GANPAT UNIVERSITY

FACULTY OF ENGINEERING AND TECHNOLOGY (DIPLOMA PROGRAMMES)

Programme	Diploma Engineering		Branch/Spec.	Electrical Engineering	
Semester	VI		Version	1.0.0.0	
Effective from Academic Year	2020-21		Effective for the batch Admitted in		July2018
Subject code	1EE2505	Subject Name	SPECIAL ELECTRICAL MACHINES		

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	0	1	0	5	Theory	40	60	100
Hours	4	0	2	0	6	Practical	30	20	50

Course Learning Outcomes:

- Types of transformers efficiently for various applications.
- Types induction machines for different applications
- Types synchronous machines for different applications.
- Types of fractional horsepower motors.
- Types of Small specialised electric machines.

Theory syllabus

UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
Unit – I Special Transformer	1a. Power and distribution transformer, their construction, vector groups and cooling methods 1b. Features of a welding transformer 1c. Audio transformer and isolation transformers 1d. Instrument transformer - current and potential transformers 1e. Specification of power transformer	1.1 Different types of connections of power and distribution transformers, vector groups, cooling methods 1.2 Welding transformers 1.3 Construction, working and application of isolation transformer & audio transformer 1.4 Instrument transformers : current transformers and potential transformers and related theories 1.5 Name plate of power transformer and specification.	18	18
Unit – II Special Induction	2a. Working principle of dual winding squirrel cage induction generator with sketches 2b. Phenomenon of cogging and	2.1 Dual winding Squirrel cage induction generator 2.2 Cogging and crawling in induction machines.	14	14

Machines	crawling in induction machines. 2c. Working principle of soft starters with sketch. 2d. Working principle of wound rotor induction generator with sketches 2e. Explain the working principle of doubly fed induction generator with sketches	2.3 Soft starters 2.4 Wound rotor induction generator (WRIG) 2.5 Doubly fed induction generator (DFIG)		
Unit – III Fractional Horse Power Motors	3a. Concept of FHP motor sand their applications 3b. Working of hysteresis motor with sketches and application 3c. Working of permanent magnet motors and their applications 3d. Working principles of Reluctance motor	3.1 Fractional horse power (FHP) motor 3.2 Hysteresis motor 3.3 Permanent magnet motor 3.4 Reluctance motor	14	14
Unit - IV Other Special Motors	4a. Working principle of different types of stepper motors 4b. Working principle of Brushless DC Motor and their applications 4c. Working principle of a Servomotor with sketches and application 4d. Working principle of synchros with sketches and application	4.1 Stepper motor and its types. 4.2 Brushless DC motors 4.3 Servomotors 4.4 Synchros	14	14

List of Practical	
1	Identify the various parts of a squirrel cage induction generator (SCIG)
2	Operate the squirrel cage induction motor as a SCIG to test the performance.
3	Operate the wound rotor induction motor as a WRIG to test the performance.
4	Identify the various parts of a doubly-fed induction generator (DFIG).
5	Identify the various parts of a permanent magnet synchronous generator (PMSG)
6	Dismantle/assemble/test a Hysteresis motor
7	Dismantle/assemble/test a Permanent magnet motor
8	Dismantle/assemble/test a Reluctance motor
9	Dismantle/assemble/test a Stepper motor and its types
10	Dismantle/assemble/test a Synchros

List of Instruments/Equipments/ Trainer Board	
1	Squirrel Cage Induction Generator:
2	Welding transformers

3	Isolation transformer
4	Hysteresis motor
5	Stepper motors
6	Reluctance motor

List of Text Books			
1	Electrical Technology Vol. II	Theraja ,B. L.	S Chand and Co., New Delhi
2	Theory and performance of Electrical Machines	Gupta, J.B.	S.K. Kataria and sons, New Delhi

List of Reference Books			
1	Special Electrical Machines	E. G. Janardanan	Eastern Economy Edition,PHI

Link of Learning Resources	
	http://www.learnabout-electronics.org/ac_theory/transformers04.php http://www.tpub.com/celec/5.htm http://www.wisegeek.com/what-is-a-fractional-horsepower-motor.htm www.sskphdmm.com www.nptel.iitm.ac.in www.electricalandelectronics.org www.allaboutcircuits.com www.nmbtc.com