M. C. E. Society's
Abeda Inamdar Senior College
Of Arts, Science and Commerce, Camp, Pune-1
(Autonomous) Affiliated to Savitribai Phule Pune University
NAAC accredited 'A' Grade

B.Sc. Electronic Science (Minor) as per NEP

(CBCS – Autonomy 21 Pattern)

Course Offered as	Minor
Course/ Paper Title	**Basics of Electronics**
Course Code	**23SBEL21MN**
Semester	II
No. of Credits	2
No of Hours	30

Aims & Objectives of the Course:

Sr. No.	Objectives
1	The course has been designed to introduce fundamental principles of analog electronics commonly used in engineering, IT and Industries
2	To get the knowledge of electronic components and semiconductor devices.
3	To understand the concepts, working principles and key applications of different semiconductor devices.
4	To study elementary electronic circuits

Expected Course Specific Learning Outcome

Sr. No.	Learning Outcome
1.	To acquire the knowledge about the characteristics and working principles of semiconductor diodes, Bipolar Junction Transistor, Field Effect Transistor and Uni Junction Transistor.
2.	Know about different rectifier circuits and their use in electronics and communication circuits.

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	**Electronic Components and Electronics Laws**	**15**
	1) Concept of Voltage and Current Sources, electric energy and power 2) Resistors: Types, characteristics, color coding, series and parallel combination with numeric problems. Color Coding of Resistors 3) Inductors: Types, self and mutual inductance, series and parallel combination with numeric problems. 4) Capacitors: Principle of capacitance, Types. Series and parallel, value and unit of capacitor. 5) Transformer: Principle, construction and working, Types of transformers (Step up and Step down). 6) Kirchoff's Voltage Law and Current Law 7) Current and voltage divider rule	
Unit II	**Semiconductor Devices**	**11**
	1) Semiconductors and its types 2) Formation of Depletion Layer in diode 3) Forward and Reverse bias characteristics of diode 4) Special Diodes: Zener diode, Light Emitting Diode, Photo Diode 5) Opto-coupler: working principles and application 6) Solar cell working principle and characteristics 7) Bipolar Junction Transistor: Construction, types, Biasing, Applications of transistor as switch - circuit and working	
Unit III	**DC Power Supplies**	**10**
	1) Rectifiers: construction and working half wave, full wave, and Bridge. Filters: concept and types. 2) Block Diagram of Regulated Power Supply 3) Use of Zener Diode as a Voltage Regulator 4) IC voltage regulation fixed and variable. (IC 78XX and 79XX as regulator) 5) Block Diagram and explanation of SMPS and UPS	

References:

Sr. No.	Author	Title of the Book	Publication
1	N. N. Bhargava, D. C. Kulshreshtha, S. C. Gupta	Basic Electronics and Linear circuits	Tata Mc Graw Hill
2	A.P. Malvino	Electronics Principles	Tata McGraw Hill
3	B.L. Thereja	Basic Electronics	S. Chand Publication
4	V.K. Mehta	Principle of Electronics	S. Chand Publication
5	Boylestad & Nashelsky's	Electronic Devices and Circuits Theory	Pearson India

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Course Offered as	Minor
Course/ Paper Title	Basics of Computer Organization
Course Code	**23SBEL22MN**
Semester	II
No. of Credits	2
No of Hours	30

Aims & Objectives of the Course:

Sr. No.	Objectives
1	To get familiar with sequential circuits
2	To study Basic computer Organization
3	To study Memory architecture
4	To get familiar digital sequential circuits

Expected Course Specific Learning Outcome

Sr. No.	Learning Outcome
1.	The students will be familiar with sequential circuits.
2.	The students will understand the basics of Computer Organization
3.	The students will be able to classify semiconductor memories

Syllabus

Unit No	Title with Contents	No. of Lectures
Unit I	**Flip Flops**	**7**
	1. RS Flip Flop using NAND gate 2. Clocked RS Flip Flop 3. D Latch 4. J-K Flip Flop and Master Slave J-K Flip Flops 5. T flip flop	
Unit II	**Shift registers and Counters**	**18**
	1. Introduction 2. Types of Shift registers - Serial In Serial Out (SISO) Register, Serial In Parallel Out (SIPO) Register, Parallel In Parallel Out (PIPO) Register and Parallel In Serial Out (PISO) Register 3. Ring Counter using D Flip flop 4. Counters -Synchronous and Asynchronous type (3 -bit Up, Down and Up - Down counter) 5. Study IC 7490 with its internal Block Diagram and examples and Concept of modulus Counters	
Unit III	**Basics of Computer System**	**11**
	1 Introduction to Basic Computer Organization 2 Concept of Address Bus, Data Bus, Control Bus. 3 CPU Block Diagram and Explanation of each block 4 Register based CPU organization 5 Concept of Stack & its organization 6 I/O organization: Need of interface, Block diagram of general I/O interface and Working 7 Memory Organization: Memory Architecture, Memory hierarchy, Types of Memories, Role of Cache memory and Virtual Memory	

References:

Sr. No.	Author	Title of the Book	Publication
1	Floyd T.M., Jain R.P	Digital Fundamentals	Pearson Education
2	Jain R.P	Digital Electronics	Tata McGraw Hill
3	M. Morris Mano	Digital Logic and Computer Design	Pearson Education
4	William Stallings	Computer Organization and Architecture	Pearson Education
5	Computer System Architecture	Computer System Architecture	Pearson Education

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Course Offered as	VSC
Course/ Paper Title	Electronics Laboratory-I
Course Code	**23SBEL21VS**
Semester	II
No. of Credits	2
No of Hours	30

List of Practical (Minimum 10)

Sr. No.	Title of Experiment
1	Introduction to electronic components and instruments
2	Verification of Kirchoff's Law.
3	Study of forward and reverse characteristics of PN Junction Diode
4	Study of breakdown characteristics and voltage regulation action of Zener diode.
5	Study of half wave, full wave and bridge rectifier circuit (with and without capacitor filters).
6	Study of Bipolar Junction Transistor as a Switch.
7	Study of Logic Gates (Verification of Truth tables)
8	Study of De-Morgan's Theorems
9	Study of Half Adder and Full Adder using Logic Gates.
10	Use of Ex-OR as a 4-bit Parity Checker and Generator.
11	Study of Decimal to BCD (Binary) Converter using Gates.
12	Study of Multiplexer and Demultiplexer
13	Study of BCD to Seven Segment Display using IC 74138 and IC 7447
14	Study of 4-Bit R-2R Ladder Network type of DAC.
15	Study of 3-bit Flash ADC

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Course Offered as	OE
Course/ Paper Title	**Repair and Maintenance of Electrical and Electronic Appliances**
Course Code	**23SBEL21OE**
Semester	I
No. of Credits	2
No of Hours	30

Objectives :

- To acquire skills of proper use of the tools, equipment etc.
- To acquire skills of circuit assembly and disassembly.
- To learn systematic approach to fault location and troubleshooting.
- To gain expertise in the use of equipment.
- To gain practice in circuit board tracing and identification of circuit blocks.
- To acquire skills of referencing from data-books, operating instruction manuals and other referencing material.
- To inculcate good, safe and disciplined work practices.
- To be aware of the importance of cost effective work practices by avoiding wastages and by recycling of material.
- To learn to carry out error assessment and analysis .

S Y L L A B U S

UNIT	Topic
Unit-I	**Demonstration of different electronics Components with their functions and Applications** Resistors, Capacitors, Diodes, LEDs, Battery, Switches, Multimeter
Unit-II	**Demonstration of different electrical tools and their Function** Cutter, Stripper , Multi-Wire Stripper Cutter , Nose plier , Tester, Soldering Gun and de-solder pump , Types of wires, Earthing Test Lamp, Fuses : Function, Types and Applications
Unit-III	**Electrical Extension Board** Introduction, Need of Extension Board, Types of Sockets & Plugs Making And testing of Extension Board Types of Boards : Wooden Box, PVC Box, Mini Portable Extension , Extension Board with Fan regulator , MCB
Unit-IV	**Soldering & De-soldering Techniques** To build and test LED circuit ,Remote Control ,Power Indicator and test Lamp
Unit-V	**Mixer-Grinder** Introduction, working principle, functional block diagram, common types, Routine maintenance, Common faults and their troubleshooting and repairing
Unit-VI	**Electric Iron** Introduction, working principle, functional block diagram, common types, Routine maintenance, Common faults and their troubleshooting and repairing
Unit-VII	**Emergency Light** Introduction, working principle, functional block diagram, common types, Routine maintenance, Common faults and their troubleshooting and repairing
Unit-VIII	**Headphones used in Mobile** Introduction, working principle, functional block diagram, common types, Routine maintenance, Common faults and their troubleshooting and repairing
Unit-IX	**LED Bulb and Tube light** Introduction, working principle, common types, Internal Parts and Their Function

P R A C T I C A L

1) Component Testing and Symbols and Demonstration of different electrical tools
2) Designing and making of 1- Socket & 1- Plug Wooden Extension Board.
3) a) Designing and making of 2- Socket & 2- Plug Wooden Extension Board.

   b) Designing and making of 2- Socket & 2- Plug PVC type Extension Board.
4) a) Designing and making of 4- Socket & 4- Plug Wooden Extension Board.

   b) Designing and making of 4- Socket & 4- Plug PVC type Extension Board.
5) Designing and making of Extension Board with Indicator and FAN regulator.
6) Designing and making of Extension Board with MCB.
7) Electric Iron : Identification of different parts , Assembling and Fault

8) Mixer-Grinder : Identification of various parts of Mixer-Grinder, Assembling Mixer-Grinder: Fault detection in Mixer-Grinder.

9) Emergency Light: Identification of different parts, Assembling and Fault detection.

10) Head Phone : Identification of different parts , Assembling and Fault detection

11) Hobby Project :- Making of LED Bulb / LED Tube Light / Emergency Light (2 Days)

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Course Offered as	SEC
Course/ Paper Title	**Repair and Maintenance of Electrical and Electronic Appliances**
Course Code	**23SBEL21SE**
Semester	II
No. of Credits	2
No of Hours	30

Objectives :

- To acquire skills of proper use of the tools, equipment etc.
- To acquire skills of circuit assembly and disassembly.
- To learn systematic approach to fault location and troubleshooting.
- To gain expertise in the use of equipment.
- To gain practice in circuit board tracing and identification of circuit blocks.
- To acquire skills of referencing from data-books, operating instruction manuals and other referencing material.
- To inculcate good, safe and disciplined work practices.
- To be aware of the importance of cost effective work practices by avoiding wastages and by recycling of material.
- To learn to carry out error assessment and analysis .

S Y L L A B U S

UNIT	Topic
Unit-I	**Demonstration of different electronics Components with their functions and Applications** Resistors, Capacitors, Diodes, LEDs, Battery, Switches, Multimeter
Unit-II	**Demonstration of different electrical tools and their Function** Cutter, Stripper , Multi-Wire Stripper Cutter , Nose plier , Tester, Soldering Gun and de-solder pump , Types of wires, Earthing Test Lamp, Fuses : Function, Types and Applications
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Unit-IV	**Soldering & De-soldering Techniques** To build and test LED circuit ,Remote Control ,Power Indicator and test Lamp
Unit-V	**Mixer-Grinder** Introduction, working principle, functional block diagram, common types, Routine maintenance, Common faults and their troubleshooting and repairing
Unit-VI	**Electric Iron** Introduction, working principle, functional block diagram, common types, Routine maintenance, Common faults and their troubleshooting and repairing
Unit-VII	**Emergency Light** Introduction, working principle, functional block diagram, common types, Routine maintenance, Common faults and their troubleshooting and repairing
Unit-VIII	**Headphones used in Mobile** Introduction, working principle, functional block diagram, common types, Routine maintenance, Common faults and their troubleshooting and repairing
Unit-IX	**LED Bulb and Tube light** Introduction, working principle, common types, Internal Parts and Their Function

P R A C T I C A L

1) Component Testing and Symbols and Demonstration of different electrical tools
2) Designing and making of 1- Socket & 1- Plug Wooden Extension Board.
3) a) Designing and making of 2- Socket & 2- Plug Wooden Extension Board.

   b) Designing and making of 2- Socket & 2- Plug PVC type Extension Board.
4) a) Designing and making of 4- Socket & 4- Plug Wooden Extension Board.

   b) Designing and making of 4- Socket & 4- Plug PVC type Extension Board.
5) Designing and making of Extension Board with Indicator and FAN regulator.
6) Designing and making of Extension Board with MCB.
7) Electric Iron : Identification of different parts , Assembling and Fault

8) Mixer-Grinder : Identification of various parts of Mixer-Grinder, Assembling Mixer-Grinder: Fault detection in Mixer-Grinder.

9) Emergency Light: Identification of different parts, Assembling and Fault detection.

10) Head Phone : Identification of different parts , Assembling and Fault detection

11) Hobby Project :- Making of LED Bulb / LED Tube Light / Emergency Light (2 Days)