DPG Institute of Technology and Management
Sector 34, Gurugram HR 122004

Lesson Plan

Course Name: Basics of Electrical and Electronics Engineering (BEEE)
Branch : CSE-Core,ME,EE,ECE,CE
Faculty Name: Dr. Swati Sharma (Asst. Prof.)
Department : Electrical Engineering

No. of Lecture Hours/Week	6	**Exam/Hours**	6
Total No. of Lecture Hours	60+(*)	**Exam Marks**	50
Course Code:	25ESC-EE-101H		

Course Objectives:

1. To introduce the basic concepts of Electrical and Electronics Engineering.
2. To apply various network laws, theorems to solve DC circuits and working principle of transformer and its types.
3. To study different types of electronic devices through their characteristics and working.
4. To study the concepts of digital electronics using number system, conversions, logic gates, SOP and POS forms.

Lecture No.	Topics to be covered	Teaching Methodology	Class Activity	Remarks
1	**Basic Introduction of the Subject and its Importance**	Lecture with interaction	Discussion on the subject and its importance	
	Unit-I (ELECTRIC CIRCUITS)			
	DC Circuits Electrical circuit elements (R, L and C)	Lecture with interaction	Discussion on electrical circuits	**CO1** *Apply various network laws and theorems to solve DC circuits*
2	Voltage and current sources, Kirchoff current	Lecture with interaction	Discussion on types of sources	
3	Voltage laws with their applications (Nodal and Mesh Analysis)	Lecture with interaction	Discussion on applications of voltage laws	
4	Analysis of simple circuits with dc excitation	Lecture with interaction	Discussion on simple circuits	
5	Superposition Theorems	Lecture with interaction	Problem-solving theorem	
6	Thevenin Theorems	Lecture with interaction	Problem-solving theorem	
7	Norton Theorems	Lecture with interaction	Problem-solving theorem	
8	AC Circuits Representation of sinusoidal waveforms, Peak and RMS values	Lecture with interaction	Discussion on AC circuit representation	
9	Real power Reactive power Apparent power	Lecture with interaction	Discussion on different types of powers	

	Power factor			
10	Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel)	Blended Learning	Discussion and problem solving on R,L,C Circuits	
	Revision of Unit I, Assignment and Chart designing			
	Unit- II (TRANSFORMERS)			
11	Ideal and Practical Transformer	Lecture with interaction	Discussion on types of transformers	**CO2** *To study the working principles of Transformers and its types.*
12	Transformer Equivalent circuit Losses in transformers	Lecture with interaction	Discussion and hands on equivalent circuit of transformers	
13	Transformer tests regulation and efficiency	Lecture with interaction	Discussion on transformer tests	
14	Ideal and Practical Transformers Phasor diagrams	Lecture with interaction	NPTEL & Discussion on phasor diagrams	
	Revision of Unit II , Assignment and Chart designing			
	Unit-III (Electronic Devices and Circuits)			
15	P-N Junction Diode	Lecture with interaction	Discussion on diodes	**CO3** *To understand the types of electronic devices and circuits*
16	VI Characteristics of diode	Lecture with interaction	Discussion on diodes characteristics	
17	Light Emitting Diode (LED)	Lecture with interaction	Discussion of LEDs and hands on experience	
18	Operation of Bipolar Junction Transistor (BJT)	Lecture with interaction	Discussion of BJTs	
19	BJT- Common Base (CB) Configuration	Lecture with interaction	Discussion of BJTs and types of configurations	
20	BJT- Common Emitter (CE) Configuration	Lecture with interaction	Discussion of BJTs and types of configurations	
21	BJT- Common Collector (CC) Configuration	Lecture with interaction	Discussion of BJTs and types of configuration	
22	Transistor as a Switch	Lecture with interaction	NPTEL and basic discussion on Transistors	
23	Metal-oxide Semiconductor Field Effect Transistor (MOSFET)	Lecture with interaction	Discussion on MOSFETs	
24	Depletion Enhancement type MOSFET	Lecture with interaction	Discussion on MOSFETs and its types	
25	Enhancement Only MOSFET	Lecture with interaction	Discussion on MOSFETs and its types	
	Revision of Unit III, Assignment and Chart designing			
	Unit-IV (Digital Electronics)			
26	Number System	Lecture with interaction	Discussion and problem-solving concepts of number system	**CO4**

27	Conversions: a. Binary-to-Decimal b. Decimal-to-Binary c. Octal-to-Decimal d. Decimal-to-Octal e. Octal-to-Binary f. Binary-to-Octal g. Hexadecimal-to-Decimal h. Decimal-to-Hexadecimal i. Binary-to-Hexadecimal j. Hexadecimal-to-Binary k. Octal-to-Hexadecimal l. Hexadecimal-to-Octal	Lecture with interaction, Lecture with examples and Flipped Classroom	Discussion on conversions with examples	*To understand the fundamental concepts and techniques used in digital electronics.*
28	Binary Arithmetic Addition and Subtraction	Lecture with interaction	Discussion with examples	
29	Subtraction using 1's Complement	Lecture with interaction	Discussion with examples	
30	Subtraction using 2's Complement	Lecture with interaction	Discussion with examples	
31	Logic Gate and their Truth Tables AND, OR, NOT, NAND, NOR, X-OR, EX-NOR	Lecture with interaction	Discussion with examples	
32	Universal gates	Lecture with interaction	Discussion with examples	
	Theorems of Boolean Algebra	Lecture with interaction	NPTEL and Discussion with examples	
32	Algebraic Simplifications-Numerical	Lecture with interaction	NPTEL and Discussion with examples	
33	Sum-of-product form (SOP)	Lecture with interaction	Discussion with examples	
34	Product-of-sum form (POS)	Lecture with interaction	Discussion with examples	
	Revision of Unit IV , Assignment and Chart designing			
35	Unit-I Revision	Lecture with interaction	Discussion	*Revisions and class tests*
36	Unit-II Revision	Lecture with interaction	Discussion	
37	Unit-III Revision	Lecture with interaction	Discussion	
38	Unit-IV Revision	Lecture with interaction	Discussion	
39	Previous Year Questions (PYQs) Practice	Lecture with interaction	Discussion	
40	Unit I and Unit II Test	Class-Test	Test	
41	Unit III and Unit IV Test	Class-Test	Test	
42.	Revisions and Tests	Class-Test	Test	

*Nature of class may be regular class/tutorial class/extra class/ etc.
#Remarks column mention: chalk & talk /ICT based/ Flip class/PPT etc.

Suggested Text / Reference Books

- E. Hughes, "Electrical and Electronics Technology", Pearson Education, 2025.
- D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2019.
- S. K Sahdev, Basic of Electrical Engineering, Pearson Education, 2023.
- D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
- L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2021.

- V. D. Toro, "Electrical Engineering Fundamentals", Pearson Education
- B.L Thareja , Electrical Technology-1," S.Chand, 2010, 2019.
- Mano M.M and Ciletti, M.D., Digital Design, Pearson, Prentice Hall,2013

Alternative NPTEL/Swayam Course:

S.No	NPTEL Course Name	Instructor	Host Institute
1	Basic Electric Circuits	Prof. Ankush Sharma	IIT Kanpur
2	Basic Electrical Circuits	Prof. Nagendra Krishnapura	IIT Madras
3	Fundamentals of Electrical Engineering	Prof. Debapriya Das	IIT Kharagpur

Course Outcomes:
At the end of the course, the student will be able to:

CO 1	*Apply various network laws and theorems to solve DC circuits.*
CO 2	*To study the working principles of Transformers and its types.*
CO 3	*To understand the types of electronic devices and circuits.*
CO 4	*To understand the fundamental concepts and techniques used in digital electronics.*

CO-PO-PSO Mapping:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO 1	3	3	2	3	-	1	-	-	1	-	-	2	3	3	3
CO 2	3	3	2	3	-	1	-	-	1	1	-	3	3	2	1
CO 3	3	3	2	3	-	1	1	-	1	1	-	3			
CO 4	3	3	2	3	1	1	-	-	1	1	-	3	1	1	1

Course Faculty: **Dr. Swati Sharma (EED)** HOD : **Dr. Simpi Mehta (ASHD)**
Signature : Signature :