Broad area of Vocational Course: Physics

Vocational Course Title: Basics of Electronics Mechanic Trade

Nature of Vocational Course: Independent

Course Developed Institute/College:

Co-ordinator: **Department:**

Number of Seats: **Course Fees:**

Course Code: **Credits:** 03

Course Outcomes:

1. Perform basic workshop operations using suitable tools, observing suitable care & safety and following safety precautions.
2. Assemble, test and troubleshoot various electronic circuits.
3. Plan and carry out the selection of a project, assemble the project and evaluate performance for a domestic/commercial applications.

Unit	Theory Topics	No. of Lectures	Practicals	No. of Lectures
1	• Familiarization with the working of Industrial Training Institute system. • Importance of safety and precautions to be taken in the industry/shop floor. • Introduction to PPEs. • Introduction to First Aid. • Response to emergencies e.g., power failure, fire, and system failure. • Identification, specifications, uses and maintenance of commonly used hand tools.	2	• Identify safety signs for danger, warning, caution & personal safety message. • Use of personal protective equipment (PPE). • Practice elementary first aid. • Use of fire extinguishers. • Identify the different hand tools.	8
2	• Basic terms such as electric charges, Potential difference, Voltage, Current, Resistance. Basics of AC & DC. • Single phase and Three phase supply. • Insulators, conductors and semiconductor properties. • Different types of electrical cables and their specifications.	2	• Identify the Phase, Neutral and Earth on power socket. • Measure the voltage between phase and ground and rectify earthing. • Measure AC and DC voltages using multi meter. • Measure voltage and current using clamp meter.	12

Unit	Theory Topics	No. of Lectures	Practicals	No. of Lectures
3	• Multi meter, use of meters in different circuits. • Use of CRO, Function Generator, LCR meters. • Different types of soldering guns, related to temperature and wattages, types of tips. • Solder materials and their grading, use of flux and other materials. • Selection of soldering gun for specific requirement.	2	• Measure DC voltage, AC voltage, time period using CRO sine wave parameters. • Practice soldering on different electronic components, small transformer and lugs. • Practice de-soldering using pump and wick.	10
4	• Ohm's law and Kirchhoff's Law. Resistors; types of resistors, their construction & specific use, color-coding, power rating. • Equivalent Resistance of series parallel circuits. • Distribution of V & I in series parallel circuits. • Principles of Induction, Self and Mutual Induction. • Series and parallel combination of L,C,R, Q factor. • Capacitance and Capacitive Reactance, Impedance.	4	• Identify the different types of active electronic components. • Measure the resistor value by color code and verify the same by measuring with multimeter. • Identify the power rating of carbon resistors by their size. • Verify laws of series and parallel circuits with voltage source in different combinations of L, C, R.	10
5	• Semiconductor materials. • PN Junction, Forward and Reverse biasing of diodes. Interpretation of diode specifications. Forward current and Reverse voltage. • Different diodes, Rectifier configurations and their efficiencies. Filter components and their role in reducing ripple. • Working principles of Zener diode, Varactor diode, their specifications and applications.	3	• Identify different types of diodes, diode modules and their specifications. • Measure the voltage and current through a diode in a circuit and verify its forward characteristic. • I- V characteristics of Zener diode. • Zener as Voltage Regulator.	10

Unit	Theory Topics	No. of Lectures	Practicals	No. of Lectures
6	Communications: • Modulation and Demodulation, AM, FM, Detectors. • Optical fibers: Fabrication and working, types and specifications.	2	• Demonstration of Analog & Digital Modulation/Demodulation. • Calculation of numerical aperture of optical fibre. • Calculation of acceptance angle of optical fibre.	10

Suggested Readings:

1. Pratap G. & Garg K., "ITI- Electronics Mechanic Theory", Vidya Prakashan, India, 2018, **1**.
2. Mittal A. K., "Electronics Mechanic Trade Theory- Hindi ITI", Asian Publishers, India, 2016, **1**.
3. Ray S., "Electronics Mechanic Theory", Neelkanth Publishers Private Limited, 2018, 2018.

Suggested digital platforms web links:

1. https://onlinecourses.swayam2.ac.in/arp19_ap95/preview
2. https://onlinecourses.nptel.ac.in/noc19_ee36/preview

This course can be opted as a Vocational Course by the students of following subjects: Open for All.

Suggested Continuous Evaluation Methods:

The Continuous Assessment (Internal) during the period of training will be based on the following:

- Performance in Lab/ Workshop.
- Record book.
- Answer sheet of assessment.
- Viva-voce.
- Attendance and punctuality.

Course Pre-requisites: To study this course, a student must have Science in Class 10th.

Suggested equivalent online courses:

1. https://nptel.ac.in/courses/117/101/117101055/
2. https://gprsstudio.com/index.php/2020/12/02/free-electrician-diploma-course/#Online_Class_of_Electrician_course

Further Suggestions: The students can have more exposure if they get an opportunity for internship in nearby industries.

Skill/ Training Partner: Any ITI/ Polytechnic/ Engineering College

Expected fields of Occupation:

- Electronics Fitter
- Electronics Mechanic

- Radio Technician
- Optical Fiber Technician

At the end of the whole syllabus any remarks/ suggestions: The student can go for an advanced level of this course to ensure quality skills in the trade.
The student should be allowed to register himself in Labour Department, Govt. of Uttar Pradesh.