RAICHUR UNIVERSITY, RAICHUR

Under Graduate Curriculum for Degree of

Bachelor of Science (B.Sc) in

Electronics

(I & II Semester)

As per Revised NEP 2024
With Effect from the Academic year from
2024-25 and onwards

B SC I SEMESTER ELECTRONICS

Program Name	B. Sc. in Electronics
Semester	**First semester**
Course Title	**Semiconductor Devices and Circuits**

Course Objectives:

On completing the course, ELE –CT1, the students will be able to understand - Various semiconductor devices and their applications, Working principle of Regulators, Wave Shaping circuits, Analysis of different Network theorems.

Unit I : Semiconductor Device Devices

PN **Junction diodes and their applications**: PN Junction diode construction, formation of depletion layer, I-V characteristics. Zener diode , Schottky diode, Varactor diode, Tunnel diode, LED, Photo diode – Construction, working, I-V characteristics and applications.

Rectifiers : Half Wave rectifier, Full Wave rectifier (centre taped, Bridge rectifier) - circuit diagram, Working and waveforms, Expression for Ripple factor and Efficiency. **Filters** : Shunt capacitor filter, LC and ∏ filters: their role in power supply, output waveform and working.

Unit II : Voltage Regulator

Zener diode as voltage regulator, series regulator, Load and line regulation. Voltage regulator ICs- Fixed IC regulators - IC 78XX and IC 79XX, Variable IC regulators IC LM 317 and LM 337- pin diagram, circuit, working. Block diagram and of DC regulated Power supply.

Unit III : Liner and Non Liner circuits

Linear and Non linear Wave shaping circuits: RC differentiator and integrator Expression for output Voltage and I/O waveforms, Clippers - positive, negative, positive biased, negative biased and combinational clippers, Clampers - Positive and negative clampers: circuit diagram, working and I/O waveforms of all circuits.

Unit IV : Network Theorems

Kirchhoff's Voltage law, , Kirchhoff's current law , Mesh analysis, Nodal analysis, Voltage divider and current divider theorems, Principle of Duality, superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Reciprocity theorem and Millman's theorem (Simple numerical examples).

OUTCOME OF THE COURSE

After studying this course, the students are:

1. Able to understand the principle and working of various semiconductor devices.
2. Able to design and fabricate DC regulated power supplies.
3. Able to design and construct wave shaping networks.
4. Able to design and analyze different types of electric Networks using theorems.

REFERENCE BOOKS:

1. Fundamentals of Electronics: B. Basavaraj –(Omkar Publications, Bangalore) revised edition 2002.
2. Principles of Electronics: V. K. Metha : Edition - 1995 (S. Chand & Company, New Delhi)
3. Fundamentals of Electrical and Electronics Engineering: B. L. Theraja- (S.Chand. and Co. : 3rd Edition)
4. Basic Electronics and linear Circuits : N. N. Bhargava., D C Kulshresta and D C Gupta- TMH Publishers 4th Ed.
5. Electronic devices: David A Bell-Reston publishing Company/DB Tarapurwala Publishers.
6. Basic Electronics: B.L. Theraja- (S. Chand. And Co.: 3rd Edition).

Program Name	B. Sc. in Electronics
Semester	**First semester**
Course Title	**Semiconductor Devices and Circuits Practicals**

Note: Minimum 10 Experiments to be performed

1. Study of V-I Characteristics of PN junction Diode.
2. Study of V-I Characteristics of Zener Diode,
3. Study of V- I characteristics of LED for two colors.
4. Half-wave rectifier without and with shunt capacitor filter, determine the ripple factor.
5. Full-wave rectifier without and with shunt capacitor filter, determine the ripple factor.
6. Study of regulated power supply using 78XX IC.
7. Study of regulated power supply using 79XX IC.
8. Study of regulated power supply using LM317 IC.
9. To design and construct voltage regulator using Zener diode.
10. To Study clipping circuits (Positive, Negative & Biased clippers).
11. To Study clamping circuits (Positive, Negative & Biased clampers).
12. To design RC differentiator circuit and hence study the output waveforms.
13. To design RC Integrator circuit and hence study the output waveforms.
14. To verify Kirchoff's Voltage Law (KVL) and Kirchoff's current Law (KCL).
15. To verify maximum transfer theorem.
16. To verify Reciprocity theorem.
17. To verify Thevenin's theorem.
18. To verify Norton's theorem.
19. To design and construct DC power supply using discrete components.