Semester: I/II			
Course Title	Introduction to Electronics and Communication Engineering	**CIE Marks**	50
Course Code	BECESC114/214	**SEE Marks**	50
Course Type	Theory	**Total Marks**	100
Course Category	ESC	**SEE Duration**	03 hrs
Hours Per Week	2L: 2T: 0P	**SEE Type**	Written
Total Hours	40 hrs	**Credits**	03

Course Learning Objectives
This course will enable the students to understand
• Operation of Power Supply and Amplifiers.
• Principles of operation of Oscillators and Op-amps.
• Principles of Communication and Modulation Schemes.
• Embedded Systems and Sensors.
• Logic circuits and their realization.
Pre-Requisites
• Semiconductor Physics

Module-1	**(8 hrs)**
Power Supplies: Block Diagram, Rectifiers, Reservoir and Smoothing Circuits, Improved Ripple Filters, Full Wave Rectifiers, Bi Phase Rectifiers Circuits, Bridge Rectifier Circuits, Voltage Regulators, Output Resistance and Voltage Regulation, Voltage Multipliers, (Only Voltage Doubler) Switched Mode Power Supplies. **Amplifiers:** Types of Amplifiers, Gain, Input and Output Resistance, Frequency Response, Bandwidth, Phase Shift, Negative Feedback. (**Text Book 1**: Page No: 117-128, 139-146)	
Module-2	**(8 hrs)**
Oscillators: Positive Feedback, Condition for Oscillations, Ladder Network Oscillator, Wein Bridge Oscillator, Single-Stage Astable Oscillator, Crystal Controlled Oscillators (Only Concepts, Working, and Waveforms. No Mathematical Derivations) **Operational Amplifiers:** Operational Amplifier Parameters, Operational Amplifier Characteristics, Operational Amplifier Configurations, Operational Amplifier Circuits. (**Text Book 1**: Page No:179-186, 165-169, 171-175)	
Module-3	**(8 hrs)**
Analog Communication Schemes: Introduction, Modern Communication System Scheme: Information Source and Input Transducer, Transmitter, Channel or Medium, Noise, Receiver, Concept of Modulation, Concept of Radio Wave Propagation (Ground, Space, Sky), Types of Communication Systems. **Modulation Schemes:** Amplitude Modulation, Angle Modulation, Advantages of Digital Communication Over Analog Communication, Multiplexing, Digital Modulation Schemes: ASK, FSK, PSK, (Explanation with Waveform) (**Text Book 2:** 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.9, 1.12, 1.15, 2.2.1, 3.2.1, 6.1, 6.11, 6.12, 6.13, 6.15, 6.16	
Module-4	**(8 hrs)**
Embedded Systems: 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 Book 3:** 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)

Module-5	**(8 hrs)**
Boolean Algebra and Logic Circuits: Binary Numbers, Number Base Conversion- Binary, Decimal, Octal and Hexa Decimal Numbers and Vice-Versa, Complements-1's and 2's, Basic Definitions, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Digital Logic Gates. **Combinational Logic:** Introduction, Design Procedure, Adders- Half Adder, Full Adder. (**Text Book 4**: 1.2, 1.3, 1.4, 1.5, 2.1, 2.3, 2.4, 2.5, 2.7, 4.1, 4.2, 4.3)	

Text Books:	
1.	"Electronic Circuits, Fundamentals & Applications", Mike Tooley, 5th Edition, Elsevier, 2020.
2.	"Communication Systems", S L Kakani and Priyanka Punglia, New Age International Publisher, 2017.
3.	"Introduction to Embedded Systems", K V Shibu, 2nd Edition, McGraw Hill Education (India), Private Limited, 2019.
4.	"Digital Logic and Computer Design", M. Morris Mano, Pearson Education, 2017, ISBN-978-93-325- 4252-5.

Course Outcome Statements: After the successful completion of the course, the student will be able to	
CO1	Explain the operation of electronic devices, the principles of communication systems and fundamentals of Embedded systems.
CO2	Apply the concepts of electronic devices for the construction of analog and digital circuits.
CO3	Analyze the characteristics / performance parameters of electronic devices and circuits for different applications.
CO4	Use modern tool to demonstrate the working of basic electronic circuits

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-
CO3	-	2	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	2	-	-	2	2	-	2
Avg.	**2**	**2**	-	-	**2**	-	-	**2**	**2**	**-**	**2**

3: High, 2: Medium, 1: Low

Suggested Activity Based Assessment (ABA) Methods

Students should make demonstration of the following circuits using simulation software (MultiSim / Pspice / Proteus)

- Half / full-wave rectifier using diodes.
- Voltage Doubler Circuit.
- Op-amp circuits – inverting, non-inverting amplifiers, summers, differentiators, oscillators.
- AM modulation and demodulation.
- Realization of Half adder and Full adder