VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

JNANASAGARA CAMPUS, BALLARI-583105

DEPARTMENT OF ELECTRONICS

B.Sc. (ELECTRONICS) SYLLUBUS

Effective From

2021-22

VIJAYANAGARA SHREEKRISHNADEVARAYA UNIVERSITY

JNANASAGARA CAMPUS, BALLARI-583105

Programme: B.Sc. (Electronics)

Programme Outcomes (POs):

Students after completion of this program are able to

1. Apply the knowledge of Electronics to analyse physical systems.
2. Design and Perform laboratory experiments in electronics, as well as analyse and interpret data using theoretical models.
3. Identify and solve real world problems arising in the domains of Electronics.
4. Participate effectively in teams to solve multi/interdisciplinary problems of complex in nature.
5. Evaluate electronic devices/models for optimal performance.
6. Communicate effectively the complex information in a concise manner by written, oral and visual means to different groups/audiences of technical or popular nature.
7. Adopt digital literacy for computation and appropriate software for analysis of data.
8. Understand the ethical principles and practice them in scientific and societal contexts.
9. Develop knowledge about contemporary issues in science and technology.
10. Engage in self and life-long learning.
11. Identify a research problem in Electronics and provide an appropriate scientific solution using basic principles.

B.Sc. Electronics First Semester

Course: Basic Electronics **Course Code:** DSC1
Teaching Hours/Week (L-T-P): 4 - 0 - 0 **No. of Credits:** 04
Internal Assessment: 40 Marks **Semester End Examination:** 60 Marks

Module 1: Circuit fundamentals 10 Hours

Passive components –R, L & C- features, types, uses. color coding of resistors & capacitors. charging & discharging of capacitor & growth and decay of current in inductor through resisters. Energy stored in capacitor & inductor.
Transformer- features, construction & working, turns ratio, types of transformers and losses Energy sources - concept of voltage and current source- Characteristics.

Module 2: A.C circuits 10 Hours

Fundamental characteristics of sine waves. Parameters of sine wave like Amplitude, period, frequency, average and rms value. Complex numbers, J operator Series RL, RC & RLC circuit fed with ac- determination of reactance, impedances and expression for current.
Series RLC circuit - expression for the resonant frequency, Bandwidth and quality factor. Parallel RLC circuit- expression for the resonant frequency, Bandwidth and quality factor.

Module 3: Network theorems 10 Hours

Statement, proof and problems of the following theorems like Kirhoff's Laws, Star and delta networks (T & π) and their conversions, Reciprocity theorem, Maximum power transfer theorem for DC only, Superposition theorem, Thevenin's theorem and Norton's theorem.

Module 4: Semiconductors and diodes 11 Hours

Review of semiconductor, energy band theory of crystals, Intrinsic semiconductors- Atomic structure of Germanium and Silicon Current Conduction in intrinsic semiconductors, Extrinsic semiconductor – P-type and N-type, conduction in both types of Semiconductors.
Semiconductor diode - formation of P-N junction & depletion layer. Symbol of diode, Working of P-N junction diode, I-V Characteristics in forward & reverse Bias. Knee voltage, Breakdown voltage, diode testing & ideal diode characteristics.
Study the construction, working, characteristics and uses of the following special purpose diodes zener diode, photo diode, photo cell (solar cell) light emitting diode (LED) and seven segment LED display.

Module 5: Transistors 11 Hours

The bipolar junction transistor, types and symbols, working of NPN & PNP Transistor. Transistor configurations- CB, CE & CC. Current Amplification factors in - CB, CE & CC modes and their relations. Transistors characteristics - input, output & transfer characteristics in CB, CE configurations for both npn & pnp transistors, Leakage currents.
Construction , working and characteristics of FETand MOSFET. FET as an amplifier and UJT as a relaxation oscillator.

Text Books/Reference Books:

1. Solid state electronics-by B.L. Theraja
2. Principles of electrons – by V.K. Mehta
3. Fundamentals of electrical &electronic engineering, B L Theraja
4. Electronic devices & circuits, Jacob Millman & Halkias,
5. Electronic device & circuits theory Robert boylsted & Louis Nashelsky-
6. Basic electronics, B.Grob, 8^{th} Edition
7. Electrical circuits & application, B.Grob.

Course Outcomes (CO): After completion of this course student should able to

CO	Statement
1	Describe the passive and active components.
2	Distinguish the characteristics of diodes and transistors.
3	Solve the network problems using the different theorems.
4	Describe the performance of semiconductor devices.

*****

B.Sc. Electronics First Semester

Course: Basic Electronics Lab **Course Code:** DSC1
Teaching Hours/Week (L-T-P): 0 - 0 - 4 **No. of Credits:** 02
Internal Assessment: 25 Marks **Semester End Examination:** 25 Marks

List of Experiments

1. Verification of reciprocity theorem.
2. Verification and conversion of T & π networks.
3. Verification of KCL & KVL.
4. Verification of superposition theorem.
5. Verification of maximum power transfer theorem.
6. Verification of Thevenin's theorem.
7. Series LCR circuit -determination resonance frequency.
8. Parallel LCR circuit -determination resonance frequency.
9. Measurement of Vpp, T, F of sine and square waves using CRO.
10. I-V characteristics of PN junction diode.
11. Characteristics of LED (Minimum Two different LEDs)
12. BJT – Common Emitter Characteristics.

Note:

1. Minimum of EIGHT experiments must be carried out.
2. Experiments may be added as and when required with the approval of BoS.

Reference Books:

1. Basic Electronics: A Text-lab Manual – By Paul B. Zbar, Albert Paul Malvino
2. Experimental electronics – by S.V. Subramanyam.

Course Outcomes (CO): After completion of this course student should able to

CO	Statement
1	Make connections using breadboard.
2	Use the instruments like ac/dc meters, DMM and CRO
3	Design experiments to verify different network theorems.
4	Design experiments to draw the characteristics of electrical and electronic circuits.

*****

B.Sc. Electronics First Semester

Course: Fundamentals of Electronics **Course Code:** OEC1
Teaching Hours/Week (L-T-P): 3 - 0 - 0 **No. of Credits:** 03
Internal Assessment: 40 Marks **Semester End Examination:** 60 Marks

Module 1: Theory of semiconductors **09 Hours**

Review of semiconductors - energy band theory of crystals Intrinsic semiconductors- Atomic structure of Germanium and Silicon. Current Conduction and drift current in intrinsic semiconductors, Extrinsic semiconductor – P-type and N-type, conduction in both types of semiconductors.
Semiconductor diode : - formation of P-N junction & depletion layer. Symbol Working of P-N junction diode, I-V Characteristics in forward & reverse Bias.

Module 2: Circuit fundamentals **09 Hours**

Review of passive components: - Resistors(R), Inductors(L) and Capacitors(C) features, types, colour coding of resistors. Capacitors charging &discharging. Growth and decay of current in inductor through resister. Energy stored in capacitor & inductor.
Transformer: - Construction & working, transformer turn ratio, losses & types of transformers. Energy sources - concept of voltage and current source, Characteristics.

Module 3: A.C circuits **08 Hours**

Fundamentals of AC circuits: - Characteristics of sine wave, Basic definitions of sine wave-Amplitude, period, frequency, average & rms value.
CRO& DMM: - Functions of cathode ray oscilloscope and digital multi meter and
Measurements of various parameters using CRO & DMM.

Module 4: Demonstration of basic components **08 Hours**

Demonstration of basic components like resistors, capacitors and inductors. Identification of resistors values by colour coding. Verification of Ohm's Law and power relation in electrical networks. Series and parallel combination of resistors with voltage dividing and current dividing concept. Series and parallel combination of capacitors with practical approach.

Module 5: Demonstration of PN junction diode and Soldering **08 Hours**

PN junction diode: Demonstration of pn- junction diode forward and reverse bias I V - characteristics.
Soldering: - principles of solder connection, solder joints, solder alloys, soldering fluxes, soldering tools, soldering and de-soldering tools and techniques, man soldering, solder mask, Safety precautions health and medical aspects in soldering practice.

Text Books/Reference Books:

1. Solid state electronics-by B.L. Theraja
2. Principles of electrons – by V.K. Mehta
3. Fundamentals of electrical &electronic engineering, B L Theraja
4. Electronic devices &circuits, Jacob Millman & Halkias,
5. Electronic device& circuits theory Robert Boylsted & Louis Nashelsky-
6. Basic electronics,B.Grob,8th Edition
7. Electrical circuits &application, B.Grob

Course Outcomes (CO): After completion of this course student should able to

CO	Statement
1	Describe the basic concepts of electronic principles.
2	Identify the electronic components.
3	Make the soldering and the breadboard connections.
4	Make connections according to the circuits given to them.

*****