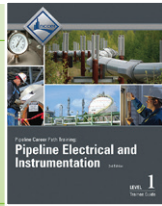


Pipeline Electrical and Instrumentation

L1 PIPELINE ELECTRICAL AND INSTRUMENTATION



LEVEL 1

Curriculum Notes

- Volume 1: 272.5 Hours
- Volume 2: 240 Hours
- Revised: 2017, Third Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK

ISBN

VOLUME 1

Trainee Guide: \$104.99

978-0-13-480564-1

VOLUME 2

Trainee Guide: \$104.99

978-0-13-480565-8

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

V1 VOLUME 1

Pipeline E&I Safety (15 Hours)

ISBN 978-0-13-038376-1

(Module ID 64102-02) Describes the types and uses of personal protective equipment and covers hazard communications. Covers lockout/tagout and MSDS requirements; safety rules, regulations, and tools; and worksite hazards.

Trade Math (40 Hours)

ISBN 978-0-13-038377-8

(Module ID 64103-02) Presents instrumentation formulas and equations. Explains how to calculate load and ampacity, and perform pipeline-specific E&I calculations. Also provides a description of conductors.

Electrical Theory (40 Hours)

ISBN 978-0-13-038378-5

(Module ID 64104-02) Introduces the electrical concepts used in Ohm's law as applied to DC series circuits. Discusses atomic theory, electromotive force, resistance, and electric power equations. Also introduces series, parallel, and series-parallel circuits. Covers resistive circuits, Kirchhoff's voltage and current laws, and circuit analysis.

Tools of the Trade (15 Hours)

ISBN 978-0-13-038379-2

(Module ID 64105-02) Identifies hand tools used in the pipeline E&I trade. Also explains trade-specific power tools, test equipment, and communication equipment.

Pipeline E&I Drawings (30 Hours)

ISBN 978-0-13-038382-2

(Module ID 64107-02) Identifies drawing classifications and written specifications. Describes the uses of electrical drawings and piping and instrumentation drawings. Also covers special drawings and documentation as well as pipeline maps and alignment sheets.

Understanding the National Electrical Code®

(7.5 Hours)

ISBN 978-0-13-038383-9

(Module ID 64108-02) Provides a map for using the NEC®. Introduces the layout and the types of information found within the code book. Presents an easy-to-follow procedure for finding information in the NEC®.

Fasteners and Anchors (7.5 Hours)

ISBN 978-0-13-038384-6

(Module ID 64109-02) Introduces hardware and systems used to mount and support boxes, receptacles, and other electrical components. Covers types of anchors and supports, their applications, and their safe installation.

Electrical Installations in Classified Areas

(40 Hours)

ISBN 978-0-13-038393-8

(Module ID 64201-02) Explains Class I, II, III, and IV pipeline areas. Describes intrinsically safe devices and systems and their ratings. Also covers allowable conduits and fittings, and explosion-proof enclosures. Explains safe work practices in classified areas, including barriers, PPE, monitoring requirements, and gas detectors.

Use of Meters and Test Equipment (15 Hours)

ISBN 978-0-13-038394-5

(Module ID 64202-02) Explains general, personal, and test equipment for E&I safety. Covers measuring current, voltage, and resistance and the types of meters used. Includes specialty instruments such as calibrators, simulators, and gauges. Includes sections on oscilloscope operation, waveform characteristics, and measurement techniques.

Grounding (30 Hours)

ISBN 978-0-13-038395-2

(Module ID 64203-02) Explains grounding basics, system types, NEC® requirements, equipment grounding, and how to bond service equipment. Includes discussion of effective grounding paths, conductors, separately derived systems, grounding at more than one building, and systems over 1,000 volts. Describes how to test grounding and measure earth resistance, three-point testing, and tank grounding.

V2 VOLUME 2

Process Control Theory (40 Hours)

ISBN 978-0-13-038396-9

(Module ID 64204-02) Explains process characteristics and control systems. Describes control loop components and control loops and modes. Discusses types of control applications, including temperature, pressure, flow, and level control.

Supervisory Control Systems (15 Hours)

ISBN 978-0-13-038397-6

(Module ID 64205-02) Explains pipeline supervisory control systems, PLCs, HMIs, and RTUs. Describes data highways and protocols, including data transfer methods, and SCADA-related communications, including transfer media, wireless radios, and Ethernet, and transmission and interface methods.

Transformers (25 Hours)

ISBN 978-0-13-103140-1

(Module ID 64301-02) Describes power systems and explains transformer construction, taps, installation requirements, and connections. Describes power distribution, instruments, control, and isolation transformer types. Also covers transformer maintenance and testing.

Switchgear and MCCs (25 Hours)

ISBN 978-0-13-103141-8

(Module ID 64302-02) Explains power factor and medium versus low-voltage cable and MCCs. Describes types of switchgear and cables, feeders, bussing, and bracing. Includes testing and maintenance on switchgear and MCCs and associated components.

Low-Voltage and Standby Power (25 Hours)

ISBN 978-0-13-103142-5

(Module ID 64303-02) Explains pipeline system standby generators, batteries, chargers, inverters, converters, and rotary and static UPSs. Also addresses the maintenance and testing of each.

Power Quality (25 Hours)

ISBN 978-0-13-103143-2

(Module ID 64304-02) Explains power quality and types of defects, power systems, protection, and conditioning equipment. Discusses types of electrical noise and related problems, and possible solutions. Describes static electricity and its effect, system verification testing, and equipment maintenance.

Prime Movers (32.5 Hours)

ISBN 978-0-13-103145-6

(Module ID 64305-02) Describes various electric motors and drives and their components. Discusses their maintenance and testing. Explains engine types, cooling and lubrication systems, turbine operation, fuel sources, and controls.

Facility Auxiliary Systems (22.5 Hours)

ISBN 978-0-13-103146-3

(Module ID 64306-02) Includes information on pipeline facility buildings and related systems, including fire, security, vapor recovery, injection, water treatment, cathodic protection, and blending systems.

SCADA (30 Hours)

ISBN 978-0-13-103147-0

(Module ID 64307-02) Explains pipeline operations systems, including control, communications, SCADA, and PLCs. Explains redundant systems and control system troubleshooting.

Continued on following page

L2 PIPELINE ELECTRICAL AND INSTRUMENTATION

LEVEL 2

Curriculum Notes

- 122.5 Hours
- Revised: 2017, Third Edition
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.
- Available as print on demand
- To purchase individual covered task modules, please visit www.nccer.org/pipeline-program

PAPERBACK

ISBN

Trainee Guide: \$104.99

978-0-13-471650-3

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Abnormal Operating Conditions - Control Center
(5 Hours)

ISBN 978-0-13-472782-0

(Module ID AOCCC-17) Introduces the abnormal operating conditions that can occur on a pipeline or in a pipeline facility. Explains how to recognize and react to abnormal operating conditions from the control center and the necessary documentation and notifications that must be completed when responding to these conditions.

Abnormal Operating Conditions - Field and Gas
(5 Hours)

ISBN 978-0-13-472784-4

(Module ID AOFCG-17) Provides an overview of the types of abnormal operating conditions (AOCs) that may occur on the pipeline or in company facilities. Appropriate responses to AOCs are covered with a focus on following company policy to protect lives and pipeline equipment. Also covered are the reports required by federal law.

Inspect, Test and Calibrate Pressure Switches
(7.5 Hours)

ISBN 978-0-13-471694-7

(Module ID CT25_1-17)

Inspect, Test and Calibrate Pressure Transmitters
(7.5 Hours)

ISBN 978-0-13-471696-1

(Module ID CT25_2-17)

Verify or Set Protection Parameters for Programmable Controllers and/or Other Instrumentation Control Loops (15 Hours)

ISBN 978-0-13-470632-0

(Module ID CT26_0-17)

Test Overfill Protective Devices (5 Hours)

ISBN 978-0-13-470636-8

(Module ID CT30_0-17)

Inspect and Calibrate Overfill Protective Devices
(7.5 Hours)

ISBN 978-0-13-470637-5

(Module ID CT31_0-17)

Inspect, Test, and Maintain Flow Computer for Hazardous Liquid Leak Detection (7.5 Hours)

ISBN 978-0-13-470640-5

(Module ID CT44_3-17)

Inspection, Testing, and Perform Corrective and Preventative Maintenance of Tank Gauging for Hazardous Liquid Leak Detection (7.5 Hours)

ISBN 978-0-13-470643-6

(Module ID CT44_4-17)

Prove Flow Meters for Hazardous Liquid Leak Detection (7.5 Hours)

ISBN 978-0-13-470644-3

(Module ID CT44_5-17)

Maintain Flow Meters for Hazardous Liquid Leak Detection (7.5 Hours)

ISBN 978-0-13-470652-8

(Module ID CT44_6-17)

Inspect, Test and Maintain Gravimeters/Densitometers for Hazardous Liquid Leak Detection
(7.5 Hours)

ISBN 978-0-13-470648-1

(Module ID CT44_7-17)

Inspect, Test and Maintain Temperature Transmitters for Hazardous Liquid Leak Detection
(7.5 Hours)

ISBN 978-0-13-470653-5

(Module ID CT44_8-17)

Maintain Fixed Gas Detection Equipment
(25 Hours)

ISBN 978-0-13-470656-6

(Module ID CT55_0-17)