Course Title:	**Introduction to Electronics & Communication**	Semester	I /II
Course Code:	**BESCK104C/204C**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Theory	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Course Learning Objectives:

CLO 1. To prepare students with fundamental knowledge/ overview in the field of Electronics and Communication Engineering.

CLO 2. 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.

CLO 3. 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.

Teaching-Learning Process

These are sample Strategies; which teacher can use to accelerate the attainment of the variouscourse outcomes and make Teaching –Learning more effective

1. Lecturer method (L) does not mean only the traditional lecture method, but a different typeof teaching method may be adopted to develop the outcomes.
2. Arrange visits to nearby PSUs such as BHEL, BEL, ISRO, etc., and small-scale hardwareIndustries to give brief information about the electronics manufacturing industry.
3. Show Video/animation films to explain the functioning of various analog and digital circuits
4. Encourage collaborative (Group) Learning in the class.
5. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotesCritical thinking.
6. Adopt Problem Based Learning (PBL), which fosters students‟ Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather thansimply recall it.
7. Topics will be introduced in multiple representations
8. Show the different ways to solve the same problem and encourage the students to come upwith their own creative ways to solve them.
9. Discuss how every concept can be applied to the real world - and when that's possible, itHelps improve the students' understanding.

Module-1: (8 hours)
Semiconductor Diodes and Applications: Introduction, V-I Characteristics of PN Junction diode, Diode current equation, Effect of temperature on diode characteristic, Ideal diodes, Practical/Real diode, Diode applications, working of half rectifier, center tapped Full wave Rectifier-Operation, Advantages and Disadvantage, Full wave Bridge Rectifier- Operation, advantages and disadvantages, Filters, Capacitor filter. (Text 1) **(RBT Levels: L1, L2 and L3)**
Module-2: (8 hours)
Amplifiers – Types of amplifiers, Gain, Input and output resistance, Frequency response, Bandwidth, Phase shift, Negative feedback, multi-stage amplifiers. **Oscillators** – Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wein bridge oscillator, Multivibrators, Single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations) (Text 2) **(RBT Levels: L1, L2 and L3**)
Module-3: (8 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 (Text 3: 1.2, 1.3, 1.4, 1.5,2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7). **Combinational logic**: Introduction, Design procedure, Adders- Half adder, Full adder (Text 2:4.1,4.2, 4.3) **(RBT Levels: L1, L2 and L3)**
Module-4: (8 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. (Text 4) **(RBT Levels: L1, L2 and L3)**
Module-5: (8 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. (Text 5) **(RBT Levels: L1, L2 and L3)**

Course outcomes:

At the end of the course, the student will be able to:

1. Explain the concept of amplifiers and Oscillator circuits
2. Explain the concept of Embedded system
3. Apply the Knowledge of diodes as a rectifier
4. Apply Boolean algebra in logic circuit synthesis
5. Analyze the concept of Analog and Digital Communication system

Continuous Internal Evaluation: 50 marks

Theory Assessment Tool	**Marks**	**Reduced marks**
IAT-1	25	25
IAT-2	25	
Assessment -1(activity based)	25	25
Assessment-2(activity based)	25	

Semester End Examination (SEE): 50 marks

SEE	**Marks**	**Reduced marks**
Course end examination (Answer any one question from each unit – Internal choice)	100	50

Course Assessment and Evaluation Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50). The minimum passing mark for the SEE is 35% of the maximum marks (18 marks out of 50). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Semester End Examination (SEE):

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

- The question paper shall be set for 100 marks. The medium of the question paper shall be English). The duration of SEE is 03 hours.

- The question paper will have 10 questions. Two questions per module. Each question is set for 20 marks. The students have to answer 5 full questions, selecting one full question fromeach module. The student has to answer for 100 marks and **marks scored out of 100 shall be proportionally reduced to 50 marks**.

- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module

Suggested Learning Resources:

Text Books:

1. Mike Tooley, "Electronic Circuits, Fundamentals & Applications",4thEdition, Elsevier,2015.
2. Digital Logic and Computer Design, M. Morris Mano, PHI Learning, 2008 ISBN-978-81-203.
3. K V Shibu, "Introduction to Embedded Systems", 2nd Edition, McGraw Hill Education(India), Private Limited, 2016.
4. S L Kakani and Priyanka Punglia, "Communication Systems", New Age InternationalPublisher,2017.

Reference Books:

1. Dr. R.S. Sedha, "Electronic Circuits", S Chand and Company Pvt.Ltd, 3rd Revisededition, Reprint 2020.
2. Robert L Boylestad "Electronic Devices and Circuit Theory", Prentice Hall of IndiaPvt.Ltd, 11th Edition, 2015, 2020 reprint.

Web links and Video Lectures (e-Resources):

- DOI https://doi.org/10.4324/9781315737980. eBook ISBN9781315737980
- www.nptel.ac.in

COs and POs Mapping (CO-PO mappings are only Indicative)
Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0-Not Mapped

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	3	2								1	1	3	
CO2	3	3	2								1	1	3	
CO3	3	3	2								1	1	3	
CO4	3	3	2								1	1	3	
CO5	3	3	2								1	1	3	