



SILVER OAK UNIVERSITY

Silver Oak Institute of Science

Bachelor of Science Physics

Course Name: Basic Electronics-I

Course Code: 2050253102

Semester: 1st

Prerequisite:

1. Fundamental knowledge of electronics.

Course Objectives:

1. Develop practical skills in electronics by identifying, testing, and understanding the behavior of active and passive components
2. Understand the fundamental principles of amplifier operation, including gain, distortion, frequency response, and phase relationships.
3. Develop proficiency in number systems and codes, including binary arithmetic, error detection/correction, and various binary code representations.

Teaching Scheme:

Teaching Scheme				
L	T	P	Contact Hours	Credit
2	0	4	6	4

Contents:

Unit	Topics	Teaching Hours	% Weightage
1	<p>Passive Circuit element Resistors, nonlinear resistors, inductors, types of inductors, capacitors, classification of capacitors, different type of capacitors. Switch, types of switches, fuses, circuit breaker, relay, PCB. Surface Mount</p> <p>Devices Measuring Instrument DC ammeters, DC voltmeters, Voltmeter sensitivity, series type ohmmeter, shunt type ohmmeter, multimeter, Rectifier type instruments (AC voltmeter), Typical multimeter circuit.</p> <p>Diodes and their Applications Load line analysis of a diode circuit, clipping circuit, positive and negative clipper, biased clipper 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, multicolor LEDs, LCDs, photodiodes, photoconductive cells, photo voltaic cells, LASER diodes and applications.</p>	14	50

2	<p>General amplifier characteristics 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</p> <p>Number systems and codes 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.</p>	14	50
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Course Outcomes:

Sr. No.	CO Statement	Unit
CO-1	Apply knowledge about different passive and active components used in electronic industry for common application.	1
CO-2	Design circuits using passive and active components for strengthening fundamental idea about basic electronics.	1
CO-3	Describe characteristics of ideal and practical amplifier, demonstrate good understanding of calculating harmonic distortion	2
CO-4	Employ the knowledge of sign binary number in Binary arithmetic, learns different types of codes for the representation of information.	2

Teaching & Learning Methodology:

1. Conceptual Learning
2. Design Thinking
3. Competency based Learning
4. Problem - based Learning

List of Experiments:**Total Hours: 56**

Sr. No.	Practical Name
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	I-V characteristics of P-N Junction diode.
6	I-V characteristics of Zener diode.
7	I-V characteristics of different colored LED.
8	To study load characteristics, internal resistance and ripple factor of a Half wave rectifier
9	To study load characteristics, internal resistance and ripple factor of a Full wave rectifier
10	Study of AND, OR, NOT, NOR , NAND and Ex- OR gate using IC 7400

Books Recommended:-

1. R. S. Sedha, A text book of electronic circuits S. Chand
2. Dennis Roddy and John Coolen, Electronic Communications (Fourth edition), Prentice Hall of India.
3. Malvino and Leach, Digital Principles and Applications, McGraw-Hill
4. Moriss Mano, Digital Design, PHI
5. Floyd, Digital Fundamentals, Pearson
6. M. N. Avadhanulu, "An Introduction to LASERS - Theory and Applications", S. Chand & Company Ltd.
7. S. N. Goswami, "Elements of Plasma Physics", New Central Book Agency (P) Ltd., Calcutta.
8. M. L. Boas, "Mathematical Methods in the Physical Sciences", John Wiley & Sons.

List of Open-Source Software/learning website:

1. <http://silveroakuni.ac.in/video-lecture>

CO-PO-PSO Matrix:

CO. No.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO-1	2	3	2	2	2	1	2	1	1	1	1	2	2
CO-2	3	3	2	2	2	3	3	1	1	1	1	2	2
CO-3	2	2	2	2	2	2	2	1	1	1	1	2	2
CO-4	2	2	2	2	2	2	2	1	1	1	1	2	2