



Nonresidential Three-Days Training Program on Protection Coordination, Relay Settings and Power-System Protection Using ETAP 23-25 November 2026 at Nagpur

Duration: 3 days; **Sessions:** 4 sessions per day, 90 minutes each **Total contact time:** 18 hours

Suggested participants: Electrical engineers, protection and maintenance engineers, commissioning personnel, and utility or industrial system operators.

Training objectives: By the end of the program, participants should be able to:

- Explain the purpose and operating principles of common power-system protections.
- Identify the data required before calculating relay settings.
- Perform short-circuit and protection coordination studies in ETAP.
- Develop and review overcurrent relay settings and time-current coordination curves.
- Understand the application and setting considerations for transformer, generator, motor, busbar and distance protection.
- Interpret ETAP study results and identify coordination gaps or incorrect assumptions.

Delivery Schedule for 3 Days:

Day 1 — Protection Fundamentals and Overcurrent Coordination

Session	Topic and coverage	Practical ETAP demonstration
1	Protection-system fundamentals: protection objectives; primary and backup protection; selectivity, sensitivity, speed and reliability; protection zones; CT and VT roles; common relay types and ANSI device numbers.	Review a single-line diagram and identify protection zones, relays, CTs and breakers. Discuss what system and equipment data are needed for a study.
2	Fault studies for protection: three-phase and phase-to-ground faults; fault-current paths; impact of transformer impedance, source strength and operating configuration; selecting appropriate fault cases.	Build or review a sample ETAP network and run short-circuit cases at selected buses. Compare maximum and minimum fault currents for relay-setting considerations.
3	Overcurrent relay characteristics and settings: 50/51 phase overcurrent; 50N/51N or earth-fault protection; pickup current, time dial/time multiplier, instantaneous element and IEC/IEEE curves; CT ratio and relay input.	Enter relay and CT data, assign protective devices and inspect relay operating characteristics. Demonstrate how pickup and curve settings affect relay operation.
4	Feeder protection coordination: grading sequence; upstream and downstream coordination; operating-time margin; fuse, relay and breaker coordination; common causes of miscoordination.	Create time-current coordination plots for a radial feeder. Adjust downstream and upstream relay settings and check selectivity for representative fault currents.



Day 2 — Equipment Protection and Relay-Setting Applications

Session	Topic and coverage	Practical ETAP demonstration
5	Transformer protection: differential protection (87T); percentage bias and restraint; transformer inrush and harmonic restraint; restricted earth fault (REF); overcurrent and earth-fault backup; Buchholz and temperature protections.	Review transformer data and protection zones. Demonstrate transformer differential protection inputs and discuss how ETAP represents the protection function in the available module.
6	Motor protection: overload (49), short-circuit (50/51), earth fault, locked-rotor and thermal limits; motor starting current and duration; CT and relay selection considerations.	Model a motor feeder, review starting current and thermal limits, and coordinate motor protection with the upstream feeder relay.
7	Generator and busbar protection: generator differential (87G), stator earth-fault protection, reverse power, loss of excitation and backup protection; busbar differential (87B) and check-zone concepts.	Review a generator or bus arrangement and identify protection zones. Demonstrate protection-device placement and discuss fault coverage and backup protection.
8	Relay setting workflow and coordination review: collecting equipment and network data; selecting protection functions; setting pickup and time delays; checking maximum and minimum faults; documenting assumptions and settings.	Complete a guided setting exercise for a transformer-fed load or industrial feeder. Review the coordination plot and record the proposed relay settings and assumptions.

Day 3 — Distance Protection, Integrated Studies and Case Exercise

Session	Topic and coverage	Practical ETAP demonstration
9	Transmission-line and distance protection: distance-protection principle; impedance measurement; Zones 1, 2 and 3; reach and time delays; load encroachment and power swings; distance protection versus overcurrent backup.	Review line and source data, calculate or inspect apparent impedance for faults at different locations, and plot or review distance-zone reach where supported by the ETAP modules available.
10	Advanced coordination considerations: directional overcurrent; parallel feeders and ring networks; transformer energisation and cold-load pickup; distributed generation and inverter-based resources; changes in fault level and protection response.	Compare protection results for alternate network configurations or source conditions. Discuss how a change in topology or generation can affect fault current and coordination.
11	ETAP protection study workflow and result interpretation: model checks; device and library data; study-case setup; fault locations; TCC plots; device operating sequence; warnings and limitations; reporting results.	Run an integrated protection coordination study. Inspect device operation and time-current plots, identify a coordination issue and revise the model or settings.



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12	Integrated case study and participant review: protection review of a small utility or industrial network; discussion of coordination gaps; setting documentation; recommendations and limitations.	Participants review a sample network, propose settings for selected relays, check fault cases and present their coordination findings. Conclude with questions and a knowledge check.
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Registration Details:

Dates of the program: 23-25 November 2026 at Nagpur (3 Days).

Timing: Till 9:30 AM to 5:30 PM

Non-residential Participation fees: 34500/- per participant (GST@18% extra).

Payment: ECS/NEFT/DD in favor of "Centre for Industrial Solutions and Advanced Training" . Account No: 9220 200 3610 6986 Bank: Axis Bank, Katol Road, Friends Colony, Nagpur-440013, MS, India; IFSC Code: UTIB0002911; MICR Code 440211015, GSTN: 27ABBPW5589J1ZV. PAN No: ABBPW5589J SAC Code 99-9293; State Code 27.

Contact for any In-house Training Program at your plant or location.

With Best Regards.

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