

**B.Sc. ELECTRONICS SYLLABUS**  
**SCHEME OF INSTRUCTIONS**  
**UNDER CBCS (w.e.f 2019-2020 academic year onwards)**

Year	Semester	Title of the Paper [ Theory and Practical ]	Instructions Hrs/week	Number of Credits	Marks
1 <sup>st</sup> Year	I Sem	<i>Paper – I : Circuit Analysis</i>	4	4	100
		<i>Practical – I : Circuit Analysis Lab</i>	3	1	50
	II Sem	<i>Paper – II : Electronic Devices</i>	4	4	100
		<i>Practical – II : Electronic Devices Lab</i>	3	1	50
2 <sup>nd</sup> Year	III Sem	<i>Paper – III : Analog Circuits</i>	4	4	100
		<i>Practical – III : Analog Circuits Lab</i>	3	1	50
	IV Sem	<i>Paper – IV : Linear Integrated circuits and Basics of Communication</i>	4	4	100
		<i>Practical – IV : Linear Integrated Circuits and Basics of Communication Lab</i>	3	1	50
3 <sup>rd</sup> Year	V Sem	<i>Paper – V : Discipline Specific Elective - I</i> A. Digital Electronics (OR) B. Microprocessor & Applications	4	4	100
		<i>Practical – V : Discipline Specific Elective - I</i> A. Digital Electronics Lab (OR) B. Microprocessor Lab	3	1	50
	VI Sem	<i>Paper – VI : Discipline Specific Elective - II</i> A. Digital Communication (OR) B. Microcontroller & Applications	4	4	100
		<i>Practical – VI : Discipline Specific Elective - II</i> A. Digital Communication Lab (OR) B. Microcontroller Lab	3	1	50

**Total Credits: 30**

Skill enhancement courses:

1. Measurements and Errors
2. Basic Instrumentation
3. Biomedical Instrumentation
4. Hardware Definition Language

Generic Elective:

1. Basic Electronics

Project work (OR) Optional Paper (Digital System Design)

## B.Sc. ELECTRONICS SYLLABUS

### B.Sc. I YEAR Semester – I

#### DSC- Paper – I : Circuit Analysis

Total number of hours : 56

No of hours per week : 4

Credits : 4

#### UNIT - I

**AC Fundamentals :** The sine wave –average and RMS values – The J Operator – Polar and Rectangular forms of complex numbers – Phasor diagram-Complex impedance and admittance.

**Kirchhoff's Current and Voltage Laws:** Concept of Voltage and current sources-KVL and KCL- application to simple circuits (AC and DC) consisting of resistors and sources – Node voltage analysis and Mesh analysis.

#### UNIT-II

**Network Theorems (DC and AC):** Superposition Theorem ,Thevenin's Theorem, Norton's Theorem, Maximum power transfer Theorem, Reciprocity Theorem, Milliman's Theorem, Application to simple Networks.

#### UNIT-III

**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 and High pass filter- frequency response, passive differentiating circuit and passive integrating circuit.

#### UNIT-IV

**Resonance :** RLC Series and parallel resonance circuits –Resonant frequency –Q Factor- Bandwidth-Selectivity.

**Cathode Ray Oscilloscope:** Cathode Ray Tube (CRT) and its working, electron gun focusing, deflection sensitivity, florescent screen. Measurement of Time period, Frequency , Phase and amplitude.

#### **Text Books:**

- 1) Basic Electronics-Grob 10th edition(TMh)
- 2) Circuit Analysis-P.Gnanaswam pearson Education.
- 3) Circuit and Networks-A. Sudhakar & S. Pallri(TMh)
- 4) Pulse, digital & switching waveforms-Milliman &Taub.
- 5) Networks, Lines and Fields-John Ryder (PHI)
- 6) Network theory-Smarajit Ghosh(PHI)

## B.Sc. I Year, Semester – I : Electronics Practical

### Paper – I : Circuit Analysis Lab

No. of hours per week : 3

1. Measurement of peak voltage, frequency using CRO.
2. Measurement of phase using CRO.
3. Thevenin's theorem and Norton's theorem – verification.
4. Maximum power transfer theorem – verification.
5. CR circuit – 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  $f_0$ , Q and band width.
8. Simulation: i) verification of KVL and KCL.  
ii) study of network theorems.  
iii) study of frequency response ( LR ).

**Note: Student has to perform minimum of Six experiments.**

Reference Books:

- 1) Lab manual for Electronic Devices and Circuits – 4<sup>th</sup> Edition. By David A Bell – PHI
- 2) Basic Electronics – A Text Lab Manual –Zbar, Malvino, Miller.



**B.Sc. ELECTRONICS SYLLABUS**  
**B.Sc. I YEAR**  
**Semester - II**  
**DSC- Paper –II : Electronic Devices**

**Total number of hours : 56**  
**No of hours per week: 4**  
**Credits :4**

**UNIT- I**

**PN Junction:** Formation of 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.

**UNIT-II**

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

**UNIT- III**

**Field Effect Transistor ( FET ):** Construction and working of JFET, output and transfer characteristics of FET, Determination of FET parameters. Application of FET as Voltage variable resistor. Advantages of FET over BJT. **MOSFET ::** construction and working of enhancement and depletion modes , output and transfer characteristics Application of MOSFET as a switch .

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

**UNIT- IV**

**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).

**Books Recommended:**

- 1) Electronic Devices and circuits-Millman and Halkias,(TMH)
- 2) Principles of Electronics-V.K.Mehta & Rohit Mehta
- 3) Electronic Devices and Circuits-Allen Moltershed(PHI)
- 4) Basic Electronics and Linear Circuits-Bharghava U
- 5) Electronic Devices and Circuits-Y.N.Bapat
- 6) Electronic Devices and Circuits-Mithal.
- 7) Experiments in Electronics-S.V.Subramanyam.

**B.Sc. I Year, Semester – II : Electronics Practical  
Paper – II : Electronic Devices Lab**

**No. of hours per week: 3**

1. To draw volt- ampere characteristics of Junction diode and determine the cut – in voltage, forward and reverse resistances.
2. Zener diode V – I Characteristics – Determination of Zener breakdown voltage.
3. Voltage regulator ( line and load ) using Zener diode.
4. BJT input and output characteristics (CE configuration) and determination of 'h' parameters.
5. FET – Characteristics and determination of FET parameters.
6. UJT characteristics – determination of intrinsic standoff ratio.
7. UJT as relaxation oscillator.
- 8 Characteristics of LDR/Photo diode/Photo transistor/Solar cell.

**Note: Student has to perform minimum of Six experiments.**

**Reference Books:**

- 1) Lab manual for Electronic Devices and Circuits – 4<sup>th</sup> Edition. By David A Bell - PHI



## Question paper pattern

Faculty of Science  
Electronics  
Title of the paper:  
Paper:

Duration: 3Hrs]

[Max. Marks : 80

### Section-A: Short Answer Questions

(8 x 4 = 32)

Answer any EIGHT questions

1. Unit – I
2. Unit – I
3. Unit – I (Problem)
4. Unit – II
5. Unit – II
6. Unit – II (Problem)
7. Unit – III
8. Unit – III
9. Unit – III (Problem)
10. Unit – IV
11. Unit – IV
12. Unit – IV (Problem)

### Section B: Essay Answer Questions

(4 x 12 = 48)

- 13 (a) Unit – I  
OR  
(b) Unit – I
- 14 (a) Unit – II  
OR  
(b) Unit – II
- 15 (a) Unit – III  
OR  
(b) Unit – III
- 16 (a) Unit – IV  
OR  
(b) Unit – IV