



SILVER OAK UNIVERSITY

College of Technology (01)
Bachelor of Technology in EC/ EE/CE/IT Engineering
Subject Name: Basic Electronics
Subject Code: 1010083112
Semester: 1st Year

Prerequisite:

1. High School Education & Physics

Objective:

1. Electronics is playing a key role in all engineering applications. All engineers should have basic knowledge of electronics. Purpose of this subject is making students familiar with basic electronics concepts. Students will be able to operate electronic test and measurement equipment like multi-meter, CRO, DC power supply and function generator.

Teaching and Examination Scheme:

| Teaching Scheme | | | | | Evaluation Scheme | | | | Total Marks |
|-----------------|---|---|---------------|---|-------------------|----------|-----------|----------|-------------|
| L | T | P | Contact Hours | C | Theory | | Practical | | |
| | | | | | CIE (TH) | ESE (TH) | CIE (PR) | ESE (PR) | |
| 3 | 0 | 2 | 5 | 4 | 40 | 60 | 20 | 30 | 150 |

Content:

| Unit No. | Course Contents | Teaching Hours | Weightage % |
|----------|--|----------------|-------------|
| 1 | Semiconductor Diodes Semiconductor materials- intrinsic and extrinsic types, Ideal Diode, Terminal characteristics of diodes: p-n junction under open circuit condition p-n junction under forward bias and reverse bias conditions p-n junction in breakdown region, Diode small signal model, Zener diode and applications, Rectifier Circuits, Clipping and Clamping circuits | 10 | 20% |
| 2 | Bipolar Junction Transistors (BJTs) Physical structure and operation modes, Active region operation of transistor, D.C. analysis of transistor circuits, Transistor as an amplifier, Biasing the BJT: fixed bias, emitter feedback bias, collector feedback bias and voltage divider bias, Basic BJT amplifier configuration: common emitter, common base and common collector amplifiers, Transistor as a switch: cut-off and saturation modes | 10 | 20% |
| 3 | Field Effect Transistor (FET) Enhancement-type MOSFET: structure and physical operation, current-voltage characteristics, Depletion-type MOSFET, D.C. operation of MOSFET circuits, MOSFET as an amplifier, Biasing in | 10 | 20% |

| | | | |
|---|--|---|-----|
| | MOSFET amplifiers, Basic MOSFET amplifier configuration: common source, common gate and common drain types, High frequency model of MOSFET amplifier, Junction Field-Effect Transistor (JFET) | | |
| 4 | Special purpose diodes and transistors Light emitting diode (LED). Zener diode, Zener diode circuit for voltage regulation, Photo diode, Solar cell, PIN diode, Varactor, Schottky diode, Varistors, Tunnel diode, Seven Segment display, sixteen segment display, Identify segments on pin using multi-meter, Dot-matrix LED display, Photo transistor, Reading datasheet. | 4 | 20% |
| 5 | Operation Amplifier (Op-amps) Ideal Op-amp, Differential amplifier: differential and common mode operation common mode rejection ratio (CMRR), Practical op-amp circuits: inverting amplifier, non -inverting amplifier, weighted summer, integrator, differentiator, Large signal operation of op-amps, Other applications of op-amps. | 5 | 20% |

Course Outcome:

| Sr. No. | CO statement | Unit No |
|---------|--|---------|
| CO-1 | Analyze the semiconductor diodes and circuits | 1 |
| CO-2 | Design biasing circuits for BJT | 2 |
| CO-3 | Analyze basic FET Circuits | 3 |
| CO-4 | Analyze the general – and special-Purpose diode circuits | 4 |
| CO-5 | Analyze the op-amps circuits | 5 |

Teaching & Learning Methodology:-

List of Experiments/Tutorials:

Diode Characteristics
 BJT circuits analysis
 FET circuits analysis
 Special purpose diode Characteristics
 Op-amps

Major Equipment:

1. CRO
2. Function generator
3. DC Power Supply
4. Bread board and discrete electronics components

Books Recommended: -

- [1] David A. Bell, "Electronic Devices and Circuits", Oxford University Press, Fifth edition
- [2] Albert Malvino & David, "Electronic Principles", Tata McGraw-Hill, Seventh edition
- [3] R. L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education
- [4] Jaccob Millman, Chritos Halkias, Chetan D Parikh, "Integrated Electronics", Tata McGraw-Hill, Second edition
- [5] Albert Malvino & David, "Problems and Solutions in Basic Electronics, McGraw Hill Education

List of Open Source Software/learning website:

<http://nptel.ac.in/syllabus/117103063/>
<https://swayam.gov.in/course/3595-basic-electronics>
eSIM available on FOSSEE website:
<https://fossee.in/>