



NORTHEAST PUBLIC POWER ASSOCIATION

2024 SUBSTATION II PROGRAM



**NEPPA Training Center
200 New Estate Road, Littleton, MA 01460**

Includes 4 Sessions

Sept 10 - 13

Oct 1 - 4

Oct 22 - 25

Nov 19- 22

SUBSTATION II PROGRAM

NORTHEAST PUBLIC POWER ASSOCIATION

Includes 4 Sessions

Sept
10-13



Oct
1-4



Oct
22-25



Nov
19-22

Building on the success of Substation I, NEPPA is pleased to offer the Substation II Program which is held in 4-day sessions 4 times a year. Participants will be expected to attend all sessions.

Substation II expands on Substation I and moves into protection and controls, understanding operations, schematics, and diagrams, testing and test results interpretation of substation equipment. Upon successful completion of the Program, students are awarded a Certificate of Completion.

In addition to in-class lecture, the Substation II Program incorporates hands-on application of concepts and testing, building, and manipulating a relay panel, and weekly testing including a final exam to demonstrate knowledge and comprehension of the course content. Each Friday of each session will be a half-day conducted virtually for review and testing.

WHO SHOULD ATTEND

This course is designed for:

- Lineworkers or operations employees
- Substation Technicians
- Employees or Supervisors transitioning from other departments
- Construction Supervisors
- Project Managers

LEARNING OBJECTIVES

Upon completion of this four-week program, participants will be able to successfully:

1. Apply concepts to design, build, maintain, troubleshoot, and repair a substation.
2. Demonstrate an advanced understanding and knowledge of applicable standards, specifications, and regulations such as OSHA, the NESC, and NERC/CIP.
3. Practice safely entering, exiting, and performing maintenance in a substation.
4. Apply advanced concepts of the substation's role in a distribution system including testing and programming.
5. Demonstrate ability to test and program equipment found in a substation, including applicable safety precautions and PPE
6. Demonstrate an advanced understanding of SCADA, as well as switching and tagging.
7. Demonstrate an understanding of how to operate and interpret relay functions.

PREREQUISITES

To be successful in the Substation II Program, students are expected to participate in the **Basic Electricity and Mathematics for Utility Operations** course, as well as successfully complete the **Substation I Program**.

SUPPLEMENTAL MATERIALS:

In addition to the printed student manual and a program t-shirt, participants are provided the following supplemental material(s)*:

1. Calculator
2. Distribution Transformer Handbook
3. UGLY's Electrical Reference

* Materials are provided in the Apprentice Lineworker, Advanced Lineworker and Substation I Programs and will only be distributed if a student has not already received them.

TESTING

Weekly Tests (20 Questions); Mid-Term Exam (25 Questions); Final Exam (50 Questions)

REGISTRATION FEES

Registration fees include coffee and lunch each day. If you have any dietary restrictions or considerations, please make note on your registration.

Members:	\$2,795
Non-Members	\$4,150

CANCELLATION POLICY

Cancellations are accepted until Tuesday, August 27, 2024. Substitutions may be made at any time prior to the start of the first session.

INSTRUCTOR

Tim Richardson, P.E., Technical & Safety Trainer



Tim Richardson joined NEPPA in September of 2019 and has been an asset to the training team. Tim has a long history working in the electric utility industry, including as General Manager of Belmont Municipal Light Department from 1995 - 2007.

Most recently, Tim has worked as Principal of Fundy Power Services, LLC and at Consulting Engineers Group prior to that.

Tim brings a wealth of both technical and safety expertise to the organization and applies his expertise of both in an easy-to-understand and easy-to-learn approach.

AGENDA

Agenda details are subject to change.

Tuesday, September 10 - Friday, September 13

Session I – Overview, Substation Operations, Protection (Part I)

Day 1

8:00 am Welcome & Introductions
8:30 am Substation Safety, Switching & Tagging, 3-Part Communication
9:30 Break
9:45 am Substation Safety, Switching & Tagging, 3-Part Communication (Cont.)
11:30 am Lunch
12:00 pm Intro to Substation Design/Bus Types
2:30 pm Adjourn

Day 2

8:00 am Feeder Protection
9:15 am Break
9:30 am Overcurrent Protection
11:30 am Lunch
12:00 pm Overcurrent Protection (Cont.)
2:00 pm Adjourn

Day 3

8:00 am **Guest Speaker & Demonstration**
11:30 am Lunch
12:00 pm Transformer & Bus Protection
1:00 pm Transmission Line Protection
2:00 pm Adjourn

Day 4 (Virtual)

8:00 am Review the week
9:00 am Break
9:15 am Week 1 Test
10:30 am Review Exam Results
11:00 am Adjourn

Tuesday, October 1 - Friday, October 4

Session II – Protection (Part 2) and Substation Drawings

Day 1

8:00 am Welcome, Introductions & Recap
9:00 am Relays – Operation & Interpretation
9:45 am Break
10:00 am Relays – Operation & Interpretation (Cont.)
11:30 am Lunch
12:00 pm **Guest Speaker: Relays**
2:00 pm Adjourn

Day 2

8:00 am Elementary Schematics
9:45 am Break
10:00 am Lockout & Auto-Transfer Schemes
11:30 am Lunch

12:00 pm Hands-On Relay Panels Project
2:00 pm Adjourn

Day 3

8:00 am Logic Diagrams
9:15 am Break
9:30 am Logic Diagrams
10:00 am Hands-On Relay Panels Project
11:30 am Lunch
12:00 pm Hands-On Relay Panels Project (cont.)
2:00 pm Adjourn

Day 4 (Virtual)

8:00 am Review the week
9:00 am Break

9:15 am Week 2 Test
 10:30 am Review Exam Results
 11:00am Adjourn

Tuesday, October 22 – Friday, October 25

Session III – SCADA/Communications

Day 1

8:00 am Welcome, Introductions & Recap Weeks 1 & 2
 8:30 am IEC 6150: What & Why
 9:45 am Break
 10:00 am Substation Networks
 11:30 am Lunch
 12:00 pm **Guest Speaker:
 Advanced SCADA Applications**
 2:00 pm Adjourn

Day 2

8:00 am SCADA Systems
 9:30 am Break
 9:45 am IED & Relay Communications
 11:30 am Lunch
 12:00 pm Hands-On Relay Panels Project
 2:00 pm Adjourn

Day 3

8:00 am **Guest Speaker: NERC/CIP**
 10:00 am Hands-On Relay Panels Project
 11:30 am Lunch
 12:00 pm Hands-On Relay Panels Project
 2:00 pm Adjourn

Day 4 (Virtual)

8:00 am Review the Week
 9:00 am Break
 9:15 am Week 3 Test
 10:30 am Review Exam Results
 11:00 am Adjourn

Tuesday, November 19 – Friday, November 22

Session IV – Maintenance / Testing

Day 1

8:00 am Welcome, Introductions & Recap
 9:00 am Transformer Testing & Results
 10:00 am Break
 10:15 am Transformer Testing & Results (cont.)
 11:30 am Lunch
 12:00 pm Hands-On Relay Panels Project
 2:00 pm Adjourn

Day 2

8:00 am Breaker Testing & Results (HV Breaker vs. MV Breaker)
 9:45 am Break
 10:00 am Breaker & MV Switchgear Bus Testing & Results (cont.)
 11:30 am Lunch
 12:00 pm Other Common Tests: Recap of Equipment Testing (CTs/VTs, Arresters, etc.);

Circuit/Lockout Verification; Ground Grid Testing
 2:00 pm Adjourn

Day 3

8:00 am Miscellaneous Systems
 10:30 am Hands-On Relay Panels Project
 11:30 am Lunch
 12:00 pm Presentation of Relay Panels Project
 2:00 pm Adjourn

Day 4 (Virtual)

8:00 am Final Recap of Weeks 1 – 3
 9:45 am Break
 10:00 am Final Exam
 11:15 am Certificates of Completion
 11:30 am Adjourn

