

Model Curriculum

B.Sc. Courses (Structure)

First year:

S.no.	Subject	Hrs per week
1.	English language including communication skills	6
2.	Second language	4
3.	Core1-I	4
4.	Core2-I	4
5.	Core3-I	4
6.	Core1-lab I	3
7.	Core2-lab I	3
8.	Core3-lab I	3
9.	Foundation course	3
10.	Computer skills	2
	Total	36

Second year:

B.Sc (Electronics) – Scheme of instruction

S.No.	Year	Paper	Hours/week	Total hours
A. THEORY				
01	First Year	Paper-I Circuit Analysis and Electronic Devices	4hrs/ Week	120 Hours
02	Second Year	Paper-II Analog Circuits and Communications	4hrs/ Week	120 Hours
03	Third Year	Paper -III Digital Electronics and Microprocessors.	3hrs/ Week	90 Hours
04	Third Year	Paper -IV (Electives) <i>Any one of the following</i> i) Paper – IVA Embedded Systems and Applications ii) Paper – IVB Digital Design using VHDL	3hrs/ Week	90 Hours
B. PRACTICALS				
05	First Year	Paper – I: Circuit Analysis and Electronic Devices Lab	3hrs/Week	90 Hours (30Sessions)
06	Second Year	Paper – II: Analog Circuits and Communication Lab	3hrs/ Week	90 Hours (30Sessions)
07	Third Year	Paper – III: Digital Electronics and Microprocessor Lab	3hrs/ Week	90 Hours (30 Sessions)
08	Third Year	Paper – IV (Electives) Any one of the following Paper - IV (A): Embedded Systems and Applications Lab Paper - IV (B): Digital design Using VHDL Lab	3 hrs/Week	90 Hours (30 Sessions)

B.Sc I Year -Electronics

PAPER-I Circuit Analysis and Electronic Devices. (120 hours)

UNIT-I (30 hours)

AC Fundamentals: The sine wave –Average and RMS values, the Operator J, Phasor diagram- Phasor representation of sinusoidal currents and voltages, Complex impedance and admittance, Polar and rectangular forms of complex numbers, Circuit analysis using Complex number representation.

Passive networks: Concept of voltage and current sources – Kirchoff's Voltage Law (KVL) and Kirchoff's Current Law (KCL) - Applications to simple networks consisting of resistors with AC and DC sources – Solution of networks using Node and mesh analysis.

Network theorems (DC and AC): Superposition Theorem–Thevenin's Theorem– Norton's Theorem–Maximum power transfer Theorem–Millman's Theorem- Reciprocity Theorem – Applications to simple networks.

UNIT- II (30 hours)

Cathode Ray Oscilloscope - Cathode Ray Tube (CRT) and its working, electron gun, focusing, deflection sensitivity, fluorescent screen

RC and RL Circuits: Transient response of RL and RC circuits with step input– time constants. Frequency response of RC and RL circuits – Types of Filters: Low pass filter – High pass filter – frequency response - Passive differentiating and integrating circuits.

Resonance: Series resonance and parallel resonance RLC circuits – Resonant frequency – Q factor – Band width – Selectivity.

UNIT-III (30 hours)

PN Junction: Depletion region – Junction capacitance – Diode equation (no derivation) – Effect of temperature on reverse saturation current – V-I characteristics and simple applications of i) Junction diode ii) Zener diode iii) Tunnel diode and iv) Varactor diode.

Bipolar Junction Transistor (BJT): PNP and NPN transistors–current components in BJT – BJT static characteristics (Input and Output) – Early effect- CB, CC, CE configurations (cut off, active, and saturation regions) CE configuration as two port network – h-parameters – h-parameter equivalent circuit. Determination of h-parameters from the characteristics. Load line analysis. Transistor Biasing – Fixed and self bias.

UNIT-IV (30 hours)

Field Effect Transistor (FET): Construction and working of JFET and MOSFET – output and transfer characteristics – Determination of FET parameters. Application of FET as voltage variable resistor and MOSFET as a switch – Advantages of FET over BJT.

Uni Junction Transistor (UJT): Construction and working of UJT- Characteristics. Application of UJT as a relaxation oscillator.

Silicon Controlled Rectifier (SCR): Construction and working of SCR. Two transistor representation, Characteristics of SCR. Application of SCR for power control.

Photo electronic Devices: Construction and characteristics of Light Dependent Resistor (LDR), Photo voltaic cell, Photo diode, Photo transistor and Light Emitting Diode (LED).

(NOTE: Solving related problems in all the Units)

Text Books :

1. Grob's Basic Electronics - Mitchel E.Schultz 10th Edn. Tata McGraw Hill (TMH)
2. Network lines and fields- J D Ryder- Prentice Hall of India (PHI)
3. Circuit analysis - P.Gnanasivam- Pearson Education
4. Electronic Devices and Circuits-Millman and Halkias - TMH
5. Electronic Devices and Circuits-Allen Mottershead - PHI
6. Pulse digital switching waveforms –Millman &Taub – TMH.
7. Applied Electronics- R.S.Sedha – S Chand &Co

Reference Books:

1. Circuits and Networks - A.Sudhaksr & Shyammohan S. Palli - TMH
2. Network Theory - Smarajit Ghosh - PHI
3. Principles of Electronics- V.K. Mehta and Rohit Mehta - S Chand &Co
4. Electronic Devices and Circuit Theory- R.L.Boylestad and L.Nashelsky- PHI /Pearson Education.
5. A First course in Electronics- AA Khan & KK Day- PHI
6. Principles of Electronic circuits- Stanely G.Burns and Paul R. Bond- Galgotia.
7. Electronic Principles and Applications – A.B. Bhattacharya- New Central Book Agency Pvt.
8. Electronic devices and circuits – Kumar and Jain-2007, PHI



B.Sc I Year – Electronics
Practicals
Paper-I (90 Hours-30 Sessions)

Circuit Analysis and Electronic devices Lab

1. Measurement of peak voltage, frequency and phase using CRO.
2. Thevenin's theorem – verification.
3. Norton's theorem – verification.
4. Maximum power transfer theorem – verification.
5. CR and LR circuits- Frequency response- (Low pass and High pass).
6. CR and LR circuits – Differentiation and integration – tracing of waveforms.
7. LCR–Series resonance circuit–Frequency response–Determination of f_o , Q and band width.
8. To draw volt-ampere characteristics of Junction diode and determine the cut-in voltage, forward and reverse resistances.
9. a) Zener diode V-I Characteristics– Determination of Zener breakdown voltage.
b) Voltage regulator using Zener diode
10. BJT input and output characteristics (CE configuration) and determination of 'h' parameters.
11. FET –Characteristics and determination of FET parameters.
12. UJT characteristics – determination of parameters
13. UJT as relaxation oscillator.
14. SCR Volt-ampere characteristics
15. Characteristics of LDR / Photo diode / Photo transistor / Solar cell.

Note : *Student has to perform All the Experiments.*

Reference Books :

- 1) Lab manual for Electronic Devices and Circuits - 4th Edition
By David A Bell - PHI

