

# St. Xavier's College (Autonomous), Ahmedabad

Syllabus of Semester – I to be implemented from the Academic Year 2023-24.

## FACULTY OF SCIENCE

### DEPARTMENT OF PHYSICS & ELECTRONICS

Minor 1: Basic Electronics – 1

4 Cr

100 Marks

Course Title & Code	Credit Distribution of The Course				Marks	Eligibility Criteria	Prerequisite(s) of the Course
	Cr	Lectures hrd	Tutorial hrs	Practical hrs			
EL-1101 Basic Electronics-1	2	12x1	3x1		50	10+2	Science Stream Math-Group
	2			14x2	50		

### Learning Objectives:

At the end of this course, students will be able to

#### Unit-1

- Perform the basic algebra operation of vectors and differential operation of vectors, gauging of curved line and surface with vectors, and calculate the values.
- Understand the gradient of scalar field and the divergence and curvilinear coordinates
- Understand of the Gauss theorem, Stokes theorem and their applications.

#### Unit-2

- Understanding of sound waves, production, control, transmission, reception and its effects, also in an auditorium.
- Learning of ultrasonic wave production and their applications.

### Learning Outcome:

## **UNIT 1: Diodes and their Applications**

**Credit of Course: 1 Cr**

**Lecture 12 Hrs**

**Tutorial 3Hrs**

Load line analysis of a diode circuit, clipping circuit, positive and negative clipper, biased clipper, some other biased clipper, combination clipper, two level slicer, clamping circuit, biased clampers, practical clamper circuits, application of clamping circuits, voltage multiplier, voltage doublers, voltage tripler and quadrupler.

Special purpose diodes: varactor diode, varactor diode specifications and applications, LED, LED voltage drop and current, LED applications, multicolour LEDs, LCDs, photodiodes, photoconductive cells, photo voltaic cells, LASER diodes and applications.

**Text Books:** Electronic Devices and Circuits by Allen Mottershead

**Article no:** 2.1)

A text book of electronic circuits R. S. Sedha, S. Chand

**Articles no:** 6.1 to 6.14., 7.12 to 7.14, 7.21 to 7.24, 7.27 to 7.31, 7.33 to 7.35.-7.25

**Ref Book:** Electronic Devices and Circuit By Boylestead and Namensky  
Electronic Principles By Malvino and Bates

## **UNIT 2: Number systems and codes**

**Credit of Course: 1 Cr**

**Lecture 12 Hrs**

**Tutorial 3Hrs**

Introduction, number system, inter conversion of number, signed binary number, floating point representation of number, binary arithmetic, complement binary arithmetic, arithmetic overflow, codes (BCD, 2-4-2-1 code, 4-bit BCD and 5-bit BCD, Biquinary code, excess 3, gray code, 7-segment code, alpha numeric codes, error detecting, error correcting code, hamming code.

**Text Book:** Digital electronics By G. K. Kharate, Oxford University Press  
Articles: 2.1 to 2.9

**Ref Book:** (1) Digital Design By Moriss Mano, PHI  
(2) Digital Principles By Malvino and Leach McGraw Hill  
(3) Digital Fundamentals By Floyd, Pearson

## Unit3 and Unit 4: Electronics Laboratory-I

### Learning Objectives:

At the end of this course, students will be able to

- Perform the basic experiments on electronic principle and also get aware about the possibilities of errors.
- Make students capable to connect the elementary circuits of experiments use few advance equipment with their understanding.

### Learning Outcomes:

At the end of this course, students will be able to

- Demonstrate few experiments independently.
- Identify the errors in experiments and in capacity to rectify it up to certain extent.
- Learn to identify the range and capability of instruments to be used in experiments.

### GROUP A

1. Identification and testing of electronics active and passive components.
2. To familiarize with various laboratory instrument.
3. To design and test the multirange AC / DC voltmeter.
4. To determine dielectric constant of given material.
5. To study voltage doubler circuit.
6. To study voltage multiplier circuit.
7. I-V characteristics of different colored LED.

### GROUP B

1. To study load characteristics, internal resistance and ripple factor of a Half wave rectifier (with and without 'C' filter).
2. To study load characteristics, internal resistance and ripple factor of a Full wave rectifier (with and without 'C' filter).
3. To study Zener diode as shunt voltage regulator.

4. To find resonance frequency, bandwidth and Q of a given series resonant circuit by varying frequency of ac source
5. To study Wien bridge as a frequency selective network.
6. CE Amplifier (load variation).
7. Study of AND, OR, NOT, NOR , NAND and Ex- OR gate using IC 7400.