




TRAINING CATALOG 2016



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	Course Title		Page
a)	General Electricity Courses		
1	Electric Energy Essentials		3
2	Power Network Essentials		6
3	Electric Energy Step by Step		10
b)	Power System Network Courses		
4	Power System Network Engineering		12
5	Grid connection and Protection		12
6	HVDC System basics		12
7	Electrical Networks Fault Calculation and Analysis		12
8	Conventional Instrument Transformers		13
9	Digital Instrument Transformers		13
10	Fundamentals of Power Transformers		13
11	Generators and Motors - Theory		14
12	Power System Engineering - freshers		14
13	System Grounding		14
c)	Power System Protection & Control Courses		
14	Fundamentals of Power System Protection		16
15	Protection Scheme Philosophy for MV and HV Networks		16
16	Power System Analysis and Protection - Utility or Transmission networks		17
17	Power System Analysis and Protection - Industries or Power plants		22
18	Application of Protective Relays to Transmission systems		27
19	Application of Protective Relays to Distribution systems		27
20	Overcurrent and Earth fault relays co-ordination to Industrial system		27
21	Generator Protection and Schemes		28
22	Numerical Power System Protection and Relays		28
23	Modern Power System Protective Relaying		29
24	Current and Voltage Transformers for Protection Relaying		32
d)	Power System Protection Relays Courses		
25	Directional & non directional Overcurrent and EF Relays -ABB/ALSTOM/AREVA/SIEMENS		34
26	Line Distance Protection Relays-ABB/ALSTOM/AREVA/SIEMENS		34
27	Overhead lines or UG cables Current differential Relays -ABB/ALSTOM/AREVA/SIEMENS		35
28	Power Transformers Protection Relays -ABB/ALSTOM/AREVA/SIEMENS		35
29	Bus bar Protection Relays -ABB/ALSTOM/AREVA/SIEMENS		36
30	Generator Protection Relays -ABB/ALSTOM/AREVA/SIEMENS		36
31	Motor Protection Relays -ABB/ALSTOM/AREVA/SIEMENS		37
32	Synchronising and Breaker Failure Protection Relays -ABB/ALSTOM/AREVA/SIEMENS		37
33	Numerical Relays - Testing, Setting and Configuration		38
34	Commissioning and Preventive Maintenance of Protective Relays		38
e)	Substation Engineering & Design Courses		
35	Substation Design and Engineering		40
36	Current and Voltage Transformers Sizing calculation for Substation Relays, BCUs and Metering		40
37	Setting Calculations for Substation Relays, BCUs and Metering		41
f)	Management & Leadership Courses		
38	Management and Leadership		43
39	Marketing Management		51
40	Management Information System		51
41	Cost effective Maintenance Management		52
42	Maintenance Leadership and Technology		53
43	Root Cause Failure Analysis (RCFA)		54

GENERAL ELECTRICITY COURSES



Course on Electric Energy Essentials

Day 01- Electric Energy Essentials	
Sources of Energy	<ul style="list-style-type: none"> >> Hydro electric, Wind , solar ,Tidal , Fuel cell & Geo thermal resources >> Primary energy resources >> Electricity generation by resources >> Annual electric energy consumption >> Ideas on Reserve on the resources >> Hydro electric resource- Consumption and reserve >> Wind and solar resources- Consumption & reserve >> Nuclear resource – Consumption and reserve
Renewable Energy	<ul style="list-style-type: none"> >> Solar systems – Types >> Passive and Active systems >> Solar power and environment >> Wind energy and systems >> Wind power and environment >> Fuel Cells and issues >> Types of fuel cells and systems >> Geothermal energy systems >> Tidal power and systems >> Biomass energy and systems >> Bio mass energy and environment
Evolution of Electrical Power Systems	<ul style="list-style-type: none"> >> History of electric power systems >> Inventions and evolutions >> The battle of DC versus AC >> Problems with Low voltage systems >> Tesla's solution to AC systems >> Edison's AC high voltage systems >> AC , waveform and generation >> Concepts of RMS for AC systems >> Phasor and mathematical representation of AC systems >> Concepts of Impedance, Resistance and reactance >> Concepts of Apparent, Active and Reactive power >> Power factor and reactive power compensation
Components of Power Systems	<ul style="list-style-type: none"> >> Main types of power plants >> Hydro power plants and components >> Turbines and performance >> Fossil Fuel Power Plant Coal, Oil and Natural Gas >> Nuclear power plants and components >> Safety measures >> Types of transmission lines >> Three phase AC lines >> Double circuit transmission lines >> Insulators & grading in transmission lines >> Bundled conductors and use >> Ideas on static, shield ground wires >> Direct Cuurent transmission Lines >> Why to use DC lines ? >> Transmission line parameters & definitions >> Representation of transmission lines



	<ul style="list-style-type: none"> >> Short , medium and Long lines differentiation >> Transmission line Transients, effects and protection >> Lightning and Traveling wave concepts >> Typical installations of transmission lines
Worldwide Standards	<ul style="list-style-type: none"> >> Today's power system >> World wide standards for house hold voltage and frequencies >> Why different voltage standards- a look >> Why different Frequency standards – a look >> Low voltage networks
Environmental Impact of Power Systems	<ul style="list-style-type: none"> >> Impact of primary resources >> Energy and environment >> Key problems associated with generation of energy >> Fossil fuel power plants >> Sulphur Oxide and Ozone pollution >> Acid rain concepts and problems >> CO2 pollution & ashes >> Industrial green house gases >> Environmental Concerns of Hydroelectric Power Plants >> Environmental Concerns of Nuclear Power Plants

Day 02- Electric Energy Essentials

Electric safety	<ul style="list-style-type: none"> >> Safety facts- AC system >> Effects of AC and DC currents >> IEEE standards for safety >> Factors affecting Human safety >> Effect of Voltage , Current and Body resistance >> Effect of source frequency and duration >> Effect of path way >> Ground resistance –Definition >> IEEE standard – Ground resistance >> Touch and step potential >> Prevention and protection from electric shock >> Difference between Neutral and ground in networks >> Ground faults and interrupters >> Grounding of de-energised line equi potential zones
Power System Topology and Protection	<ul style="list-style-type: none"> >> Basics of power system protection >> Need for protection devices >> Types of faults >> Relays to control circuit breakers >> Directional power flow and protection >> Discrimination and grading by overcurrent relays >> Co-ordination of over current and distance relays >> Substation protection with Overlapping Zones >> Balanced and un balanced fault analysis >> Introduction to symmetrical components >> Grading and selectivity curves for over current relays >> Co-ordination of current relays with Fuses



Electrical Energy System Control	<ul style="list-style-type: none"> >> System control and control center concepts >> Control center Roles >> Network switching –Causes and Changes >> Automatic and operator guided power restoration >> Data collection and communication with other centers >> System state monitoring – Voltage & power
Deregulation & Power Trading	<ul style="list-style-type: none"> >> Open markets and electricity pricing >> The path to deregulation, Energy policies and Commissions >> New business establishments to operate transmission systems >> Existing ISO's (Independent System Operators) >> Market structures to operate systems >> How the market – Clearing - price is determined?
Interconnection Failures and Blackouts	<ul style="list-style-type: none"> >> A tale of two black outs >> Black out statistics >> Black outs- contributing factors >> Events leading to failures >> How to react or handle black outs >> Working of power systems –An overview >> Control centers- Information processing and communication >> Grids separation and frequency variations >> Grid monitoring & locating affected areas >> Soft network switching technologies >> How to prevent black out or power failures
Future Trends of Power Systems	<ul style="list-style-type: none"> >> Generation ,Transmission and Distribution – Major Challenges and Tools >> Generation Capacity and margins >> Projected transmission growth >> Growth limitation Tool – Demand side management >> Reduce transmission needs – Distributed generation concepts >> Dispersed energy storage and units >> Reliability enhancement Tool – Distribution system Control Centers >> Improved control centers- New measurements PMU's >> Improved system controls – FACTs (Flexible AC Transmission Systems) >> Intelli Grid with phone and internet connections >> Challenges in power networks >> Additional needs for better power management >> Market forecasts, Communication infrastructure, Sustainable energy integration, Renewable energy, Power control interface and standards, Power electronics for high reliability of power systems



Course on Power Network Essentials

Day 01- Power Network Essentials	
The growth of Electric power systems	<ul style="list-style-type: none"> >> History of electric power systems >> Inventions and evolutions >> The battle of DC versus AC >> Problems with Low voltage systems >> Tesla's solution to AC systems >> Edison's AC high voltage systems >> AC , waveform and generation >> Concepts of RMS for AC systems >> Phasor and mathematical representation of AC systems >> Concepts of Impedance, Resistance and reactance >> Concepts of Apparent, Active and Reactive power >> Power factor and reactive power compensation
Energy Resources	<ul style="list-style-type: none"> >> Hydro electric, Wind , solar ,Tidal , Fuel cell & Geo thermal resources >> Primary energy resources >> Electricity generation by resources >> Annual electric energy consumption >> Ideas on Reserve on the resources >> Hydro electric resource- Consumption and reserve >> Wind and solar resources- Consumption & reserve >> Nuclear resource – Consumption and reserve
Worldwide Standards	<ul style="list-style-type: none"> >> Today's power system >> World wide standards for house hold voltage and frequencies >> Why different voltage standards- a look >> Why different Frequency standards – a look >> Low voltage networks
Power Plants	<ul style="list-style-type: none"> >> Main types of power plants >> Hydro power plants and components >> Reservoir analysis >> Penstock analysis >> Turbines and performance >> Fossil Fuel Power Plant Coal, Oil and Natural Gas >> Nuclear power plants and components >> Safety measures
Environmental Impact	<ul style="list-style-type: none"> >> Impact of primary resources >> Energy and environment >> Key problems associated with generation of energy >> Fossil fuel power plants >> Sulphur Oxide and Ozone pollution >> Acid rain concepts and problems >> CO2 pollution & ashes >> Industrial green house gases >> Environmental Concerns of Hydroelectric Power Plants >> Environmental Concerns of Nuclear Power Plants
Renewable Energy	<ul style="list-style-type: none"> >> Solar systems – Types >> Passive and Active systems >> Solar power and environment >> Wind energy and systems



	<ul style="list-style-type: none"> >> Wind power and environment >> Fuel Cells and issues >> Types of fuel cells and systems >> Geothermal energy systems >> Tidal power and systems >> Biomass energy and systems >> Bio mass energy and environment
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Day 02- Power Network Essentials	
Electric safety	<ul style="list-style-type: none"> >> Safety facts- AC system >> Effects of AC and DC currents >> IEEE standards for safety >> Factors affecting Human safety >> Effect of Voltage , Current and Body resistance >> Effect of source frequency and duration >> Effect of path way >> Ground resistance –Definition >> IEEE standard – Ground resistance >> Touch and step potential >> Prevention and protection from electric shock >> Difference between Neutral and ground in networks >> Ground faults and interrupters >> Grounding of de-energised line equi potential zones
Transmission Lines	<ul style="list-style-type: none"> >> Types of transmission lines >> Three phase AC lines >> Double circuit transmission lines >> Insulators & grading in transmission lines >> Bundled conductors and use >> Ideas on static, shield ground wires >> Direct Cuurent transmission Lines >> Why to use DC lines ? >> Transmission line parameters & definitions >> Representation of transmission lines >> Short , medium and Long lines differentiation >> Transmission line Transients, effects and protection >> Lightning and Traveling wave concepts >> Typical installations of transmission lines
Complex Power	<ul style="list-style-type: none"> >> Concept of complex power >> Real power, Active & Reactive power >> Power flow to different types of loads >> Power factor concepts & influence with loads >> Reactive power compensation >> Load voltage calculation examples >>
Power flow on Transmission lines	<ul style="list-style-type: none"> >> Synchronous Generator and connection to large systems >> Modeling the Power systems >> Phasor diagrams >> Real power control and equations >> Real power flow in transmission lines



	<ul style="list-style-type: none"> >> Reactive power control and equations >> Over and under excited generators in power systems and its impact >> Reactive power flow in networks-worked examples
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Day 03- Power Network Essentials	
Networks	<ul style="list-style-type: none"> >> Basic power systems >> Radial systems and reliability >> Networks paths to improve reliability >> Generator redundancy & reliability of networks >> Power transfer in power lines >> Energy demand in networks >> Generation capacity & deficits >> Electric energy trade >> World wide Web of Power- A look
Power Flow	<ul style="list-style-type: none"> >> Power flow analysis >> Electric Nodes in networks and equations >> Power flow problems in networks and analysis >> Power system visualization by Iterations >> Changes of Real and Reactive power in networks
System Control	<ul style="list-style-type: none"> >> System control and control center concepts >> Control center Roles >> Network switching –Causes and Changes >> Automatic and operator guided power restoration >> Data collection and communication with other centers >> System state monitoring – Voltage & power
Economic Operations	<ul style="list-style-type: none"> >> Optimal generation of power and Dispatch >> Generation –Cost and operation curves >> Generation –Limits and losses >> Computer analysis in handling losses

>> Day 04- Power Network Essentials	
Protection	<ul style="list-style-type: none"> >> Basics of power system protection >> Need for protection devices >> Types of faults >> Relays to control circuit breakers >> Directional power flow and protection >> Discrimination and grading by overcurrent relays >> Co-ordination of over current and distance relays >> Substation protection with Overlapping Zones >> Balanced and un balanced fault analysis >> Introduction to symmetrical components >> Grading and selectivity curves for over current relays >> Co-ordination of current relays with Fuses
Stability (I)	<ul style="list-style-type: none"> >> Introduction to stability studies >> Power balance equations >> Synchronous machines in the system- operational aspects



	<ul style="list-style-type: none"> >> Machines- Equivalent and Phasor diagrams >> Machines Frequency –speed relations in networks >> Power control in networks >> Steady state stability analysis- power limit evaluation >> Methods to increase steady state stability >> How to decrease the total reactance of lines >> Single & Double transmission lines -An overview
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Day 05- Power Network Essentials	
Stability (II)	<ul style="list-style-type: none"> >> Series capacitors and its influence in stability >> Series compensation in Lines and solutions to improve steady state stability >> Transient stability Analysis >> Transients in networks – Causes >> Power swings and swing angle >> Oscillations in networks – Stable and Unstable >> Stability analysis- Equal Area Criterion >> Representation of Stable and Unstable systems >> General stability condition with examples >> Stability analysis – Opening of one breaker >> Critical clearing angle and its impact >> Dynamic stability study – An introduction >> Dynamic stability analysis with multi-machines system >> Analysis by Eigen equations >> Stability Controllers in systems >> PID control in electric systems
Black Outs and Inter Connection Failures	<ul style="list-style-type: none"> >> A tale of two black outs >> Black out statistics >> Black outs- contributing factors >> Events leading to failures >> How to react or handle black outs >> Working of power systems –An overview >> Control centers- Information processing and communication >> Grids separation and frequency variations >> Grid monitoring & locating affected areas >> Soft network switching technologies >> How to prevent black out or power failures
Energy Deregulation	<ul style="list-style-type: none"> >> Open markets and electricity pricing >> The path to deregulation >> Energy policies and Commissions >> New business establishments to operate transmission systems, >> Existing ISO's (Independent System Operators) >> Market structures to operate systems >> How the market – Clearing - price is determined?
Power Trading	<ul style="list-style-type: none"> >> Electricity markets- Basics >> Planning – System Operations >> Maintain current system operations >> Generation capacities – Country level analysis >> Why the large drop in contracts in 2003? >> Market Vs Control phases , >> Energy market evaluation- 1997 to 2001



<p>Future Trends In Power systems</p>	<ul style="list-style-type: none"> >> Generation ,Transmission and Distribution – Major Challenges and Tools >> Generation Capacity and margins >> Projected transmission growth >> Growth limitation Tool – Demand side management >> Reduce transmission needs – Distributed generation concepts >> Dispersed energy storage and units >> Reliability enhancement Tool – Distribution system Control Centers >> Improved control centers- New measurements PMU's >> Improved system controls – FACTs (Flexible AC Transmission Systems) >> Intelli Grid with phone and internet connections >> Challenges in power networks >> Additional needs for better power management >> Market forecasts, Communication infrastructure, Sustainable energy integration, Renewable energy, Power control interface and standards, Power electronics for high reliability of power systems
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Course on Electric energy Step by Step

<ul style="list-style-type: none"> >> Network characteristics >> Transmission networks >> HV Substation technologies >> Archetecture of HV substations >> HV Substation Operating safety and reliabilities >> HV Overhead Lines and Cables
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POWER SYSTEM NETWORK COURSES



Course on Power System Network Engineering

- >> Basic Power system
- >> 3 Phase current network
- >> Energy transfer via 3phase network
- >> Short circuit in networks

Course on Grid Connection & Protection

- >> Grid connectivity
- >> Islanding in networks
- >> Grid Codes and Impact with IPPs
- >> Inter connection protection
- >> Inter connection relaying
- >> Settings and Commissioning

Course on HVDC system basics

- >> Introduction to HVDC
- >> Fundamentals and components
- >> HVDC blocks and SLDs
- >> Harmonics and HVDC
- >> Control and Protection of HVDC system

Course on Electrical networks Fault calculation & Analysis

- >> Basic understanding of Vector Algebra
- >> Introduction to the Power system basics, balanced & unbalanced electrical faults
- >> Equivalent circuits of power equipments, Per unit and three-phase power concepts
- >> Analysis of balanced faults
- >> An introduction to Symmetrical component analysis of faults
- >> Analysis of unbalanced faults
- >> Tutorials with solutions on balanced & unbalanced faults



Course on Conventional Instrument Transformers

- >> Current Transformers basics
- >> Current Transformers construction
- >> Voltage Transformers basics
- >> Voltage Transformers construction-Inductive and Capacitive
- >> Composite Errors - accuracy
- >> Saturation and Knee point Voltage in CTs
- >> Types of current transformers and Voltage transformers
- >> Protection and Measuring CTs and VTs
- >> Selection of RATING ,CLASS, RATIO ,ALF and BURDEN of CT and VT
- >> Connections to relays and meters

Course on Digital Instrument Transformers

- >> Operation
- >> Technology
- >> Accuracy
- >> Communication with interfacing – IEC 61850-9-2
- >> Comparison with conventional transformers

Course on Fundamentals of Power Transformers

- >> Basic Theory
- >> Cooling modes
- >> Stress and failure modes
- >> On Load and Off Load tap changers
- >> Connections
- >> Delta, Star, Zig-zag topologies
- >> Operation and Maintenance



Course on Generators and Motors –Theory

- >> Basic operating principle
- >> Construction
- >> Operation and speed control
- >> Excitation systems
- >> Operating constraints
- >> Selection of AC machines
- >> Stand by operation
- >> Selection of machines
- >> Steady state and Transient stability

Course on Power System Engineering – freshers

- >> Basic power systems technology
- >> Three-phase current network
- >> Capital assets characteristics
- >> Energy transference in the three-phase current network
- >> Short circuit
- >> Physical phenomena

Course on System Grounding

System grounding

- >> System Grounding philosophy
- >> Grounded vs. ungrounded systems
- >> Ground detection in ungrounded systems
- >> High impedance grounding
- >> Low impedance and solidly grounded systems
- >> Grounding generator neutrals
- >> Solved problems



POWER SYSTEM PROTECTION & CONTROL COURSES



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Course on fundamentals of Power System Protection

- >> Protection fundamentals
- >> Basic application principle
- >> Introduction to overcurrent protection
- >> Differential protection
- >> Line distance protection
- >> Busbar protection
- >> Motor protection
- >> Generator protection

Course on Protection scheme philosophy for MV & HV Networks

- >> Electrical networks topology/Switchboards exploitation/Protective scheme
- >> Fault calculations/Neutral earthing modes
- >> Busbars protective scheme philosophy
- >> Power transformers protective scheme philosophy
- >> Generators protective scheme philosophy
- >> Synchronous and asynchronous motors protective scheme philosophy
- >> Lines and cables protective scheme philosophy
- >> Current transformers
- >> Introduction to the control-command systems
- >> Application examples for the specification of a protective relay



Course on Power System Analysis & Protection - Utility

DAY 1

- >> Electrical Power system basics & components
- >> Power system protective Relaying fundamentals
- >> Identify the types of protective systems
- >> Modern protection systems & schemes
- >> Design concepts in applying protection relays
- >> ANSI codes & their significance in relaying
- >> Select appropriate protection systems for various applications based on reliability, performance, security & cost considerations
- >> Basic understanding of Vector Algebra
- >> Introduction to the Power system basics, balanced & unbalanced electrical faults
- >> Equivalent circuits of power equipments, Perunit and three-phase power concepts
- >> Analysis of balanced & unbalanced faults
- >> An introduction to Symmetrical component analysis of faults
- >> Analysis of sequence networks for faults
- >> Tutorials with solutions on balanced & unbalanced faults
- >> Basic concepts on non-directional over current & earth fault protection in radial networks including busbars , cables & transformers
- >> Understanding the connection, configuration and concepts on directional over current & earth fault protection
- >> Phase and earth overcurrent devices in LV networks.
- >> Application and concepts on sensitive earth fault protection for Cable feeders.
- >> Application on phase and earth over current devices and settings for Delta/Star transformers.
- >> Non-directional & directional Overcurrent & earth fault relays and system co-ordination and establish selective and graded schemes
- >> Tutorials with solutions for current protective devices co-ordination in radial networks.



DAY 2

- >> Principles and basics on unit protection for feeders
- >> Circulating current & balanced voltage principles in feeder/cable protection schemes
- >> Electromechanical Pilot Wire Relays and Schemes
- >> Solid State Pilot Wire Relays and Schemes
- >> Concepts of Summation Transformers and Fault Settings in pilot wire relaying
- >> Understand line charging currents & pilot wire protection
- >> Pilot Wire cable Characteristics, Isolation and supervision in relaying schemes
- >> Ideas on Translay relaying schemes & Application
- >> Application of Overcurrent Check in pilot relaying
- >> Concepts and need for Intertripping / Destabilising in pilot relaying.
- >> Theory, winding configurations and equivalent circuit analysis on transformers
- >> Faults and its categorization in transformers
- >> Differential protection principles & techniques
- >> Influence on 2nd harmonic & 5th harmonic detection in transformer differential relaying
- >> Restricted earth fault protection principles & techniques
- >> Back up phase and earth over current protection
- >> Over view of mechanical protection devices such as Buchholz , winding temperature, Sudden pressure devices etc.
- >> Concepts and application on Overfluxing or Volt /Hertz protection
- >> Over all differential relaying for Generator-Transformer Feeders
- >> Analysis and concepts on protection relaying schemes for power transformers
- >> Transformer protection relays setting philosophy and criteria.
- >> Setting example & tutorials on differential, REF, over current earth fault , Over load and overfluxing protection & associated schemes.



DAY 3

- >> Introduction to Transmission Lines
- >> Basic principles on R-X plane and relaying
- >> Fundamentals on distance relay operating characteristics and developments with merits/de-merits.
- >> Phase selection & Switch On To Fault
- >> Introduction to Communication schemes in distance relaying
- >> Residual & mutual impedance compensation in distance relays
- >> Concepts in distance relaying for short lines, multi-terminal and tapped line protections
- >> Influence of load flow and fault, arc resistance in distance relays
- >> Weak infeed and Echo logic
- >> Power swing & distance protection
- >> VT fuse failure & distance relays
- >> Fault Location & distance relays
- >> Tripping , Auto re-closing & synchro check functions in line with distance protection
- >> Line protection relays setting philosophy and criteria.
- >> Different Zones & compensation factors - Setting calculations with example.
- >> Grading of distance zones
- >> Power swing, weak infeed & Echo logic settings
- >> Setting considerations & tips on Short lines, multi terminal lines and Tapped lines
- >> Distance relays and telecommunication schemes
- >> Zone 1 extension Schemes
- >> Transfer Trip schemes – Direct & Permissive
- >> Blocking & Un blocking schemes
- >> Configuration of distance relays with various schemes , both conventional & modern



DAY 4

- >> Introduction to the basics of auto re-closing in transmission networks
- >> Application of auto re-closing & system stability
- >> Factors influencing auto re-closing in electrical networks
- >> High speed & delayed Auto re-closing in HV /EHV networks
- >> Single phase & three phase auto re-closing concepts, selection and application
- >> Examples of auto re-close application in HV/EHV networks
- >> Introduction to busbar faults
- >> Busbar protection requirements
- >> Principles and philosophies in Bus bar protection
- >> Frame earth leakage protection for LV bus bars
- >> Busbar differential protection principles & Techniques
- >> Features, benefits and characteristics of busbar protection relays
- >> High impedance busbar differential protection
- >> Low impedance busbar differential protection
- >> Sensitivity towards internal faults & Stability towards External Faults
- >> Configuration of Bus bars & schemes
- >> Main ,check protection schemes and bus wire supervision relaying
- >> Introduction to Numerical busbar protection & relays
- >> Busbar protection relay settings , setting criteria and calculations
- >> Buswire supervision relays –settings & criteria
- >> Conventional current differential protection of feeders and its de-merits
- >> Introduction to Digital/ Numerical current differential protection
- >> Main features , benefits and characteristics of numerical differential relays
- >> Carrier protection schemes and signaling
- >> Time synchronization and signal transfer techniques
- >> Signal propagation and propagation delays
- >> Fault detection and operating Quantities
- >> Schemes and capacitive current compensation Techniques
- >> Application to Plain feeders
- >> Application to transformer feeders
- >> Configuration of numeric differential relays to the feeders or cables



DAY 5

- >> Understanding current transformers and its role in electrical networks
- >> Basic Theory, winding configurations and equivalent circuit analysis on current transformers
- >> Construction of CTs
- >> Composite Errors in CTs- Ratio & Phase angle
- >> Saturation and Knee point Voltage in CTs
- >> Accuracy and its requirement of CTs
- >> Types of current transformers
- >> Protection CTs and Measuring CTs
- >> Polarity check and V_k determination in CTs
- >> Steady state response of CTs
- >> Transient behaviour of CTs
- >> Selection of RATING ,CLASS, RATIO ,ALF and BURDEN etc of CTs in line with protective devices
- >> Tutorials with solutions and calculations in selecting the CTs and V_k for different protective relays
- >> An introduction to Non Conventional CTs or Optical CTs
- >> Optical sensors – construction & concepts
- >> Optical CTs- Advantages & disadvantages
- >> Electrical Systems Protection and control evolution from Electromechanical , Static and digital technologies
- >> An introduction to Digital and Numerical relaying
- >> Principles of Numerical relays & construction
- >> Hardware and software
- >> User interface & look, Features and functions of Numerical relays
- >> Digital Inputs and Outputs interface
- >> Settings and setting procedures
- >> Programming the Numerical relays
- >> Current and Voltage supervision functions
- >> Metering in Numerical relays
- >> Extraction and downloading of settings and configuration Tips
- >> An introduction to Fault records, Event records and Disturbance records
- >> Customisation of Numerical relays for different networks



Course on Power System Analysis & Protection – Industry/Power Plants

DAY 1

Overview of Protection Fundamentals :

- >> Electrical Power system basics & components
- >> Power system protective Relaying fundamentals
- >> Identify the types of protective systems
- >> Modern protection systems & schemes
- >> Design concepts in applying protection relays
- >> ANSI codes & their significance in relaying
- >> Select appropriate protection systems for various applications based on reliability, performance, security & cost considerations

Fault Calculations & Power Systems Analysis :

- >> Basic understanding of Vector Algebra
- >> Introduction to the Power system basics, balanced & unbalanced electrical faults
- >> Equivalent circuits of power equipments, Per unit and three-phase power concepts
- >> Analysis of balanced & unbalanced faults
- >> An introduction to Symmetrical component analysis of faults
- >> Analysis of sequence networks for faults
- >> Tutorials with solutions on balanced & unbalanced faults

Application of Non-Directional and Directional Over current and Earth Fault Protection to Feeders, Cables, Transformers and Busbars :

- >> Basic concepts on non-directional over current & earth fault protection in radial networks including busbars , cables & transformers
- >> Understanding the connection, configuration and concepts on directional over current & earth fault protection
- >> Phase and earth overcurrent devices in radial networks.
- >> Application and concepts on sensitive earth fault protection for Cable feeders.
- >> Application on phase and earth over current devices and settings for Delta/Star transformers.
- >> Non-directional & directional Overcurrent & earth fault relays and co-ordination and establish selective and graded schemes
- >> Tutorials with solutions for current protective devices co-ordination in radial networks.



DAY 2**Pilot Wire Differential Protection: Principles and Application :**

- >> Principles and basics on unit protection for feeders
- >> Circulating current & balanced voltage principles in feeder/cable protection schemes
- >> Electromechanical Pilot Wire Relays and Schemes
- >> Solid State Pilot Wire Relays and Schemes
- >> Concepts of Summation Transformers and Fault Settings in pilot wire relaying
- >> Understand line charging currents & pilot wire protection
- >> Pilot Wire cable Characteristics, Isolation and supervision in relaying schemes
- >> Ideas on Translay relaying schemes & Application
- >> Application of Overcurrent Check in pilot relaying
- >> Concepts and need for Intertripping / Destabilising in pilot relaying.

Power Transformer & Transformer feeder protection & Schemes :

- >> Theory, winding configurations and equivalent circuit analysis on transformers
- >> Faults and its categorization in transformers
- >> Differential protection principles & techniques
- >> Influence on 2nd harmonic & 5th harmonic detection in transformer differential relaying
- >> Restricted earth fault protection principles & techniques
- >> Back up phase and earth over current protection
- >> Over view of mechanical protection devices such as Buchholz, winding temperature, sudden pressure devices etc.
- >> Concepts and application on Overfluxing or Volt /Hertz protection
- >> Over all differential relaying for Generator-Transformer Feeders
- >> Analysis and concepts on protection relaying schemes for power transformers
- >> Transformer protection relays setting philosophy and criteria.
- >> Setting example & tutorials on differential, REF, over current earth fault, over load and overfluxing protection & associated schemes.



DAY 3**Generator Protection- Basic Principles, Relays, Application & Schemes :**

- >> Generator constitution
- >> Connections to power systems
- >> Electrical protection requirements
- >> Generator Faults
- >> Stator earth fault protection
- >> Method of earthing & Fault current limitations
- >> Neutral voltage displacement protection
- >> Differential protection techniques
- >> Negative sequence overcurrent protection
- >> Reverse power protection
- >> Loss of excitation protection
- >> Loss of Synchronisation protection techniques
- >> Thermal Over load protection
- >> Rotor earth fault protection
- >> Back up underimpedance/voltage controlled protections
- >> Under/over Voltage & Frequency protections
- >> Typical generator Electrical protection schemes
- >> Tutorial with solutions – Generator Protection relays Settings & Calculations

DAY 4**Motor Protection & Control :**

- >> Types of faults & Causes
- >> Thermal overload & protection
- >> Start/Stall protection
- >> Unbalancing & Protection
- >> Single phasing, Reverse phase rotation & protection
- >> Under voltage protection
- >> Short circuit protection
- >> Differential protection
- >> Mechanical failures- A look
- >> Synchronous motors & Protection
- >> Tutorial with solutions – Motor Protection relays Settings Example



DAY 4**Busbar Protection Techniques & Schemes :**

- >> Introduction to busbar faults
- >> Busbar protection requirements
- >> Principles and philosophies in Bus bar protection
- >> Frame earth leakage protection for LV bus bars
- >> Busbar differential protection principles & Techniques
- >> Features, benefits and characteristics of busbar protection relays
- >> High impedance busbar differential protection
- >> Low impedance busbar differential protection
- >> Sensitivity towards internal faults & Stability towards External Faults
- >> Configuration of Bus bars & schemes
- >> Main ,check protection schemes and bus wire supervision relaying
- >> Introduction to Numerical busbar protection & relays
- >> Busbar protection relay settings , setting criteria and calculations
- >> Buswire supervision relays –settings & criteria



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DAY 5**Current Transformer Requirements for Protection Relaying :**

- >> Understanding current transformers and its role in electrical networks
- >> Basic Theory, winding configurations and equivalent circuit analysis on current transformers
- >> Construction of CTs
- >> Composite Errors in CTs - Ratio & Phase angle
- >> Saturation and Knee point Voltage in CTs
- >> Accuracy and its requirement of CTs
- >> Types of current transformers
- >> Protection CTs and Measuring CTs
- >> Polarity check and V_k determination in CTs
- >> Steady state response of CTs
- >> Transient behaviour of CTs
- >> Selection of RATING, CLASS, RATIO, ALF and BURDEN etc of CTs in line with protective devices
- >> Tutorials with solutions and calculations in selecting the CTs and V_k for different protective relays
- >> An Introduction to Non Conventional CTs or Optical CTs
- >> Optical sensors – construction & concepts
- >> Optical CTs - Advantages & disadvantages

Electrical Systems Protection and control evolution from Electromechanical, Static and digital technologies :

- >> An Introduction to Digital and Numerical relaying
- >> Principles of Numerical relays & construction
- >> Hardware and software
- >> User interface & look, Features and functions of Numerical relays
- >> Digital Inputs and Outputs interface
- >> Settings and setting procedures
- >> Programming the Numerical relays
- >> Current and Voltage transformers supervision functions
- >> Metering in Numerical relays
- >> Extraction and downloading of settings and configuration Tips
- >> An introduction to Fault records, Event records and Disturbance records
- >> Customisation of Numerical relays for different networks



Course on application of Protective relays to Transmission systems

- >> Application principles of distance protection
- >> Setting procedures of distance protection relays
- >> Application principles of distance protection schemes
- >> Application principles of current differential protection
- >> Setting procedures of differential protection relays
- >> Auto reclose on Transmission Systems
- >> System Stability
- >> Application principles and setting procedures of busbar protection

Course on application of Protective relays to Distribution systems

- >> Application principles of feeder protection
- >> Setting procedures of feeder protection
- >> Auto reclose on Distribution Systems
- >> Application principles of Motor protection
- >> Setting procedures of motor protection
- >> Application principles of Transformer protection
- >> Setting procedures of transformer protection

Course on Overcurrent & EF relays co-ordination to Industrial systems

- >> Basic concepts on non-directional over current & earth fault protection in radial networks including busbars , cables & transformers
- >> Phase and earth overcurrent devices in LV networks.
- >> Application on phase and earth over current devices and settings for Delta/Star transformers.
- >> Tutorials with solutions for current protective devices co-ordination in radial networks.



Course on Generator Protection and schemes

- >> Generator constitution
- >> Connections to power systems
- >> Electrical protection requirements
- >> Generator Faults
- >> Stator earth fault protection
- >> Method of earthing & Fault current limitations
- >> Neutral voltage displacement protection
- >> Differential protection techniques
- >> Negative sequence overcurrent protection
- >> Reverse power protection
- >> Loss of excitation protection
- >> Loss of Synchronisation protection techniques
- >> Thermal Over load protection
- >> Rotor earth fault protection
- >> Back up underimpedance/voltage controlled protections
- >> Under/over Voltage & Frequency protections
- >> Typical generator Electrical protection schemes
- >> Tutorial with solutions – Generator Protection relays Settings & Calculations

Course on State of art Numerical Power System protection & Relays

- >> Electrical Systems Protection and control evolution from Electromechanical , Static and digital technologies- Numerical relays
- >> An introduction to Digital and Numerical relaying- One box solution concepts
- >> Principles of Numerical relays & construction
- >> Hardware and software
- >> User interface & look, Features and functions of Numerical relays
- >> Digital Inputs and Outputs interface
- >> Setting procedures and configuration
- >> Programming the Numerical relays
- >> Current and Voltage supervision functions
- >> Metering in Numerical relays
- >> Communication to SCS or SCADA
- >> An introduction to Fault records, Event records and Disturbance records
- >> Customisation of Numerical relays for different networks



Course on Modern Power system protective Relaying

Fault Calculations & Power Systems Analysis :

- >> Introduction to the Power system basics, balanced & unbalanced electrical faults
- >> Equivalent circuits of power equipments, PU and 3-phase power concepts
- >> Analysis of balanced & unbalanced faults
- >> An introduction to Symmetrical component analysis of faults
- >> Analysis of sequence networks for faults
- >> Tutorials with solutions on balanced & unbalanced faults

Application of Non-Directional and Directional Over current and Earth Fault Protection to Feeders, Cables, Transformers and Busbars :

- >> Basic concepts on non-directional over current & earth fault protection in radial networks including busbars , cables & transformers
- >> Understanding the connection, configuration and concepts on directional over current & earth fault protection
- >> Non-directional & directional Overcurrent & earth fault relays and co-ordination and establish selective and graded schemes
- >> Tutorials with solutions for current protective devices co-ordination in radial networks.

Pilot Wire Differential Protection: Principles and Application :

- >> Circulating current & balanced voltage principles in feeder/cable protection schemes
- >> Electromechanical and Solid State Pilot Wire Relays and Schemes
- >> Concepts of Summation Transformers and Fault Settings in pilot wire relaying
- >> Understand line charging currents & pilot wire protection
- >> Pilot Wire cable Characteristics, Isolation and supervision in relaying schemes
- >> Concepts and need for Intertripping / Destabilising in pilot relaying.

Power Transformer & Transformer feeder protection & Schemes :

- >> Faults and its categorization in transformers
- >> Differential protection principles & techniques
- >> Influence on 2nd harmonic & 5th harmonic detection in transformer differential relaying
- >> High impedance Restricted earth fault protection principles & techniques
- >> Over view of mechanical protection devices such as Buchholz, winding temperature, sudden pressure devices etc.
- >> Concepts and application on Overfluxing or Volt /Hertz protection
- >> Analysis and concepts on protection relaying schemes for power transformers
- >> Transformer protection relays setting philosophy and criteria.



Distance protection:

- >> Fundamentals on distance Protection and operating characteristics
- >> Introduction to Communication schemes in distance relaying
- >> Residual & mutual impedance compensation in distance relays
- >> Concepts in distance relaying for short lines, multi-terminal and tapped line protections
- >> Influence of load flow and fault, arc resistance in distance relays
- >> Weak infeed and Echo logic
- >> Power swing & distance protection
- >> VT fuse failure & distance relays
- >> Fault Location & distance relays
- >> Tripping , Auto re-closing & synchro check functions in line with distance protection
- >> Line protection relays setting philosophy and criteria.
- >> Different Zones & compensation factors - Setting calculations with example.
- >> Grading of distance zones
- >> Power swing, weak infeed & Echo logic settings
- >> Distance relays and telecommunication schemes
- >> Zone 1 extension and Transfer Trip schemes – Direct & Permissive
- >> Blocking & Un blocking schemes
- >> Configuration of distance relays with various schemes , both conventional & modern

Busbar Protection & Schemes :

- >> Introduction to busbar faults
- >> Principles and philosophies in Bus bar protection
- >> Frame earth leakage protection for LV bus bars
- >> Busbar differential protection principles & relays
- >> High impedance busbar differential protection
- >> Low impedance busbar differential protection
- >> Configuration of Bus bars & schemes
- >> Main ,check protection schemes and bus wire supervision relaying
- >> Busbar protection relay settings , setting criteria and calculations
- >> Buswire supervision relays –settings & criteria



Generator Protection- Basic Principles, Relays, Application & Schemes :

- >> Generator constitution
- >> Generator Faults- Stator earth fault protection
- >> Neutral voltage displacement protection
- >> Differential protection techniques
- >> Negative sequence overcurrent protection
- >> Reverse power protection
- >> Loss of excitation protection & Loss of Synchronisation protection
- >> Thermal Over load protection
- >> Rotor earth fault protection
- >> Back up underimpedance/voltage controlled protections
- >> Under/over Voltage & Frequency protections
- >> Typical generator Electrical protection schemes
- >> Tutorial with solutions – Generator Protection relays Settings & Calculations

Motor Protection & Control :

- >> Types of faults & Causes
- >> Thermal overload & protection
- >> Start/Stall protection, Unbalancing & Protection
- >> Single phasing, Reverse phase rotation & protection
- >> Under voltage protection
- >> Short circuit protection
- >> Differential protection
- >> Mechanical failures- A look
- >> Synchronous motors & Protection

CTs & VTs for Protective relaying :

- >> Basic Theory, winding configurations of current and Voltage transformers
- >> Construction of CTs & VTs
- >> Composite Errors in CTs- Ratio & Phase angle
- >> Saturation and Knee point Voltage in CTs
- >> Accuracy and its requirement of CTs & VTs
- >> Types of current transformers and Voltage Transformers
- >> Protection CTs and Measuring CTs & VTs
- >> Selection of RATING ,CLASS, RATIO ,ALF and BURDEN etc of CTs & VTs in line with protective and Metering devices
- >> Tutorials with solutions and calculations in selecting the CTs and V_k for different protective relays



Current and Voltage Transformers (CTs&VTs) for Protection relaying

- >> Current transformer requirements for Protective relaying
 - >> Basic Theory & Principle
 - >> Standards
 - >> Polarity
 - >> Knee Point Voltage & Saturation – Concept & Definition
 - >> Types of CTs
 - >> Measurement CTs
 - >> Protection CTs
 - >> CTs- Designation – CLASS & Specification
 - >> CT selection for different protection applications.

- >> Voltage transformers for Protective relaying
 - >> Basic Theory & Principle
 - >> Standards
 - >> Types of VTs
 - >> VTs- Designation – CLASS & Specification
 - >> VT selection for different protection applications

- >> CT and VT requirements
 - >> Tutorials – CT &VT sizing calculation example



POWER SYSTEM PROTECTION RELAYS COURSES



Course on Protection Relays

Directional and non directional Overcurrent and Earth fault Protection - **ABB /ALSTOM /AREVA /SIEMENS** relays

- >> Hardware & Software Familiarisation
- >> Function , features and Application
- >> Menu Navigation, Measurements & Monitoring
- >> Introduction to the Software setting
- >> Local Communication & Programming
- >> Uploading, Downloading & Setting Files creation
- >> Menu Text Editing and File Transfer
- >> Faults & Events Records Extraction & Interrogation
- >> Disturbance Records Extraction process
- >> On-line Measurements and Commissioning Tools explanation
- >> Practical session- Functional testing and performance analysis

Line Distance Protection Relays-

ABB /ALSTOM /AREVA /SIEMENS relays

- >> Hardware & Software Familiarisation
- >> Function , features and Application
- >> Menu Navigation, Measurements & Monitoring
- >> Introduction to the Software setting
- >> Local Communication & Programming
- >> Uploading, Downloading & Setting Files creation
- >> Menu Text Editing and File Transfer
- >> Faults & Events Records Extraction & Interrogation
- >> Disturbance Records Extraction process
- >> On-line Measurements and Commissioning Tools explanation
- >> Practical session- Functional testing and performance analysis



Line or cable current Differential Protection Relays-

ABB /ALSTOM /AREVA /SIEMENS relays

- >> Hardware & Software Familiarisation
- >> Function , features and Application
- >> Menu Navigation, Measurements & Monitoring
- >> Introduction to the Software setting
- >> Local Communication & Programming
- >> Uploading, Downloading & Setting Files creation
- >> Menu Text Editing and File Transfer
- >> Faults & Events Records Extraction & Interrogation
- >> Disturbance Records Extraction process
- >> On-line Measurements and Commissioning Tools explanation
- >> Practical session- Functional testing and performance analysis

Transformer Protection Relays-

ABB /ALSTOM /AREVA /SIEMENS relays

- >> Hardware & Software Familiarisation
- >> Function , features and Application
- >> Menu Navigation, Measurements & Monitoring
- >> Introduction to the Software setting
- >> Local Communication & Programming
- >> Uploading, Downloading & Setting Files creation
- >> Menu Text Editing and File Transfer
- >> Faults & Events Records Extraction & Interrogation
- >> Disturbance Records Extraction process
- >> On-line Measurements and Commissioning Tools explanation
- >> Practical session- Functional testing and performance analysis



Bus bar Protection Relays-**ABB /ALSTOM /AREVA /SIEMENS relays**

- >> Hardware & Software Familiarisation
- >> Function , features and Application
- >> Menu Navigation, Measurements & Monitoring
- >> Introduction to the Software setting
- >> Local Communication & Programming
- >> Uploading, Downloading & Setting Files creation
- >> Menu Text Editing and File Transfer
- >> Faults & Events Records Extraction & Interrogation
- >> Disturbance Records Extraction process
- >> On-line Measurements and Commissioning Tools explanation
- >> Practical session- Functional testing and performance analysis

Generator Protection Relays-**ABB /ALSTOM /AREVA /SIEMENS relays**

- >> Hardware & Software Familiarisation
- >> Function , features and Application
- >> Menu Navigation, Measurements & Monitoring
- >> Introduction to the Software setting
- >> Local Communication & Programming
- >> Uploading, Downloading & Setting Files creation
- >> Menu Text Editing and File Transfer
- >> Faults & Events Records Extraction & Interrogation
- >> Disturbance Records Extraction process
- >> On-line Measurements and Commissioning Tools explanation
- >> Practical session- Functional testing and performance analysis



Motor Protection Relays-**ABB /ALSTOM /AREVA /SIEMENS relays**

- >> Hardware & Software Familiarisation
- >> Function , features and Application
- >> Menu Navigation, Measurements & Monitoring
- >> Introduction to the Software setting
- >> Local Communication & Programming
- >> Uploading, Downloading & Setting Files creation
- >> Menu Text Editing and File Transfer
- >> Faults & Events Records Extraction & Interrogation
- >> Disturbance Records Extraction process
- >> On-line Measurements and Commissioning Tools explanation
- >> Practical session- Functional testing and performance analysis

Synchronising & Breaker Failure Protection Relays-**ABB /ALSTOM /AREVA /SIEMENS relays**

- >> Hardware & Software Familiarisation
- >> Function , features and Application
- >> Menu Navigation, Measurements & Monitoring
- >> Introduction to the Software setting
- >> Local Communication & Programming
- >> Uploading, Downloading & Setting Files creation
- >> Menu Text Editing and File Transfer
- >> Faults & Events Records Extraction & Interrogation
- >> Disturbance Records Extraction process
- >> On-line Measurements and Commissioning Tools explanation
- >> Practical session- Functional testing and performance analysis



Course on Numerical relays – Testing procedure, setting & Configuration

- >> Numerical relay- Hardware & Software Familiarisation
- >> Function , features and Application
- >> Menu Navigation, Measurements & Monitoring
- >> Introduction to the Software setting
- >> Local Communication & Programming
- >> Uploading, Downloading & Setting Files creation
- >> Menu Text Editing and File Transfer
- >> Faults & Events Records Extraction & Interrogation
- >> Disturbance Records Extraction process
- >> On-line Measurements and Commissioning Tools explanation
- >> Practical session- Functional testing and performance analysis

Course on Commissioning & Preventive Maintenance of protective relays

- >> Protection relays –Testing methods & procedures
- >> Primary and secondary injection tests
- >> Site requirements
- >> Pre-commissioning
- >> Commissioning & preventive maintenance techniques
- >> Frequency of maintenance
- >> Maintenance checks
- >> CT & VT checks
- >> Functional test on relays and performance evaluation methods
- >> Fault recorders and Disturbance recorders analysis
- >> Condition monitoring
- >> Fault finding & Troubleshooting



SUBSTATION ENGINEERING & DESIGN COURSES



Course on Substation Design and Engineering

- >> Substation SLD
- >> Base Design Concepts
- >> Protection and control schemes – understanding
- >> Standards and Codes
- >> Design & drafting Software tools definition
- >> Detailed design scheme principles
- >> Design and development of schematics- procedure
- >> Engineering check lists
- >> Cortec definition and material management
- >> Understanding and applying wiring diagrams
- >> Manufacturing documents and wiring list , tables
- >> Interfacing and cable schedules
- >> AS-BUILT formulation and techniques
- >> Design of schemes with tutorials

Course on CT and VT sizing calculation for substation Relays,BCUs & Meters

- >> Current transformer requirements for Protective relaying
 - >> Basic Theory & Principle
 - >> Standards
 - >> Types of CTs
 - >> Measurement CTs
 - >> Protection CTs
 - >> CTs- Designation – CLASS & Specification
 - >> CT selection for different protection applications.
- >> Voltage transformers for Protective relaying
 - >> Basic Theory & Principle
 - >> Standards
 - >> Types of VTs
 - >> VTs- Designation – CLASS & Specification
 - >> VT selection for different protection applications
- >> Current transformer sizing calculation for relays
 - >> Tutorials – CT adequacy calculation example –OC, Distance, Differential , REF, Busbar etc.. relays



Course on Setting calculations for Substation Relays, BCUs & Meters

- >> Substation SLD with relays connections
- >> Application of functions
- >> Setting criteria
- >> Configuration techniques
- >> Relay co-ordination principles
- >> OEM relays setting pattern analysis
- >> Settings tool
- >> Setting calculation report formulation
- >> Setting calculation for relays:
- >> Tutorials with example –OC, Distance, Differential , REF, Busbar etc.. relays



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MANAGEMENT & LEADERSHIP COURSES



Course on Management & Leadership

LEADERSHIP & MANAGEMENT STYLES

- >> Introduction
- >> Differences between leading and managing
- >> Setting Direction
- >> Organising and staffing
- >> Aligning people
- >> Execution
- >> Controlling and problem solving
- >> Motivating and inspiring
- >> Outcome
- >> Producing stability
- >> Producing change

- >> Autocratic
- >> Permissive
- >> Directive Democrat
- >> Directive Autocrat
- >> Permissive Democrat
- >> Permissive Autocrat
- >> Quadrants of Situational Leadership
- >> Telling
- >> Delegating
- >> Participating
- >> Selling
- >> Summarising



COMMUNICATION & MYERS-BRIGGS TYPE INDICATOR [MBTI]

- >> Introduction
- >> Barriers to effective Communication
- >> Active Listening
- >> Questioning Skills
- >> Behaviour
- >> Listening skills
- >> Pre-occupation
- >> Emotional blocks
- >> Hostility
- >> Charisma
- >> Past Experience
- >> Hidden Agendas
- >> Inarticulateness
- >> Special Languages
- >> Stereotyping
- >> Physical Environment
- >> Individual's Physical Condition
- >> Defensiveness
- >> Relationships
- >> Status
- >> How to improve Listening Skills
- >> Be comfortable
- >> Watch as well as listen
- >> Do not distract other people
- >> Ask if you do not understand
- >> Maintenance of eye contact



- >> Use supportive sounds
- >> Clarifying
- >> Restatement
- >> Neutral
- >> Reflective
- >> Verbal, Vocal and Visual [Body Language]

- >> What is MBTI and where does it come from?
- >> Eight preferences on four bipolar scales
- >> Extraversion
- >> Introversion
- >> Sensing
- >> Intuition
- >> Thinking
- >> Feeling
- >> Judging
- >> Perceiving
- >> Summarising



MANAGING ACROSS CULTURES

- >> Introduction
- >> Diversity Management
- >> Intercultural Competences
- >> Promote values of own national culture
- >> Represent company values
- >> Understand other cultures
- >> Communicate with other cultures
- >> Negotiate effectively
- >> Acquire valid experience
- >> Dimensions of cultural Difference
- >> Interpersonal Communication
- >> Perception of time
- >> Respect for seniority
- >> Assumptions
- >> Stereotyping
- >> Valuing Diversity
- >> Openness
- >> Organisation cultures
- >> Culture type
- >> Individual motivation
- >> Way to success
- >> Definition of success
- >> Climate
- >> Summarising



PERFORMANCE MANAGEMENT

- >> Introduction
- >> Plan
- >> Implement
- >> Review
- >> Evaluation
- >> Benefits
- >> Multiple purposes
- >> Quickly changing environments
- >> Time
- >> Bureaucracy
- >> Feedback
- >> Subjective
- >> Objectives
- >> Personal reactions
- >> Coverage
- >> Storage and use
- >> Ownership
- >> Lack of creativity
- >> Changes occurring in approaches
- >> The elements of performance management
- >> Interrelated activities
- >> Job descriptions
- >> Performance plans



- >> Personal Development Plan
- >> Agreeing targets
- >> SMART- Stretching, Measurable, Agreed, Realistic, Time bound
- >> CASE- Condition , Action , Standard , Evaluate
- >> Summarising

MANAGING OTHERS

- >> Introduction
- >> Activity
- >> Performance Appraisal
- >> Good Practice
- >> Preparation
- >> Setting
- >> Attitude
- >> Opening
- >> The Interview
- >> Closing
- >> Follow up
- >> Appraisal pitfalls
- >> Bias
- >> Prejudice
- >> The Halo Effect
- >> The Horn Effect
- >> Logical Rating
- >> Contrast



- >> Similarity
- >> Leniency
- >> Harshness [Strictness, Severity]
- >> Central Tendency
- >> Proximity
- >> Recency
- >> Fatigue
- >> Length of Service
- >> Forced Distribution
- >> Avoiding Defensive Communication
- >> Rewards
- >> Development and methods
- >> Coaching is just good management
- >> Training
- >> Coaching
- >> Mentoring
- >> Focus, Time span , Employee involvement
- >> GROW - Goal , Reality , Options , Will
- >> Why bother
- >> Summarising



MOTIVATION

- >> Introduction
- >> Recognising motivation
- >> What motivates people
- >> The Effort-Performance-Outcome Links
- >> Objectives, Ability and Skill
- >> Extrinsic- Pay, Status ,Working condition, Praise, Promotion, Leisure
- >> Intrinsic – Self Respect, Achievement, Learning, Contribution, Worthwhile Activity
- >> Job Satisfaction
- >> Type and Motivation
- >> Sensing types and Intuitive types
- >> Motivating thinking people and feeling people
- >> Motivating Judging types and perceptive types

PERSONAL DEVELOPMENT PLANNING

- >> Goal Setting
- >> SMART- Specific, Measurable, Achievable, Result Oriented, Time Bound/Based
- >> ASS - Agreed, Supported, Stretching
- >> Planning
- >> Measurable Activity
- >> Accountability
- >> Timed Activities
- >> Available Resources
- >> Evaluating Process, Commitment
- >> Tools for Development
- >> Learning Cycle
- >> Summarising , Certification



Course on Marketing Management

DAY 1
<ul style="list-style-type: none"> >> Introduction >> Marketing Segmentation >> Elements of Marketing Mix >> Marketing Strategy >> Sales Forecasting, Managing the Product
DAY 2
<ul style="list-style-type: none"> >> Product Life Cycle >> Pricing >> Marketing Information System >> International Marketing >> Summarising, Certification

Course on Management Information system

DAY 1
<ul style="list-style-type: none"> >> HR/Administration Management >> Marketing Management >> Sales Management
DAY 2
<ul style="list-style-type: none"> >> Procurement and Logistics Management >> Sress Management >> Crisis Management >> Summarising >> Certification



Course on Cost Effective Maintenance Management

- >> Introduction of Maintenance Management
- >> Specific Maintenance Definition Maintenance Goals
- >> Reactive Maintenance
- >> Predictive Maintenance
- >> Preventative Maintenance
- >> Total Productive Maintenance
- >> Reliability -- Centered Maintenance
- >> Overall Equipment Effectiveness
- >> Principles of Maintenance Management
- >> Why we have a Maintenance Plan?
- >> Maintenance Process
- >> Expected Outcomes
- >> Maintenance Budget
- >> Levels of Planning
- >> Effective Planned Maintenance
- >> How to implement a good Maintenance Plan (Manpower, Spare Parts, Tools)
- >> Plan Evaluation & Feedback
- >> Causes of Poor Productivity
- >> Elements of Labor Control
- >> Total Cost Visibility
- >> Life Cycle Cost
- >> Maintenance Methods and Cost Centers
- >> Maintenance Classifications
- >> Accounting Procedures
- >> Area for reducing Maintenance Costs
- >> Economics Indicators of Maintenance Costs
- >> How to reduce maintenance Cost :
- >> Use of Contractors
- >> Area Maintenance/ Zones/ Shifts
- >> Company Maintenance Manpower
- >> Ordering Parts
- >> Functions of the Maintenance Store
- >> Spare Parts Storage & Retrieval
- >> Methods to control & reduce Inventory
- >> 10 Rules for Improvement of Work Process



Course on Maintenance Leadership and Technology

- >> Introduction to Maintenance Management
- >> Definitions of key terms
- >> Types of Maintenance - Reactive, planned and improvement jobs, Preventive and Proactive
- >> Maintenance Planning and Scheduling
- >> Computerised Maintenance Management Systems
- >> Developing Maintenance Key Performance Indicators
- >> Maintenance Organisation Structure and Policies
- >> Developing and Implementing a Preventive Maintenance Program
- >> Applying Reliability Based principles to Maintenance Strategy Development
- >> Managing Maintenance Spare Parts and Logistics
- >> Optimising Spare Parts Inventory Levels
- >> Maintenance Budgeting
- >> Controlling Maintenance Costs
- >> Engineering, Production & Maintenance Teams
- >> Benefits of Integrated teams
- >> Motivation and empowerment
- >> Implementing Team Based Continuous Improvement in Maintenance
- >> Causes of Machinery Failure
- >> Cause of system failures
- >> Electrical components failures
- >> Job Feedback and the Importance of History Records
- >> Elementary Statistics
- >> Collection, Analysis, Representation and Interpretation of Statistical Data
- >> Reliability Models
- >> Maintenance Cost Optimisation
- >> Condition based Maintenance -What to Monitor and Where
- >> Condition Monitoring Systems
- >> Trending of Monitored Data
- >> Frequency of Measurement
- >> Parameter Symptom Limits
- >> Substation condition monitoring
- >> Condition based maintenance strategies and planning



Course on Root Cause Failure Analysis

- >> Problem Solving - Basic Principles
- >> Problem Identification Session
- >> Terminology of RCFA
- >> Decision Logic
- >> Three Knowledge Types
- >> Maintenance Maturity Indexing
- >> Six Level Generic Performance Standard
- >> Continuous Improvement
- >> The SQC Performance Model
- >> Reverse Risk Analysis
- >> Maintenance /Operations Objectives and Resource Analysis
- >> Complexity; Risk; and Variability Models
- >> The Maintenance Cost Ratio
- >> Solving of Delegate Problems
- >> Cross Referencing Operational Variables
- >> Sigma Sets: The Absolute Decision Standard
- >> Data / Knowledge Base
- >> Accuracy and Availability of Data / Cost relationship
- >> The Four critical stages of Data Maturity
- >> Logical Critical Thinking vs. Creative Lateral Divergent Thinking
- >> Maintenance Strategy Development and Implementation
- >> Standard Pitfalls for Maintenance Improvement Initiatives
- >> Generic Problem Solving Techniques
- >> Logical Problem Solving Techniques
- >> Creative Problem Solving Techniques
- >> A Systematic Root Cause Failure Analysis Methodology
- >> Introduction to TRIZ Methodology



- >> Review of Most Suitable Techniques
- >> Development of an “Instant Approach” to Problem Solving
- >> Review of Most Suitable Techniques
- >> Development of an “Instant Approach” to Problem Solving
- >> Individual Delegate Requirements
- >> Commercial Programs
- >> Logistical Requirements for Practical RCFA implementation
- >> RCFA Exercises (Analysis of Client Company Specific Problems)
- >> Case Studies: Analysis and Exercises

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