ENERGY COUNCIL OF THE NORTHEAST

Power Utility Institute

Electrical Calculations I

Technician/Intro Level

February 6 – 7, 2019 Avangrid/United Illuminating • Orange, CT

Who Should Attend

This two-day course is designed for technicians, designers, or novice engineers who are new to the power industry and have a very limited background in electrical calculations. Basic awareness of utility electric systems is necessary and attendance of the Power Utility Institute: Overview of the Electric System course or suitable work experience is a prerequisite.

A background in college level math and electric circuit theory are recommended. Students must be familiar with using an engineering or scientific calculator and bring one to use in class.

This course or equivalent work experience is a prerequisite for other Power Utility Institute Courses such as the distribution Protection course.

Deliverables

The course provides a brief review of electric circuit theory, and then covers the basics of AC voltage and current, single-phase and three-phase AC power, real and reactive power, load types, transformers, phasing, trigonometry relationships, polar and rectangular notation, and per unit calculations.

Upon completion of this course, participants will have the skills to perform basic AC power calculations and will have a foundation for more advanced courses that deal with analyzing AC circuits and systems.

Instructors

Rick Allen, PE, Distribution Standards Engineer at The United Illuminating Company. BSEE from Mercer University. MEng in Power Systems Engineering from Worcester Polytechnic Institute.

Kunihiro Muto, Protection and Controls Engineer at The United Illuminating Company. Graduated from the University of Connecticut with a Bachelor's Degree in Electrical Engineering.

Ravina Hingorani, Rotational Engineer at The United Illuminating Company. Graduated from Fairfield University with a Bachelor's Degree in Electrical Engineering.

Registration and Tuition

To register for this course, visit the course page on the ECNE website at www.ecne.org or complete the PUI registration form to enroll in this course. Space is limited, and registrations are accepted on a first-requested, first honored basis. Cancellations will be accepted up until two (2) week prior to the course date. Substitutions may be made at any time.

Membership Type	Full Program
Full IOU, Municipal & Associate Members	$550
Non-Members	$1,050

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Course Syllabus

Wednesday, February 6th		Thursday, February 7th	
8:00 am	Refreshments Available	8:00 am	Refreshments Available
8:30 am	Class Begins	8:30 am	Class Begins
12:00 pm	Lunch	12:00 pm	Lunch
4:45 pm	Summary & Adjournment	4:00 pm	Course Summary & Wrap-up

Topics Covered

Review of Basic Circuit Theory – Simple DC

AC Voltage and Current
Sinusoids – alternating voltage/current waveform
AC voltage
Instantaneous and RMS
AC Current
Phasors
- Geometry and Trigonometry
- Polar Notation – Magnitude and Angle
- Rectangular Notation

Phase Natation
Phase Sequence
Single-Phase vs. Three-Phase
Complex Math

AC Power
Energy
AC Power
Instantaneous and Power Equations, Power Triangle
Single-Phase and Three-Phase

Load Types
Constant Impedance
Constant Current
Constant Power
Resistive
Reactive

Connections
Phase to Phase
Phase to Neutral
Neutral versus Ground

Transformers
Types
Typical Equivalent Model
Primary and Secondary
Connections and Phasing

Per Unit
Base Equations
Calculations

The curriculum includes course work and homework to ensure opportunities to apply the concepts presented during class.