Semester:	I / II	**Course Type:**	ESC		
Course Title: Introduction to Electronics & Communication Engineering					
Course Code:	25ECT13/23			**Credits:**	3
Teaching Hours/Week (L: T:P:S)			3:0:0:1	**Total Hours:**	40
CIE Marks:	50	**SEE Marks:**	50	**Total Marks:**	100
SEE Type:	Theory			**Exam Hours:**	3

I. Course Objectives

This course will enable students:

- To understand the construction, operation and characteristics of Semiconductor Diodes & BJT.
- To demonstrate the operation and applications of Op-Amp
- To design basic digital circuits using logic gates.
- To explain the basics of communication systems, WLAN and Bluetooth.
- To Interpret the structure and functionality of embedded systems.

II. Teaching-Learning Process (General Instructions)

- Chalk and talk method.
- Power point presentation / keynotes
- Videos
- Virtual Labs
- Demonstration of components /circuits
- Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
- Case-based teaching
- Role play
- Project/activity based learning

III. COURSE CONTENT

Module-1 Semiconductor Diodes and its Applications — 8 Hours

Semiconductor diode, Ideal Versus Practical, Resistance Level, Diode Equivalent Circuits, Zener diodes, Load Line Analysis.
Half Wave Rectification, Full Wave Rectification, Capacitor filter.
Textbook-1 : Chapter - 1, 2, 15 : Sections: 1.6,1.7,1.8,1.9,1.15 , 2.2,2.6,2.7,2.10 , 15.3

RBT Levels: L1, L2, L3

Module-2 BJT & Operational Amplifier — 8 Hours

Introduction, Transistor construction, Transistor Operation, Common Base, Common Emitter, Common Collector Configuration

Operational Amplifier: Operational Amplifier Parameters, Operational Amplifier Characteristics, Operational Amplifier Configurations, Operational Amplifier Circuits.

Textbook 1: Chapter - 3, Sections 3.1,3.2,3.3,3.4,3.5,3.6,3.7

Textbook 2: Chapter 8, Page No:165-169,171-175

RBT Levels: L1, L2, L3

Module-3 Digital Electronics Fundamentals | 8 Hours

Digital Computers and Digital Systems, Binary Numbers, Number Base Conversion Octal and Hexadecimal numbers,

Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates.
Combinational Logic: Introduction, design procedure, adders.

Text 3 : Chapter 1 , 2 , 4 Sections: 1.1,1.2,1.3,1.4, 2.2,2.3,2.4,2.5,2.7, 4.1,4.2,4.3

RBT Levels: L1, L2, L3

Module-4 Communication Systems | 8 Hours

Introduction, Modern Communication System Scheme, Transmitter, Channel, Noise, Receiver, Modulation, Types of Communication System.

Introduction, Cellular Telephone System, Cellular Concept and Frequency Reuse, GSM Communication, Wireless LAN, Bluetooth

Text 4: Chapter 1, 8 Sections: 1.1,1.2,1.3,1.4,1.5,1.6,1.9,1.15, 8.1,8.2,8.3, 8.7, 8.16,8.17

RBT Levels: L1, L2, L3

Module-5 Embedded Systems | 8 Hours

Definition, Embedded Systems Vs General Computing Systems, Classification of Embedded Systems, Major Application Areas of Embedded Systems, Purpose of an Embedded System, Core of The Embedded System: Microprocessors, GPP Vs ASIP, Microcontrollers, Microprocessor Vs Microcontroller, DSP, RISC V/S CISC, Memory: ROM, Sensors, Actuators, LED, 7-Segment LED Display.

Text 5: 1.1, 1.2, 1.4, 1.5, 1.6, 2.1.1.1-2.1.1.6, 2.2.1, 2.3.1, 2.3.2, 2.3.3.1, 2.3.3.2.

IV. COURSE OUTCOMES

At the end of the course students will be able to

CO1	Apply the working principles, fundamental characteristics of various semiconductor devices including diodes, transistors and operational amplifiers in basic electronic circuits.
CO2	Analyze basic rectifier and amplifier circuits using the principles of diodes and operational amplifiers
CO3	Design basic combinational circuits using the fundamental principles of digital systems.
CO4	Illustrate the fundamental concepts of communication systems and their applications.
CO5	Interpret the structure and functionality of embedded systems and digital logic components such as microcontrollers & sensors

V. CO-PO-PSO MAPPING (H=3; M=2; L=1)

PO/ PSO	1	2	3	4	5	6	7	8	9	10	11	S1	S2	S3
CO1	3							1	1					
CO2		3						2	2					
CO3			3						2					
CO4	3													
CO5	2													

VI. Assessment Details (CIE & SEE)

General Rules: Refer to Academic Regulations

Continuous Internal Evaluation (CIE): Refer to Annexure SL #1

Semester End Examination (SEE): Refer to Annexure SL #1

VII. Learning Resources

VII(a): Textbooks:

Sl. No	Title of the Book	Name of the author	Edition and Year	Name of the publisher
1	Electronic Devices and Circuits Theory	Robert L Boylestad & Louis Nashelsky	10th edition	Pearson
2	Electronic Circuits Fundamentals & Applications	Mike Tooley	6th Edition	Elsevier, 2020
3	Digital Logic and Computer Design	M. Morris Mano	ISBN-978-81-203-0417-8,2008	PHI Learning
4	Communication Systems	S L Kakani , Priyanka Punglia	1st edition,2017	New Age International Pvt Ltd
5	'Introduction to Embedded Systems',	K V Shibu	2nd Edition,2019.	McGraw Hill Education (India), Private Limited,

VII(b): Reference Books:

1	Electronic Devices and Circuit Theory	David A Bell	5th Edition	Oxford University Press
2	Electronic Communication Systems	George Kennedy	4th edition	TMH

VII(c): Web links and Video Lectures (e-Resources):

- https://nptel.ac.in/courses/122106025
- https://nptel.ac.in/courses/108105132
- https://nptel.ac.in/courses/117104072
- https://youtu.be/C0s7TS6HK0I
- https://youtu.be/j8V8nDCIHXY

VIII: Activity Based Learning / Practical Based Learning/Experiential learning:

Welcome to Virtual Labs - A MHRD Govt of India Initiative (vlabs.ac.in)