सूक्ष्म, लघु एवं मध्यम उद्यम मंत्रालय
DEVELOPMENT COMMISSIONER
MINISTRY OF MICRO, SMALL & MEDIUM ENTERPRISES
MSME TECHNOLOGY CENTRE

MODEL CURRICULUM

Qualification Name:

JR. TECHNICIAN - ELECTRONICS EQUIPMENT)

Qualification Code:

Version: 2.0

NSQF Level: 3

Model Curriculum Version: 2.0

Submitted By:

MSME TECHNOLOGY CENTRE

O/o DC MSME, Ministry of Micro, Small and Medium Enterprises

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COURSES / MODULE TEMPLATE

NOS /Module: Acquire the concepts of Electronic Devices & Circuits

NOS /Module Code: MSME/EET/01

Outcomes:

After completion of course Student should be able to:

- Identify, test and find the resistance of a resistor.
- Identify, test and find the capacitance of a capacitor.
- Know the use of capacitor.
- Manufacture RF coils.
- Test inductors and RF coils.
- Manufacture and test transformers.
- Explain the electron transport in semiconductors.
- Explain the operating principle of PN junction.
- Identify and test different types of diodes.
- Test transistor.
- Assemble the amplifier circuit.
- Describe the different oscillator circuits.
- Assemble various oscillator circuits.
- Test proper working of the oscillator circuit.
- Explain the theory of ripple factor, regulation and efficiency of a power supply.
- Assemble different types of rectifiers (half wave, full wave, bridge).
- Explain the pin diagram and working of UA741.
- Precautions during handling of Electronic ICs.
- Explain the use of clipping and clamping circuits.

Theory Hours: 60 Practical Hours: 100 Theory Marks: - Practical Marks: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours
UNIT-I	Electrical Safety	At the end of this unit the student should be able to: • Observe safety precautions while working with electricity.	Safety precautions with electricity.	6	5

UNIT-II	Passive Components	At the end of this unit the student should be able to: • Identify, test and find the resistance of a resistor. • Identify, test and find the capacitance of a capacitor. • Know the use of capacitor. • Manufacture RF coils. • Test inductors and RF coils. • Manufacture and test transformers.	Resistors- Carbon film, Metal film, Carbon composition, Wire wound and Variable type (presets and potentiometer), Constructional details, Characteristics (size voltage, tolerance temperature and frequency dependence and noise consideration, specification, testing, mutual comparison and typical applications). Capacitors- Polyester, Metalized polyester, Ceramic, Paper, Mica, Electrolytic, Tantalum and Solid Aluminium types, Construction details and testing, Mutual comparison and typical applications. Inductors and RF Coils- Methods of manufacture of inductors, RF coils and their testing. Transformers- Methods of manufacture of small power and AF transformers, their testing and properties of cores. Need and type of shielding.	6	10
UNIT-III	Semiconductor Physics & Active Components	At the end of this unit the student should be able to: • Explain the electron transport in semiconductors. • Explain the operating principle of PN junction. • Identify and test different types of diodes.	Atomic structure. Electron transport in semiconductors. Construction, operating principle and characteristics of PN junction. Zener, Tunnel, Varactor, Schott key and Light emitting diodes. Bipolar, Field effect and Unijunction transistors.	6	10
UNIT-IV	Working of Transistor	At the end of this unit the student should be able to: • Test transistor. • Assemble the amplifier circuit. • Explain lathe machine. • Describe the lathe machine parts & accessories.	Testing of transistor biasing circuits. Transistor as switch and amplifier. Driver and power amplifiers. Driver amplifiers. Negative feedback, single and multi-stage amplifiers.	6	10
UNIT-V	Oscillator Circuits	At the end of this unit the student should be able to: • Describe the different oscillator circuits. • Assemble various oscillator circuits. • Test proper working of the oscillator.	Oscillators- Hartley, Colpitt, Crystal and Wein bridge oscillators (circuit description and testing).	6	19
UNIT-VI	Power Supplies	At the end of this unit the student should be able to:	Power Supplies- Consideration regarding ripple, regulation and efficiency.	12	19

		• Explain the theory of ripple factor, regulation and efficiency of a power supply. • Assemble different types of rectifiers (half wave, full wave, bridge.	Rectifiers, Filters and Electronic stabilization circuits. Short circuit protection. Polyphase rectifiers. Electronic converters, Applications in industry.		
UNIT-VII	Electronic Devices and Circuits	At the end of this unit the student should be able to: • Explain the pin diagram and working of UA741. • Precautions during handling of Electronic ICs. • Explain the use of clipping and clamping circuits.	Electronic ICs and their uses. Voltage regulator ICs. Clipping, Clamping, Differentiating and Integrating circuits.	18	24

COURSES / MODULE TEMPLATE

NOS /Module: Learn and apply Industrial Instrumentation Techniques

NOS /Module Code: MSME/EET/02

Outcomes:

After completion of course Student should be able to

- Define transducer.
- Explain the use of transducers.
- Use various amplifiers as per the requirements.
- Identification and testing of different types of thyristors.
- Highlight the application areas of different thyristors.
- Know the specification of a relay.
- Test relays. Test different types of optoelectronic components.
- Explain the use of different circuits controlled by optoelectronic components.
- Draw the PLC architecture diagram.
- Enumerate the application of PLC in industry.

THEORY HOURS: 60 PRACTICAL HOURS: 40 THEORY MARKS: 100 PRACTICAL MARKS: -

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours
Unit-I	Transducers	At the end of this unit the student should be able to: • Define transducer. • Explain the use of transducers. • Use various amplifiers as per the requirements. • Understand concept of hardware & software.	Classification of transducers, Selecting a transducer, Strain gauges, Displacement transducer. Temperature measurements. Amplifiers in industrial electronics, Industrial timers, Instrumentation amplifiers, Pressure indicators etc. software features. Concept of hardware & software.	10	4
Unit-II	Thyristors	At the end of this unit the student should be able to: • Identification and testing of different types of thyristors. • Highlight the application areas of different thyristors.	Voltage current characteristics, Gate control, SCR ratings, DC gate control, Rectification characteristics. Phase shift bridge circuits, Phase shift control, DIAC and its applications, TRIAC and its applications, UJT.	10	4
Unit-III	Relays	At the end of this unit the student should be able to: • Know the specification of a relay. • Test relays. • Explain the use of relay in electronic circuits.	Functions and operations of relays, Open and closed circuit relay system, Light sensitive relay, Specification and identification of contacts.	10	4

Unit-IV	Optoelectronics	At the end of this unit the student should be able to: • Test different types of optoelectronic components. • Explain the use of different circuits controlled by optoelectronic components.	Photo transistor, Photo diode, LASER diode, LED, Optocoupler, Photoelectronic control of an SCR. Timing circuits, UJT controlled SCR time delay.	10	4
Unit V	PLC	At the end of this unit the student should be able to: • Draw the PLC architecture diagram. • Enumerate the application of PLC in industry.	Introduction to PLC. PLC applications. PLC architecture (processor, power supply, I/O board & man machine interface).	20	24

COURSES / MODULE TEMPLATE

NOS /Module: Electronics Equipment Repair & Maintenance Skills

NOS /Module Code: MSME/EET/03

Outcomes:

After completion of course Student should be able to

- Plan for preventive maintenance.
- Rectify faulty system.
- Breakdown maintenance.

THEORY HOURS: - 60 PRACTICAL HOURS: 190 THEORY MARKS: - PRACTICAL MARKS: 100

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	PR hours
Unit I	Repair & Maintenance Skills	At the end of this unit the student should be able to: • Plan for preventive maintenance. • Rectify faulty system. • Breakdown maintenance. • Calibrate the electro technical equipment.	Maintenance organization, Breakdown maintenance, Preventive maintenance, Troubleshooting methods and techniques. Field failures and their rectification. Connection & component failures. SMD repair techniques including Ball Grid Array (BGA) components, Antistatic devices and their applications. Chip level repair of industrial PCB's. Calibration needs and techniques.	60	190

COURSES / MODULE TEMPLATE

NOS /Module: Employability Skill

NOS /Module Code: MSME/ES/01

THEORY HOURS: 30 PRACTICAL HOURS: - THEORY MARKS: 100 PRACTICAL MARKS: -

Refer Standard Curriculum developed by NCVET. (https://nqr.gov.in/downloads/pdfs/30-hours_MC_Employability_Skills.pdf)