

1	Name of Syllabus	C.C. IN Electronics Technology (301206)																																																													
2	Max. No's of Student	25 students.																																																													
3	Duration	1 YEAR																																																													
4	Type	Full Time																																																													
5	No Of Days / Week	6 Days																																																													
6	No Of Hours /Days	7 Hrs																																																													
7	Space Required	Lab = 800 Sq feet Class Room = 200 Sq feet TOTAL = 1000 Sq feet																																																													
8	Entry Qualification	S.S.C.																																																													
9	Objective Of Syllabus/ introduction	On completion of the course, the students should have 1. Knowledge of working and operating principles of electronic circuits and equipments. 2. Skills for fault analysis and diagnosis of electronic equipments, repair and replacement of faulty parts. 3. Skills on assembly, testing, repair, maintenance and installation of audio-video and other electronic equipments. 4. Ability to examine schematic layouts, wiring diagrams and product details. 5. Knowledge of entrepreneurship activities. 6. Awareness of safety precautions.																																																													
10	Employment Opportunity	Self Employment / May get job in Establishment.																																																													
11	Teacher's Qualification	Diploma / Certificate course in Electronics field.																																																													
12	Training System	Training System Per Week <table><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>18 Hours</td><td>24 Hours</td><td>42 Hours</td></tr></table>						Theory	Practical	Total	18 Hours	24 Hours	42 Hours																																																		
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13	Exam. System	<table><tr><td>Sr. No.</td><td>Paper Code</td><td>Name of Subject</td><td>TH/PR</td><td>Hours</td><td>Max. Marks</td><td>Mini. Marks</td></tr><tr><td>1</td><td>30120611</td><td>Basic Electricity & Digital, Linear Electronics</td><td>TH-I</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>2</td><td>30120612</td><td>Basic Electronics & Modern Communication Systems</td><td>TH-II</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>3</td><td>30120613</td><td>Electronic Instrumentation & Applied Electronics</td><td>TH-III</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>4</td><td>30120621</td><td>Basic Electricity& Digital, Linear Electronics</td><td>PR-I</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>5</td><td>30120622</td><td>Basic Electronics & Modern Communication Systems</td><td>PR-II</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>6</td><td>30120623</td><td>Electronic Instrumentation & Applied Electronics</td><td>PR-III</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td></td><td></td><td>Total</td><td></td><td></td><td>600</td><td>255</td></tr></table>						Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks	1	30120611	Basic Electricity & Digital, Linear Electronics	TH-I	3 hrs.	100	35	2	30120612	Basic Electronics & Modern Communication Systems	TH-II	3 hrs.	100	35	3	30120613	Electronic Instrumentation & Applied Electronics	TH-III	3 hrs.	100	35	4	30120621	Basic Electricity& Digital, Linear Electronics	PR-I	3 hrs.	100	50	5	30120622	Basic Electronics & Modern Communication Systems	PR-II	3 hrs.	100	50	6	30120623	Electronic Instrumentation & Applied Electronics	PR-III	3 hrs.	100	50			Total			600	255
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Electronics Technology

THEORY - I : Basic Electricity & Digital, Linear Electronics

PART A

1. Introduction

- 1.1 Basic Concepts of Electricity
- 1.2 Sources of voltage
- 1.3 Ohm's law
- 1.4 Resistance Networks
- 1.5 Safety precautions
- 1.6 Network theorems

2. Electrostatics

- 2.1 Basic concepts
- 2.2 Capacitor theory

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3. Magnetism

- 3.1 Basic concepts

4. Electro magnetism

- 4.1 Basics of Electromagnetism
- 4.2 Inductance

5. Alternating voltage and current

- 5.1 A.C. fundamentals
- 5.2 Resonance

6. Study of electric components

- 6.1 Resistors
- 6.2 Capacitors
- 6.3 Inductors
- 6.4 Transformers
- 6.5 Relays
- 6.6 Switches
- 6.7 Accessories for Basic circuit Assembly
- 6.8 Loudspeaker and Microphone

7. Meters

8. Soldering Technique

PART B

Theory

1. Number systems and Boolean algebra

- 1.1 Types of number systems.
- 1.2 Binary Codes
- 1.3 Binary Arithmetic

2. Logic Gates

- 2.1 Basic Logic Operations
- 2.2 Logic Gates
- 2.3 Boolean Algebra
- 2.4 Derived Gates
- 2.5 Arithmetic Circuits

3. Digital Logic Families

- 3.1 Types
- 3.2 CMOS ICs

4. Combinational Logic Circuits

- 4.1 Multiplexer (MUX)

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- 4.2 De multiplexer (DEMUX)

4.3 Decoder

4.4 Encoder

5. Sequential Logic circuits

5.1 Flip Flops

5.2 Registers

5.3 Counters

6. Operational Amplifiers (Op-Amps)

6.1 Introduction

6.2 Op-Amp Parameters

6.3 Linear Applications of Op-Amp

6.4 Non Linear Applications of Op-Amp

7. A/D and D/A Converter

7.1 D/A Converter

7.2 A/D converter

Practical - I Basic Electricity & Digital, Linear Electronics

PART A

Practical

1. Safety precautions to be observed while working with electronic equipments and systems
2. Drawing electrical symbols as per ISI specifications
3. Drawing an electrical circuit with various components
4. Study of AC and DC sources (power suppliers) available in the laboratory with their specifications.
5. Identification of various materials tools and devices
6. Familiarization of ammeter, voltmeter, multimeter (analog, digital) and understanding their specifications.
7. Verification of Ohm's law, using resistors in series and in parallel.
8. Identifying different cables.
9. Identifying different connectors.
10. Study of different cables and connectors.
11. Study of RELAYS verifying conditions, such as normally 'on' and 'off' etc.
12. Testing a transformer, continuity, installation and turn ratio
13. Study of different types of microphones and loud speakers. Replacement of cone in loud speaker.
14. Preparation of loudspeaker enclosure using cross over network
15. Use of PMMC movement to construct multi range ammeter
16. Use of PMMC movement to construct multi range voltmeter
17. Measurement of electrical power consumption in simple AC/DC circuit by VI method.
18. Verification of KCL and KVL (Kirchhoff's Laws)
19. Measurement of input and output resistance of power supply and verification of maximum power transfer theorem.
20. Study of different cells and batteries used in different electronic systems including EPS/UPS.

PART B

Practical

1. Study of inverting and non-inverting amplifier using op- Amp
2. Study of Op-Amp as an inverting adder
3. Converting Binary to decimal, octal and hexadecimal and vice versa
4. Addition and Subtraction of Binary numbers
5. Study of NOT, OR, NOR, NAND and AND gates using ICs
6. Study of XOR and XNOR gates using ICs (Verification or truth table)
7. Prove De Morgan's Theorem using gates
8. Study of NOR and NAND gates as universal building blocks
9. Constructing RS Flip-Flop using NAND and NOR gates
10. Constructing logic circuit as per the given logical equation
11. Verification of truth table for Half and Full adder
12. Study of R.S. and J.K. Flip-Flops
13. Study of Multiplexers using IC 74153
14. Study of De multiplexers using IC 74139
15. Study of decade counter using 7490
16. Study of encoder using IC 74147
17. Study of decoder using IC 7447/7448
18. Study of 4 bit binary Adder using IC 7483
19. Study of Op-Amp as Comparator
20. Study of D/A converter using R- 2R ladder of Op-Amp.

THEORY - II - Basic Electronics & Modern Communication Systems

PART A

1. Semiconductors

- 1.1 Structure of semiconductors
- 1.2 Types of semiconductors

2. Semiconductor Diodes

- 2.1 P-N junction
- 2.2 Types of diodes
- 2.3 Rectifiers

VOCATIONAL SUBJECTS 20 VOLUME - I

3. Bipolar Transistor

- 3.1 Bipolar Transistors
- 3.2 Transistor configuration
- 3.3 Transistor biasing
- 3.4 Transistor Amplifier
- 3.5 Frequency response of amplifiers
- 3.6 Multistage amplifiers
- 3.7 Differential amplifier

4. Other Semiconductor Devices

- 4.1 J.F.E.T
- 4.2 M.O.S.F.E.T
- 4.3 U.J.T.
- 4.4 S.C.R., Diac, Triac

5. Oscillators

- 5.1 Introduction
- 5.2 Types

PART B
Modern Communication Systems

Theory

1. Fundamentals of Communication

- 1.1 Elements of communication
- 1.2 Types of communications
- 1.3 Electromagnetic spectrum
- 1.4 Modulation
- 1.5 Amplitude Modulation
- 1.6 Frequency Modulation
- 1.7 Demodulation
- 1.8 Filter-Optic Communication

2. Radio Receivers

- 2.1 Basic Super heterodyne
- 2.2 Properties of Radio Receiver

VOCATIONAL SUBJECTS 29 VOLUME - I

3. T.V. Receivers

- 3.1 Colour TV receiver
- 3.2 Video Signal
- 3.3 TV Antenna
- 3.4 Picture and Sound Signal Transmission
- 3.5 Camera Tube
- 3.6 Assignment and servicing of TV Receivers

4. Cable TV systems

- 4.1 Introduction
- 4.2 Cable signal processing
- 4.3 Cable Network
- 4.4 Introduction to Condition Access System (CAS)

5. Electronic Telephony

- 5.1 Basic Telephony
- 5.2 Advanced Telephony
- 5.3 Cellular/Mobile Telephony

PRACTICAL - II - Basic Electronics & Modern Communication Systems

PART A

- 1. Identifying diodes and transistors using codes and data sheets.
- 2. Drawing electrical symbols as per ISI specifications
- 3. Testing of diodes using multimeter (including LED and ILD)
- 4. Testing of transistors using multimeter
- 5. Testing of UJT, FETSCR, DIAC and TRIAC using multimeter
- 6. Forward and reverse biased characteristics of p-n junction diode
- 7. Use of opt-coupler to measure speed of tachometer
- 8. Use of transistor as switch to turn light/LED on or off
- 9. Study of Zener as a voltage stabilizer VOCATIONAL SUBJECTS 21 VOLUME - I
- 10. Study of half wave rectifier with or without filters
- 11. Study of full wave rectifier with or without filter
- 12. Study of bridge rectifier with or without filter
- 13. Comparative study of all rectifiers with or without filter
- 14. Study of potential divider biasing of transistor. Measure different voltages by changing the resistors

15. Study of single stage CE amplifier with potential divider biasing. Measure the voltages and hence calculate the gain (Use of CRO not expected)
16. Study of Hartley and phase shift oscillators for two different frequencies and test them. (Use of CRO not expected)
17. To study the gain of a two stage RC coupled amplifier
18. Demonstration experiment of negative and positive feedback concept.
19. Study of commercially available audio amplifier IC (CA 810 or equivalent. Measuring o/p voltage and power not expected.)
20. Study of role of equalizer circuit in an amplifier.

PART B

1. Assembly of one band AM and FM radio receiver
2. Measurement of voltages at various test points of AM and FM radio receiver
3. Alignment of RF and IF stages of radio receiver using signal generator
4. Assembly and installation of TV receiver antenna (indoor and outdoor)
5. Assembly and installation of Dish antenna
6. Alignment and setting of various controls of colour TV using pattern generator
7. Alignment and setting of various controls of colour TV using remote control
8. Build and study simple AM modulator circuit using transistor
9. Build and study simple FM modulator circuit using transistor
10. Assembly and study of AM demodulator circuit
11. Assembly and study of PWM using IC 555
12. Demonstration of fiber-optic transmitter and receiver using photo-diode/phototransistor and LED / ILD
13. Cable signal distribution plan DFM and compare them
14. Study of functional controls of a typical cellular phone and its utilities.
15. Testing various voltages at different TEST points in a colour TV receiver.
16. Identification and Repairs of minimum FIVE faults in a colour TV receiver.
17. Construction and working of a single chop electronic telephone.
18. Study of Digital Telephone Exchange. (Visit)
19. Study actual working of a Cable TV station. (Visit)
20. Study actual working of a TV Transmission station.(Visit)

THEORY - III - Electronic Instrumentation & Applied Electronics

PART A

Theory

1. Introduction to Instrumentation system

1.1 Introduction

2. Transducers

2.1 Introduction

2.2 Types of transducers

2.3 Sensors

3. Power supplies

3.1 Power supply characteristics

3.2 Regulator types

3.3 Three terminal regular IC's

3.4 Switch Mode power supply

3.5 Selection of power supply

3.6 Inverters

3.7 U. P. S.

4. Ultrasonic

4.1 Fundamentals of ultrasonic

4.2 Applications of ultrasonic

5. Medical Instruments

5.1 X-rays

5.2 Other Diagnostic Tools

VOCATIONAL SUBJECTS 23 VOLUME - I

6. Test Instruments

6.1 CRO

6.2 Signal Generators

6.3 Electronic Meters

6.4 Frequency Counters and Time Interval Measurements

7. Others Instruments

PART B

1. Photo Electric Cells

1.1 Basic Concepts

1.2 Applications

2. Electronic Timers

2.1 Timer Fundamentals

2.2 Timer Circuits

3. Display Devices

3.1 LED Displays and Liquid Crystal Displays

3.2 Alpha Numeric Displays

4. Remote Control

4.1 Basics of Remote Control

4.2 Applications of Remote Control

VOCATIONAL SUBJECTS 32 VOLUME - I

5. Motors

5.1 Motor fundamentals

5.2 Simple Circuits for Motor

5.3 Applications of Motors

6. Audio - Video Systems

6.1 Audio system

6.2 Video system

6.3 Compact disk systems

6.4 Servicing of Audio - Video systems.

PRACTICAL - III - Electronic Instrumentation & Applied Electronics

PART A

1. Calibration of voltmeter ranges of analog multimeter

2. Calibration of ammeter ranges of analog multimeter

3. Measurement of various electrical parameters using DMM

4. Measurement of resistance of a thermister at different temperatures

5. Measurement of resistance of a LDR for different light intensities

6. Build and study load regulation of DC power supply using rectifier and filter

7. Build and study line regulation of DC power supply using rectifier and filter

8. Build and study a fixed DC voltage supply using 3 pin IC and test it.

9. Measure frequency, phase and amplitude using internal time-base of CRO.

10. Measure frequency, phase and amplitude with Lissajous figures using CRO.

11. Study of phase shift between input and output of Common emitter and emitter follower amplifiers and trace the output wave forms from CRO.
12. Test various components like resistors, capacitors and diodes using CRO.
13. Measure 5 different frequencies with CRO and DFM and compare them
14. Measure 5 different revolution speed of DC motor using RPM counter
15. Measure pH values of 5 different solutions using pH meter.
16. Measure the electric energy consumed by 5 different loads with Watt-meter and compares them with theoretical (calculated) values.
17. Study the directive gains of different speakers using dB meter
18. Study operational details of X-Ray machines (Visit)
19. Study operational details of ECG machines (Visit)
20. Measure inductance and capacitance of different inductors and capacitors using LCR meter.

PART B

1. Photo relay circuit using transistor
2. Photo relay circuit using IC 555
3. Study the characteristics of Solar Cell
4. Study the assembly of solar panel and its use in solar lighting or heater
5. Charging and discharging of capacitor through resistor with charging and discharging curves and hence calculated the RC time constant
6. Use of IC 555 as a fix interval timer
7. Use of IC 555 as table multi vibrator
8. Build and study a photo relay circuit using transistors
9. Build and study a photo relay circuit using IC
10. Build and study Traffic control circuit using IC
11. Study of various types of available LED and LCD displays
12. Testing alphanumeric displays for various types of characters
13. Construction and working of a simple Clap - switch circuit.
14. Construction and working of a simple Car - Lock System using remote control.
15. Construction and working of a transistorized DC motor Control circuit.
16. Study assembled circuit of Stepper motor.(reversing the direction)
17. Fault finding and maintenance of a typical Audio - Video system.
18. Fault finding and maintenance of a typical CD / DVD player.
19. Assembly and Testing of PA system with minimum one cordless Mic.
20. To study the Servicing and Maintenance of Electronic Consumers equipments.

Reference Books

1. Basic Electronics (Eighth Edition)
Bernard Grob Tata MC Grow Hill Publishing Limited.
2. Basic Electronics and Linear circuits
N. N. Bhargava, D.C. Kulshreshtha, S. S. Gupta
Tata McGraw-Hill Publishing Limited
3. Electronic Instrumentation and networking techniques (3rd edition)
Prentice Hall of India Private Limited
4. Electronic Principles A.P.Malvino
Tata McGraw-Hill Publishing Company Limited
5. Communication Electronics
Frenzel Tata McGraw-Hill Publishing Company Limited
6. Digital Principles and Applications
Malvon & Leach VOCATIONAL SUBJECTS 34 VOLUME - I
7. Modern Digital Electronics
R.P.Jain Tata McGraw-Hill Publishing Company Limited

8. Computer and Commonsense
Hunt and Shelly
9. Laboratory Manuals
10. Understanding Fiber Optics (Second Edition)
Jeff Hecht BPB Publications, NEW DELHI-110001.
11. Electronic Components F. J. Waters
12. Electronic Components Madhuri Joshi
13. Digital Computer Electronics A. P. Malvino, TMH.
14. Industrial Electronics Mittal
Khanna Publishers, New Delhi
15. Modern Television Practice Principles, Technology and Servicing, R.R.Gulati,
New Age International (P) Ltd.
16. Basic TV and Video systems Grob, TMH
17. Basic Radio and TV S. P. Sharma, TMH
18. Elementary Applied Electronics Naik - Desai, Himalaya Publishing
19. Electronic Principles and Circuit Allen Mottershed, TMH
20. TV Trouble shooting dictionary Saundh Nitma
21. Electrical Technology V. K.Mehta
22. Electronics Technology Soni
23. Principles and systems for Radio Ibrahim Pitman and T.V. Mechanics

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24. Basic Test Equipment Turner
25. Radio Receiver Theory Philips
26. Laboratory Manuals, Data sheets of Components of ICS
User Manuals of signals
Generators, C.R.O.S.
Multimeters, Power supplies etc.

Tools and Equipments

(For a batch of 25 Students)

1. Hand Tools:
 - a) Pliers (Assorted) 5 Nos.
 - b) Tweezers 2 Nos.
 - c) Diagonal Cutter (Assorted) 5 Nos.
 - d) Screw-drivers (Assorted) 10 Nos.
 - e) Penknife 5 Nos.
 - f) Hacksaw with blades (Assorted) 2 Nos.
 - g) Power drill with bits 1 No.
 - h) Hand drill with bits 1 No.
 - i) Soldering iron 10 Nos.
 - j) Center Punch and Scriber (Assorted) 2 Nos.
 - k) Hammer and Mallet (Assorted) 2 Nos.
 - l) Chisel (Assorted) 3 Nos.
 - m) Bench Vice 2 Nos.
 - n) Files (Assorted) 5 Nos.
 - o) Wire gauge set 1 Nos.
2. Meters:
 - a) Voltmeter (DC/AC) (Assorted) 10 Nos.
 - b) Ammeters (DC/AC) (Assorted) 15 Nos.
 - c) Multimeter (Analog) 10 Nos.

d) Multimeter (Digital)	10 Nos.
3. CRO (Minimum 20 MHz Dual Trace with CT)	2 Nos.
4. Function Generator (Up to MHz with all functions)	2 Nos.
5. Regulated Power Supplies a) 0 to 15 VDC, 1 Amp.	10 Nos.
6. Dimmer stat (0 - 300 V)	2 Nos.
7. Step down Transformers (Assorted)	10 Nos.
8. Laboratory Manuals (For Components and equipments)	1 No.
9. DC motor	2 Nos.
10. Rheostat (Assorted)	2 Nos.
11. Thermometer	2 Nos.
12. Electric Heater	1 No.
13. Bread Boards / Tag Boards / PCB (Assorted)	10 Nos.
14. Audio Amplifier systems with Equalizer, Speaker and mic	1 No.
15. Stop watches	2 Nos.
16. Galvanometer	1 No.
17. Test lamp, Tester, Magnifying Glass etc.	1 No.
18. AM, RF, and AF generator	1 No.
19. Digital Frequency Meter	1 No.
20. MP - 3 system	1 No.
21. Audio tape recorder trainer kit	1 No.
22. CD player	1 No.
23. DVD player	1 No.
24. Pattern Generator	1 No.
25. TV Dish Antenna set	1 No.
26. Colour TV Trainer kit	1 No.
27. Colour TV Receiver	1 No.
29. Transistor Tester	1 No.
30. IC Tester	1 No.
31. FM and AM radio receiver trainer kits	1 each
32. A.F. Signal Generator	2 Nos.
33. Microphones	2 Nos.
34. Loud speakers	2 Nos.
35. L.C.R. Bridge meter	1 No.
36. Mobile phone trainer kit	1 No.
37. EPABX Telephony trainer kit	1 No.
38. dB meter	1 No.
39. Solar panel for light / heat	1 No.
40. Alpha Numeric Rolling Display	1 No.
41. Watt meter	1 No.
42. Thermocouple arrangement	1 No.
43 PH meter	1 No.
44 RPM Counter	1 No.

COMPONENTS

1. Assorted Resistors, Capacitors & inductors.
2. Assorted Relays, scotches, dry cello.
3. Assorted Diodes - PN, Zener, LED, and Rhotolade.
4. Assorted Iransiskrs - BJT, UJT, FET, DIAC, and TRJACS.
5. All types of Transducers.
6. Assorted Linear & Digital IC's.
