BASIC ELECTRONICS		
Subject Code	22BEE13/23	CIE: 50
Number of Lecture Hours/Week	3 (Theory)	SEE: 50
Total Number of Lecture Hours	40	SEE Hours: 03
CREDITS- 3		

Course objectives:

- To prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.
- To equip students with a basic foundation in electronic engineering required for comprehending the operation and application of electronic circuits, logic design, embedded systems, and communication systems.
- Professionalism & Learning Environment: To inculcate in first-year engineering students an ethical and professional attitude by providing an academic environment inclusive of effective communication, teamwork, ability to relate engineering issues to a broader social context, and life-long learning needed for a successful professional career

Module#	Teaching Hours
Module-1	**08 Hours**

Power Supplies: Block diagram, Half-wave rectifier, Full-wave rectifiers and filters, Voltage regulators, Output resistance and voltage regulation, Voltage multipliers.

Amplifiers: CE amplifier with and without feedback, Multi-stage amplifier; BJT as a switch: Cutoff and saturation modes.

Module-2	**08 Hours**

Operational amplifiers: Ideal op-amp; characteristics of ideal and practical op-amp.

Practical op-amp circuits: Inverting and non-inverting amplifiers, voltage follower, summer, subtractor, integrator, differentiator.

Oscillators: Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator (using op-amp), Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)

Module-3	**08 Hours**

Boolean Algebra and Logic Circuits: Binary numbers, Number Base Conversion, octal & Hexa Decimal Numbers, Complements, Basic definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates

Combinational logic: Introduction, Design procedure, Adders- Half adder, Full adder.

Module-4	**08 Hours**

Embedded Systems: Definition, Embedded systems vs general computing systems, Classification of Embedded Systems, Major application areas of Embedded Systems, Elements of an Embedded System, Core of the Embedded System, Microprocessor vs Microcontroller, RISC vs CISC

Sensors and Interfacing: Instrumentation and control systems, Transducers, Sensors, Actuators, LED, 7-Segment LED Display.

Module-5	**08 Hours**

Analog Communication Schemes: Modern communication system scheme, Information source, and input transducer, Transmitter, Channel or Medium – Hardwired and Soft wired, Noise, Receiver, Multiplexing, Types of communication systems. Types of modulation (only concepts) – AM , FM, Concept of Radio wave propagation (Ground, space, sky)

Digital Modulation Schemes: Advantages of digital communication over analog communication, ASK, FSK, PSK, Radio signal transmission Multiple access techniques.

Question paper pattern:
- The question paper will have ten questions.
- Each full question consists of 20marks.
- There will be 2 full questions (with a maximum of four sub questions) from each module, there will be five modules.
- Each full question will have sub questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.

Text books:
1. Mike Tooley, 'Electronic Circuits, Fundamentals & Applications', 4th Edition, Elsevier, 2015. DOI https://doi.org/10.4324/9781315737980. eBook ISBN9781315737980 2nd
2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-2030417-84.
3. D P Kothari, I J Nagrath, 'Basic Electronics', 2nd edition, McGraw Hill Education (India),Private Limited, 2018

Reference Books:

E books and online course materials:

Course Outcome:
On completion of the course, the student will be able to:

Course Code	CO #	Course Outcome (CO)
22BEE13/23	**CO1**	Design basic power supply & study concept of amplifiers.
	CO2	To analyze working of op-amp with its applications & to study oscillators.
	CO3	Develop competence knowledge to construct basic digital circuit by make use of basic gate and its function.
	CO4	Understand the concept of embedded system. Study role of Sensor and its interfacing.
	CO5	To study various analog and digital modulation and demodulation techniques

22BEE13/23: Basic Electronics

CO#	CO	PO												PSO		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	Design basic power supply & study concept of amplifiers.	3	3	2		2	2							3		
CO2	To analyze working of op-amp with its applications & to study oscillators.	3	2	3		2	1							3	2	1
CO3	Develop competence knowledge to construct basic digital circuit by make use of basic gate and its function.	3	2	3		3				1				3	3	1
CO4	Understand the concept of embedded system. Study role of Sensor and its interfacing.	2	1	1		2	1			1			1	3		1
CO5	To study various analog and digital modulation and demodulation techniques	2	1	1		2	1			1			1	3		
	Average	2.6	1.8	2		2.2	1			0.6			0.4	3	1	0.6