis, Electrical Measurements and Measuring Instruments, 5th ed., AH Wheeler & Company, Calcutta, 1993.
3. H. Cotton, Advanced Electrical Technology, Sir Isaac Pitman and Sons, London, 1974

	Course Plan		
Module	**Contents**	**Hours**	**Semester Exam Marks**
I	Transformers- Principle of operation - emf equation - Phasor diagram - Equivalent circuit - OC and SC tests – Basic principles of auto transformer and three phase transformer	5	15%
II	DC Generator – E.M.F equation- Armature reaction – Commutation - interlopes – power flow diagram – losses and efficiency – voltage regulation – parallel operation – load sharing	8	15%
	FIRST INTERNAL EXAMINATION		
III	DC Motor- back E.M.F. – speed equation – torques – performance characteristics – power flow diagram losses and efficiency – starter- two point and three point – swinburns test – thyristor control of series and shunt motor.	8	15%
IV	Alternator- Rotating field - Frequency effect of distribution of winding - emf equation – Basic principles of	6	15%

	synchronous motor – Losses and Efficiency - Torque equation - Starting methods - induction motor - Constructional features - Principle of operation of 3 phase induction motor – Vector diagram and equivalent circuits - Starting and speed control of squirrel cage and wound rotor induction motor		
SECOND INTERNAL EXAMINATION			
V	Three phase Induction motor- types – torque equations- torque slip and torque speed characteristics- power flow diagram – efficiency – equivalent circuit- induction generator Special machines – single phase FHP motor starting methods- double field revolving theory-types and applications – stepper motor –classifications and applications – servomotors – classifications and applications –shaded pole motors –applications	6	20%
VI	Principle of Indicating instruments- moving coil, moving iron and dynamometer type instruments- Extension of range of voltmeter and ammeter - Measurement of 3 phase power by two wattmeter method – Principle and working of Induction type energy meter- DC slide wire, potentiometer.	9	20%
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN:

Maximum Marks: 100   Exam Duration: 3 Hours

Part A
Answer any two out of three questions uniformly covering Modules 1 and 2 together. Each question carries 15 marks and may have not more than four sub divisions
                                                                (15 x 2 = 30 marks)

Part B
Answer any two out of three questions uniformly covering Modules 3 and 4 together. Each question carries 15 marks and may have not more than four sub divisions.
                                                                (15 x 2 = 30 marks)

Part C
Answer any two out of three questions uniformly covering Modules 5 and 6 together. Each question carries 20 marks and may have not more than four sub divisions.
                                                                (20 x 2 = 40 marks)