St. Xavier's College (Autonomous), Ahmedabad

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

DEPARTMENT OF PHYSICS & ELECTRONICS

Minor 1: EL 2101 Basic Electronics –2 **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 2101 Basic Electronics-2	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

- At the end of this course, students will be able to
- 1. Perform the basic experiments on electronic principle and also get aware about the possibilities of errors.
- 2. Make students capable to connect the elementary circuits of experiments use few advance equipment with their understanding.

Unit-2

- Define and explain amplification principles.
- Understand maximum power transfer, conversion efficiency and identify and describe different amplifier classes
- Define harmonic distortion and use the three-point method for measurement.
- Explain zero decibel reference level and use a voltmeter as a decibel indicator
- Analyze frequency impact on amplifiers and explain phase relationships.

Learning Outcome:

Unit-1

- Learn methods for simplifying complex networks.
- Understand key theorems like Thevenin's, Norton, and maximum power transfer theorem for circuit analysis.
- Learn about the frequency selecting circuits (Series and parallel) and its implications for circuit design and analysis.

Unit-2

- Understand principles and characteristics of amplifiers.
- Analyze amplifier notation, gain, input/output resistance, efficiency, distortion, frequency response, bandwidth, and phase relationship.
- Perform measurements and calculations related to amplifier performance.

UNIT 1: Network Theorem and Filters

Credit of Course: 1 Cr **Lecture 12 Hrs** **Tutorial 3Hrs**

A: Network Theorem:

Reduction of complicated network, conversion between T and π sections, bridge T network, the lattice network, superposition theorem, the reciprocity theorem, Thevenin's theorem, Norton theorem, maximum power transfer theorem, compensation theorem.

Text Books: Network, Lines and Field by John D Ryde

Article no:

B: Resonance:

Definition of Q, the figure of merit, series resonance, Bandwidth of the series resonant circuit, parallel resonance or anti-rsonance, current in anti-resonant circuits, Bandwidth of antiresonant circuits.

Text Books: Network, Lines and Field by John D Ryde

Article no:

UNIT 2: General amplifier characteristics

Credit of Course: 1 Cr **Lecture 12 Hrs** **Tutorial 3Hrs**

Concept of amplification, amplifier notation, current, voltage and power gain, amplifier input resistance and output resistance, maximum power transfer, conversion efficiency, classes of amplifier, harmonic distortion , three point method of calculating distortion, Measurement of harmonic distortion, other type of amplifier

distortion, Decibels, other equation for decibel computation, zero decibel reference level, use of a voltmeter as a decibel indicator, voltmeter range correction factor, frequency response, amplifier band width, phase relationship in amplifier, square wave testing

Text Book: Electronic Devices and Circuits: An Introduction by Allen Mottershead
Article no: 7-1 to 7-12, 7-15, 7-16, 8-1 to 8-8, 8-10, 8-11

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

Unit 3 and Unit 4: Electronics Laboratory -II 2 Cr

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	To verify the Thevenin's theorem
2	To verify the maximum transfer theorem
3	Conversion of a given network in to T- network and π- network
4	RC high pass filter (Soldering and Bread Board)
5	RC low pass filter (Soldering and Bread Board)
6	Clipper and clamper circuit (soldering)
7	I -V Characteristic of a Photodiode

GROUP B

1	Parallel Resonance circuit
2	Bridge rectifier with and without ‘C’ filter
3	Study of CE amplifier (frequency response)
4	Wien bridge as a frequency selecting network
5	Ex-OR gate and its application
6	BCD to decimal and Decimal to BCD
7	Conversion of binary to gray and gray to binay.