SYLLABUS

ITI Wireman Syllabus (Two-Year Course)

1st Semester

Unit 1: Occupational Safety and Fundamental Electrical Concepts

1. **Professional Knowledge (Theory)**
   - **Occupational Safety and Health**
     - Introduction to occupational safety practices in electrical work
     - Use of fire extinguishers, elementary first aid, and personal protective equipment (PPE)
     - Safety regulations and compliance in the workplace
   - **Fundamental of Electricity**
     - Basics of electric current: definition, units, and effects on human body
     - Conductors, insulators, and semiconductors: properties and applications
     - Types of wires and cables: characteristics, classifications, and uses
     - Principles of soldering: techniques, types of solder, fluxes, and applications
     - Introduction to resistors: types, functions, and Ohm's law applications
     - Kirchhoff's laws: understanding and practical applications
     - Basics of electromagnetism and its relevance in electrical systems
     - Introduction to alternating current (AC) and its basic principles
     - Overview of basic electronics components and circuits
2. **Professional Skills (Practical)**
   - **Safety and Tools**
     - Practical training in occupational safety measures
     - Hands-on use of fire extinguishers and first aid simulations
     - Demonstration and practice with various hand tools and equipment
   - **Electrical Fundamentals**
     - Practical exercises in soldering techniques and practices
     - Application and verification of Ohm's law and Kirchhoff's laws
     - Jointing and soldering practices on different types of conductors
     - Demonstration of basic electronics circuits and component handling

2nd Semester

Unit 2: Electrical Wiring and Systems

1. **Professional Knowledge (Theory)**
    - **Electrical Wiring Systems**
        - Types and applications of measuring instruments: ammeter, voltmeter, ohmmeter
        - Introduction to digital meters: features, operation, and calibration
        - National building codes: compliance and standards for house wiring
        - Techniques for fixing screws, cable bending, and conduit pipe installations
        - Materials used in conduit pipe wiring and their specifications
        - Illumination systems: types, design considerations, and applications
        - Wiring practices in commercial buildings and industrial setups
        - Introduction to LAN wiring: components, configurations, and troubleshooting
        - Basics of computer networking and internet connectivity in electrical systems
2. **Professional Skills (Practical)**
    - **Electrical Installations**
        - Practical training with electrical measuring instruments
        - Calibration and operational testing of digital meters
        - Hands-on experience in domestic and commercial wiring installations
        - Testing and jointing practices with single and multi-stranded conductors
        - Installation and layout design of wiring boards and conduit systems
        - Practice sessions on using power drills and wiring accessories
        - Introduction to office package software and basic internet applications

3rd Semester

Unit 3: Advanced Electrical Concepts

1. **Professional Knowledge (Theory)**
    - **Transistors, Generators, and Motors**
        - Types of transistors: bipolar junction transistors (BJTs), field-effect transistors (FETs), and their applications
        - Zener diode: characteristics, uses in voltage regulation, and application circuits
        - Overview of common electrical accessories: switches, sockets, connectors, and their specifications
        - Importance of neutral wire in electrical systems and its effect on circuits
        - Soldering techniques: advanced methods and applications in electrical connections
        - Introduction to DC generators: working principles, components, and EMF equation
        - DC motors: types, construction, and necessity of starters in motor operation
        - Basics of AC polyphase systems: configurations, advantages, and applications
        - Introduction to alternators: parts, construction, and working principles

        - Three-phase induction motors: principles, types, and speed control methods
2. **Professional Skills (Practical)**
    - **Electrical Circuits and Machines**
        - Testing procedures for various electrical circuits and components
        - Advanced soldering techniques and practical applications
        - Hands-on experience with DC generators: insulation resistance testing and maintenance
        - Motor operation and maintenance practices: testing different types of DC motors
        - Practical sessions on AC generators and motors: operation, maintenance, and troubleshooting
        - Familiarization with direct online (DOL) starters and single phasing preventers
        - Power wiring techniques for DC and AC motors: installation, testing, and safety practices

4th Semester

Unit 4: Power Generation and Distribution

1. **Professional Knowledge (Theory)**
    - **Transformers and Substations**
        - Types of transformers: distribution transformers, power transformers, and their applications
        - Generation, transmission, and distribution of electrical power: systems and components involved
        - Bus trunking and rising mains: design considerations, installation practices, and safety standards
        - Types of electrical distribution: overhead distribution, underground cables, and their advantages
        - Substation equipment: switchgear, transformers, relays, and protection systems
        - Importance and advantages of maintenance in electrical systems
        - Concept and principles of electrical planning: estimation, costing, and project management
2. **Professional Skills (Practical)**
    - **Power Systems and Maintenance**
        - Identification and testing procedures for different types of transformers
        - Insulation testing and connections of single-phase and three-phase transformers
        - Practical training in operating and maintaining overhead line components
        - Demonstration sessions on substation operations and low/high voltage equipment
        - Synchronization practices for parallel operation of generators and transformers
        - Control panel wiring: layout design, installation, and operational testing

- Preventive maintenance techniques and routine testing procedures for electrical systems