

GOVT. POLYTECHNIC KANDHAMAL, (PHULBANI)

**LESSON PLAN: FUNDAMENTALS OF ELECTRICAL & ELECTRONICS
ENGINEERING**

1ST YEAR – 2026-2027

Discipline: MATH & SCI(CIVIL ENGG). Year: 2026-2027

Name of Faculty : MANOJ KUMAR PRADHAN & PRASANTA KUMAR DAS

Subject:TH-6(FEE)			Effective From Date:17.08.2026-17.04.2027	
Week	No. of days/ week Class		Theory	
	allotted: 2			
1 st	Class Day		Unit 1(Electric & Magnetic Circuits) Definition of EMF, Current, Potential Difference Ohm's law and its relation with temp concept of source and load, relation of V, I&R In series and parallel circuit, voltage and current division rule Power and Energy, KCL, KVL: simple problems.	
	1 st	2 nd		
2 nd	1 st	2 nd	Basic Definition of M.M.F, magnetic force, flux, permeability ,reluctance, permeance Electromagnetic induction, Faraday's Lenz's law; Self and mutual inductance, leakage factor	
	1 st	2 nd		
3 rd	1 st	2 nd	Hysteresis loop and BH curve, Analogy between electric and magnetic circuits AC fundamentals: Definitions of Cycle Frequency, Periodic time, Amplitude, Angular velocity, RMS value Average value Form Factor Peak Factor, phase angle	
	1 st	2 nd		
4 th	1 st	2 nd	Unit 2(A.C. Circuits:)Mathematical and phasor representation of alternating emf and current; Mathematical and phasor representation of alternating emf and current; Voltage and Current relationship in Star and Delta connections (Derivation).	
	1 st	2 nd		
5 th	1 st	2 nd	Voltage and Current relationship in Star and Delta connections (Derivation). Impedance, A.C in R-circuit with phasor Impedance, A.C in L-circuit with phasor	
	1 st	2 nd		
6 th	1 st	2 nd	Impedance, A.C in C- circuit with phasor power triangle, power factor, concept of real, reactive and apparent power with units.	
	1 st	2 nd		
7 th	1 st	2 nd	UNIR-3(Transformer and DC Machines)Fleming's rules, Construction	
	1 st	2 nd		
8 th	1 st	2 nd		
	1 st	2 nd		
9 th	1 st	2 nd		
	1 st	2 nd		

10 th	1 st	Working principle of DC machines
	2 nd	EMF equations of DC machines and applications
11 th	1 st	General construction of different type of transformers
	2 nd	General principle of different type of transformers;
12 th	1 st	Emf equation and transformation ratio of transformers (single phase).
	2 nd	Emf equation and transformation ratio of transformers (single phase).
13 th	1 st	Emf equation and transformation ratio of transformers (single phase).
	2 nd	UNIT-4(Measuring instruments), Introduction to measuring instruments,
14 th	1 st	types of torques (concept only), concept of PMMC
	2 nd	MI type instruments and its uses (1-phase Ammeter) with connection diagram.
15 th	1 st	(1- phase Voltmeter, wattmeter, energy meter) with connection diagram
	2 nd	Wiring &Power billing: Types of wiring for domestic installation (concept only)
16 th	1 st	Types of wiring for domestic installation (concept only)
	2 nd	Calculate energy consumption in a small electric installation(domestic)
17 th	1 st	Simple numerical.
	2 nd	UNIT-5(Overview of Basic Electronics & Components) Passive Active Components
18 th	1 st	Resistances, Capacitors, Inductors, Diodes, Transistors
	2 nd	their Applications (Concept and simple problems of Resistance, Capacitor & Inductor)
19 th	1 st	Energy bands in solids, Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors
	2 nd	Definition, Classification and Working of Diode (PN junction LED, Zener)
20 th	1 st	Transistor: BJT, Concept of FET (Definition, Types, Symbol & Terminals)
	2 nd	MOS and CMOS (Definition Types, Symbol & Terminals)
21 st	1 st	UNIT-6(Overview of Signals & Analog Circuits:) DC/AC, voltage/current, periodic/non-periodic signals, average, rms, peak values, different types of signal waveforms
	2 nd	Analog & Digital Signals: Definitions & Difference
22 nd	1 st	Ideal/non-ideal voltage/current sources, independent/dependent voltage current sources (Definitions)
	2 nd	Diode as rectifier – half wave and full wave

		rectifier (center taped & bridge).
23 rd	1 st	Diode as rectifier – half wave and full wave rectifier (center taped & bridge).
	2 nd	Introduction to Clippers & Clampers (Definitions only)
24 th	1 st	Transistor (BJT only) as an amplifier
	2 nd	Working of RC Coupled amplifier, Oscillator (only definition & types)
25 th	1 st	UNIT-7 (ICs & OP-Amps:) Introduction to ICs, advantages & uses
	2 nd	741 IC pin configuration Operational Amplifiers
26 th	1 st	Operational Amplifiers Characteristics of Ideal Op-Amp,
	2 nd	Operational Amplifiers Open loop and closed loop configurations
27 th	1 st	Application of Op-Amp as amplifier adder,
	2 nd	Application of Op-Amp as amplifier differentiator
28 th	1 st	Application of Op-Amp as amplifier integrator.
	2 nd	Doubt clearing classes
29 th	1 st	Unit 8(Overview of Digital Electronics) Number Systems: Binary Simple problems
	2 nd	Number Systems: Octal Simple problems
30 th	1 st	Number Systems: Hexadecimal Simple problems
	2 nd	Introduction to Logic Gates (Circuit symbol & Truth table),
31 st	1 st	Universal Logic gates De' Morgans Law
	2 nd	Implementation of Boolean expression using logic gates (simple problem)
32 nd	1 st	Doubt clearing classes , Previous semester question discussion
	2 nd	Doubt clearing classes , Previous semester question discussion

Course Outcomes (COs)

CO1: Acquire knowledge of electrical and magnetic circuit parameters, AC circuits, and perform basic analysis of electrical machines and transformers.

CO2: Analyze the operation of electrical measuring instruments, domestic wiring systems, and apply electrical principles for power and energy billing calculations.

CO3: Identify, analyze, and apply the fundamentals of electronic components, basic electronic circuits, operational amplifier (op-amp) circuits, and digital electronic circuits.


Sign. of Faculty Concerned


Sign. of HOD