



Electrical Engineering

Overhead Transmission Lines Inspection & Maintenance Techniques

Course Introduction

The course covers transmission line aspects that influence maintenance and investment decisions and covers reliability measures used in the industry. The maintenance section provides inspection and diagnostic options, sample maintenance programming with cost and accomplishment reporting, industry practices, a method to evaluate maintenance program effectiveness and important condition information needed to manage line assets/components. The course includes strategies for sustainment investment planning that covers health indexing, condition based criteria, asset replacement optimization, criticality ranking of transmission lines and methods to improve reliability.

A component of power system

This course will cover the concepts involved in power transmission and distribution systems: Components of power systems; Transmission line as a component of power system; Line conductors; Line parameters and their calculations; Performance of transmission lines; Traveling waves on the transmission lines, Power limits of transmission systems, Voltage Control, Interference of power with communication lines

O.H.T.L An overhead power line is an electric power transmission line suspended by towers or utility poles. Since most of the insulation is provided by air, overhead power lines are generally the lowest-cost method of transmission for large quantities of electric energy. Towers for support of the lines are made of wood (as-grown or laminated), steel (either lattice structures or tubular poles), concrete, Aluminium, and occasionally reinforced plastics.

Target Audience

- Electrical Design Engineer
- Electrical Engineer
- Electrical Project Engineer

Learning Objectives

- Become familiar with the basic operation, behavior, and modeling of transmission lines.
- Determine conductor sag, tension, and mechanical forces on overhead structures
- Describe performance and economic factors relevant to the specification of wood, steel, and concrete poles and structural components
- Determine insulation levels and select insulators, lightning arresters, grounding, and other
- Components coordinated to provide acceptable lightning performance

Course Outline

• DAY 01

Module (01) Introduction to Power System Engineering

- 1.1 Overview of Generation; Transmission & Distribution of Electrical Power
- 1.2 Layout of Transmission & Distribution System
- 1.3 Choice of System Voltage & Frequency; Comparison between AC and DC Power Systems
- 1.4 System units and parameter

Module (02) Balanced 3-Phase Voltages

- 2.1 Basic Three-Phase Circuit Connections
- 2.2 Basic Three-Phase Relationships
- 2.3 Active power, reactive power, and apparent power in a 3-phase system
- 2.4 Advantages of three-phase systems
- 2.5 Unbalanced Three-Phase Systems

• Day 02

Module (03) Inductance of Overhead Transmission Lines

- 3.1 Transmission Line Conductors
- 3.2 Inductance of a conductor due to internal and external flux linkages
- 3.3 Inductance of single phase transmission line
- 3.4 Flux linkages of a conductor in a group of conductors
- 3.5 Inductance of composite conductor
- 3.6 Three phase conductor with equilateral and spacing with the concept of transposition
- 3.7 Inductance of double circuit transmission line
- 3.8 Inductance of bundled conductor transmission line

Module (04) Capacitance of Overhead Transmission Lines

- 4.1 Capacitance of single phase transmission line
- 4.2 Capacitance of composite conductor;
- 4.3 Capacitance of double circuit transmission line
- 4.4 Capacitance of bundled conductor transmission line
- 4.5 Capacitance of single & three phase transmission line taking into account the effect of ground

• Day 03

Module (05) Transmission Line Analysis

- 5.1 Parameters of Transmission Line
- 5.2 Classification of Transmission Lines
- 5.3 Modeling and analysis of short, medium and long transmission lines
- 5.5 Generalized circuit constants
- 5.6 Concept of SIL and propagation constant

Module (06) Traveling Waves on Transmission Lines

- 6.1 Transient analysis of a transmission line
- 6.2 Reflection & refraction at the junction of two lines
- 6.3 Reflection at the short and open circuit end of line
- 6.4 Bewley lattice diagram.

• Day 04

Module (07) T.L Accessories and Function & Protection Philosophy

- 7.1 Protection philosophy used to protect the power station system.
- 7.2 Types of insulators and string efficiency.
- 7.3 Types of accessories and function.
- 7.4 Overhead TL, Underground TL.
- 7.5 Transmission line types.
- 7.6 Smith chart & solving microwave problems using chart

Module (08) Overhead T.L Maintenance

- 8.1 Power plant maintenance (preventive maintenance)
- 8.2 Power factor, How to improve the power factor
- 8.3 Why we are using high voltage in transmission line instead of high Current
- 8.4 Mechanism of heat flow in cable
- 8.5 DC and AC distribution
- Lockout&Tagout procedure during the maintenance

• Day 05

Module (09) Overhead T.L Maintenance Washing Procedures

- 9.1 Solving of TL problems, Earthing system
- 9.2 Live line insulator washing procedures for MV and HV power line
- 9.3 SCADA system to monitor
- 9.4 Distribution plant, Voltage drop
- 9.5 Reducing the power consumption
- 9.6 Daily and weekly check should be done in our systems
- 9.7 Difference between turbines and generators
- 9.8 What is the newest tech. in power transmission system?

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
June 23, 2025	June 27, 2025	5 days	4250.00 \$	UAE - Dubai

FROM	TO	DURATION	FEEs	LOCATION
Dec. 22, 2025	Dec. 26, 2025	5 days	4250.00 \$	UAE - Dubai
July 7, 2025	July 11, 2025	5 days	4950.00 \$	England - London