Broad Area of Vocational Course : Physics
Vocational Course Title : Basics of Electrician 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 Electrician tasks using suitable knowledge and tools.
2.Hand on experience on electrical appliances and troubleshoot various important circuits.
3. Students acquire problem solving skills and get "Industry Ready."

Max. Marks: 25+75 **Min. Passing Marks:** 35

Total No. of Lectures-Tutorials-Practical (in hours per week): L-T-P: 1-0-2

Unit	Theory Topics	No. of Lectures	Practical	No. of Lectures
I	**Basics of Electricity and Magnetism** • Electric Current, Potential, Energy and Power. • Magnetic flux, Principle of electro-magnet, Faraday's laws of Electromagnetic Induction. • Concept of resistors, Inductors and Capacitors. • Conductors & cables, Wire joints, Soldering, Energy consumption & monthly billing. • Transformer	2	• Identify the importance of current and electric potential in a circuit. • Knowledge of AC and DC current and voltage along with their sources. • Learning and identifying different types of cables. • Soldering	10
II	**Electrical Measurement** • Introduction to measuring instruments, their least count, and errors. • Study of Ammeter and Voltmeter; their connection & Calibration. • Study of Wattmeter and its applications for single phase and three phase systems. • General Description and features of various Energy meters & their applications. • Study of Megger, Multimeter, Clamp meter & their applications.	3	• Conversion of Galvanometer to Ammeter and Voltmeter. • Using Ammeter and Voltmeter. • Using Wattmeter, Megger, Multimeter and Clamp meter and the result analysis.	10
III	**Lead Acid Cells** • Maintenance and methods of charging and discharging of Lead Acid Cells used in Inverters. • Repair and testing of batteries. • Connection of batteries to Inverters and UPS. • Battery ratings.	2	• Demonstration of Working of Lead Acid Cells. • Learning Maintenance of Batteries. • Connection of Batteries.	12
IV	**DC Motor**	3	• Identification of parts	10

	• Construction & Principle of DC Motors, Types- Series, Shunt & Compound Motors, Characteristics curve, Applications. • Necessity of starter, Construction and Working of starters (3 point& 4 point), • Trouble shooting – Care and maintenance.		of DC motors. • Characteristics curve &Efficiency of DC Motor • Dismantling & Re assembling of DC motor.	
V	**Cable Faults and Fire Fighting** • Single phase and Three Phase Cables, Uses and Advantages. • Cable Faults and Fault Finding. Repair of Cable Faults and cable jointing. • Concept of Earthing, fuse and MCB. • Fire Fighting, Safety handling Tools & Equipment. • Rescue of person who is in contact with live wire, Treat a person for electric shock/ injury.	3	• Fire Extinguishers & its Types • General Safety of Tools & Equipment • Rescue of person who is in contact with live wire • Treat a person for electric shock/ injury • Demonstration of wiring in home.	8
VI	**Basic Home Appliances** • Study of circuit diagrams of different types of heating appliances. • Study of circuit diagrams of different types of motorized appliances. • Localization of faults in different home appliances & their remedies.	3	• Heating appliances such as Iron, Heaters & Geysers. • Motorized appliances such as Mixer, Grinder, Washing Machine, Hand Drill, table fan.	10

Suggested Readings:

1. Mittal, A K, "Electrician Theory", Arihant Publishers (Hindi), India, 2019.
2. Agrawal Priti, "Electrician Theory I-II)", Neelkanth Publishers, India, 2018.
3. Dahiya Satish, "Electrician Practical I-II)", Neelkanth Publishers, India, 2018.
4. Suggestive digital platforms web links-

This course can be opted as a vocational course by the students of following subjects: Open for all students having Science in their 10th standard.

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 10th standard.

Suggested equivalent online courses:

1. Basic Electric Circuits by Prof. Ankush Sharma, IIT Kanpur
   https://onlinecourses.nptel.ac.in/noc19_ee36/preview
2. Fundamental Concepts of Electricity by A M Kulkarni, IIT Bombay
   https://onlinecourses.swayam2.ac.in/arp19_ap95/preview

Further Suggestions: Students can have more exposure if they get an opportunity for internship in nearby industries.
Skill/Training Partner: Any ITI/ Polytechnic/Engineering College/ Department of Physics, St. John's College, Agra
Expected Fields of Occupation: Factories, Construction Companies, Self-Employment, Appliances Manufacturing Companies.

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, if interested.
- The student can work part-time as electrician while studying.

Note:

1. Number of units in Theory/Practical may vary as per need.
2. Credits for Theory =01 (Teaching Hours = 15)
3. Credits for Internship/Training/Practical = 02 (Training Hours = 60)