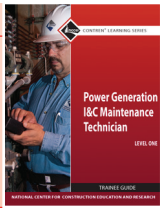




## L1 POWER GENERATION I&C MAINTENANCE TECHNICIAN



LEVEL 1

### Curriculum Notes

- 225 Hours (Includes 100 hours of *Power Industry Fundamentals*, which is a prerequisite for Level 1 completion and must be purchased separately. See p. 83 for more information.)
- Published: 2010
- Please note that these modules are drawn as is from other craft areas. To order modules individually, refer to the specific craft page for ISBNs.
- Instructor's Guide includes access code to download TestGen software, module exams, PowerPoints®, and performance profile sheets from [www.nccerirc.com](http://www.nccerirc.com).

PAPERBACK	ISBN
Trainee Guide: \$67	978-0-13-215430-7
Instructor's Guide: \$67	978-0-13-215431-4

### MODULES

#### Tools of the Trade (5 Hours)

(Module ID 40102-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614613-1  
 Instructor \$20 ISBN 978-0-13-614626-1

#### Fasteners and Anchors (5 Hours)

(Module ID 40103-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614614-8  
 Instructor \$20 ISBN 978-0-13-614627-8

#### Oxyfuel Cutting (17.5 Hours)

(Module ID 40104-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614615-5  
 Instructor \$20 ISBN 978-0-13-614628-5

#### Gaskets and Packing (10 Hours)

(Module ID 40105-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614616-2  
 Instructor \$20 ISBN 978-0-13-614596-7

#### Craft-Related Mathematics (15 Hours)

(Module ID 40106-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614617-9  
 Instructor \$20 ISBN 978-0-13-614597-4

#### Construction Drawings (12.5 Hours)

(Module ID 40107-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614618-6  
 Instructor \$20 ISBN 978-0-13-614598-1

#### Pumps and Drivers (5 Hours)

(Module ID 40108-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614619-3  
 Instructor \$20 ISBN 978-0-13-614599-8

#### Valves (5 Hours)

(Module ID 40109-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614620-9  
 Instructor \$20 ISBN 978-0-13-614600-1

#### Introduction to Test Instruments (7.5 Hours)

(Module ID 40110-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614621-6  
 Instructor \$20 ISBN 978-0-13-614601-8

#### Material Handling and Hand Rigging (15 Hours)

(Module ID 40111-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614622-3  
 Instructor \$20 ISBN 978-0-13-614602-5

#### Mobile and Support Equipment (10 Hours)

(Module ID 40112-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614623-0  
 Instructor \$20 ISBN 978-0-13-614639-1

#### Lubrication (12.5 Hours)

(Module ID 40113-07; from *Industrial Maintenance E&I Technician Level One*)  
 Trainee \$20 ISBN 978-0-13-614624-7  
 Instructor \$20 ISBN 978-0-13-614640-7

#### SMAW Equipment and Setup (5 Hours)

(Module ID 29107-09; from *Welding Level One*)  
 Trainee \$20 ISBN 978-0-13-610533-6  
 Instructor \$20 ISBN 978-0-13-610547-3

## L2 POWER GENERATION I&C MAINTENANCE TECHNICIAN

LEVEL 2

### Curriculum Notes

- 167.5 Hours
- Published: 2010
- Please note that these modules are drawn as is from other craft areas. To order modules individually, refer to the specific craft page for ISBNs.
- Instructor's Guide includes access code to download TestGen software, module exams, PowerPoints®, and performance profile sheets from [www.nccerirc.com](http://www.nccerirc.com).

PAPERBACK	ISBN
Trainee Guide: \$97	978-0-13-215432-1
Instructor's Guide: \$97	978-0-13-215433-8

### MODULES

#### Industrial Safety for E&I Technicians

(12.5 Hours)  
 (Module ID 40201-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604701-8  
 Instructor \$20 ISBN 978-0-13-604716-2

#### Managing Electrical Hazards (12.5 Hours)

(Module ID 26501-09; from *Electrical*)  
 Trainee \$22 ISBN 978-0-13-608661-1  
 Instructor \$22 ISBN 978-0-13-608663-5

#### Introduction to the National Electrical Code® (5 Hours)

(Module ID 40202-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604702-5  
 Instructor \$20 ISBN 978-0-13-604717-9

#### Electrical Theory (15 Hours)

(Module ID 40203-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604704-9  
 Instructor \$20 ISBN 978-0-13-604718-6

#### Alternating Current (20 Hours)

(Module ID 40204-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604705-6  
 Instructor \$20 ISBN 978-0-13-604719-3

#### E&I Drawings (10 Hours)

(Module ID 40303-09; from *Industrial Maintenance E&I Technician Level Three*)  
 Trainee \$20 ISBN 978-0-13-604697-4  
 Instructor \$20 ISBN 978-0-13-604747-6

#### E&I Test Equipment (10 Hours)

(Module ID 40205-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604706-3  
 Instructor \$20 ISBN 978-0-13-604720-9

#### Conductors and Cables (10 Hours)

(Module ID 40212-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604714-8  
 Instructor \$20 ISBN 978-0-13-604692-9

#### Conductor Terminations and Splices (10 Hours)

(Module ID 40213-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604715-5  
 Instructor \$20 ISBN 978-0-13-604693-6

#### Motor Controls (15 Hours)

(Module ID 40304-09; from *Industrial Maintenance E&I Technician Level Three*)  
 Trainee \$20 ISBN 978-0-13-604698-1  
 Instructor \$20 ISBN 978-0-13-604748-3

#### Hydraulic Controls (15 Hours)

(Module ID 40311-09; from *Industrial Maintenance E&I Technician Level Three*)  
 Trainee \$20 ISBN 978-0-13-604742-1  
 Instructor \$20 ISBN 978-0-13-604757-5

#### Pneumatic Controls (15 Hours)

(Module ID 40312-09; from *Industrial Maintenance E&I Technician Level Three*)  
 Trainee \$20 ISBN 978-0-13-604739-1  
 Instructor \$20 ISBN 978-0-13-604754-4

#### Programmable Logic Controllers (17.5 Hours)

(Module ID 40409-09; from *Industrial Maintenance E&I Technician Level Four*)  
 Trainee \$20 ISBN 978-0-13-609136-3  
 Instructor \$20 ISBN 978-0-13-610441-4

**L3 POWER GENERATION I&C MAINTENANCE TECHNICIAN**

LEVEL 3

**Curriculum Notes**

- 225.5 Hours
- Published: 2010
- Please note that these modules are drawn as is from other craft areas. To order modules individually, refer to the specific craft page for ISBNs.
- Instructor's Guide includes access code to download TestGen software, module exams, PowerPoints®, and performance profile sheets from www.nccerirc.com.

PAPERBACK	ISBN
Trainee Guide: \$97	978-0-13-215434-5
Instructor's Guide: \$97	978-0-13-215436-9

**MODULES**

**Instrumentation Electrical Circuitry (25 Hours)**  
 (Module ID 12305-03; from *Instrumentation Level Three*)  
 Trainee \$20 ISBN 978-0-13-103301-6  
 Instructor \$20 ISBN 978-0-13-103309-2

**Process Mathematics (15 Hours)**  
 (Module ID 40207-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604708-7  
 Instructor \$20 ISBN 978-0-13-604722-3

**Flow, Pressure, Level and Temperature (15 Hours)**  
 (Module ID 40206-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604707-0  
 Instructor \$20 ISBN 978-0-13-604721-6

**Instrument Drawings and Documents, Part One (15 Hours)**  
 (Module ID 40211-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604713-1  
 Instructor \$20 ISBN 978-0-13-604691-2

**Electrical Systems for Instrumentation (22.5 Hours)** (Module ID 12104-01; from *Instrumentation Level One*)  
 Trainee \$20 ISBN 978-0-13-868241-5  
 Instructor \$20 ISBN 978-0-13-868258-3

**Relays and Timers (7.5 Hours)**  
 (Module ID 12208-03; from *Instrumentation Level Two*)  
 Trainee \$20 ISBN 978-0-13-103272-9  
 Instructor \$20 ISBN 978-0-13-103288-0

**Switches and Photoelectric Devices (5 Hours)**  
 (Module ID 12209-03; from *Instrumentation Level Two*)  
 Trainee \$20 ISBN 978-0-13-103273-6  
 Instructor \$20 ISBN 978-0-13-103289-7

**Tubing (15 Hours)**  
 (Module ID 40209-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604710-0  
 Instructor \$20 ISBN 978-0-13-604724-7

**Clean, Purge, and Test Tubing and Piping Systems (7.5 Hours)**  
 (Module ID 40210-08; from *Industrial Maintenance E&I Technician Level Two*)  
 Trainee \$20 ISBN 978-0-13-604711-7  
 Instructor \$20 ISBN 978-0-13-604690-5

**Layout and Installation of Tubing and Piping Systems (22.5 Hours)**  
 (Module ID 40309-09; from *Industrial Maintenance E&I Technician Level Three*)  
 Trainee \$20 ISBN 978-0-13-604740-7  
 Instructor \$20 ISBN 978-0-13-604755-1

**Electronic Components (10 Hours)**  
 (Module ID 40302-09; from *Industrial Maintenance E&I Technician Level Three*)  
 Trainee \$20 ISBN 978-0-13-604696-7  
 Instructor \$20 ISBN 978-0-13-604746-9

**Panel-Mounted Instruments (7.5 Hours)**  
 (Module ID 12212-03; from *Instrumentation Level Two*)  
 Trainee \$20 ISBN 978-0-13-103277-4  
 Instructor \$20 ISBN 978-0-13-103293-4

**Installing Field-Mounted Instruments (25 Hours)**  
 (Module ID 12213-03; from *Instrumentation Level Two*)  
 Trainee \$20 ISBN 978-0-13-103278-1  
 Instructor \$20 ISBN 978-0-13-103294-1

**Grounding and Shielding of Instrumentation Wiring (10 Hours)**  
 (Module ID 12306-03; from *Instrumentation Level Three*)  
 Trainee \$20 ISBN 978-0-13-103302-3  
 Instructor \$20 ISBN 978-0-13-103310-8

**Analyzers (20 Hours)**  
 (Module ID 12408-03; from *Instrumentation Level Four*)  
 Trainee \$20 ISBN 978-0-13-109619-6  
 Instructor \$20 ISBN 978-0-13-109629-5

**L4 POWER GENERATION I&C MAINTENANCE TECHNICIAN**

LEVEL 4

**Curriculum Notes**

- 210 Hours
- Published: 2010
- Please note that these modules are drawn as is from other craft areas. To order modules individually, refer to the specific craft page for ISBNs.
- Instructor's Guide includes access code to download TestGen software, module exams, PowerPoints®, and performance profile sheets from www.nccerirc.com.

PAPERBACK	ISBN
Trainee Guide: \$97	978-0-13-215437-6
Instructor's Guide: \$97	978-0-13-215438-3

**MODULES**

**Standby and Emergency Systems (12.5 Hours)**  
 (Module ID 40401-09; from *Industrial Maintenance E&I Technician Level Four*)  
 Trainee \$20 ISBN 978-0-13-609163-9  
 Instructor \$20 ISBN 978-0-13-609139-4

**Basic Process Control Elements, Transducers and Transmitters (15 Hours)**  
 (Module ID 40402-09; from *Industrial Maintenance E&I Technician Level Four*)  
 Trainee \$20 ISBN 978-0-13-609165-3  
 Instructor \$20 ISBN 978-0-13-609140-0

**Instrument Calibration and Configuration (10 Hours)**  
 (Module ID 40403-09; from *Industrial Maintenance E&I Technician Level Four*)  
 Trainee \$20 ISBN 978-0-13-609166-0  
 Instructor \$20 ISBN 978-0-13-609141-7

**Pneumatic Control Valves, Actuators and Positioners (40 Hours)**  
 (Module ID 40404-09; from *Industrial Maintenance E&I Technician Level Four*)  
 Trainee \$20 ISBN 978-0-13-609167-7  
 Instructor \$20 ISBN 978-0-13-609142-4

**Performing Loop Checks (7.5 Hours)**  
 (Module ID 40405-09; from *Industrial Maintenance E&I Technician Level Four*)  
 Trainee \$20 ISBN 978-0-13-609168-4  
 Instructor \$20 ISBN 978-0-13-609143-1

**Troubleshooting and Commissioning a Loop (10 Hours)**  
 (Module ID 40406-09; from *Industrial Maintenance E&I Technician Level Four*)  
 Trainee \$20 ISBN 978-0-13-609169-1  
 Instructor \$20 ISBN 978-0-13-610439-1

**Process Control Theory (20 Hours)**  
 (Module ID 12204-03; from *Instrumentation Level Two*)  
 Trainee \$20 ISBN 978-0-13-103267-5  
 Instructor \$20 ISBN 978-0-13-103283-5

**Process Control Loops and Tuning (20 Hours)**  
 (Module ID 40407-09; from *Industrial Maintenance E&I Technician Level Four*)  
 Trainee \$20 ISBN 978-0-13-609135-6  
 Instructor \$20 ISBN 978-0-13-610440-7

**Data Networks (15 Hours)**  
 (Module ID 40408-09; from *Industrial Maintenance E&I Technician Level Four*)  
 Trainee \$20 ISBN 978-0-13-609138-7  
 Instructor \$20 ISBN 978-0-13-610443-8

**Digital Logic Circuits (10 Hours)**  
 (Module ID 12401-03; from *Instrumentation Level Four*)  
 Trainee \$20 ISBN 978-0-13-109610-3  
 Instructor \$20 ISBN 978-0-13-109621-9

**Calibrate Supervisory Instrumentation Elements (10 Hours)**  
 Trainee \$20 ISBN 978-0-13-266216-1  
 Instructor \$20 ISBN 978-0-13-266218-5  
 (Module ID 51401-10) Describes the sensing devices used to monitor key parameters, including vibration and speed sensors, eccentricity sensors, and thrust bearing wear detectors. Also covers the test instruments used to calibrate supervisory instrumentation, including shakers and Wobulators®, and explains how to use selected test instruments in the calibration process.

## Power Generation I&C Maintenance Technician Level 4

### **Boiler/HRSG Control** (12.5 Hours)

Trainee \$20

ISBN 978-0-13-266217-8

Instructor \$20

ISBN 978-0-13-266219-2

(Module ID 51402-10) Covers the control devices, methods, and strategies used for boilers and Heat Recovery Steam Generators (HRSGs). Discusses fuel, air, oxygen, feedwater, and steam control, as well as the precautions and regulations related to burner and furnace fuel control.

### **Preventive and Predictive Maintenance**

(10 Hours)

(Module ID 32401-09; from *Industrial Maintenance Mechanic Level Four*)

Trainee \$20

ISBN 978-0-13-610445-2

Instructor \$20

ISBN 978-0-13-610456-8

### **Distributed Control Systems** (17.5 Hours)

(Module ID 40410-09; from *Industrial Maintenance E&I*)

*Technician Level Four*)

Trainee \$20

ISBN 978-0-13-609137-0

Instructor \$20

ISBN 978-0-13-610442-1