Learnoz™
Learn Smart. Grow Fast.

Professional Electrical Design

Master Course

(Engineering Course Bundle- 5th Months Semester Course)

Learnoz™
Learn Smart. Grow Fast.

(১০টি কোর্সের সমন্বয়ে ইলেকট্রিক্যাল ডিজাইন মাস্টার কোর্স)

১. প্রফেশনাল সাব-স্টেশন ডিজাইন (ইঞ্জিনিয়ারিং কোড বেজড)

২. ইলেকট্রিক্যাল ডিজাইন (SLD) ফর RSC অডিট

৩. ইলেকট্রিক্যাল সেফটি অডিট কোর্স

৪. লাইটনিং প্রটেকশন সিস্টেম (LPS) Design (BNBC-2020 & NFPA-70)

৫. অটোক্যাড (2D & Isometric 3D) ফর ইলেকট্রিক্যাল ডিজাইন

৬. অডিট বেডজ ইলেকট্রিক্যাল টেষ্ট রিপোর্ট প্রিপারেশন

৭. বিল্ডিং ইলেকট্রিক্যাল ডিজাইন কোড রুলস BNBC-2020

৮. Understanding the NFPA-70 (NEC) Code,

Code বুঝে বাস্তব ডিজাইনে প্রয়োগ করার প্রাকটিস

৯. ইলেকট্রিক্যাল Panel Isometric 3D Drawing (Only View Making)

10. ফায়ার ডিটেকশন সিস্টেম ডিজাইন (NFPA-72) Recorded

কোর্স-০১

AUTO CAD (2D & ISOMETRIC 3D)

(Auto CAD 2D & Isometric 3D)

(Day-01-05)

i. Day-01

- **Class-1:** Introducing to Auto CAD, Line, Poly Line, Spline, Rectangle, Circle, Copy, Move, Erase, Function of Muse, Short Commands, Ribbon, Menu bar
- **Class-2:** Arc, Object, Object Selection Method 1, 2 & 3, Functional Key F-3 & F-8 etc.
- **Class-3:** Scale, Stretch, Zoom, Draft Setting
- **Home Work:** Make a Transformer Symbol, How to on/off Menu bar, Ribbon Close & Open

ii. Day-02 (Class: 4-6) Class Duration-2Hr.

- Class-4: Offset, Trim, Extend, Unit Setting, Dimension Setting, Exercise.
- Class-5: Hatch, Details of Option command.
- Class-06: Rotate, Mirror, Joint, Break, and Break at point.
- Home Work: Make Earthing Symbol, Room layout plan, trim an object & extend etc.

Day-03 (Class: 7-9) Class Duration-2Hr.

- Class-07: Drafting Setting, Chamfer, Fillet.
- Class-08: Array, Block, Insert Block, Explode, Layer, Match.
- Class-9: Layout Making, Page Setup, Limit setting, Text.
- Home Work: Make a Fane, DB, Socket, Circuit Breaker Symbol, Generator Symbol & Converting to Block.

iii. Day-04: (Class: 10) Class Duration-2Hr.

- Making a Professional Substation SLD Project

iv. Day-05: (Class: 11) Class Duration-2Hr. (Isometric 3D)

- RCC Building 2D & Isometric 3D Drawing
- Shed Building 2D & Isometric 3D Drawing

Learnoz™
Learn Smart. Grow Fast.

কোর্স-০২

LIGHTNING PROTECTION SYSTEM (LPS) DESIGN

Based on BNBC-2020 & NFPA-780

Course Name: Professional Lightning Protection System (LPS) Planning, Drawing & Design According to BNBC-2020 & NFPA-780

Class-01

i. Introduction to LPS Materials

- Air Terminal, Air Terminal Base Plate (Single & Double)
- Saddle, Introducing of Cable Joints (Squire Joint, Brass Clamp Joint etc.)
- Test Box (Copper & Bimetallic Type), Bimetallic Joint
- Earthing Busbar with Insulator, Earth Electrode, Earth Lead, ECC, Copper Wire / Lead Connector (U-Clamp), Royal Bolt, Main & Down Conductor.

ii. When Need to Install LPS for Building

- Discussion About Risk Index
- Risk Index Calculation from BNBC-2020

iii. Classification of Structure/Building Criteria for LPS Design (Class-I & II Building Selection)

- What is Class-I Structure
- What is Class-II Structure
- When Have to Use Class-I & Class-II Materials
- When Have to Use Class-I & Class-II Materials used in same structure

iv. Class-I Materials Specification

- Diameter of Air Terminal & Height (For Copper & Aluminum)
- Main Conductor & Down Conductor Size ((For Copper & Aluminum)

v. Class-II Materials Specification

- Diameter of Air Terminal & Height (For Copper & Aluminum)
- Main Conductor & Down Conductor Size ((For Copper & Aluminum)

i. Air Terminal Installation

- Maximum Spacing Between Air Terminal to Air Terminal (Condition-I)
- Maximum Spacing Between Air Terminal to Air Terminal (Condition-II)
- When Need Air Terminal Support & Why
- Tip Height of Air Terminal
- Elevation of Air Terminal
- Ornament Ball of Air Terminal

ii. Bimetallic Connector

- When Need Bimetallic Connector
- Installation of Bimetallic Connector

iii. Main & Down Conductor Installation

- Number of Down Conductor (Condition-I)
- Number of Down Conductor (Condition-II)
- Project Analysis & Calculation of Down Conductor
- Main & Down Conductor Support
- Maximum Distance of Saddle
- Conductor Bends Procedure with Details
- Location of Devices (Air Terminal)

Class-2 (Strike Termination Devices on Roof)

i. Type of Roof

- Pitched Roof
- Flat / Gently Slopping Roof
- Dormers Roof
- Domed Roof

Flat / Gently Slopping Roof

- Introduction of Flat / Gently Slopping Roof
- Air Terminal Installation of Flat Roof (Condition-I)
- Air Terminal Installation of Flat Roof (Condition-II)
- When Need Run Conductor
- When Need Cross Run Conductor
- Project Design Practice in Class for Flat Roof

❖ **Pitched Roof**
❖ Introduction of Pitched Roof
❖ Air Terminal Installation of Pitched Roof (Condition-I)
❖ Air Terminal Installation of Pitched Roof (Condition-II)
❖ When Need Run Conductor
❖ When Need Cross Run Conductor

Class-03 (Project Design)

i. **Flat/Gently Slopping Roof Project Design (RCC Building)**
❖ Preparation of Preliminary Drawing according to actual Structure in Auto CAD (2D Drawing)
❖ Air Terminal Selection & Practically Drawing Preparation
❖ Main Conductor / Run Conductor / Cross Run Conductor Layout Drawing Preparation
❖ Down Conductor Selection with Proper Location
❖ Preparation of Earthing Drawing with Details According to Code with Consideration Environment
❖ Preparation of Isometric Drawing in Auto CAD

Class-04

ii. **Flat/Gently Slopping Roof Project Design (Factory Shed Building)**
❖ Preparation of Preliminary Drawing according to actual Structure in Auto CAD (2D Drawing)
❖ Air Terminal Selection & Practically Drawing Preparation
❖ Main Conductor / Run Conductor / Cross Run Conductor Layout Drawing Preparation
❖ Down Conductor Selection with Proper Location
❖ Preparation of Earthing Drawing with Details According to Code with Consideration Environment
❖ Preparation of Isometric Drawing in Auto CAD

Class-05 (Exam)

i. **Assignment Have to Submit properly**
❖ After passed in Exam Certificate will be provided

কোর্স-০৩

PROFESSIONAL SUBSTATION DESIGN (CODE BASED)

Class-01 (Preparation of Electrical Design)

vi. How to Practice Engineering Code & Related Guidelines.

- Importance of Engineering Code for Design
- Combination of Engineering Code & Practices
- Engineering Code & Team Work
- Real Life Examples
- Attached: References with Article Number & Edition

vii. Basic Idea of Electrical Design (Definition with Explanation)

- Proposed/Masterplan Drawing & Design
- As-Built Drawing
- Single Line Diagram (SLD)
- Electrical Layout Diagram
- Attached: References with Article Number & Edition

viii. Various Type of Cable

- Definition of RM, RE, SM, BYA, NYY, XLPE Cable & where use it
- Engineering Cable Code & Color Code with Details
- Electrical Load from BNBC
- Load Calculation with Short method

ix. Various Type of Circuit breaker & its uses

- Miniature Circuit Breaker (MCB) & when have to use
- Molded Case Circuit Breaker (MCCB) & when have to use
- Air Circuit Breaker (ACB) & when have to use
- Load Break Switch (LBS) Selection
- Vacuum Circuit breaker (VCB) Selection
- Circuit Breaker with Cable Combination for proper Design as per Any Audit

x. Circuit breaker Selection Method from Engineering Code for Industrial Audit

- Circuit Breaker Selection According to BNBC
- Circuit Breaker Selection According to NFPA-70 (NEC)/ACCORD/RSC Requirement
- Circuit Breaker Selection For Substation
- Discussion about Circuit Breaker Set Point

- **Busbar Current Calculation from NFPA-70 (NEC) & Selection**
- Copper Busbar Current Calculation
- Aluminum Busbar Current Calculation
- Bus bar Weight Calculation
- Available Size of Busbar
- RSC Audit CAP/Findings Discussion about Busbar

Class-02 (Substation Design)

iv. Preparation of Substation Design

- Introducing to various type of equipment of Substation
- Like Transformer, HT & LT Switchgear, PFI, CT, PT etc.…

v. Transformer

- Transformer Rating/Capacity Selection
- Transformer Primary/HT Current Calculation with Short Method
- Transformer Secondary/LT Current Calculation with Short Method

vi. HT & LT Cable Selection

- HT Cable Selection with Requirements of License board
- LT Cable Selection using RSC/Any Audit Cable Chart
- Circuit Breaker with Cable Combination for proper Design as per Any Audit

vii. Voltage Drop Calculation

- Voltage Drop Calculation of Cable
- Discussion about Allowable Voltage Drop as per BNBC & NFPA-70

viii. PFI Selection

- Introducing to PFI
- Why PFI 60% (Proved using Power Triangle equation)
- PFI Static Capacitor Stage Selection
- Capacitor Current Calculation
- Magnetic Contact Selection
- HRC Fuse Selection
- Relay Controller Setting Calculation
- When need two Capacitor Panel

ix. Current Transformer (CT) & Potential Transformer (PT)

- HT CT & PT Selection (11kV Side)
- LT CT Selection

Class-03 & 04 (Earthing System)

ii. Earthing Cable Selection

- Earthing Cable Selection as per BNBC -2006 & 2020
- Earthing Cable Selection Using Adiabatic Calculation
- Thumb/Short Rules for Earthing Cable Selection

iii. Earthing System Design

- Various Type of Earthing
- Copper Rod Earthing, Copper Plate Earthing, GI Pipe Earthing
- Depth of Earth Pit
- Earth Electrode Size, Minimum Earthing Lead Size
- Difference between Earth Electrode, Earthing Lead & Earth Continuity Conductor
- Preparation of Earthing Layout for Substation & Generator
- Number of Earth Pit Selection as per BNBC & Adiabatic Equation
- One Earth Pit to Another Earth Pit Distance Requirements Discussion

iv. Transformer Earthing

- How many Earthed need for Transformer & Generator Body Earthing
- Transformer & Generator Neutral Earthing
  Ref: BNBC & Bangladesh Electricity Act-1937

Class-05 (Substation Design Exam Preparation)

iii. Substation Design

- Assignment-01 (2000kva/More Capacity S/S Design) Must be submitted
- Online Exam Preparation

কোর্স-০৪

PROFESSIONAL ELECTRICAL DESIGN FOR INDUSTRIAL RSC AUDIT

PROFESSIONAL ELECTRICAL DESIGN FOR INDUSTRIAL RSC AUDIT

Class-01

i. How to Field Assessment, Data Collection & Prepare Proper SLD

- How to Prepare SLD from Electrical Assessment Data
- How to Draft SLD for final Drawing
- How Many Load Information Add to SLD
- How to Prepare Proposed SLD from As-Built SLD

Class-02 (Understanding Audit CAP & SLD Correction)

iv. SLD Correction & CAP Preparation for Audit

- Understanding Audit Observation & Review of SLD
- Audit Review & Recommendation Solving
- **Home Work:** Home work for online exam.

Class-03 (BBT SYSTEM UNDERSTANDING & their SLD Making)

i. SLD of BBT System

- Introducing to BBT
- How to Prepare of SLD for BBT
- BBT Reduction Method as Per NFPA-70
- Schematic Diagram of BBT

Class-04 RSC Audit SLD Case Study & Solving to get SLD Approval from RSC Audit

ii. Necessary Case Study will be Discussed

Class-05 (Final Assignment-02 & Online Exam Preparation)

iii. Final Assignment

- Discussion About Assignment-02
- Preparation procedure of SLD for Audit
- Preparation of Load Schedule in Excel for Audit
- Online Exam Questions Idea

কোর্স-০৫

ELECTRICAL TESTS

Class-01 & 02 (Electrical Test Report Preparation)

i. **Earth Resistance Test & Report Preparation**
ii. **Cable Insulation Resistance & Report Preparation**
iii. **Thermography Scan Test & Report Preparation**

কোর্স-০৬

ELECTRICAL SAFETY AUDIT COURSE

Class-01 & 02 (will be share Factory Visit real experience, Observation & Audit Report Preparation)

i. **About 100 Rules from Engineering Code**
ii. **Pictorial Evidence**
iii. **Audit Report Preparation**

কোর্স-০৭

BUILDING ELECTRICAL DESIGN CODE RULES

Class-01 (100+ Building Electrical Code Rules Explanation)

100+ Electrical Design Code Rules From BNBC

- Importance Engineering Code Rules are included
- Each Rules will be Explained in Bangla
- Each Rules Code Reference will be mentioned with Page Number

কোর্স-০৮

UNDERSTANDING THE NFPA-70 (NEC) CODE

Class-01 & 02 (Understanding Fundamentals of NFPA-70)

- NFPA-70 TECHNICAL TERMS
- Mandatory & Permissive Rules explanation
- Electrical Safety with Working Clearance details

কোর্স-০৯

Class-01

Audit SLD Case Study & Solving to get SLD Approval from RSC Audit

কোর্স-১০

FIRE DETECTION SYSTEM DESIGN RECORDED COURSE

Class-36 -40

Course contents:

1. **Introduction to Fire Detection & Alarm System.**
   - What is Fire Detection & Alarm System?
   - Type of Fire Detection & Alarm System.
   - Components of a Fire Detection & Alarm System
   - Benefits of Fire Detection & Alarm System
2. **Introduction to Fireman Telephone & Public Addressable (PA) System.**
   - What is Telephone & PA System.
   - Type of Telephone & PA System.
   - Components of a Telephone & PA System.
   - Benefits of Telephone & PA System.
3. **Classifications of Cabling Fire Detection & Alarm System**.
   - Type of Wiring System.
   - SLC Loop Cabling System
   - NAC Cabling System
   - Aspiration System
4. **Introducing to all devices of fire detection & alarm System.**
   - Smoke, Heat, Multi-sensor, Flam, Beam, Gas etc.
   - Manual call point system
   - Strobe with Alarm system
5. **Device Selection & placement**
   - Beam & Height Consideration
   - 4 No. All Device Placement Location
   - Room wish Device Selection
   - How to Install Aspiration Detection system.
   - And others…

6. **Device to Device Between Maximum Spacing**
    - Smoke, Heat, Multi-sensor, Flam, Beam, Gas etc. Detector Spacing.
    - Manual pull station spacing.
    - Strobe with Horn spacing.
    - Aspiration Detector Spacing etc.
7. **Evacuation plan, Egress path and corridor design for safe Exit.**
    - Exit Route Selection & Placement.
    - Exit Sign Selection & Placement.
    - Emergency Light Selection & Placement.
8. **Input/output Device Selection Matrix**
    - When Need Input/output Device
    - Control Device system Selection & Placement.
    - Monitor Device system Selection & Placement.
    - Isolator Device Selection & Placement.
9. **Preparation of Design Criteria & Layout Design Drawing**
    - As per Class Decussation
    - Auto CAD Layout Drawing
10. **Preparation of Standard Details Drawing**
    - As per Class Decussation
    - Auto CAD Layout Drawing
11. **Preparation of Technical Specifications of Item**
    - As per Class Decussation
12. **Secondary Battery Set Selection.**
    - As per Class Decussation
13. **Voltage Drop Calculation**
    - As per Class Decussation
14. **Preparation of BoQ**
    - As per Class Decussation

Standards are below:

BNBC 2020, Bangladesh National Building Code.
NFPA 72, Fire Detection & Alarm System.
IFC, International Fire Code.
BFSCD, Bangladesh Fire Service & Civil Defence.