

Progressive Education Society's
Modern College of Arts, Science and Commerce (Autonomous),
Shivajinagar, Pune – 5

First Year of B. Sc. (Computer Science)
(2023 Course under NEP 2020)

Course Code: 23CsCmpU1501

Course Name: Fundamentals of Analog and Digital Electronics Lab

Teaching Scheme: 4 Hours/Week

Credit: 02

Examination Scheme: CIA: 20 Marks

End-Sem : 30 Marks

Prerequisite Courses:

- 12th Science (PCM).

Course Objectives:

- To provide basic skills and knowledge to understand Electronics principles in computer based electronic systems.
- To enrich the students' practical skills in computer based Electronic systems.
- To develop foundation and provide stepping stone for research and development in computer based Electronics systems and computer applications.

Course Outcomes:

On completion of the course, student will be able to–

- Design and able to test basic analog and digital circuits.
- Understand fundamental Electronics concepts and terminologies used in computer based Electronic systems.
- Demonstrate a working knowledge of practical skills in Electronic system, Computer based Electronics system industries.

Course Contents:

Experiments (Expt 1 and 2 are compulsory)

1. **Identification of Components / Tools, Use of Multimeters , Study of Signal Generator/CRO.**
2. **Activity /Field visit /Seminar /Small Projects / Participation in competition.**

SECTION A (ANY 6)

1. Verification of network theorems: KCL / KVL,
2. Verification of network theorems: Thevenin, Norton.
3. Study of forward and Reverse biased characteristics of PN Junction Diode
4. Study of breakdown characteristics and voltage regulation action of Zener diode
5. Study of Half-wave, Full-wave and Bridge rectifier circuits.
6. Design, build and test Low pass and High pass RC filters.
7. Study of Transfer and Output characteristics of Bipolar Junction Transistor in CE mode
8. Study of Output and Transfer characteristics JFET/MOSFET
9. Build and test Inverting and Non-inverting amplifier using OPAMP.
10. Build and test Adder and Subtractor circuits using OPAMP.

SECTION B (ANY 6)

1. Basic Logic gates using Diodes and verification of Demorgan's Theorem.
2. Interconversions and realizations of logic expressions using Gates/ ICs.
3. Build and Test Half Adder, Full Adder and Subtractor using basic gates.
4. Build and Test 4-bit parity checker/ generator using X-OR gate.
5. Study of Four-bit Universal Adder/Subtractor.
6. Build and Test 4:1 Multiplexer and 1:4 Demultiplexer using gates.
7. Study of BCD Encoder and Decoder.
8. Study of RS, JK and D flip flops using NAND gates.
9. Study of decade counter IC circuit configurations.
10. Study of 4-bit Shift register IC.

Text/ Reference Books:

1. Basic Electronics: Bernard Grob, McGraw Hill Publication, 8th Revised Edition, 2010
2. Electronic Principles: Albert Malvino, David J Bates, McGraw Hill 7th Edition. 2012
3. Principals of Electronics: V.K. Mehta, S. Chand and Co.
4. A text book of electrical technology: B. L. Theraja, S. Chand and Co.
5. Basic Electronics and Linear Circuits: Bhargava N.N., Kulshreshtha D.C., Gupta S.C., Tata McGraw Hill.
6. Digital Electronics: Jain R.P., Tata McGraw Hill
7. Digital Principles and Applications: Malvino Leach, Tata McGraw-Hill.
8. Digital Fundamentals: Floyd T.M., Jain R.P., Pearson Education
9. A Textbook of Digital Electronics , Dr. R S Sedha, 3rd Edition, S. Chand Publishing