Guru Nanak Dev Engineering College, Ludhiana

Department of Electronics and Communication Engineering

B. Tech. (Electronics and Communication Engineering)

Subject Code: OEEC-102

Subject Name: Basics of Electronics and Communication

Programme: B.Tech.	**L:** 3 **T:** 0 **P:** 0
Semester: 6	**Teaching Hours:** L:39
Theory/Practical: Theory	**Credits:** 3
Internal Marks: 40	**Percentage of Numerical/Design Problems:** 20%
External Marks: 60	**Duration of End Semester Exam (ESE):** 3 hours
Total Marks: 100	**Elective Status:** Compulsory

Prerequisites: Fundamentals of electronic devices
Additional Material Allowed in ESE: Scientific calculator

On Completion of the course, the student will have the ability to:

CO#	Course Outcomes
1.	Apply the knowledge of working principle of diode for utilization in different applications.
2.	Apply the knowledge of working principle of transistor for utilization in different applications.
3.	Understand the basic concept of feedback in amplifiers and applying for designing LC and RC oscillators.
4.	Comprehend the basic concept of Binary Number System and apply for Boolean problems.
5.	Analyze performance of different types of analog modulation techniques.
6.	Demonstrate the concepts of digital modulation techniques.

Detailed Contents:

Part -A

Introduction to Electronics **8 hours**

Semiconductors, Intrinsic Semiconductors, Extrinsic Semiconductor, P-N Junction Diode Operation, Junction Theory, V-I Characteristics of P-N Junction Diode, Ideal Diode, Diode Applications, Special Diodes- Zener diode as a voltage regulator, Light Emitting Diode, Photodiode.

Transistors and its applications **7 hours**

Introduction to Transistors, Construction and Working of a Transistor, Transistor as an amplifier, Basic configurations - Common Emitter, Common Base, Common Collector: characteristics and comparison, Need for Biasing, Operating point, Need for Bias

Stabilization,

Oscillators **4 hours**

Feedback in Amplifiers, Types of Feedback, Principle of Oscillators, LC and RC oscillators

Part -B

Fundamentals of Digital Electronics **7 hours**

Logic Gates: AND, OR, NOT, Universal Gates, Exclusive Gates, Boolean algebra, Binary Number System- Binary, Decimal, Octal, Hexadecimal, Number System Conversions, Binary Addition, Binary Subtraction-1's and 2's compliment, 7-Segment LCD Display.

Analog Communication **8 hours**

Elements of a communication system, Introduction to Modulation and Demodulation, Need of Modulation, Types of Modulation – Amplitude Modulation: Mathematical analysis, Modulation index; Frequency Modulation: Mathematical analysis, Frequency spectra, Modulation Index; Phase Modulation: Mathematical analysis, Applications in Engineering.

Digital Communication **5 hours**

Advantages of Digital Communication, Digital Modulation techniques – ASK, FSK, and PSK. Applications of Digital Modulation. M-ary modulation.

Text Books:

1. Jacob Milliman, Christos Halkias, Chetan Parikh, "Milliman's Integrated Electronics" Paperback, 2nd Edition.
2. Donald P. Leach, Albert Paul Malvino, Goutam Saha, "Digital Principles and Applications". McGraw Hill Education; Eighth Edition.
3. Kennedy Davis,"Electronics Communication Systems" Paperback, 4th Edition.

Reference Books:

1. N.N Bhargava, S.C. Gupta, D.C. Kulshreshtha " Basic Electronics and Linear Circuits", Tata McGraw-Hill Education.
2. R.P Jain, " Modern Digital Electronics", Tata McGraw Hill Publications, 4th edition.

E books and online learning materials:

1. http://web.eecs.utk.edu/~roberts/ECE342/AnalogCommunicationSystems.pdf
2. https://inst.eecs.berkeley.edu/~ee100/su07/handouts/DiodeTransistorNotes.pdf

MOOCS and Video Course:

1. NPTEL Course on: Basic Electronics and Lab
2. http:// nptel.ac.in/courses/122106025/