Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Name of the Faculty: Science & Technology

CHOICE BASED CREDIT SYSTEM

Syllabus: Electronics

Name of the Course: B.Sc. I (Sem–I & II)

(To be effective from the academic year June-2019).

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Syllabus
For B.Sc. I Electronics
Choice Based Credit System (CBCS) Pattern
To be implemented from Academic Year 2019-20

1. Course Structure: (Discipline Specific Core) - Electronics

Paper No	Title of the course	UA	CA	Total	L	T	P	Credits
		Marking Scheme			**L**	**T**	**P**	**Credits**
		UA	**CA**	**Total**				
	Semester –I Electronics							
I	Basic Circuit Theory and Network Analysis	40	10	50	2.5	-	-	4
II	Digital Fundamentals	40	10	50	2.5	-	-	
	Total	**80**	**20**	**100**	**5**	**-**	**-**	**4**
	Semester –II Electronics							
III	Semiconductor Devices	40	10	50	2.5	-	-	4
IV	Digital Electronics	40	10	50	2.5	-	-	
	Total	**80**	**20**	**100**	**5**	**-**	**-**	**4**
Practicals	Practical I & II	80	20	100	-	-	4	4
	Total	**80**	**20**	**100**	**-**	**-**	**4**	**4**
Grand Total		**240**	**60**	**300**	**10**		**4**	**14**

2. Distribution of each Theory paper (Marks 50)

a. University Assessment (UA)	:	40 Marks
b. College Assessment (CA)	:	10 Marks

Scheme of College Assessment(10)

1. Unit Test	:	5 Marks
2. Home Assignment/Tutorials/ Seminars/Group discussion/ Viva/ Industrial Visit	:	5 Marks

3. Distribution of Practical Marks (100)

Practical examination will be at the end of second semester. The candidate has to perform twopracticals, one from each group.

A. University Practical Examination (80) Marks(UA)

a) Practical from group A	:	35
b) Practical from group B	:	35
c) Journal	:	10

B. Break up of 35 marks for each practical (UA)

a) Circuit diagram	:	08
b) Assembly of the circuit	:	08
c) Observations	:	08
d) Calculation and Graphs/ Verification of Truth table/ Timing diagrams	:	08
e) Results/Comments	:	03

C. College Assessment CA (20 marks)
Break up of 20 marks

• Practical Unit Test	:	10 Marks
• Home Assignment and Oral	:	10 Marks

B.Sc. I-Electronics (CBCS Pattern)
Semester – I
Paper –I Basic Circuit Theory and Network Analysis

Total Marks: 50
(35 periods)

1. **Circuit Elements** **(6)**

   Active and passive elements, Resistors, Capacitors, Inductors, Transformers, Relaysand Fuses (Classification, Specifications and Applications only)

2. **Circuit Fundamentals** **(6)**

   DC sources, Constant voltage and current sources, AC sources, Sinusoidal and nonsinusoidal sources, RMS current and voltage, Phase relationship of current andvoltagewith pure resistor, capacitor and inductor. (Numerical examples are expected)

3. **AC Circuits** **(9)**

   Series and Parallel RLC circuits, Phase diagram, Impedance, Admittance, Series andParallel resonance, Response curve, Band width, Quality factor (Numerical Examplesare expected)

4. **Network Theorem** **(8)**

   Kirchhoff's Laws, Mesh and Nodal analysis [Only DC resistive circuits], Thevenin's Theorem, Norton's Theorem, Superposition Theorem, Millman's Theorem,Maximum power transfer theorem (Numerical examples are expected)

5. **Two Port Network** **(6)**

   Black box theory, Concept of equivalent network, Z, Y, H & Transmission (ABCD)parameters, T-network, π-network and their interconversion expressions only(Numerical examples are expected)

Recommended Books:

1. Circuit and Networks: Analysis and Synthesis A. Sudhakar& S.P. ShamMohan, (TMH)

2. Network Lines and Fields J.D. Ryder, (McGraw Hill)

3. Network Analysis   M.E. Van Valkenberg(PHI, New Delhi)

4. Basic ElectronicsBernardGrob

5. A Text Book of Applied Electronics by R.S. Shedha (S.Chand & Co.)

B.Sc. I-Electronics (CBCS Pattern)
Semester – I
Paper –II Digital Fundamentals

Total Marks: 50
(35 periods)

1. **Number Systems** (7)

   Binary, Octal, Decimal, Hexadecimal number systems and their inter-conversions, 1's compliment, 2's compliment, Arithmetic operations, Signed binary numbers

2. **Binary Codes** (5)

   8421 code, Excess-3 code, Gray code, ASCII code, Parity bit

3. **Logic Gates** (8)

   OR, AND, NOT, NAND, NOR, Ex-OR, Ex-NOR gates, Positive and Negative logic, De Morgan's Theorems, Universality of NAND and NOR gates, Study of IC 7400, 7402, 7404, 7408, 7432, 7486

4. **Boolean Algebra** (8)

   Rules and laws of Boolean algebra, Simplification of Boolean expression, K-map, K-maps for 2, 3 and 4 variables, Use of K-map for reduction of Boolean expressions

5. **Arithmetic Circuits** (7)

   Exclusive OR gate as a Binary to Gray converter, Parity checker, Controlled inverter, Half adder, Full adder, Parallel binary adder, Half and Full subtractor, Block diagram of digital computer and its organization

Recommended Books:

1. Digital Fundamentals by Floyd, Pearson Education
2. Digital Principles & Applications by A.P. Malvino& D.P. Leach (TMH, New Delhi)
3. Modern Digital Electronics by R.P. Jain
4. Digital Systems: Principles and Applications by Ronald J Tocci, Neat S. Widerman, PEA
5. Digital Electronics, Circuits & Systems by V. K. Puri, TMH, New Delhi.

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Total Marks: 50
(35 Periods)
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1. **Semiconductor and p-n Junction** (6)

   Intrinsic and extrinsic semiconductors, Formation of p-n junction, Barrier potential,I-V characteristics, Diode equation, Static and dynamic resistance, Junction capacitance

2. **Special diodes** (6)

   Zener diode, Breakdown mechanism (Zener& avalanche), I-V characteristics, LED,Photo diode, Varactor Diode, Tunnel Diode (Construction, working and applications only)

3. **Bipolar Junction Transistor (BJT)** (8)

   BJT construction and operation, Transistor configurations, I/P and O/P characteristicsof CE and CB configurations, Graphical determination of α and β, Graphicaldetermination of h-parameters for CE configuration (Numerical examples are expected)

4. **Field Effect Transistor (FET)** (5)

   FET, Comparison between BJT and FET, Structure and operation of n-channel JFET,I-V characteristics, Parameters, Applications (Numerical examples are expected) Depletion and Enhancement MOSFET, Structure and operation, I-V characteristics

5. **Power Devices** (6)

   Construction, working and characteristics of SCR, DIAC, TRIAC and UJT

Recommended Books:

1. Electronic Devices and Circuits:Jacob Milman&Chrstes S Halkias, MGH

2. Electronic Devices and Circuits, An introduction:Allen Mottershed (PHIDelhi)

3. A Text Book of Applied Electronics: R.S. Shedha (S. Chand & Co.)

4. Basic Electronics & Linear Circuits: N.N Bhargava, D.C. Kulshreshta, S.C. Gupta TMH)

5. Principles of Electronics (10th Edition): V.K. Mehta (S. Chand & Co.)

B.Sc. I-Electronics (CBCS Pattern)
Semester – II
Paper –IV Digital Electronics

Total Marks: 50
(35 Periods)

1. **Digital Logic Families** (7)

    Introduction to logic families, TTL NAND gate, Specifications of TTL logic family (Sinking, sourcing current, Input/output voltage limits, Fan-in, Fan-out, Noise margin, Propagation delay, Power dissipation)

2. **Combinational Logic** (8)

    Encoder: Decimal to BCD encoder, Priority encoder (IC 74147)
    Decoder: 2-4 and 3-8 decoders (IC 74138), BCD-Decimal decoder, BCD-7 segment decoder (IC 7447).Multiplexer: 4-1 and 8-1 multiplexer (IC 74153)
    De-multiplexer: 1-4 and 1-8 de-multiplexer

3. **Flip Flops** (7)

    RS flip flop using NOR gates, Clocked RS flip flop, D-flip flop, Edge triggered D-flip flop, JK-flip flop, Master slave JK flip flop, T flip flop, (Timing diagrams are expected)

4. **Shift Registers** (6)

    Shift register, Types of shift registers, SISO, SIPO, PISO and PIPO, Serial and parallel loading, Study of Right shift, Left shift, Ring counter, Johnson counter (IC 7495) (Timing diagrams are expected)

5. **Counter Techniques** (7)

    Basic counter operation, 4-bit asynchronous and synchronous counters, Combination counter, MOD-2, MOD-5 counter, Decade counter (IC 7490) (Timing diagrams are expected)

Recommended Books:
1. Digital Fundamental : Floyd, Pearson Education
2. Digital Principles and Applications : A. P. Malvino& D.P. Leach (TMH Delhi)
3. Modern Digital Electronics : R.P. Jain
4. Digital Systems: Principle and Applications : Ronald J. Tocci, Neat S Widemer, PEA
5. Digital Electronics, Circuits and Systems : V.K. Puri, TMH, New Delhi
6. Digital Computer Electronics: Malvino Brown, 3rd Edition, TMH

B.Sc.–I Electronics (CBCS Pattern)
Practical Course
List of Experiments

Group-A

1. Study of Kirchhoff's Laws
2. Study Series /Parallel Resonance
3. Study Thevenin's Theorem
4. Study Superposition Theorem
5. Study Maximum Power Transfer Theorem
6. Measurement of Z, Y, and h-parameters for two port resistive network
7. Characteristics of Semiconductor Diode
8. Characteristics of Zener Diode
9. Characteristics of CE/CB configuration
10. Characteristics of JFET

Group-B

1. Study De Morgan's Theorems
2. Study of Universal Gates
3. Study Half and Full Adder
4. Study Half Subtractor
5. Study of RS, D and JK Flip flop
6. Study of Counters (divided by 2, 5 and 10) using IC-7490
7. Study of Left shift and Johnson counter using IC 7495
8. Study Right shift and Ring counter using IC7495
9. Study of Multiplexer and De-multiplexer
10. Study of Encoder (74148) and Decoder (74138)
11. Study of BCD to 7 segment decoder

N.B.:

1. Minimum 08 experiments from each group should be completed.
2. In addition to above experiments, the students should be exposed to the laboratory equipment such as, Cathode Ray Oscilloscope, Function Generator, Power supplies, Multi-meters, etc
3. Students should be encouraged to use data sheets, manuals, etc.
4. They should be encouraged for employing innovative ideas in current trends of Electronics