

Branch Name:	Electrical Engineering
Program Code:	ET109
Course Name:	ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING
CourseCode:	1ET1000114
Pre-requisiteCourse:	Knowledge of semiconductor physics, Electric and Magnetic fields, Various communication equipment.

CourseObjective:

1. To introduce the operating and working principles of various electronic and communication systems at block diagram level and make the students aware about different areas of EC Engineering.
2. To make the students aware about different Circuit concepts
3. To make the students aware about different communication systems.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)								
Lecture	Tutorial	Practical	Credit	Theory				Practical				Total
				University Assessment		Continuous Assessment		University Assessment		Continuous Assessment		
				Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
4	-	2	5	28	70	12	30	-	-	08	20	120

CourseContents				
Sr. No	Topic	Total Hours	Weight (%)	
1	Semiconductor Devices: Semiconductors, Diode: p-n junction under bias, Bipolar Junction Transistor: structure and symbols, Field Effect Transistors: classification, symbols, Integrated Circuits	4	5	
2	Circuit concepts: Electrical Quantities: electric charge, electric field, electric potential (voltage), current, magnetic field, energy & power, Source and loads: types of voltage & current sources, Lumped Circuit Elements: circuit, resistor, inductor, capacitor, maximum power transfer, Meters and Measurements: voltmeter, ammeter, oscilloscope, Node-Voltage & Mesh-Current Analysis: examples, Computer aided circuit analysis using SPICE & MATLAB.	8	15	
3	Analog Building Blocks: Continuous time signal, continuous state (analog) signal & their examples, analog system examples, The amplifier block: basic amplifier circuit model, voltage gain, current gain, power gain, Ideal operational Amplifier: symbol & characteristics, Practical properties of Op-amp: typical values for I.C 741, Applications of Op-amp: Basic circuit diagrams.	8	15	

4	Digital Building Blocks: Discrete time signal, discrete state (digital) signal & their examples, digital system examples, advantages of digital systems over analog systems, Digital Building blocks: number systems & conversions, BCD system, logic blocks, digital logic gates, boolean postulates, Digital system components: combinational & sequential circuit examples (block diagram level only), Display devices: LED, LCD, segment display, CRT, Block diagram of computer organization, Types of computer networks & Network topologies.	12	25
5	Signal Processing: Signal and spectral analysis: block diagram of signal processing system, different signal processing tasks, digital communication system, line spectrum, signal bandwidth, Modulation, Sampling and Multiplexing: signal modulation & its requirements, frequency translation using product modulator, sampling and pulse modulation, multiplexing systems, Interference & noise: Interfering signals, thermal noise, white noise, SNR.	8	20
6	Communication Systems: Electromagnetic spectrum, propagation modes, Waves, Transmission lines, Wave guides and Antenna fundamentals: types of transmission lines & waveguides, antenna types, Analog communication systems: AM, FM, PM with waveforms only, Mobile radio systems: Cellular telephone concept, Digital communication systems: PCM, Carrier Modulation by digital signals: ASK, FSK, PSK with waveforms only, Global Positioning System.	8	20

List of Text Book:

1. Introduction to Electrical Engineering by Mulukutla S. Sarma, Oxford University Press.

List of Reference Books:

1. Electronics Principles by Malvino, 6th edition, TMG publication.
2. Electronics Communications by Dennis Roody & John Coolen, 1st edition, Pearson publication.

Titles of Experiments:

1. Introduction to Integrated Circuits.
2. Universal gates.
3. Half adder and full adder.
4. Maximum Power transfer theorem.
5. Op-amp as an inverting & non-inverting amplifier.
6. Op-amp as a summing & averaging amplifier.
7. Flip-flops.
8. Frequency modulation.
9. Sampling theorem.
10. Pulse Code Modulation.
11. Computer aided circuit analysis using SPICE.
12. Computer aided circuit analysis using MATLAB.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	To make the students understand Semiconductor Devices	1 Remembering 2 Understanding
CLO2	To make the students understand Circuit concepts and its applications	2 Understanding 3 Applying
CLO3	To make the students understand Analog Building Blocks	2 Understanding 3 Applying
CLO4	To make the students understand Digital Building Blocks	3 Applying
CLO5	To make the students understand Signal Processing	2 Understanding 3 Applying
CLO6	To make the students understand Communication Systems and its applications	4 Analyze 5 Evaluate

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H	M	M	L	L	M			L				H	L		
CLO2		L	M	H	L	L					L	L	M	L		
CLO3	L	M	M	L	M	H		M		L			M	L		
CLO4	M	M	M	L	M	H		M	L				M	L		
CLO5	M	L	L	L	M	H		M		L			H	L		
CLO6	L	M	L	L	M	H		M			L		H	L		

H: High, M: Medium, L: Low