

GOVT. POLYTECHNIC KANDHAMAL, (PHULBANI)

LESSON PLAN: DC MACHINES & TRANSFORMERS (TH 4)

3RD – SEMESTER, 2026 (WINTER)

Discipline: Electrical Engineering	Semester: Winter 2026	Name of the teaching faculty: PRIYABRATA PALASINGH NAYAK
Subject: DCM&T(TH4)	No of days/per week class allotted: 03	Semester From Date: 01.07.2026 To Date: 05.11.2026 No of weeks: 15
Week:	Class day:	Theory/practical topics:
1ST	1ST	Unit 1 (DC Generators) D.C. generator: construction
	2ND	Parts, materials and their functions
	3RD	Principle of operation of DC generator
2ND	1ST	Fleming's right hand rule
	2ND	Derive the emf equation of DC Generator
	3RD	Schematic diagrams of different types of DC generator
3RD	1ST	Armature reaction
	2ND	Commutation
	3RD	Applications of D.C. generators
4TH	1ST	Unit 2 (D.C. Motors) D.C. motor: Types of DC motors
	2ND	Fleming's left hand rule
	3RD	Principle of operation of Back e.m.f. and its significance
5TH	1ST	Voltage equation of DC motor
	2ND	Torque and Speed; Armature torque, Shaft torque
	3RD	BHP, Brake test, losses, efficiency
6TH	1ST	DC motor starters: Necessity, two point and three point starters

	2 ND	Speed control of DC shunt and series motor: Flux and Armature control
	3 RD	Brushless DC Motor: Construction and working
7 TH	1 ST	Unit 3 (Single Phase Transformers) Types of transformers: Shell type and core type
	2 ND	Construction: Parts and functions
	3 RD	Materials used for different parts: CRGO, CRNGO
8 TH	1 ST	HRGO, amorphous cores
	2 ND	Transformer: Principle of operation
	3 RD	EMF equation of transformer: Derivation, Voltage transformation ratio
9 TH	1 ST	Significance of transformer ratings
	2 ND	Transformer No-load and on-load phasor diagram, Leakage reactance
	3 RD	Equivalent circuit of transformer: Equivalent resistance and reactance
10 TH	1 ST	Voltage regulation and Efficiency: Direct loading, OC/SC method, All day efficiency
	2 ND	Unit 4 (Three Phase Transformers) Bank of three single phase transformers,(Y-Y, Δ - Δ)
	3 RD	Bank of three single phase transformers (Δ -Y, Y- Δ)
11 TH	1 ST	Single unit of three phase transformer
	2 ND	Distribution and Power transformers: Construction and cooling,
	3 RD	Criteria for selection of distribution transformer, and power transformer.
12 TH	1 ST	Need of parallel operation of three phase transformer
	2 ND	Conditions for parallel operation.
	3 RD	Polarity tests on mutually inductive coils and single phase transformers

13TH	1ST	Polarity test, Phasing out test on Three-phase transformer
	2ND	Unit 5 (Special Purpose Transformers) Single phase autotransformers Construction
	3RD	Single phase autotransformers Working
14TH	1ST	Single phase autotransformers Application
	2ND	Three phase autotransformers Construction
	3RD	Three phase autotransformers Working
15TH	1ST	Three phase autotransformers Application
	2ND	Isolation transformer: Constructional Features and applications
	3RD	Isolation transformer: applications



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