GOVT. POLYTECHNIC KANDHAMAL, (PHULBANI)

LESSON PLAN: FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING

1ST YEAR – 2026-2027

Discipline: MATH & SCI (ELECTRICAL ENGG). Year: 2026-2027
Name of Faculty : ABHISEK MOHANTY & PRASANTA KUMAR DAS

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

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

		rectifier (center taped & bridge).
23rd	1st	Diode as rectifier – half wave and full wave rectifier (center taped & bridge).
	2nd	Introduction to Clippers & Clampers (Definitions only)
24th	1st	Transistor (BJT only) as an amplifier
	2nd	Working of RC Coupled amplifier, Oscillator (only definition & types)
25th	1st	UNIT-7 (**ICs & OP-Amps:**) Introduction to ICs, advantages & uses
	2nd	741 IC pin configuration Operational Amplifiers
26th	1st	Operational Amplifiers Characteristics of Ideal Op-Amp,
	2nd	Operational Amplifiers Open loop and closed loop configurations
27th	1st	Application of Op-Amp as amplifier adder,
	2nd	Application of Op-Amp as amplifier differentiator
28th	1st	Application of Op-Amp as amplifier integrator.
	2nd	**Doubt clearing classes**
29th	1st	**Unit 8(Overview of Digital Electronics)** Number Systems: Binary Simple problems
	2nd	Number Systems: Octal Simple problems
30th	1st	Number Systems: Hexadecimal Simple problems
	2nd	Introduction to Logic Gates (Circuit symbol & Truth table),
31st	1st	Universal Logic gates De' Morgans Law
	2nd	Implementation of Boolean expression using logic gates (simple problem)
32nd	1st	**Doubt clearing classes,** Previous semester question discussion
	2nd	**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 30.07.2026 30/7/26

Sign. of HOD 30/7/2026