

Lovely Professional University, Punjab

Course Code	Course Title	Lectures	Tutorials	Practicals	Credits	
ECE249	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	1	0	4	
Course Weightage	ATT: 5 CA: 25 MTT: 20 ETT: 50					

Course Outcomes :Through this course students should be able to

CO1 :: Understand the fundamental behavior of circuit elements and DC networks.

CO2 :: Learn the fundamental behavior and notations of AC circuits.

CO3 :: Discuss the working principles and applications of transformers.

CO4 :: Analyze the working of various semiconductor devices and its applications.

CO5 :: Distinguish between combinational and sequential logic system.

CO6 :: Explore the functionality of digital circuits under real and simulated environment.

TextBooks (T)			
Sr No	Title	Author	Publisher Name
T-1	FUNDAMENTALS OF ELECTRICAL ENGINEERING AND ELECTRONICS	B.L.THERAJA	S. CHAND & COMPANY

Reference Books (R)			
Sr No	Title	Author	Publisher Name
R-1	BASIC ELECTRICAL ENGINEERING BY D.C. KULSHRESTHA, MC GRAW HILL	D.C. KULSHRESTHA	MC GRAW HILL
R-2	. DIGITAL FUNDAMENTALS BY THOMAS L. FLOYD , R. P JAIN, PEARSON	THOMAS L. FLOYD , R. P JAIN	PEARSON
R-3	DIGITAL INTEGRATED ELECTRONICS	H. TAUB AND D. SCHILLING	MCGRAW HILL EDUCATION

Other Reading (OR)	
Sr No	Journals articles as Compulsary reading (specific articles, complete reference)
OR-1	https://www.ee.iitb.ac.in/course/~emlab/assets/autotfm.pdf ,

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OR-2	https://www.iare.ac.in/sites/default/files/lecture_notes/DC%20M%26T%20_%20LECTURE_NOTES.pdf ,	
Relevant Websites (RW)		
Sr No	(Web address) (only if relevant to the course)	Salient Features
RW-1	http://iamtechnical.com/the-pn-junction-diode-animation	PN diode
Audio Visual Aids (AV)		
Sr No	(AV aids) (only if relevant to the course)	Salient Features
AV-1	https://nptel.ac.in/courses/108108111	NPTEL lecture
Software/Equipments/Databases		
Sr No	(S/E/D) (only if relevant to the course)	Salient Features
SW-1	https://circuitverse.org/	Simulator

LTP week distribution: (LTP Weeks)	
Weeks before MTE	7
Weeks After MTE	7
Spill Over (Lecture)	7

Detailed Plan For Lectures

Week Number	Lecture Number	Broad Topic(Sub Topic)	Chapters/Sections of Text/reference books	Other Readings, Relevant Websites, Audio Visual Aids, software and Virtual Labs	Lecture Description	Learning Outcomes	Pedagogical Tool Demonstration/ Case Study / Images / animation / ppt etc. Planned	Live Examples
Week 1	Lecture 1	Fundamentals of D.C. circuits(resistance, inductance, capacitance, voltage, current, power and energy concepts)	T-1		Zero Lecture	Students will understand the use of electrical components	Power point presentation	
	Lecture 2	Fundamentals of D.C. circuits(ohm's law, Kirchhoff's laws)	T-1 R-1		Different current and Laws	Students will understand different Laws	Power point presentation	
		Fundamentals of D.C. circuits(voltage division rule, current division rule)	T-1		Different current and Laws	Students will understand different Laws	Power point presentation	

Week 1	Lecture 3	Fundamentals of D.C. circuits(star–delta transformation)	T-1	OR-1	Star delta conversion	Students will understand the conversions from star to delta and vice-versa	Power point presentation	
Week 2	Lecture 4	Fundamentals of D.C. circuits(mesh and nodal analysis)	T-1 R-1		Different node analysis	Students will understand the analysis of different Nodes	Power point presentation	
	Lecture 5	Fundamentals of D.C. circuits(dependent and independent sources)	T-1		Discussion about different sources	Students will understand about different sources	Power point presentation	
	Lecture 6	Fundamentals of D.C. circuits(superposition theorem, Thevenin's theorem)	T-1		Discussion about different theorems	Students will understand different Theorems	Power point presentation	
Week 3	Lecture 7	Fundamentals of D.C. circuits(Norton's theorem, maximum power transfer theorem)	T-1 R-1		Discussion about different theorems	Students will understand different Theorems	Power point presentation	
	Lecture 8	Fundamentals of A.C. circuits(alternating current and voltage, definitions of amplitude and phase)	T-1		AC current and voltage	Students will understand about the AC current and voltage	Power point presentation	
	Lecture 9	Fundamentals of A.C. circuits(average and RMS value of an AC signal)	T-1		Different combinations of RLC circuits	Students will able to design the RLC circuits	Power point presentation	
		Fundamentals of A.C. circuits(RL, RC and RLC circuits)	T-1		Different combinations of RLC circuits	Students will able to design the RLC circuits	Power point presentation	
Week 4	Lecture 10	Fundamentals of A.C. circuits(power calculation in RL, RC and RLC circuits)	T-1 R-1		Different combinations of RLC circuits	Students will able to design the RLC circuits	Power point presentation	
	Lecture 11	Fundamentals of A.C. circuits(Transformer-working, principle, and turn ratio)	T-1		Working of transformer	Students will understand working of transformer	Lecture discussion followed by question and answer	
	Lecture 12	Fundamentals of A.C. circuits(Instrument transformers)	T-1		Working of auto transformer and instrument transformer	Students will understand auto transformer and instrument transformer	Lecture discussion followed by question and answer	
		Fundamentals of A.C. circuits(Auto-transformer)	T-1		Working of auto transformer and instrument transformer	Students will understand auto transformer and instrument transformer	Lecture discussion followed by question and answer	

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Week 5	Lecture 13				Test 1			
	Lecture 14	Fundamental of semiconductor devices(PN junction diode and its applications)	T-1	RW-1	basics of semiconductor, PN junction diode and its applications	Student will understand of semiconductor and application of diode	Animation	
	Lecture 15	Fundamental of semiconductor devices(PN junction diode and its applications)	T-1	RW-1	basics of semiconductor, PN junction diode and its applications	Student will understand of semiconductor and application of diode	Animation	
Week 6	Lecture 16	Fundamental of semiconductor devices (Bipolar junction transistor (PNP and NPN))	T-1		Bipolar transistor working	Students will understand about BJT	Animation	
	Lecture 17	Fundamental of semiconductor devices (MOSFET (working and applications))	T-1	AV-1	MOSFET architecture and working	Students will understand about MOSFET	Animation	
	Lecture 18	Fundamental of semiconductor devices(Op-amp (features and virtual ground concept))	T-1	OR-2	Op-amp basics, characteristics and configurations	Students will learn to calculate gain	Discussion and brainstorming	
Week 7	Lecture 19	Fundamental of semiconductor devices(Op-amp (inverting and non-inverting))	T-1	OR-2	Inverting and non inverting configuration	Students will learn to calculate gain	Discussion and brainstorming	
SPILL OVER								
Week 7	Lecture 20				Spill Over			
	Lecture 21				Spill Over			
MID-TERM								
Week 8	Lecture 22	Introduction to number system and logic gates (Number system (conversion and codes))	R-2		Number conversion	Students will understand the conversion from one number system to other number system	white board and power point presentation	
	Lecture 23	Introduction to number system and logic gates(logic gates)	R-2	SW-1	Logic gate and circuit realization	Students will understand to circuit development	Online simulator	
	Lecture 24	Introduction to number system and logic gates (CMOS logic gates)	R-2 R-3		Implementation of NOT, NAND and NOR gate using CMOS	Student will understand the application of CMOS	white board and power point presentation	
Week 9	Lecture 25	Introduction to number system and logic gates (boolean algebra)	R-2	SW-1	Logic gate and circuit realization	Students will understand to circuit development		

Week 9	Lecture 26	Introduction to number system and logic gates(SOP and POS)	R-2 R-3	SW-1	SOP and POS	Students will understand to circuit development		
	Lecture 27	Introduction to number system and logic gates(K-Map (up to 4 variables))	R-2		K-Map (up to 4 variable only)	Students will understand the concept of K-Map for simplification of boolean expression	White board	
Week 10	Lecture 28	Introduction to Combinational Logic Circuits(Adders, Subtractors)	R-2		Half adder, full adder, half subtractor and full subtractor	Students will understand addition and subtraction logic	Lecturing and brainstorming	
	Lecture 29	Introduction to Combinational Logic Circuits(Adders, Subtractors)	R-2		Half adder, full adder, half subtractor and full subtractor	Students will understand addition and subtraction logic	Lecturing and brainstorming	
	Lecture 30	Introduction to Combinational Logic Circuits(Comparators, Multiplexers and De-multiplexers)	R-2		Comparators, Multiplexers and De-multiplexers	Students will learn smarter way to solve complex circuit	Lecturing and brainstorming	
Week 11	Lecture 31	Introduction to Combinational Logic Circuits(multiplexer design)	R-2 R-3		Multiplexer design (up to three variable)	Students will learn smarter way to design the multiplexer	Lecturing and brainstorming	
	Lecture 32	Introduction to Combinational Logic Circuits(Decoders, Encoders)	R-2		Decoder and encoder	Students will learn smarter way to solve complex circuit	Lecturing and brainstorming	
	Lecture 33				Test 2			
Week 12	Lecture 34	Introduction to Sequential Logic Circuits(Basic sequential circuits: SR-latch, D-latch)	R-2		4 types of flip flop	Students will understand difference between latch and flip flop	white board and power point presentation	
		Introduction to Sequential Logic Circuits(D flip-flop, JK flip- flop)	R-2		4 types of flip flop	Students will understand difference between latch and flip flop	white board and power point presentation	
	Lecture 35	Introduction to Sequential Logic Circuits(T flip-flop, Master Slave JK flip flop)	R-2		4 types of flip flop and master slave	Students will understand flip flop	white board and ppts	
	Lecture 36				Assignment - Simulation based			
Week 13	Lecture 37	Introduction to Sequential Logic Circuits(Conversion of basic flip-flop)	R-2		Flip flop conversion	Students will understand the conversion from one flip flop to other	white board and ppts	

Week 13	Lecture 38	Introduction to Sequential Logic Circuits(Registers: Operation of all basic Shift Registers)	R-2		Register and types of register	Students will understand register and shifting operation	Lecturing and brainstorming	
	Lecture 39	Introduction to Sequential Logic Circuits(Counters: Design of Asynchronous)	R-2		Design of Asynchronous counter	Students will understand difference between counter	Animation	
Week 14	Lecture 40	Introduction to Sequential Logic Circuits(Synchronous counters)	R-2		Design of synchronous counter, Ring and Johnson ring counter	Students will understand counter design and shifting operation	Lecturing and brainstorming	
		Introduction to Sequential Logic Circuits(Ring counter and Johnson ring counter)	R-2		Design of synchronous counter, Ring and Johnson ring counter	Students will understand counter design and shifting operation	Lecturing and brainstorming	
		SPILL OVER						
Week 14	Lecture 41				Spill Over			
	Lecture 42				Spill Over			
Week 15	Lecture 43				Spill Over			
	Lecture 44				Spill Over			
	Lecture 45				Spill Over			

Scheme for CA:

CA Category of this Course Code is:A0203 (2 best out of 3)

Component	Weightage (%)	Mapped CO(s)
Assignment - Simulation based	50	CO1, CO2, CO3, CO4, CO5, CO6
Test 1	50	CO1, CO2, CO3
Test 2	50	CO5, CO6

Details of Academic Task(s)

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Academic Task	Objective	Detail of Academic Task	Nature of Academic Task (group/individuals)	Academic Task Mode	Marks	Allotment / submission Week
Assignment - Simulation based	To explore the real time-based applications of projects	Parameters should be specified to the students individually for the design of circuits	Individual	Offline	30	5 / 12
Test 1	To test students' understanding of the concepts of DC and AC circuit and its application	The test should involve questions related to the circuit analysis.	Individual	Offline	30	4 / 5
Test 2	To evaluate the digital circuit design capability of the student	The test should involve questions related to the covered topics	Individual	Offline	30	10 / 11

MOOCs/ Certification etc. mapped with the Academic Task(s)

Academic Task	Name Of Certification/Online Course/Test/Competition mapped	Type	Offered By Organisation
Assignment - Simulation based	GATE/IES/IAS	Test/Examination	IIT/UPSC
Test 2	GATE/IES/IAS	Test/Examination	IIT/UPSC

- Where MOOCs/ Certification etc. are mapped with Academic Tasks:
1. Students have choice to appear for Academic Task or MOOCs etc.
 2. The student may appear for both, In this case best obtained marks will be considered.

Plan for Tutorial: (Please do not use these time slots for syllabus coverage)

Tutorial No.	Lecture Topic	Type of pedagogical tool(s) planned (case analysis,problem solving test,role play,business game etc)
Tutorial1	Ohm's law, Kirchhoff's laws	Problem Solving
Tutorial2	Star Delta transformation	Problem Solving
Tutorial3	Node and mesh analysis	Problem Solving
Tutorial4	Network Theorem	Problem Solving
Tutorial5	RL,RC,RLC circuit	Problem Solving
Tutorial6	Transformer	Problem Solving
Tutorial7	PN diode and op-amp	Problem Solving

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After Mid-Term		
Tutorial8	Number conversion and Logic gate	Problem Solving
Tutorial9	Simplification of boolean algebra, SOP and POS,	Problem Solving
Tutorial10	K-Map	Problem Solving
Tutorial11	Multiplexer and decoder design	Problem Solving
Tutorial12	Flip flop conversion	Problem Solving
Tutorial13	Shifting operation in digital design	Problem Solving
Tutorial14	Counter design	Case Analysis,Problem Solving

