

Syllabus

For the trade of

MECHANIC RADIO & TV

Under

APPRENTICESHIP TRAINING SCHEME

Designed by

Government of India

Ministry of Labour & Employment (D.G.E.&T.)

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

EN- Block, Sector- V, Salt Lake,

Kolkata-700091.

List of members of the Trade Committee Meeting to design the Syllabus for the Trade of “MECHANIC RADIO & TV” under ATS held on 21.05.2009 at I.T.I. Dadar, Mumbai, Maharashtra

Director: Shri S.D. Lahiri, C.S.T.A.R.I., Kolkata

SL NO	NAME & DESIGNATION S/SHRI	REPRESENTING ORGANIZATION	REMARKS
1	Hitesh Mehta Chairman	Advance Electronics Industries, Mumbai	Chairman
2	Ilesh Shah, Managing Director	Advolt Technologies, Vikroli Mumbai	Member
3	Hemant Monaya, Director	Adtron Technologies Pvt. Ltd., Mumbai	Member
4	Ganesh Rahate, Sr. Engineer	G- Byte Technologies Pvt. Ltd., Vikhroli, Mumbai	Member
5	M Loynmoon, Sr. Engineer	Signet Instruments, Bhandup, Mumbai	Member
6	Paras Dagli, Director	Kencraft India Pvt. Ltd., New Mumbai	Member
7	Shabbir Shaikh, Director	Labtron Technologies, Mumbai	Member
8	Dipak Ghule, Sr. Engineer	Oasis Tech. Pvt. Ltd. Pune.	Member
9	Abhoy Dhotra, Director	Bi-Tronics Pvt. Ltd. Thane	Member
10	Jitin Doshi, Executive Director	Dashy Corporation for Dental Occupation, Chambur Mumbai	Member
11.	K.W. Khatavkar, Principal	I.T.I. Mumbai	Member
12	H N Bargal, Training Officer	I.T.I. Mumbai	Member
13	L.K. Mukherjee, Dy. Director	C.S.T.A.R.I., Kolkata	Member
14	Abhinoy Nandi, Dy. Director	C.S.T.A.R.I., Kolkata	Member

General Information

1. Name of the Trade : **MECHANIC RADIO & TV**
2. N. C. O. Code No. : 7243.70
3. Entry Qualification : Passed 10th class examination under 10 + 2 system of education with Science as one of the subject or its equivalent.
4. Duration of Craftsman Training : Two year
5. Duration of Apprenticeship Training : Three years including two year craftsman training.
6. Rebate : Two year ITI/ITC passed out trainees in the trade of **Mech. Radio & TV**
7. Ratio of Apprentice to Workers : 1 : 5

SYLLABUS FOR THE TRADE OF MECHANIC RADIO & TV UNDER APPRENTICESHIP TRAINING SCHEME

Duration of Training : Three year

First two year: - During first two year the apprentices will undergo the syllabus same as CTS

Next one year: - The apprentices will undergo shop floor training in the related establishment/Industry as per the under mentioned syllabus.

Shop Floor Training

1. Safety: Safety precautions, first aid and artificial respiration, Elements of fire Fighting- various types of fire fighting equipments.
2. Manufacturing Techniques/ Processes: The shop floor training to be given in as many manufacturing techniques/processes as possible depending upon the facilities available in the industry concerned e.g.
 - i) Soldering, brazing and welding
 - ii) Wire stripping & forming
 - iii) Sheet metal working, punching & drilling
 - iv) Finishing processes-polishing, buffing, spray painting
 - v) Electrode position of metals on non-conductors
 - vi) Electroplating processes
 - vii) P.C.B.single layer-multilayer.
 - viii) Vacuum impregnation
 - ix) Bakelite and plastic molding

3. General Testing

(a) Testing of components such as :

1. Resistors
2. Coils
3. Capacitors
4. Ferrite components
5. Transducers
6. Crystals
7. Relays
8. Micro-switches
9. Plugs and sockets
10. Active components
11. Plated metal parts

(b) Bulk Testing of Electronic Components using Test Rigs & Jigs

(c) Use of Test Instruments such as :

1. Insulator Tester
2. Megger
3. Transistor Tester
4. I.C. tester
5. Logic circuit Tester
6. Logic analyzer

4. Inspection

Step-wise and final inspection procedures and other quality control techniques.

5. Maintenance

1. Wiring of an electronic maintenance/test bench
2. Modern trouble shooting sequences & techniques for electronic equipments.
3. Replacement of defective components in –
 - a. Simple electronic circuits on chassis.
 - b. P.C.B. circuits
 - c. Hybrid circuits
4. Care and replacement of sockets for –
 - a. Transistors
 - b. I.Cs.

6. Transformers & Coils

(a) Care and maintenance of the following transformers:

1. Power
2. A.F.-Input-Driver-output
3. I.F.
4. R.F.
5. Rewinding of small transformers
6. Winding of R.F. coils, deflection coils, etc.

Shop Training in assembling, aligning, testing and servicing of the following equipment:

Domestic Electronics

1. Radio Receiver (Transistor & Hybrid Versions)
2. T.V. Receiver (Transistor and Hybrid Versions) LCD/ LED
3. P.A. Systems, Stereo Amplifier Systems
4. VCD/DVD Player, Blue Ray player
5. Color T.V. Receivers, LCD, Plasma, LED TV
6. Set Top Box, DTH Receiver

Civil Aviation and Navigation Electronic communication System.

Manufacturing/repairing, Maintenance, operation, Installation and Testing of following equipment used in Navigation and Aeronautical System along with study of associated Measuring Instruments.

1. Radar
2. Aeronautical Equipment.
3. Navigation Equipment.
4. Satellite Based Communication
5. Global Positioning System
6. GPRS System
7. GSM & CDMA Mobile technique

Telecommunication Transmission System

Manufacturing/repairing, maintenance, operation, Installation and Testing of following Telecommunication transmission Equipment along with study of associated Measuring Instrument.

1. Open wire Carrier System
2. Co-axial System
3. Analog/Digital Radio Communication System
(VHF/UHF/Microwave)
4. Multiplexing: FDM, TDM Multiplexing including Higher Order Multiplexing.
5. Optical Fiber System
6. Satellite Communication

Telecommunication switching System

Manufacturing/repairing, maintenance, operation, Installation and Testing of following Telecommunication switching equipment along with study of associated Measuring Instrument.

1. PSTN and ISDN: Different subscribers Instruments, Intercom equipment, EPABX, Mechanical and Electronic and Digital Exchanges.
2. Mobile Communication System: Cellular, Pager, Wireless Local Loop System. Global Positioning System. etc.
3. Data Communication System.

Professional Electronics

Shop Training in assembling, aligning, testing and servicing of any one or more of the following equipment :

1. A.F. Signal generator, pulse generator.
2. R.F. Signal generator
3. V.T.V.M. and multimeters
4. C.R.O. & Digital Oscilloscope
5. Power supplies and stabilizers.
6. Electronic desk calculators
7. Digital systems
8. Electronic exchanges.

Digital Electronics

1. Number System
2. Logic Gates
3. Sequential circuit
4. A to D & D to A Converter
5. Microprocessor & Microcontroller
6. PLC
7. Computer Hardware & Networking

SYLLABUS FOR RELATED THEORY

(1) Safety at Work

Safety devices and measures in handling electrical and electronic equipment. Fire fighting equipment.

(2) Revision of the work of previous two years.

(3) **Small Motors** : Constructional features, principle of operation and applications of fractional horsepower motors and micro motors.

(4) Electro Mechanical/Magnetic Devices & components:

1. Various types of relays and their applications
2. Micro switches, limit switches and other types of switches and their applications in electronic systems
3. Transformers: Input, output, power, driver, EHT & pulse transformers, their windings and applications.
4. Plugs, sockets, multipoint connectors, PCB connectors, R.F. & A.F. connectors, tube, transistor and I.C. sockets.

(5) Electronics Devices

Passive Devices.

Various types of resistors, their rating and performance characteristics. Various type of coils such as A.F., R.F. and I.F. , coils, various types of capacitors such as electrolytic, paper, mica, ceramic, tantalum, polyester, sty reflex, oil filled etc. their performance ratings and applications.

Ferrites : Ferrite components and their applications.

Transducers : Types of transducers and their application in electric systems.

Crystals : Types of crystals and their applications.

Insulators : Electrical properties of ceramic, plastic bakelite, mica and other insulating materials and their applications in electronic components and systems.

Active Components

Principle of operations and performance characteristics of devices such as vacuum tubes, gas tubes, photo-tubes, CRT (including picture tubes), semiconductor diodes (zener, rectifying, detection, tunnel, switching, diodes, gunn diodes, varactor diode and photo diodes) thermistors, VDRs, silicon and Germanium transistors, FET'S, UJT, DIAC'S, TRIAC'S etc. and integrated circuits. Application of the above components in common electronic equipment. Display devices- Nixie tubes, LEDs, LCDs, etc.

(6) Electronic Modules

Operating principles, testing and maintenance of electronic modules such as

1. Rectifier
2. Amplifier modules
3. Detector modules
4. Modulator modules
5. Oscillator modules
 - (a) Sine Wave
 - (b) Square Wave
 - (c) Saw Tooth Wave
6. Mixer modules
7. Differentiating modules
8. Integrating modules
9. Logic circuit modules
10. Multivibrator modules
11. Multiplexer modules
12. Recorder modules
13. Timer modules
14. Voltage regulator modules

(7) System Assembly

General principles of the working and block diagrams of systems such as

1. Radio AM/FM
2. TV (Color) / LCD's
3. P.A. systems
4. CD/DVD players
5. LCD projectors
6. Function Generator
7. C.R.O.
8. Signal generators

- 9. Pulse generators
- 10. Recording systems
- 11. Analytical instruments (Electronic)

(8) Testing and Calibrations

Testing procedures for domestic and professional electronic equipments Calibration standards,. ISI standards for various electronic equipment Quality testing of components and systems

(9) Maintenance and Servicing

Trouble shooting techniques, modern techniques etc. proper use of electronic testing instruments/equipments for servicing electronic systems. Use of test rigs & jigs, components substitution in handling of P.C.B. circuits and hybrid circuits etc.

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