

F.Y.B.Sc. (Electronic Science) Sem - I

Progressive Education Society's
Modern College of Arts, Science and Commerce(Autonomous),
Shivajinagar, Pune - 5
First Year of B.Sc.
(2023 Course under NEP 2020)

Course Code: 23ScEleU1101

Course Name: Fundamentals of Analog and Digital Electronics

Teaching Scheme: TH:4 Hours/Week

Credit: 04

Examination Scheme: CIA: 40 Marks

End-Sem: 60 Marks

Prerequisite Courses:

- 12th Science with PCM

Course Objectives:

- To get familiar with basic electronic components
- To understand different network theorems.
- To get familiar with number systems and codes.
- To understand basic logic gates, Boolean algebra, k-maps.

Course Outcomes:

On completion of the course, student will be able to–

- Solve problems on network theorems.
- Understand working and types of Semiconductor Diode
- Understand number systems and logic gates and Simplify Boolean expressions.

Course Contents

Section I: Analog Electronics		
Unit 1	Elements of Basic Electronics	10 L
	Study of basic circuit elements: Resistor- specification, types- fixed, variable, color coding of resistor, applications Capacitor- working principle, specification, types, applications. Inductor - working principle, types, applications. Transformer - working principle, specifications, types, applications. Relays, Batteries, Switches, (Working principle, circuit symbols, types, specifications, and applications). Fuses, Cables, Connectors - specification, types, applications	
Unit 2	Network Theorems	10 L
	Ideal and practical voltage and current sources, Concept of internal resistance, Series and parallel combinations of R, L and C, Voltage and Current divider rules , Concept of Two Port Network, Ohm's law, Kirchhoff's Laws (Kirchhoff's Current Law, Kirchhoff's Voltage Law), Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Problems on laws and theorems.	

Unit 3	Semiconductor Diodes	10 L
	Introduction to Semiconductors, Extrinsic and Intrinsic semiconductor, P-N junction diode (construction and working principle), I-V characteristics, parameters. Types - Zener diode, Light emitting diode, Photo diode, Varactor diode, Applications of diodes, Solar cell, Opto-coupler.	
Section II: Digital Electronics		
Unit 1	Logic Gates	8 L
	Introduction to analog signals and digital signals, Positive and Negative Logic, Logic gates: definition, symbols, truth tables, Boolean expressions of NOT, OR, AND, NAND, NOR, EX-OR, EX-NOR gates	
Unit 2	Number Systems	10 L
	Introduction to decimal, binary and hexadecimal number systems, and their interconversions, Unsigned and signed binary number representations, Binary addition, and subtraction, Subtraction using 1's and 2's complements, BCD code, Excess-3 code and Gray code, ASCII codes, Code conversion –binary to gray and gray to binary.	
Unit 3	Boolean Algebra	12 L
	Boolean algebra and Boolean laws: Commutative, Associative, Distributive, AND, OR and Inversion laws, DeMorgan's theorem, NAND, NOR as universal gate, K-map Basics, Min terms, Max terms, Boolean expression in SOP form (Min Term) and POS form (Max term) , Simplifications of Logic expressions using Boolean algebra rules and Karnaugh map (up to 4 variables), Implementation of Boolean expressions using basic gates.	

Text/ Reference Books:

1. Principles of Electronics: V.K. Mehta, S. Chand and Co.
2. Electronic Principles: Albert Melvino, David J Bates, McGraw Hill 7th Edition 2012
3. Basic Electronics and Linear Circuits: Bhargava N.N., Kulshreshtha D.C., Gupta S.C. Tata McGraw Hill
4. Electronic Devices and Circuits: Bolyestad, Tata McGraw Hill
5. Encyclopedia of electronic components- Volume –I, Charles Platt, O'Reilly Media 2013
6. A Textbook of Applied Electronics (Multicolour Edition), Dr. R S Sedha, 3rd Edition, S. Chand Publishing
7. Digital Electronics: Jain R.P., Tata McGraw Hill
8. Digital Principles and Applications: Malvino Leach, Tata McGraw-Hill
9. Digital Fundamentals: Floyd T.M., Pearson Education

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First Year of B.Sc.
(2023 Course under NEP 2020)

Course Code: 23ScEleU1102

Course Name: Analog and Digital Electronics Lab

Teaching Scheme: TH: 4 Hours/Week

Credit: 02

Examination Scheme: CIA: 20 Marks

End-Sem: 30 Marks

Prerequisite Courses:

- 12th Science with PCM

Course Objectives:

- To learn identification of electronic circuit components, specifications, and characteristics
- To verify various circuit laws used in electronics.
- To verify truth tables of digital gates and basic conversions of logical expressions using gates

Course Outcomes:

On completion of the course, student will be able to–

- Understand how to identify, use and construct electronic circuits with circuit elements.
- Differentiate different logic gates and simplification of logic expressions using them.

List of Experiments

Experiments (Any 12) + Activity/Study tour report/Assignments/Demonstration/Virtual lab

1. Introduction to Electronics Lab Instruments -Multimeter, Power Supply, Signal generator, CRO.
2. Identification of electronic components and study its types and specifications:
R, L, C, Transformer, Switches
3. Identification of electronic components and study its specifications:
Diode, LED, Seven Segment Display, Transistor, LDR
4. Study of Series and Parallel combination of resistors
5. Charging and discharging of capacitor
6. Verification of Kirchhoff's voltage and current laws
7. Verification of Thevenin's theorem
8. Verification of Norton's theorem
9. Verification of Superposition theorem
10. Verification of the Maximum Power Transfer Theorem
11. Study of Solar Cell characteristics
12. Study of the I-V Characteristics of P-N junction diode
13. Study of the reverse bias characteristics of Zener diode
14. Study of Basic Gates
15. Study of Basic Gates using Universal Gates
16. Realizations of logic expressions using logic gates
17. Verification of DeMorgan's theorem

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First Year of B.Sc.
(2023 Course under NEP 2020)

Course Code: 23ScEleU1401

Course Name: Study of E-Vehicles

Teaching Scheme: TH: 2 Hours/Week

Examination Scheme: CIA: 20 Marks

Credit: 02

End-Sem: 30 Marks

Prerequisite Courses:

- 12th Arts/Commerce

Course Objectives:

- To Study Basics of electric vehicle
- To learn Types of electric vehicles

Course Outcomes:

On completion of the course, student will be able to–

- Understand Electric Vehicle Powertrain Systems
- Understand Electric Vehicle Charging Infrastructure

Course Contents

Unit 1	Introduction to Electric Vehicle	4 L
	Basics of electric vehicle technology, Types of electric vehicles: hybrid, plug-in hybrid and battery electric vehicles, Comparison of electric vehicles with internal combustion engine vehicles, Environmental and energy efficiency advantages of electric vehicles.	
Unit 2	Electric Vehicle Powertrain System	6 L
	Components of an electric vehicle-Powertrain, Electric motors, and motor controllers Battery technologies and management systems, Power electronics and charging systems.	
Unit 3	Electric Vehicle Charging Infrastructure	6 L
	Types of electric vehicle charging stations, charging standards and protocols (e.g., AC Vs DC charging), Charging modes: Level 1, Level 2, and DC fast charging, Public charging networks and accessibility	
Unit 4	Electric Vehicle Battery System.	6 L
	Battery characteristics (Specifications), Lithium-ion battery technology and advancements, Battery pack design and safety considerations, Battery life cycle and degradation	

Unit 5	Electric Vehicle Control System	8 L
	Vehicle control unit (VCU) and onboard diagnostics, Motor control algorithms and regenerative braking systems, Battery management systems and state of charge estimation, Vehicle-to-Grid (V2G) integration and smart charging, Vehicle communication protocols (e.g., CAN bus).	

Text/ Reference Books:

1. Build your own Electric Vehicle, Seth Leitman and Bob Brant, McGraw Hill Professional, 2008.
2. Electric Vehicle Technology Explained, James Larminie , John Lowry, John Wiley & Sons, Ltd, 2012.
3. Handbook of Electric Vehicle Charging Infrastructure Implementation, version 1, NITI Aayog, Government of India, Ministry of Power, DST.
4. Modern Electric Vehicle Technology, C. C. Chan, K. T. Chau, Oxford University Press, 2001.
5. Electric Vehicle Engineering, Per Enge, Nick Enge, Stephen Zoepf, McGraw Hill LLC, 2021
6. Electric Vehicles: Modern Technologies and Trends, Nil Patel, Akash Kumar Bhoi, Sanjeevikumar Padmanaban, Jens Bo Holm-Nielsen, Springer, 2020.

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First Year of B.Sc.
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Course Code: 23ScEleU1501

Course Name: Simulation of Analog and Digital Circuits – I

Teaching Scheme: TH: 4 Hours/Week

Credit: 02

Examination Scheme: CIA: 20 Marks

End-Sem: 30 Marks

Prerequisite Courses:

- 12th Science with PCM

Course Objectives:

- To study Simulation software.
- To simulate and understand operation of simple electronic circuits.

Course Outcomes:

On completion of the course, student will be able to–

- Design simple circuits in simulation software
- Test the output of simple circuits in simulation software for different input conditions.

List of Experiments

Simulation of following circuits (Any 15)

1. Potential divider network
2. Study of Series and Parallel combination of Resistors
3. LED circuit
4. Half wave and full wave rectifier circuit
5. RC Low pass and RC high pass circuit
6. Kirchhoff's voltage and current law verification.
7. Verification of Thevenin's Theorem
8. Verification of Norton's theorem
9. Verification of Superposition Theorem
10. Truth table verification of basic and universal gates
11. Half adder circuit, full adder circuit
12. RC Integrated and RC differentiator circuit.
13. Diode characteristics
14. Simulation of logic gates
15. 2:1 Multiplexer and 1:2 Demultiplexer
16. 2 to 4 Decoder using gates

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First Year of B.Sc.
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Course Code: 23ScEleU1601

Course Name: Components Identification, Circuit Building and Testing

Teaching Scheme: TH: 4 Hours/Week

Credit: 02

Examination Scheme: CIA: 20 Marks

End-Sem: 30 Marks

Prerequisite Courses:

- 12th Science with PCM

Course Objectives:

- To learn identification of electronic circuit components, specifications and characteristics
- To build simple electronic circuits
- To test simple electronic circuits

Course Outcomes:

On completion of the course, student will be able to–

- Understand how to identify, use and construct electronic circuits with circuit elements.
- Develop skill of assembling simple electronic circuits
- Test assembled electronic circuit.

List of Experiments (Any 15)

1. Identification, Specification of Electronic components- Fuse, MCB, Relays, Batteries, Switches, Cables, Connectors, Speaker, Mic
2. Identification, Specification of Electronic components-
3. Relay, Photodiode, Thermistor, Heat sinks, PCBs
4. Measurement of resistor using color code and Multimeter
5. Testing of Diode and Transistor
6. Study of Breadboard and Tagboard
7. Voltage and Current divider Circuit
8. LED Circuit: Intensity Variation
9. Light sensitive switching: Application of LDR
10. Wiring of light circuit using Two-way switches. (Staircase wiring)
11. One-way light bulb
12. Slow light bulb. (Charging and discharging of Capacitor)
13. Burglar alarm (Use of IR led and photodiode)
14. Touch Sensor circuit
15. Fire alarm circuit (Use of Thermistor)
16. LED Flasher circuit (Transistorized a stable multivibrator)
17. Isolation using optocoupler.
18. Relay testing circuit

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First Year of B.Sc.
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Course Code: 23ScEleU1901

Course Name: Developments of Electronic Communication in India

Teaching Scheme: TH: 2 Hours/Week

Credit: 02

Examination Scheme: CIA: 20 Marks

End-Sem: 30 Marks

Prerequisite Courses:

- 12th Science with PCM

Course Objectives:

- To Study development of electronic communication in India
- To study evolution of telecommunication system in India

Course Outcomes:

On completion of the course, student will be able to–

- To understand how communication systems in India changed over the time.
- To learn Today's communication systems in India

Course Contents

Unit 1	Overview of communication system in India	8 L
	Growth and development of telecommunication in India- Telegram, Telephone, Pager, Mobile phone, Smart phones. Radio- AM, FM, Pocket Radio (transistor radio), Digital Radio, Internet Radio. Television- Black and White TV, Color TV, Smart TV.	
Unit 2	Evolution of Telecommunication system in India	8 L
	Telegram system in India- Block diagram and working. FAX Machine, Walkie - Talkie, Telephone system in India- Block diagram of telephone set, Telephone exchange Wireless communication - Radio Communication, Mobile communication (Block diagram and working)	
Unit 3	Evolution of Television in India	8 L
	Television: Block diagram and working, History of Television in India-Doordarshan, Cable and Satellite Television, VSAT, Black and White television, Color television, Smart TV, LED, LCD, Plasma, OLED	
Unit 4	Today's communication systems in India	6 L
	Electronic mail, social networking sites- Facebook, LinkedIn, Instagram, myspace, twitter, Online chat, video chatting, Internet telephony- voice, video, blogs Internet- 3G,4G, 5G, (definition), IoT, Artificial Intelligence	

Text/ Reference Books:

1. Telecommunications: Indian 50 Years of Independence: 1947-97 Status, Growth and Development Hardcover – A. V. Gokak , BR Publishing Corporation
2. Electronic Communication systems (4th edition), George Kennedy, Bernard Davis, McGraw Hill companies (2009)
3. Electronic Communication - Dennis Roddy, John Coolen, Pearson Education
4. Communication Electronics: Principles and Applications, Louis Frenzel , McGraw Hill Education

F.Y.B.Sc. (Electronic Science) Sem - II

Progressive Education Society's
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First Year of B.Sc.
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Course Code: 23ScEleU2101

Course Name: Principles of Analog and Digital Circuits

Teaching Scheme: TH: 4 Hours/Week

Credit: 04

Examination Scheme: CIA: 40 Marks

End-Sem: 60 Marks

Prerequisite Courses:

- Basic information of semiconductor.
- Basic information logic gates, positive and negative logic concept
- Digital number system and inter conversions between them
- Knowledge of Boolean Algebra

Course Objectives:

- To study BJT, FET and UJT
- To study flip flops, combinational circuits
- To study sequential circuits

Course Outcomes:

On completion of the course, student will be able to–

- Understand working of basic analog circuits.
- Understand combinational circuits
- Understand types of flip flops and sequential circuit construction using them.

Course Contents

Section I: Analog Circuits		
Unit 1	Bipolar Junction Transistor	10 L
	Bipolar Junction Transistor (BJT) , Symbol, NPN and PNP, working principle, I-V characteristics, Specifications of BJT, Transistor configurations - CB, CC and CE, Current gains (α , β), Biasing of BJT (potential divider type for CE only), DC load line, Q (operating point).	
Unit 2	Unijunction Transistor(UJT)	3 L
	Symbol, construction, working principle, equivalent circuit, I-V characteristics, intrinsic standoff ratio, application of UJT as relaxation oscillator	
Unit 3	Field Effect Transistor (FET)	8 L
	JFET: Symbol, construction, working principle, IV characteristics and specifications, Metal Oxide Semiconductor FET (MOSFET) - Enhancement type and depletion type, Circuit symbols, Working and Characteristic curves, Applications of FET (Switch and VVR)	

Unit 4	Basic Analog Circuits	9 L
	DC power supply- Rectifiers (half wave and full wave), Ripple filters, Diode clipper and clamper circuits, BJT as a switch, BJT amplifier (CE)	
Section II: Digital Circuits		
Unit 1	Combinational Circuits	12 L
	Multiplexer (2:1, 4:1), Demultiplexers (1:2, 1:4) and their applications, Encoder- Decimal to binary, Hexadecimal to binary, decoder, BCD to seven segment decoder, Code converters - Binary to Gray, Gray to Binary Arithmetic Circuits- Half adder, full adder, Half subtractor, Full subtractor, Four-bit parallel adder and subtractor.	
Unit 2	Flip Flops	8 L
	RS flip-flop using NAND gate, Concept of Latch, clocked (edge and level triggered) RS, JK, Master slave JK, D and T flip-flops, Difference between Latch and Flip-flop, Flip flop operation using truth table and timing diagram.	
Unit 3	Sequential Circuits	10 L
	Counters: Definition, Types- Synchronous, Ripple (Asynchronous) binary counter, up down counter, concept of modulus counters (MOD-2, MOD-5, MOD-10), cascading of counters. Applications of counters Shift registers: Definition, Types- SISO, SIPO, PISO, PIPO shift registers, Ring counter and Johnson counter, Universal shift register, Applications of shift registers.	

Text/ Reference Books:

1. Principles of Electronics: V.K. Mehta, S. Chand and Co.
2. Electronic Principles: Albert Malvino, David J Bates, McGraw Hill 7th Edition 2012
3. Basic Electronics and Linear Circuits: Bhargava N.N., Kulshreshtha D.C., Gupta S.C. Tata McGraw Hill
4. Electronic Devices and Circuits: Bolyestad, Tata McGraw Hill
5. Encyclopedia of electronic components- Volume –II, Charles Platt, O'Reilly Media 2013
6. A Textbook of Applied Electronics (Multicolor Edition), Dr. R S Sedha, 3rd Edition, S. Chand Publishing

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First Year of B.Sc.
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Course Code: 23ScEleU2102

Course Name: Analog and Digital Circuits Lab

Teaching Scheme: TH: 4 Hours/Week

Examination Scheme: CIA: 20 Marks

Credit: 02

End-Sem: 30 Marks

Prerequisite Courses:

- Basic information regarding semiconductor devices
- General information of electronic components and basic laws used in electronics.
- Characteristics and identification of electronic components

Course Objectives:

- To learn working of rectifiers, flip flops, adder,
- To verify truth tables of adder, subtractor

Course Outcomes:

On completion of the course, student will be able to–

- Understand BJT, FET, UJT Characteristics
- Understand working of Multiplexer De-multiplexer, 4-bit Shift register, decade counter.

List of Experiments

**Experiments (Any 12 from 1 to 16) + Activity / Study tour report / Assignments /
Demonstration/Virtual lab**

1. Study of the half wave rectifier
2. Study of the full wave (center tap) and bridge rectifier
3. Study of output I-V Characteristics of BJT in CE Configuration.
4. Study of transistor as switch
5. Study of voltage divider bias circuit for transistor
6. Study of JFET Characteristics.
7. Study of UJT Characteristics and Relaxation oscillator
8. Study of High pass and Low pass filters.
9. Study of RS and D flip flops
10. Study of JK and T flip flops
11. Verification of De Morgan's theorem
12. Verification of Half and Full Adder
13. Verification of Half and Full subtractor
14. Build and Test 2:1 Multiplexer and 1:2 Demultiplexer using gates
15. Study of 4-bit Shift register IC 7495
16. Study of decade counter using IC 7490

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First Year of B.Sc.
(2023 Course under NEP 2020)

Course Code: 23ScEleU2301

Course Name: Workshop on Fundamental Electronics

Teaching Scheme: TH: 4 Hours/Week

Credit: 02

Examination Scheme: CIA: 20 Marks

End-Sem: 30 Marks

Prerequisite Courses:

- 12th Science with PCM

Course Objectives:

- To Study different tools used in electronic laboratories.
- To learn how to assemble simple electronic circuits.
- To understand the working of a simple electronic circuit.

Course Outcomes:

On completion of the course, student will be able to–

- Identify the tools used for electronic circuit building and testing.
- Design and assemble simple electronic circuits using breadboard/ Tag Board / PCB
- Assemble application circuit
- Develop skill in selection and use of commonly used tools, equipment, components in a given situation.
- Develop skill in wiring, soldering and desoldering works.

List of Experiments

Experiments (Any 12 from 1 to 15) + Activity/ Study tour report /Assignments /Demonstration / Virtual lab

1. Tools used in Electronic Lab - Battery Holders, Test Leads (Crocodile Clips), Wire Cutter, Plier, Wire stripper, Precision Screwdriver Set, Jumper Wire, Soldering Iron (Gun)
2. Study of bread board.
3. Study of Electronic components - I [R, C, L, Transformer, Switches, Fuse, Relay, cables, connectors]
4. Study of Electronic components - II [Diode, Transistor, LED, Seven Segment Display, Speaker, Buzzer, Mic]
5. Study of Tagboard and soldering of electronic components on tagboard.
6. Study of multimeter, power supply
7. Measurement of resistor value using color code and multimeter
8. Measurement of capacitor value using multimeter
9. Testing of semiconductor diode, LED (Light Emitting Diode)
10. Study of LED Circuit (Intensity Variation)
11. Study of Charging -Discharging of Capacitor
12. Study of series and parallel combination of resistors
13. Study of Voltage and Current divider Circuit
14. Study of Kirchhoff's voltage and Kirchhoff's current laws.
15. Study of LDR

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First Year of B.Sc.
(2023 Course under NEP 2020)

Course Code: 23ScEleU2401

Course Name: Communication Electronics for everyone: HAM Radio

Teaching Scheme: TH: 2 Hours/Week

Credit: 02

Examination Scheme: CIA: 20 Marks

End-Sem: 30 Marks

Prerequisite Courses:

- 12th Arts / Commerce

Course Objectives:

- To Study Basic electronics in day-to-day life
- To learn Amateur radio operation and Licensing procedure

Course Outcomes:

On completion of the course, student will be able to–

- Understand basic technical details of any electronic communication gadgets.
- Apply for Ham radio License examination in India.
- Understand basic terminology in Electronics.

Course Contents

Unit 1	Introduction to Electronic Communication and basic circuit components.	8 L
	Basic electronic components: Resistor, Capacitor, Inductor, Transformer, power supply. Overview of electronic communication - Block diagram of electronic communication system, transmitters, receivers, and antenna (concept only) Concept of signal, parameters of signal (amplitude, frequency), types of signals, Electromagnetic waves, Frequencies spectrum used in electronic communication, Bandwidth, Multiplexing of signals. Evolution of electronic communication- volve radio to internet radio, Telegram to Smart phones	
Unit 2	Wired Communication	4 L
	Introduction to wired communication. Different types of wired communication e.g., Serial, Parallel, Analog, Digital Introduction to wired communication interfaces (e.g., USB, Ethernet), OFC Components used in wired communication - Cable, connectors. Transmission characteristics (Bandwidth)	

Unit 3	Wireless Communication	6 L
	Overview of wireless communication - Propagation of electromagnetic waves, Wireless signal propagation media and range considerations, technologies (e.g., AM, FM, Wi-Fi, Bluetooth), Communication Systems – Radio, Television, Mobile	
Unit 4	Ham Radio	12 L
	Introduction to Ham Radio A. Definition and Purpose of Amateur Radio B. Importance of Ham Radio in Emergency Communication / in disaster management C. Licensing and Regulations for Amateur Radio Operators Ham Radio Operating Procedures A. Introduction to Morse code B. Alphabets and Q codes Ham Radio Equipment A. Transceivers B. Antennas and Feedlines C. Accessories and Station Setup Ham Radio Bands and Modes A. HF (High Frequency) Bands B. VHF (Very High Frequency) and UHF (Ultra High Frequency) Bands C. Digital Modes, Voice Modes, and Morse Code Emergency Communications and Public Service A. Role of Amateur Radio in Emergency Situations B. ARES (Amateur Radio Emergency Service) and RACES (Radio Amateur Civil Emergency Service) C. SKYWARN and Weather Spotting	

Text/ Reference Books:

1. Electronic Communication systems (4th edition), George Kennedy, Bernard Davis, McGraw Hill companies (2009)
2. Electronic Communication Dennis Roddy, John Coolean, Pearson Education
3. Communication Electronics: Principles and Applications, Louis Frenzel , McGraw Hill Education
4. A License manual and study guide for the Amature Radio - Ham Radio Team Newstone Publishing
5. Ham Radio: The Ultimate Ham Radio QuickStart Guide - From Beginner to Expert, Jack Campbell, CreateSpace Independent Publishing Platform, 2016

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First Year of B.Sc.
(2023 Course under NEP 2020)

Course Code: 23ScEleU2501

Course Name: Basics of Test and Measuring Instruments

Teaching Scheme: TH: 4 Hours/Week

Credit: 02

Examination Scheme: CIA: 20 Marks

End-Sem: 30 Marks

Prerequisite Courses:

- Understanding of basic electronics.

Course Objectives:

- To study front panel of test and measuring instrument
- To understand the working principle of an instrument.

Course Outcomes:

On completion of the course, student will be able to–

- Understand the front panel controls of an instrument.
- Use instruments for measurement and testing electronic circuits.

List of Experiments

Experiments (Any 15)

For all experiments, study front panel controls and displays / indicators of an instrument. Study the working principle of an instrument. Understand specifications given in the operating manual of an instrument.

1. Study of Cathode Ray Oscilloscope (CRO) - Front panel controls
2. Study of Cathode Ray Oscilloscope (CRO) - Measurement of waveform parameters - Amplitude of Sine, Square wave, Frequency, Duty cycle, Phase
3. Study of Signal Generator
4. Study of Function Generator
5. Study of Ammeter and Voltmeter.
6. Study of Analog Multimeter
7. Study of Digital Multimeter
8. Study of Digital Panel Meter (DPM)
9. Study of Digital Storage Oscilloscope (DSO) -Measurement of waveform parameters
10. Study of LCR meter in measurement of R
11. Study of LCR meter in measurement of L, C
12. Study of Frequency Counter
13. Study of fixed o/p voltage power supply
14. Study of variable o/p voltage power supply
15. Study of tachometer
16. Study of lux meter

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First Year of B.Sc.
(2023 Course under NEP 2020)

Course Code: 23ScEleU2601

Course Name: PCB Designing and Fabrication

Teaching Scheme: TH: 4 Hours/Week

Credit: 02

Examination Scheme: CIA: 20 Marks

End-Sem: 30 Marks

Prerequisite Courses:

- Basic knowledge of electronic components and circuits.

Course Objectives:

- To study use of PCB in electronic system.
- Identify dimensions of electronic and mechanical components for PCB layouts.
- Prepare PCB layout for analog and digital circuits using software.
- To understand the process of PCB making and assembling electronic components on PCB.

Course Outcomes:

On completion of the course, student will be able to–

- To prepare PCB layout for given circuit.
- Use software for creating layout.
- Make PCB and solder components on PCB.

List of Experiments

Experiments (Expt 1 to 7 are compulsory and perform any 8 from remaining)

1. Creating the schematic of circuit.
2. Using a schematic capture tool to create PCB layout.
3. Placing components with proper footprints and routing the traces (DRC).
4. Adding labels, identifiers and generating design/layout files.
5. Printing the PCB layout on actual copper clad and masking the tacks, pads etc.
6. Etching and Drilling of PCB.
7. Mounting and soldering of components.

Making PCBs of following Circuits

8. Light switching using LDR
9. Water level controller circuit (Use of Transistor)
10. Debounce switch for Digital board
11. Half adder
12. Full adder
13. Rectifier - Half wave, Full wave (Bridge)
14. Seven Segment Display driver interface
15. Decade counter
16. 2:1 Multiplexer
17. 1:2 De-multiplexer
18. LED Flasher circuit