

DEPARTMENT OF ELECTRICAL ENGINEERING
GOVERNMENT POLYTECHNIC, BARGARH



LESSON PLAN

DC MACHINE & TRANSFORMER (TH 4)

3RD SEMESTER

ELECTRICAL ENGINEERING DEPARTMENT

PREPARED BY

NITESH KUMAR ACHARYA

LECTURER(S-II) (ELECTRICAL ENGG)

DEPARTMENT OF ELECTRICAL ENGINEERING

VISION:

To produce Electrical Engineer professionals who can contribute for socio-economic and technological development to meet global needs.

MISSION:

M1 - To strengthen academic infrastructure leading to quality professional by using modern technical tools and technologies.

M2 - To impart innovative knowledge among the students and make more industry-institution programs to make them successful professionals for serving the society.

M3 - To provide a learning environment to improve problem solving abilities, leadership abilities, ethical responsibilities and lifelong learning.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO1: Apply electrical engineering knowledge and practical skills to solve well-defined engineering problems using modern tools and techniques.

PEO2: Perform effectively in industry and society as competent junior engineer, supervisors, or entrepreneurs with ethical and sustainable engineering practices.

PEO3: Demonstrate teamwork, communication, leadership, and project management skills in professional engineering activities.

PEO4: Engage in lifelong learning and adapt to emerging technologies for career growth and higher education.

PROGRAM SPECIFIC OUTCOMES

The electrical diploma engineers will be able to:

PSO1:-Apply the fundamentals of mathematics, science and engineering knowledge to identify, formulate, design and investigate engineering problems of electric circuits, analog and digital electronics, control system, electrical machines and power system.

PSO2:- Apply the appropriate techniques and modern engineering hardware and software tools in electrical engineering to engage in life-long learning and to successfully adapt in multidisciplinary environments.

PSO3:-Work professionally in power systems engineering, Electrical machinery and electrical circuit.

GOVERNMENT POLYTECHNIC, BARGARH

Department Of Electrical Engineering

Semester: 3RD. DIPLOMA

Subject: DC MACHINE & TRANSFORMER

Branch: Electrical Engineering

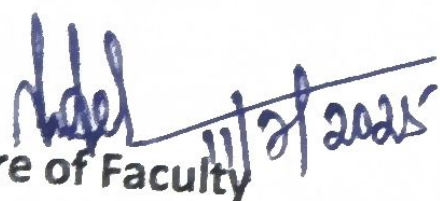
Session: WINTER-2025(14.07.2025 to 15.11.2025)

No of Period :-45 (3p/week)

Name of Faculty: NITESH KU. ACHARYA

Week	Period	Topics to be covered
1 st Week	1	D.C. generator: construction, parts, materials and their functions
	2	Principle of operation of DC generator, Fleming's right hand rule
	3	Derive the emf equation of DC Generator & numericals
2 nd Week	4	Schematic diagrams of different types of DC generator
	5	Armature reaction
	6	Armature reaction
3 rd Week	7	Commutation
	8	Methods of improving commutation
	9	Applications of D.C. generators
4 th Week	10	Introduction to DC Motor, Types of DC motors
	11	Fleming's left hand rule, Principle of operation of Back e.m.f. and its significance
	12	Voltage equation of DC motor, power equation of DC motor
5 th Week	13	Armature torque, Shaft torque of DC motor, BHP
	14	Brake test, losses, efficiency of DC motor
	15	DC motor starters: Necessity, two point and three point starters
6 th Week	16	Speed control of DC shunt and series motor: Flux and Armature control
	17	Speed control of DC shunt and series motor: Flux and Armature control- numerical
	18	Brushless DC Motor: Construction and working
7 th Week	19	Types of transformers: Shell type and core type
	20	Construction of transformer:-Parts and functions
	21	Materials used for different parts: CRGO, CRNGO, HRGO, amorphous cores
8 th Week	22	Transformer: Principle of operation, EMF equation of transformer: Derivation, Voltage transformation ratio
	23	Significance of transformer ratings, Transformer No-load and on-load phasor diagram, Leakage reactance
	24	Equivalent circuit of transformer: Equivalent resistance and reactance
9 th Week	25	Voltage regulation and Efficiency: Direct loading, OC/SC method
	26	All day efficiency of transformer
	27	Numerical on transformer

10 th Week	28	Bank of three single phase transformers, (Y-Y, Δ - Δ , Δ -Y, Y- Δ)
	29	Single unit of three phase transformer
	30	Distribution and Power transformers: Construction and cooling
11 th Week	31	Criteria for selection of distribution transformer, and power transformer
	32	Need of parallel operation of three phase transformer, Conditions for parallel operation
	33	Polarity tests on mutually inductive coils and single phase transformers
12 th Week	34	Polarity test, Phasing out test on Three-phase transformer
	35	Single phase autotransformers : Construction,
	36	Single phase autotransformers -working and applications.
13 th Week	37	Saving of Cu in Autotransformer
	38	Three phase autotransformers
	39	Isolation transformer: Constructional Features and applications
14 th Week	40	Numerical on autotransformer
	41	Numerical solving of DC Generator/Motor/Transformer
	42	Numerical solving of DC Generator/Motor/Transformer
15 th week	43	Revision and model question discussion
	44	Revision and model question discussion
	45	Revision and model question discussion

Signature of Faculty  11/7/2025


Signature of HOD 11/7/2025