

Discipline: Electrical Engineering	Semester: 3 <sup>rd</sup> Semester 2025-Winter	Name of the Teaching Faculty: Shri Hrudananda Nayak, Lect.(S-I), Electrical Engg
Subject: TH:4- DC MACHINES AND TRANSFORMERS (DMAT)	No. of Days/week Class Allotted:45	Semester from date: 14/07/2025 to date: 15 /11/2025
Week	Class Day	Theory Topics
1 <sup>st</sup>	1 <sup>st</sup>	DC Generators 1.1 D.C. generator: construction, parts, materials and their functions
	2 <sup>nd</sup>	1.2 Principle of operation of DC generator 1.2.1 Fleming's right hand rule
	3 <sup>rd</sup>	1.2.2 Derive the emf equation of DC Generator
2 <sup>nd</sup>	1 <sup>st</sup>	1.2.3 Schematic diagrams of different types of DC generator
	2 <sup>nd</sup>	1.2.4 Armature reaction
	3 <sup>rd</sup>	1.2.5 Commutation
3 <sup>rd</sup>	1 <sup>st</sup>	1.2.6 Applications of D.C. generators
	2 <sup>nd</sup>	D.C. Motors 2.1 D.C. motor: Types of DC motors
	3 <sup>rd</sup>	2.1.1 Fleming's left hand rule 2.1.2 Principle of operation of Back e.m.f. and its significance
4 <sup>th</sup>	1 <sup>st</sup>	2.1.3 Voltage equation of DC motor
	2 <sup>nd</sup>	2.1.4 Torque and Speed; Armature torque, Shaft torque,
	3 <sup>rd</sup>	BHP, Brake test
5 <sup>th</sup>	1 <sup>st</sup>	losses, efficiency
	2 <sup>nd</sup>	Single Phase Transformers 3.1 Types of transformers: Shell type and core type
	3 <sup>rd</sup>	3.2 Construction: Parts and functions
6 <sup>th</sup>	1 <sup>st</sup>	3.3 Materials used for different parts: CRGO, CRNGO, HRGO, amorphous cores
	2 <sup>nd</sup>	3.4 Transformer: Principle of operation
	3 <sup>rd</sup>	3.5 EMF equation of transformer: Derivation, Voltage transformation ratio



7 <sup>th</sup>	1 <sup>st</sup>	3.6 Significance of transformer ratings 3.7 Transformer No-load and on-load phasor diagram, Leakage reactance
	2 <sup>nd</sup>	3.8 Equivalent circuit of transformer: Equivalent resistance and reactance
	3 <sup>rd</sup>	3.9 Voltage regulation and Efficiency: Direct loading
8 <sup>th</sup>	1 <sup>st</sup>	OC/SC method,
	2 <sup>nd</sup>	All day efficiency
	3 <sup>rd</sup>	<b>Three Phase Transformers</b> 4.1 Bank of three single phase transformers, (Y-Y, $\Delta$ - $\Delta$ , $\Delta$ -Y, Y- $\Delta$ )
9 <sup>th</sup>	1 <sup>st</sup>	4.2 Single unit of three phase transformer 4.3 Distribution and Power transformers: Construction and cooling,
	2 <sup>nd</sup>	4.4 Criteria for selection of distribution transformer, and power transformer.
	3 <sup>rd</sup>	4.5 Need of parallel operation of three phase transformer 4.6 Conditions for parallel operation.
10 <sup>th</sup>	1 <sup>st</sup>	4.7 Polarity tests on mutually inductive coils and single phase transformers
	2 <sup>nd</sup>	4.8 Polarity test, Phasing out test on Three-phase transformer
	3 <sup>rd</sup>	<b>Special Purpose Transformers</b> 5.1 Single phase autotransformers: Construction, working and applications.
11 <sup>th</sup>	1 <sup>st</sup>	5.1 three phase autotransformers: Construction, working and applications.
	2 <sup>nd</sup>	5.2 Isolation transformer: Constructional Features
	3 <sup>rd</sup>	5.2 Isolation transformer: applications
12 <sup>th</sup>	1 <sup>st</sup>	Discussion of probable questions and answers-1
	2 <sup>nd</sup>	Discussion of probable questions and answers-2
	3 <sup>rd</sup>	Discussion of probable questions and answers-3
13 <sup>th</sup>	1 <sup>st</sup>	Discussion of probable questions and answers-4
	2 <sup>nd</sup>	Discussion of probable questions and answers-5
	3 <sup>rd</sup>	Discussion of probable questions and answer -6
14 <sup>th</sup>	1 <sup>st</sup>	Discussion of probable questions and answers-7
	2 <sup>nd</sup>	Discussion of probable questions and answers-8
	3 <sup>rd</sup>	Discussion of probable questions and answers-9
15 <sup>th</sup>	1 <sup>st</sup>	Discussion of probable questions and answers-10
	2 <sup>nd</sup>	Discussion of probable questions and answers-11
	3 <sup>rd</sup>	Discussion of probable questions and answers-12

  
11/07/25  
Faculty Signature

  
11/07/25  
HOD Electrical Signature