

Trades Details Summary

Trade Name	Description	Duration (Days)
Electronics & Instrumentation	To give Technical Training in Electronics & Instrumentation trade	18

Theory (Electronics & Instrumentation)

Topic	Keylearning Outcomes	Equipment Required	Duration
Registration of participants	*Self-declaration of Covid-19 measures guidelines *Participants Profile. *Describe the role of an Electronics Technician.	White Board	2:0
Material Handling	Movement of Raw Material. Movement of Finished Material. Waste Segregation. Cleanliness. Stacking.	Audio-Video	2:0
Electronics safety & Knowledge about PPEs	What is Safety? Awareness about General Safety. Electronics Safety. Use of PPEs. Advantages of Safety. Do's & Don'ts.	Power Presentations	2:0
Introduction of Electrical terms	Basic terms such as electric charges, Potential difference, Voltage, Current, Resistance. Basics of AC & DC. Various terms such as +ve cycle, -ve cycle, Frequency, Time period. Insulators, conductors and semiconductor properties.	Power Presentations	2:0
Introduction of Electronics	Brief about Electronics Trade. Introduction of Electronics. Basic knowledge of Electronics. Important Symbols used in Electronics. Knowledge of general Electronics Instruments. Knowledge about Resistance, Inductance & Capacitance	Power Presentations	1:0
Passive Elements	Resistors; types of resistors, specific use, color-coding. Equivalent Resistance of series parallel circuits. Principles of induction, inductive reactance. Types of inductors, applications and energy storage concept. Capacitance and Capacitive Reactance, Impedance. Types of capacitors, applications. Dielectric constant. Significance of Series parallel connection of capacitors.	Power Point Presentations	2:0
Semiconductors and applications	Semiconductor materials. PN Junction, Forward and Reverse biasing of diodes. Different diodes, Rectifier configurations, Filter components and their role in reducing ripple. Working principles of Zener diode, varactor diode, their applications. Working and application of LED, IR LEDs, Photo diode, photo transistor, their applications.	Power Point Presentations	3:0
Power supply	Regulated Power supply using 78XX series, 79XX series. Op-amp regulator, 723 regulator, (Transistorized & IC based). Voltage regulation.	Power Point Presentations	1:30
Transistors and its applications	Construction, working of a PNP and NPN Transistors, purpose of E, B & C Terminals. Need for Biasing of Transistor. Different types of biasing, various configurations of transistor (C-B, C-E & C-C), their characteristics and applications. Transistor applications as switch and amplifier. Construction of FET & JFET, difference with BJT.	Power Point Presentations	3:0
Operation Amplifier	Block diagram and Working of Op-Amp, importance, advantages and applications. Schematic diagram of 741, symbol.	Power Point Presentations	2:0
Digital electronics	Introduction to Digital Electronics. Difference between analog and digital signals. Number systems (Decimal, binary, octal, Hexadecimal). Various Logic Gates and their truth tables.	Power Presentations	3:0
Instrumentation	Introduction to electrical and electronic measuring instruments. Basic principle and parts of simple meters. MC and MI meters. Range extension, need of calibration. Characteristics of meters and errors in meters. Multi meter, use of meters in different circuits. Use of CRO, Function generator, LCR meter	Power Point Presentations	3:30
Valedictory	Work Ethics. Personal Financial Planning. Health.	Power Point Presentations, White Board	2:0
Effective Communication	Subordinates. Peers. Superiors. Customers.	Audio-Video	3:0
First Aid	Electrocution Cut. Bleeding. Faint. Bandage. Resuscitation. • Ambulance.	Audio-Video	2:0

Soldering and Desoldering	Different types of soldering guns, related to Temperature. Solder materials and their grading. Soldering and De-soldering stations and their specifications.	Power Point Presentations, Trainer Guide	1:0
Power Source	Construction, types of primary and secondary cells. Materials used, Specification of cells and batteries. Charging process, efficiency, life of cell/battery. Selection of cells / Batteries etc. Use of Hydrometer.	Power Presentations	1:0
Orientation Programme & Introduction about Entrepreneurship	<ul style="list-style-type: none"> • Entrepreneur, Entrepreneurship and Enterprise • Scheme & Types of Entrepreneurship • Importance of Entrepreneurship • Entrepreneurship Opportunities & Challenges • Startup Business • Cash Flow • Incubation Centre like DIC & IIT (BHU) 	Presentations, Trainer's Guide	2:0
Financial Management	<ul style="list-style-type: none"> • Financial Management • Resources / Fund availability by Bank • Loan Scheme like Mudra Loan 	Presentations, Trainer's Guide	2:0
Execute the operation of different process sensors, identify, wire & test various sensors	Identify sensors used in process industries such as RTDs, Thermocouples, proximity switches (inductive, capacitive and photo electric), load cells, strain gauge.	Different Trainer kit	3:0

Practical (Electronics & Instrumentation)

Topic	Keylearning Outcomes	Equipment Required	Duration
Measurement of Electrical Parameters	Measurement of Current. Measurement of Voltage. Measurement of Power.	Ammeter, Voltmeter, Wattmeter, Multimeter, Lead, Wires & personal protective equipment	5:0
Test various electronic components using proper measuring instruments and compare the data using st	<ul style="list-style-type: none"> • Identify the different types of active electronic components. • Measure the resistor value by colour code and verify the same by measuring with multimeter • Identify resistors by their appearance and check physical defects. • Measure the resistance, Voltage, Current through series and parallel connected networks using multi meter • Identify different inductors and measure the values using LCR meter. • Identify the different capacitors and measure capacitance of various capacitors using LCR meter 	Multimeter, resistors	10:0
Soldering/ Desoldering and Various Switches	Practice soldering on different electronic components, small Transformer and lugs. Practice soldering on IC bases and PCBs. Practice de-soldering using pump and wick.	Soldering and desoldering station, flux soldering wire, PCB, different electronic components such as diode, transistors, switch, transformer, etc.	6:0
Operations Using Suitable Tools	Identify the different hand tools. Selection of proper tools for operation and precautions in operation. Care & maintenance of trade tools.	Various tools used in electronics	3:0
Testing and measurement of various electronics components.	Identify different types of diodes Test the given diode using multi meter and determine forward to reverse resistance ratio. Identify and test Zener diode. Identify and testing of different types of transistors.	Multimeter, transistors, diodes.	6:0
Assemble simple electronic power supply circuit and test for functioning.	<ul style="list-style-type: none"> •Construct and test rectifiers •Construct and test a +12V fixed voltage regulator. 	Soldering material, solder iron, PCB, transformer, diode, capacitor, resistor	6:0
Assemble, test various digital circuits.	<ul style="list-style-type: none"> •Identify different Logic Gates (AND, OR, NAND, NOR, EX-OR, EX-NOR, NOT ICs) 	Logic gates ICs, bread board, wires	6:0
Identify and testing of power electronics components	<ul style="list-style-type: none"> •Identify different Transistors •Test the condition of a given transistor using ohm-meter. •Identify various power MOSFET by its number and test by using multimeter. 	Transistor, multimeter, MOSFET	6:0
Rework on PCB after identifying defects	<ul style="list-style-type: none"> •Checked and Repair Printed Circuit Boards single, Double layer, and important tests for PCBs. 	PCB board, multimeter, solder iron	3:0
Construct power supply	<ul style="list-style-type: none"> •Identify the different types of fixed +ve and –ve regulator ICs and the different current ratings (78/79 series) 	Soldering material, solder iron, PCB, transformer, diode, capacitor, resistor, IC (78/79 series)	6:0

