

UTKAL GOURAV MADHUSUDAN INSTITUTE OF TECHNOLOGY, RAYAGADA
DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION ENGINEERING
LESSON PLAN (ACADEMIC YEAR 2026-27)

SEMESTER:	1st / 2nd Semester (1st Year) ETC	NO. OF PERIODS/WK:	3 (Tue-1, Sat-2) [2nd & 4th Sat Off]
SUBJECT:	Fundamentals of Electrical & Electronics Engineering (TH-6)	TOTAL PERIODS:	55 Periods
FACULTY:	Hemanta Kumar Sethi, Lecturer Stage-II (ETC)	DURATION:	17.08.2026 to 17.04.2027
EXAM MARKS:	End Exam: 70 Progressive Assessment (IA): 30 Total: 100	BRANCH / CREDIT:	ETC / 2 Credits

Month / Week	Period & Date	Unit / Chapter	Topic to be Covered
August (1st Week)	1st (18.08.2026)	Unit-1 Electric & Magnetic Circuits	1.1 Definition of EMF, Current, Potential Difference, Ohm's law and its relation with temperature.
August (2nd Week)	1st (25.08.2026)	Unit-1 Electric & Magnetic Circuits	1.1 Concept of source and load, relation of V, I & R in series and parallel circuits.
August (2nd Week)	1st (29.08.2026)	Unit-1 Electric & Magnetic Circuits	1.1 Voltage division rule & current division rule, Power and Energy concepts.
August (2nd Week)	2nd (29.08.2026)	Unit-1 Electric & Magnetic Circuits	1.1 Kirchhoff's Current Law (KCL) & Kirchhoff's Voltage Law (KVL) with simple numerical problems.
September (3rd Week)	1st (01.09.2026)	Unit-1 Electric & Magnetic Circuits	1.2 Basic definition of MMF, magnetic force, flux, permeability, reluctance, and permeance.
September (3rd Week)	1st (05.09.2026)	Unit-1 Electric & Magnetic Circuits	1.2 Electromagnetic induction: Faraday's laws, Lenz's law, Self and mutual inductance, leakage factor.
September (3rd Week)	2nd (05.09.2026)	Unit-1 Electric & Magnetic Circuits	1.3 Hysteresis loop and BH curve, Analogy between electric and magnetic circuits; 1.4 AC fundamentals (RMS, Average value, Form factor, Peak factor).
September (4th Week)	1st (08.09.2026)	Unit-2 A.C. Circuits	2.1 Mathematical and phasor representation of alternating EMF and current.
September (5th Week)	1st (19.09.2026)	Unit-2 A.C. Circuits	2.2 Three-phase systems: Voltage and Current relationships in Star and Delta connections (Derivations).
September (5th Week)	2nd (19.09.2026)	Unit-2 A.C. Circuits	2.3 Impedance, AC through Pure Resistance (R), Pure Inductance (L), and Pure Capacitance (C) circuits.
September (6th Week)	1st (22.09.2026)	Unit-2 A.C. Circuits	2.3 AC Series R-L circuit: Phasor diagram, impedance triangle, voltage, current and power.
September (7th Week)	1st (29.09.2026)	Unit-2 A.C. Circuits	2.3 AC Series R-C circuit: Phasor diagram, impedance triangle, power factor calculations.
October (7th Week)	1st (03.10.2026)	Unit-2 A.C. Circuits	2.3 AC Series R-L-C circuit: Impedance, phasor diagram, and series resonance condition.
October (7th Week)	2nd (03.10.2026)	Unit-2 A.C. Circuits	2.3 Concept of Real (Active), Reactive, and Apparent Power, Power Triangle, and Power Factor significance.
October (8th Week)	1st (06.10.2026)	Unit-3 Transformer and DC Machines	3.1 Fleming's Left-Hand & Right-Hand rules, Working principle and general construction of DC machines.
October (11th Week)	1st (27.10.2026)	Unit-3 Transformer and DC Machines	3.1 Functions of major parts of DC Machines (Yoke, Poles, Armature, Commutator, Brushes) & Types of DC machines.
October	1st (31.10.2026)	Unit-3	3.2 EMF equation of DC Generator and Back-EMF

(11th Week)		Transformer and DC Machines	equation of DC Motor with simple problems.
October (11th Week)	2nd (31.10.2026)	Unit-3 Transformer and DC Machines	3.2 Operational characteristics and practical industrial applications of DC machines.
November (12th Week)	1st (03.11.2026)	Unit-3 Transformer and DC Machines	3.3 Single-phase Transformer: Working principle, construction of Core-type and Shell-type transformers.
November (12th Week)	1st (07.11.2026)	Unit-3 Transformer and DC Machines	3.3 Transformer materials (CRGO steel, windings, insulation, transformer oil) and cooling methods.
November (12th Week)	2nd (07.11.2026)	Unit-3 Transformer and DC Machines	3.4 EMF equation and transformation ratio of single-phase transformer, losses, efficiency, and numericals.
November (13th Week)	1st (10.11.2026)	Unit-4 Measuring Instruments, Wiring & Power Billing	4.1 Measuring Instruments: Introduction, classification, and types of torques (Deflecting, Controlling, Damping).
November (14th Week)	1st (17.11.2026)	Unit-4 Measuring Instruments, Wiring & Power Billing	4.1 Permanent Magnet Moving Coil (PMMC) instruments: Construction, principle, and uses.
December (16th Week)	1st (01.12.2026)	Unit-4 Measuring Instruments, Wiring & Power Billing	4.1 Moving Iron (MI) type instruments (Attraction & Repulsion type) and comparison with PMMC.
December (16th Week)	1st (05.12.2026)	Unit-4 Measuring Instruments, Wiring & Power Billing	4.1 Dynamometer type Wattmeter and Induction type 1-Phase Energy Meter with connection diagrams.
December (16th Week)	2nd (05.12.2026)	Unit-4 Measuring Instruments, Wiring & Power Billing	4.2 Domestic Wiring: Types of wiring systems (Cleat, Casing-Capping, Batten, Conduit wiring - concept only).
December (17th Week)	1st (08.12.2026)	Unit-4 Measuring Instruments, Wiring & Power Billing	4.2 Wiring accessories, safety devices (Fuse, MCB, ELCB/RCCB) and Earthing (Pipe & Plate earthing).
December (18th Week)	1st (15.12.2026)	Unit-4 Measuring Instruments, Wiring & Power Billing	4.2 Power Billing: Calculation of domestic electrical energy consumption (kWh / Units) & tariff numericals.
December (18th Week)	1st (19.12.2026)	Unit-5 Overview of Basic Electronics & Components	5.1 Passive & Active Components: Classification and functions of Resistors, Capacitors, Inductors, Diodes, Transistors.
December (18th Week)	2nd (19.12.2026)	Unit-5 Overview of Basic Electronics & Components	5.1 Simple concepts and numerical problems of Resistance, Capacitance & Inductance.
December (19th Week)	1st (22.12.2026)	Unit-5 Overview of Basic Electronics & Components	5.2 Energy bands in solids, Types of materials (Insulator, Semi-conductor, Conductor), Intrinsic and Extrinsic semiconductors.
December (20th Week)	1st (29.12.2026)	Unit-5 Overview of Basic Electronics & Components	5.3 P-N Junction Diode: Forward and reverse biasing characteristics (V-I curve).
January (20th Week)	1st (02.01.2027)	Unit-5 Overview of Basic Electronics & Components	5.3 Special Diodes: Light Emitting Diode (LED) and Zener Diode (Working principle & Voltage Regulator concept).
January (20th Week)	2nd (02.01.2027)	Unit-5 Overview of Basic Electronics & Components	5.4 Transistors: BJT configuration, Concept of FET, MOS and CMOS (Definition, Types, Symbol & Terminals).
January (22th Week)	1st (12.01.2027)	Unit-6 Overview of Signals & Analog Circuits	6.1 DC/AC, voltage/current, periodic/non-periodic signals, average, RMS, peak values, different waveforms.
January (22th Week)	1st (16.01.2027)	Unit-6 Overview of Signals & Analog Circuits	6.2 Analog & Digital Signals: Definitions & Differences; 6.3 Ideal/non-ideal & Independent/Dependent sources.

January (22th Week)	2nd (16.01.2027)	Unit-6 Overview of Signals & Analog Circuits	6.4 Diode as rectifier: Half-wave rectifier circuit, working principle, output waveforms, and efficiency.
January (24th Week)	1st (30.01.2027)	Unit-6 Overview of Signals & Analog Circuits	6.4 Full-wave Rectifiers: Center-tapped and Bridge rectifier circuits, working, ripple factor, and comparisons.
January (24th Week)	2nd (30.01.2027)	Unit-6 Overview of Signals & Analog Circuits	6.5 Introduction to Clippers & Clampers (Definitions, basic circuit concepts & waveforms).
February (25th Week)	1st (02.02.2027)	Unit-6 Overview of Signals & Analog Circuits	6.6 Transistor (BJT only) as an amplifier, Working of single-stage RC Coupled amplifier, frequency response.
February (27th Week)	1st (16.02.2027)	Unit-6 Overview of Signals & Analog Circuits	6.6 Electronic Oscillators: Barkhausen criterion for oscillations, Definition, Block diagram, and Types of oscillators.
February (27th Week)	1st (20.02.2027)	Unit-7 ICs & OP-Amps	7.1 Introduction to ICs, advantages & uses, classifications (Linear/Digital, SSI to VLSI).
February (27th Week)	2nd (20.02.2027)	Unit-7 ICs & OP-Amps	7.2 IC 741 pin configuration, Operational Amplifiers block diagram and power supply requirements (+Vcc, -Vee).
February (28th Week)	1st (23.02.2027)	Unit-7 ICs & OP-Amps	7.2 Characteristics of Ideal Op-Amp vs. Practical Op-Amp, Open-loop and closed-loop configurations.
March (29th Week)	1st (02.03.2027)	Unit-7 ICs & OP-Amps	7.3 Application of Op-Amp as amplifier: Inverting amplifier and Non-Inverting amplifier with gain derivations.
March (30th Week)	1st (09.03.2027)	Unit-7 ICs & OP-Amps	7.3 Op-Amp as Voltage Follower (Buffer) and Summing Amplifier (Adder circuit and mathematical derivation).
March (31th Week)	1st (16.03.2027)	Unit-7 ICs & OP-Amps	7.3 Application of Op-Amp as Differentiator: Circuit diagram, working operation, output equation, and waveforms.
March (31th Week)	1st (20.03.2027)	Unit-7 ICs & OP-Amps	7.3 Application of Op-Amp as Integrator: Circuit diagram, working operation, output voltage derivation, and applications.
March (31th Week)	2nd (20.03.2027)	Unit-8 Overview of Digital Electronics	8.1 Number Systems: Binary, Octal, Decimal, and Hexadecimal number systems, Base/Radix concept.
March (33th Week)	1st (30.03.2027)	Unit-8 Overview of Digital Electronics	8.1 Conversion between Number Systems and simple arithmetic problems (1's and 2's complement).
April (33th Week)	1st (03.04.2027)	Unit-8 Overview of Digital Electronics	8.2 Introduction to Logic Gates (Circuit symbol & Truth table): Basic gates (AND, OR, NOT).
April (33th Week)	2nd (03.04.2027)	Unit-8 Overview of Digital Electronics	8.2 Derived Logic Gates (NAND, NOR, EX-OR, EX-NOR): Circuit symbols and Truth tables.
April (35th Week)	1st (13.04.2027)	Unit-8 Overview of Digital Electronics	8.2 Universal Logic gates (NAND and NOR implementation) and De Morgan's Laws.
April (35th Week)	1st (17.04.2027)	Unit-8 Overview of Digital Electronics	8.3 Implementation of Boolean expression using logic gates (simple problems) and circuit realization.
April (35th Week)	2nd (17.04.2027)	Unit-8 Overview of Digital Electronics	8.3 Comprehensive Course Revision, Discussion on Previous Year SCTE&VT Board Question Papers & Examination Guidance.

Key Schedule & Academic Calendar Notes (AY 2026-27):

- Class Routine: 3 Periods per Week (Tuesday: 1 Period, Saturday: 2 Periods). 2nd & 4th Saturdays of every month are strictly observed as Holidays.
- Commencement of Classes: 17.08.2026 | Closing of Attendance: 17.04.2027 | Tentative Exam: 30.04.2027 to 21.05.2027
- Internal Assessments & Portions:

- 1st Internal Assessment (20.11.2026 to 30.11.2026): Unit-I (Electric & Magnetic Circuits) & Unit-V (Overview of Basic Electronics & Components)
- 2nd Internal Assessment (05.02.2027 to 12.02.2027): Unit-II (A.C. Circuits), Unit-VI (Signals & Analog Circuits) & Unit-VII (ICs & OP-Amps)
- 3rd Internal Assessment (05.04.2027 to 12.04.2027): Unit-III (Transformer & DC Machines), Unit-IV (Measuring Instruments, Wiring & Power Billing) & Unit-VIII (Digital Electronics)
- End Semester Examination Portion: Unit-I, Unit-IV, Unit-VI & Unit-VIII
- Holidays & Fests Excluded: 2nd & 4th Saturdays of every month, Nuakhai (15-16 Sep), Institute Fest (12-16 Oct), Durga Puja / Vijaya Dasami (17 Oct), 1st IA / Rasa Purnima (20-30 Nov), Regional Fest (04-08 Jan), Makar Sankranti (14 Jan), State Fest (18-20 Jan), Republic Day (26 Jan), 2nd (05-12 Feb), Maha Shivaratri (06 Mar), Holi (23 Mar), Utkal Divas (01 Apr), 3rd IA (05-12 Apr), Maha Bishuba Sankranti (14 Apr).
- References:
 1. Fundamentals of Electrical and Electronics Engineering by Prof. Susan S. Mathew (AICTE e-KUMBH portal).
 2. Basic Electrical Engineering by Ritu Sahdev, Khanna Publishing House.
 3. Basic Electrical Engineering by Mittle and Mittal, McGraw Education, New Delhi.

Pratima
17/8/26

HOD
Math & SC

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