

LESSON PLAN

Subject Name: **Basic Electrical Engineering**Subject Code: **ES-EE 101**Semester: **B. Tech 1st Semester**Stream: **CSE**Session: **2025 - 2026**Faculty Name: **Dr. Binoy Krishna Biswas**

LECTURE NO.	CHAPTER	DETAILS OF CHAPTER	Text Books/References	Teaching Aids/Teaching methods	Course Outcomes satisfied	Blooms Taxonomy satisfied
Lecture 1	Module 1: DC Circuits (8 hours)	Definition of electric circuit, linear circuit, non-linear circuit, bilateral circuit, unilateral circuit, Independent source, Dependent source, active and passive elements.	T1/T2/ T3/T4 /N&T	C&T, PPT, CD	CO1	Apply
Lecture 2		Node, branch, loop, Kirchhoff's laws, Resistance in series and parallel, Short circuit and open circuit.	T2/T3/ N&T	C&T, PPT, CD	CO1	Apply
Lecture 3		Source equivalence and conversion, Loop analysis.	T2/T3/ N&T	C&T, PPT, CD, PS	CO1	Apply
Lecture 4		Network Theorems – Superposition Theorem.	T2/T3/ N&T	C&T, PPT, CD, PS	CO1	Apply
Lecture 5		Thevenin's Theorem.	T2/T3/ N&T	C&T, PPT, CD, PS	CO1	Apply
Lecture 6		Norton Theorem.	T2/T3/ N&T	C&T, PPT, CD, PS	CO1	Apply
Lecture 7		Maximum Power Transfer Theorem.	N&T	C&T, PPT, CD, PS	CO1	Apply
Lecture 8		Star-Delta Conversions.	N&T	C&T, PPT, CD	CO1	Apply
Lecture 9	Module 2: AC Circuits (8 hours)	Sinusoidal quantities, Average and RMS values, peak factor, Form factor, Phase and Phase difference.	T2/T3/ N&T	C&T, PPT, CD	CO2	Apply
Lecture 10		Concept of phasor diagram, V-I Relationship in R, L, C circuit.	T2/T3/ N&T	C&T, PPT, CD	CO2	Apply
Lecture 11		Combination R-L-C in series and parallel circuits with phasor diagrams.	T2/T3/ N&T	C&T, PPT, CD, PS	CO2	Apply
Lecture 12		Impedance and admittance, impedance triangle.	T2/T3/ N&T	C&T, PPT, CD	CO2	Apply
Lecture 13		Power triangle, Power factor, concept of resonance, Power in AC circuit.	T2/T3/ N&T	C&T, PPT, CD	CO2	Apply
Lecture 14		Simple problems (series and parallel circuit only).	T2/T3/ N&T	C&T, PPT, CD, PS	CO2	Apply

Lecture 15		Three-phase balanced circuits.	T2/T3/ N&T	C&T, PPT, CD	CO2	Apply
Lecture 16		Concept of three-phase power measurement.	T2/T3/ N&T	C&T, PPT, CD, PS	CO2	Apply
Lecture 17	Module 3: Transformer s (6 hours)	Working of a single-phase transformer, Problems on EMF equation.	N&T	C&T, PPT, CD	CO3	Apply
Lecture 18		Classification, construction and losses of single-phase transformer.	N&T	C&T, PPT, CD	CO3	Apply
Lecture 19		Transformer on No-Load and On-Load Condition.	N&T	C&T, PPT, CD, PS	CO3	Apply
Lecture 20		Equivalent circuit of Transformer, Open circuit test and Short Circuit Test.	N&T	C&T, PPT, CD, PS	CO3	Apply
Lecture 21		Phasor Diagram.	N&T	C&T, PPT, CD	CO3	Apply
Lecture 22		Additional numerical problem and solution	N&T	C&T, PPT, CD, PS	CO3	Apply
Lecture 23		Generation of rotating magnetic fields	T5/T6/ N&T	C&T, PPT, CD	CO4	Apply
Lecture 24	Module 4: Electrical Machines (8 hours)	Construction and working of a three-phase induction motor	T5/T6/ N&T	C&T, PPT, CD	CO4	Apply
Lecture 25		Significance of torque-slip characteristic.	T5/T6/ N&T	C&T, PPT, CD, PS	CO4	Apply
Lecture 26		Loss components and efficiency, starting and speed control of induction motor.	T5/T6/ N&T	C&T, PPT, CD, PS	CO4	Apply
Lecture 27		Single-phase induction motor.	T5/T6/ N&T	C&T, PPT, CD	CO4	Apply
Lecture 28		Construction, working, torque-speed characteristic and speed control of separately excited dc motor.	T5/T6/ N&T	C&T, PPT, CD	CO4	Apply
Lecture 29		Construction and working of synchronous generators.	T5/T6/ N&T	C&T, PPT, CD, PS	CO4	Apply
Lecture 30		Additional numerical problem and solution	T5/T6/ N&T	C&T, PPT, CD, PS	CO4	Apply
Lecture 31	Module 5: Power Converters (6 hours)	DC-DC buck converters,	N&T	C&T, PPT, CD	CO5	Apply
Lecture 32		DC-DC boost converters,	N&T	C&T, PPT, CD	CO5	Apply
Lecture 33		DC-DC buck and boost converters	N&T	C&T, PPT, CD	CO5	Apply
Lecture 34		Duty ratio control	N&T	C&T, PPT, CD	CO5	Apply
Lecture 35		Single-phase and three-phase voltage source Inverters.	T1/T2/ T3/T4 /N&T	C&T, PPT, CD	CO5	Apply
Lecture 36		Sinusoidal modulation.	N&T	C&T, PPT, CD, PS	CO5	Apply
Lecture 37	Module 6: Electrical	Components of LT Switchgear: Switch Fuse Unit (SFU)	T5/T6/ N&T	C&T, PPT, CD	CO6	Understand
Lecture 38		MCB, ELCB	T5/T6/ N&T	C&T, PPT, CD	CO6	Understand
Lecture 39		MCCB, Types of Wires and Cables, Earthing.	T5/T6/ N&T	C&T, PPT, CD	CO6	Understand

Lecture 40	Installations (6 hours)	Types of Batteries, Important Characteristics for Batteries.	T5/T6/ N&T	C&T, PPT, CD	CO6	Understand
Lecture 41		Elementary calculations for energy consumption, power factor improvement and battery backup.	T5/T6/ N&T	C&T, PPT, CD	CO6	Understand
Lecture 42		Introduction on simple domestic electricity consumption and bill.	T5/T6/ N&T	C&T, PPT, CD, PS	CO6	Understand

Text Books/ References:

T1	Ritu Sahdev, Basic Electrical Engineering, Khanna Book Publishing Co. (P) Ltd., Delhi.
T2	D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
T3	D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
T4	L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
T5	E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
T6	V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
N&T	Notes and PPT prepared by Dr. Binoy Krishna Biswas

***Teaching Pedagogy:**

S. No.	Abbreviation	Full Form
1.	C&T	Chalk & Talk
2.	PPT	Power Point Presentation
3.	CD	Classroom Discussions
4.	Q	Quiz
5.	PS	Problem Solving
6.	FC	Flipped Class

Signature of faculty

 Dr. Binoy Krishna Biswas

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