ELA Institute for Facility Management Education

Spring 2021

Building Operators' Certificate
Facility Maintenance Certificate
HVAC Continuing Education
Electrical Continuing Education




Operated by

The Electric League of Arizona

The Arizona Heat Pump Council

Sponsored by

Safety Notice: Courses being held in person will adhere to the latest public health guidance and state and local orders. We are closely monitoring health department and Centers for Disease Control and Prevention (CDC) guidelines to ensure a safe classroom and office environment.

ELA Institute for Facility Management Education

The Institute - The ELA Institute for Facility Management Education offers educational programs to meet the unique continuing educational and training needs of facility managers and their personnel. The ELA Institute is operated by the Educational Departments of the Electric League of Arizona and the Arizona Heat Pump Council. The curricula for the Institute's educational programs were developed by industry practitioners and educators, associated with the ELA and the AHPC, the lead instructors for both organizations, and the Energy Efficiency Department at APS. These programs are designed for a wide range of facility management personnel, including maintenance technicians, and managers of large, complex, multi-facility organizations.

The Electric League of Arizona - The Electric League of Arizona founded in 1960 is a statewide, multi-industry trade association supporting the electrical, HVACR and energy management industries through education; publications, including trade and consumer newspapers and Buyers' Guide; consumer referral services and other utility trade ally programs. The Electric League of Arizona also provides the HVACR Continuing Education Program offered by the Arizona Heat Pump Council and the Electrical Continuing Education Program offered in conjunction with GateWay Community College.

The ELA Institute for Facility Management Education opened its doors in the fall of 2002 with the first Facility Maintenance Technician Program. To date, The Institute has graduated over 650 students in this program. These students represent over 300 companies through out the state of Arizona. The Building Operators' Certificate Program was added to the Institute in the fall of 2003. The Institute has registered over 200 students in this program, representing about 150 companies state wide. The Institute's instructors are expert practitioners in their specific field and bring a wealth of up to date knowledge to each class.

Building Operators' Certificate Program

The ELA Institute for Facility Management Education presents an educational program leading to a certificate in Building Operations. The certificate will be of most benefit to managers with total responsibility for multi-facilities, as well as those with single facility responsibility.

The Faculty is composed of the lead instructors for the Education Departments of the Electric League of Arizona and the Arizona Heat Pump Council; APS energy personnel; SRP energy personnel; and guest instructors, as appropriate. The program is offered eight hours a day, one-day a week for 8 weeks at the ELA Institute located in the Electric League of Arizona Education Center.

Course Coverage

FME 101

HVAC FUNDAMENTALS IN A COMMERCIAL/INDUSTRIAL FACILITY

Course Description: A discussion of commercial systems, chiller systems, and A/C control systems in a modern industrial setting.
Course Content: A discussion of types of systems and controls working with application sequences, energy efficiency, diagrams and specific HVAC Controls.

- Reviews heating, cooling, and ventilation
- Commercial systems and their applications
- Commercial condensers, evaporators and compressors
- Centrifugal, screw, scroll and reciprocating applications
- Types of chillers and their applications
- A/C Control Systems
- Work with specific systems diagrams
- Chiller Systems
- Specific HVAC Controls
- KW per ton and energy usage

FME 102

AIRFLOW DYNAMICS FOR THE COMMERCIAL/INDUSTRIAL FACILITY

Course Description: A thorough understanding of airflow dynamics can enable you to uncover and resolve system problems.
Course Content: An overview of what causes most airflow related problems and how they can be prevented.

- Airflow dynamics
- Central air systems
- Airflow systems and components
- Variable speed fans and pumps
- Ventilation requirements for HVAC
- Types of fans
- Airflow testing and instruments

FME 103

HVAC CODES AND SAFETY FOR THE COMMERCIAL/INDUSTRIAL FACILITY

Course Description: A discussion of local and national health, safety, energy and environmental codes as they relate to the HVAC system in a Commercial/Industrial Facility.
Course Content: An overview of codes, standards and specifications and how they apply in a Commercial/ Industrial Facility.

- EPA Codes
- Mechanical Codes

FME 104

ELECTRICAL CODES AND STANDARDS FOR THE COMMERCIAL/INDUSTRIAL FACILITY

Course Description: Electrical, energy management and related codes that facility managers must know.
Course Content: Compliance with the most important maintenance related codes and their application to an energy efficient building.

- 2020 National Electrical Codes

FME 106

ELECTRICAL SAFETY FOR THE COMMERCIAL/INDUSTRIAL FACILITY

Course Description: A discussion of commercial facility safety practices as it relates to electrical systems.
Course Content: An overview of safety practices related to electricity and how it relates to the Commercial/Industrial Facility.

- Recommended safety practices
- OSHA Codes

Course Coverage continued

FME 107

LIGHTING FUNDAMENTALS AND EFFICIENCY FOR THE COMMERCIAL/INDUSTRIAL FACILITY

Course Description: A broad-based discussion of lighting fundamentals and efficiency and how they're applied to a Commercial/Industrial Facility.

Course Content: An overview of the Lighting Industry.
- Lighting fixture technology and efficiency
- Applications and Strategies
- Light Source/Efficiency/Common Retrofits
- Lighting maintenance

FME 108

POWER QUALITY FOR THE COMMERCIAL/INDUSTRIAL FACILITY

Course Description: The basics of important, "Need to know" power quality issues in your facility. Learn as the instructor performs a real, hands-on analysis of a large facility.
Course Content: An overview of what causes most Power Quality related problems and how they can be prevented.
- Techniques for identifying PQ symptoms
- Trouble-shooting common problems

FME 109

INDOOR AIR QUALITY FOR THE COMMERCIAL/INDUSTRIAL FACILITY
Course Description: The purpose of this course is to familiarize the attendees with Indoor Air Quality (IAQ) and Indoor Environmental Quality (IEQ).
Course Content: This course will familiarize attendees with common IEQ issue and terminology. Attendees will receive and introduction on how to anticipation, recognition, prevention and responses to common IEQ issues that impact the facilities. Attendees will receive an:
- Introduction to common contributors to poor IEQ.
- Familiarization with the common IEQ terms.
- Introduction to broadly applicable prevention, assessment and response concepts.
- Comprehension of the health effects, building consequences and other liabilities associated with poor or mismanaged IEQ.
- Acquaintance with example preventative actions, such as controlling outside air, regular HVAC filter replacement, managing pests, addressing water releases, reducing Legionella in water systems, etc.
- Understanding of various response actions to IEQ issues such as asbestos releases, sewer line breaks, COVID-19 positive occupants, visible mold growth, odor complaints, sick occupants, Legionellosis outbreaks, chemical releases, etc.

FME 110

ENERGY CONSERVATION TECHNIQUES

Course Description: The use of energy in commercial buildings and how to identify and prioritize conservation opportunities.

Course Content: An overview of the basics of energy accounting, evaluation of fuel options, operation and maintenance strategies to improve efficiency, and energy management planning techniques.
- Implementing an effective energy management program
- Use of infrared technology to measure thermal losses
- Developing an energy efficiency "checklist" for a facility
- Utility fact sheets that are customized for different facilities and energy end uses
- Sensible retrofits
- Case studies of local facilities
- Building controls
- HVAC maintenance
- Efficient lighting
- New technologies

FME 111

ENERGY AUDIT

Course Description: The essentials that a building operator should know about how to measure the energy performance of their facilities.

Course Content: An overview of where your facility uses energy and how your facilities' energy use compares to your competition.
- Find out where you spend the most and where the most opportunities for savings exist
- Techniques for studying your energy usage history and downloading your account data into spreadsheets to analyze usage and quickly highlight important trends
- Energy end-use data that shows typical energy breakdowns for different types of facilities
- Essential for operators who manage multiple facilities

FME 112

DIRECT DIGITAL CONTROLS

Course Description: An introduction to the application of Direct Digital Controls (DDC) to operating a building's temperature control system.

Course Content: Topics will include:
- The ability of the system to process data
- Input & output types, transducers, variable frequency drive (VFD) theory, communication protocols (LON & BACnet), programming vs. configuring controllers
- Workstation basics
- How to make the controls act like an Energy Management System (EMS).
- Specific manufacturers will not be covered, only the overall theory of how these systems operate.

FME 115

DESIGN & OPERATION OF COMMERCIAL CHILLED WATER SYSTEMS

What You Can Expect: This class provides an overview of the design and operation of Building Chilled Water Systems including piping system design and unit components.

Piping System Design

A. Direct & Reverse Return Piping Systems
B. Pipe Sizing
C. Piping Specialties
D. Flow Control

Equipment

A. Pumps
B. Chillers
C. Terminal Units (Air Handliners, Fan Coil Units, Coils)
D. Cooling Towers
E. Compression-Expansion Tanks

"Since adding the Building Operator & Facility Maintenance certificates to my resume, I have nearly doubled my income during the big recession!"

Eric Collins
Facility Maintenance
Honolulu Airport

Building Operators' Certificate

Sponsored by:

Operated by:

Program Registration

❑ **Tuition** (Space is limited register early)

$1,275 ELA Mbr. / $1,325 Non-Mbr. (Tuition includes books & lunch)

Please call the Institute at 602-263-0115 for more information

Dates: ❑ March 17 - May 5, 2021

Eight Wednesdays ~ 9:00 a.m. - 5:00 p.m.

Location: Electric League Training Center - 2702 N. 3rd Street Ste. 2020, Phoenix, Arizona 85004

Are you a member of the Electric League of Arizona? ❑ Yes ❑ No

Date:_____ Student Name: _____

Company:_____ Prefer to be called: _____

Daytime Phone: _____ **Fax:_____

Title:_____

Mailing Address: _____ City:_____

**E-mail: _____ State: AZ Zip: _____

Method of Payment: Payment must be received prior to start of class.

❑ Check enclosed #: _____ Total Fees Due: $_____

❑ VISA ❑ MASTERCARD ❑ American Express (All credit card receipts will be sent to the email address provided.)

❑ Credit Card #: _____ 3 Digit Code: _____Exp Date: _____

Exact name on card: _____ Signature: _____

Billing address if different:_____

***Cancellation Policy:** A full refund will be issued only if written notice of cancellation is received **seven (7) days** prior to the class start date. All registrations received by mail or fax are confirmed registrations, unless cancelled within the proper time frame. All courses are subject to cancellation if minimum enrollment requirements are not met. No-shows: participants are charged the full amount if they register but do not attend. Due to the number of classes we hold each season, we do not provide confirmation. ____ Please initial here indicating you have read and understand the cancellation policy.

****We may use this fax number or email address to inform you of similar educational courses.

REGISTER ONLINE AT: EDU.ELAZ.ORG

Please return application and fees to:
ELA Institute - 2702 N. 3rd Street Ste. 2020, Phoenix, Arizona 85004
Fax 602-274-0029 or call 602-263-0115 for more information.

ELA Institute for Facility Management Education

Facility Maintenance Technician Program

Sponsored by SRP Operated by

About the Program:
This program has been designed by industry educators and practitioners, associated with the Electric League of Arizona's education department and the Arizona Heat Pump Council. This session will be taught by one of the League's electrical instructors and a lead instructor for the Arizona Heat Pump Council education program. Upon completion of this 16 week 2 nights a week program, successful students will receive a Certificate of Completion and Facility Maintenance Master Technician Patches. (A "C" average or better is required for successful completion.)

Course Coverage

(Order and content is subject to change)

HVAC Curriculum:
The HVAC training will include a comprehensive review of Refrigeration System fundamentals, refrigerants, HVAC Equipment, air movement and measurement, air quality, residential and commercial systems, air & water source heat pumps.

- Refrigeration Theory I
- Refrigeration Theory II
- Refrigeration Components
- Introduction to Refrigerants
- Charging & Piping
- A/C Control Systems I
- A/C Control Systems II
- Review & Quiz
- Refrigerators & Freezers
- Residential Systems - Air Conditioning
- Residential Systems - Heat Pumps
- Commercial Systems
- Air Quality & Distribution (Air Flow)
- HVAC Systems Troubleshooting
- Servicing Commercial Systems
- Review & Final Exam

Electrical Curriculum:
The electrical training will include a comprehensive review of basic electrical fundamentals; practical installation, operation, maintenance, and troubleshooting techniques, with an emphasis on electrical safety procedures.

- Concepts of Electricity I
- Concepts of Electricity II
- Basic Circuitry I
- Basic Circuitry II
- Basic Circuitry III
- Commercial & Industrial Buildings Practical AC Circuits
- Commercial & Industrial Practical AC Power Delivery
- Building Systems Control Systems
- Electrical Codes & Standards
- Basic AC/DC Rotating Electrical Machinery
- Variable Frequency Drive Systems I
- Variable Frequency Drive Systems II
- Electrical Power Quality Commercial & Industrial
- Electrical Troubleshooting I
- Electrical Troubleshooting II
- The Importance of Electrical Safety

Facility Maintenance Program Registration

❑ **Tuition** (Space is limited register early) (Tuition includes all books and applicable fees)
$895 ELA Member/$945 Non-Member • Contact the Institute for more information at 602-263-0115
Dates: January 12 - May 6, 2021 • Tuesdays & Thursdays • Time: 6:00 p.m. - 8:50 p.m. No class week of March 8.
Location: Electric League Training Center, 2702 N. 3rd Street Suite 2020, Phoenix, AZ 85004
HVAC Program: Tuesdays • Electrical Program: Thursdays

Student Name:_____ Date: _____

Company:_____ Contact person:_____

Daytime Phone: _____ **E-mail: _____ **Fax: _____

Mailing Address: _____ City: _____ State:AZ Zip:_____

Are you a member of the Electric League of Arizona? ❑ Yes ❑ No

***Method of Payment:* Payment must be received prior to start of class.**

Total: $_____ ❑ Check enclosed #: _____ ❑ M/C ❑ Visa ❑ AMEX

(All credit card receipts will be sent to the email address you provide above.)

Credit Card #: _____ 3 Digit Code: _____ Exp Date: _____

Exact name on card: _____ Signature: _____

Billing Address if different: _____ State:AZ Zip: _____

Cancellation Policy: A full refund will be issued only if written notice of cancellation is received **seven (7) days** prior to the class start date. All registration received by mail, or fax are confirmed registrations, unless cancelled within the proper time frame. All courses are subject to cancellation if minimum enrollment requirements are not met. **No-shows:** participants are charged the full amount if they register but do not attend. Due to the number of classes we hold each season, we do not provide confirmation. _____ Please initial here indicating you have read and understand the cancellation policy.
**We may use this fax number or email address to inform you of similar educational courses.

Please return application and fees to:
Electric League of Arizona - 2702 N. 3rd Street Ste. 2020, Phoenix, Arizona 85004
Fax 602-274-0029 or call 602-263-0115 for more information.

REGISTER ONLINE AT: EDU.ELAZ.ORG

ELA Institute for Facility Management Education

Facility Management General Studies

The ELA Institute for Facility Management Education presents its General Studies continuing education program. The General Studies Program was developed to meet the unique training needs of facility maintenance personnel who wish to participate in continuing education on an individual course basis to refresh existing job skills or learn new skills. Students interested in more structured curricula may wish to consider the Institute's Certificate programs.

Courses

HPC 101

REFRIGERATION THEORY & SYSTEMS DIAGNOSIS

Dates: January 25 & 27, 2021
Fees: $120 Mbr/$150 Non-Mbr
Time: 6:00 p.m. - 9:30 p.m.
Instructor: Rich Porter
4 Continuing Education Credits

What You Can Expect: This course will review mechanical refrigeration theory and system troubleshooting. The four basic components, reversing valves, superheat, sub-cooling, sensible heat, latent heat and BTU's are all reviewed. This course will focus on heat pump operation and diagnosis. If you do not have service experience and/or refrigeration training, Refrigeration Fundamentals is a recommended prerequisite.

HPC 102

CHARGING, PIPING, & DEHYDRATION

Dates: Jan. 28, Feb. 2 & 4, 2021
Fees: $140 Mbr/$170 Non-Mbr
Time: 6:00 p.m. - 9:30 p.m.
Instructor: Joel Harris
4 Continuing Education Credits

What You Can Expect: Did you know factory studies of failed compressors show a large amount of compressor failures are caused by improper refrigerant levels? This is not a well-known fact in our industry. Refrigerant charge imbalances cause slow degradation of the compressor bearings, valves and motor windings. This results in compressor failures occurring some time after the charge becomes unbalanced, making the connection between refrigerant levels and malfunctions difficult. Improper piping and contaminants are also big offenders.

HPC 103

ELECTRICAL FUNDAMENTALS FOR HEAT PUMPS

Dates: February 16 & 18, 2021
Fees: $114 Mbr/$144 Non-Mbr
Time: 6:00 p.m. - 9:30 p.m.
Instructor: Carl Bartoli
4 Continuing Education Credits

What You Can Expect: This class will focus on basic electricity as it pertains to heat pump operations. Topics to be covered include basic electron theory, electromagnetism and PSC motor theory. You will understand how compressors run and start systems work. Having an understanding of capacitor and potential relay operation on an electron level can help the service technician diagnose and avoid malfunctions that are commonly overlooked.

HPC 104

CONTROL SYSTEMS FOR HEAT PUMPS

Dates: February 23 & 25, 2021
Fees: $114 Mbr/$144 Non-Mbr
Time: 6:00 p.m. - 9:30 p.m.
Instructor: Carl Bartoli
4 Continuing Education Credits

What You Can Expect: Participants will attain the knowledge to design an entire electrical system for a residential heat pump. You will also learn the theory of operations and diagnostics of heat pump control circuitry including calibration and testing of common brands of thermostats, cooling and heating anticipation circuits, and commonly used electromechanical and electronic defrost systems.

HPC 106

HVAC CODE & SAFETY

Dates: February 22 & 24, 2021
Fees: $174 Mbr/$204 Non-Mbr
Times: 6:00 p.m. - 9:30 p.m.
Instructor: Travis Howard
4 Continuing Education Credits

What You Can Expect: This class is designed to make you more comfortable with the International Mechanical Code. In this interactive class, popular code issues and interpretations will be discussed. Come prepared to discuss your personal experiences with the Code.

HPC 147

COMMERCIAL REFRIGERATION

Dates: April 8, 2021
Fees: $104 Mbr/$134 Non-Mbr
Times: 6:00 p.m. - 9:30 p.m.
Instructor: Vic Pietkiewicz
4 Continuing Education Credits

What You Can Expect: This course will discuss commercial refrigeration systems, including walk-in refrigerators and freezers. Operating conditions, refrigerants and refrigerant selection will be reviewed. The focus will be on wiring, defrost control and operating strategies, and we will discuss refrigeration theory as it applies to product cooling. Mechanical and electrical troubleshooting will also be covered.
Prerequisites: HPC 101 - Refrigeration Theory & Systems Diagnosis

HPC 107

AIRFLOW DYNAMICS

Dates: March 1 & 3, 2021
Fees: $114 Mbr/$144 Non-Mbr
Time: 6:00 p.m. - 9:30 p.m.
Instructor: Rich Porter
4 Continuing Education Credits

What You Can Expect: Airflow is one of the most critical issues for customer comfort. Many comfort complaints and improper system operation problems are a result of poor air distribution. A thorough understanding of airflow dynamics can enable you to uncover and resolve system problems. This course will help you identify inadequate or excessive airflow issues. It will help you solve complaints of hot spots, drafts, noises and stale air. Frequently airflow problems can be easily solved by a minor adjustment or changing to a better register.

HPC 165

DESIGN & OPERATION OF COMMERCIAL CHILLED WATER SYSTEMS

Dates: May 11 & 13, 2021
Fees: $114 Mbr/$144 Non-Mbr
Times: 6:00 p.m. - 9:00 p.m.
Instructor: Vic Pietkiewicz
4 Continuing Education Credits

Note: Students who have completed the Facility Maintenance Technician Program can complete the FME 115 version of this course for an Advanced Course Certificate of Completion in Facility Management Studies.

What You Can Expect: This two-session class provides an overview of the design and operation of Building Chilled Water Systems.

Course Content:

Class 1: Piping System Design
A. Direct & Reverse Return Piping Systems
B. Pipe Sizing
C. Piping Specialties
D. Flow Control
Class 2: Equipment
A. Pumps
B. Chillers
C. Terminal Units (Air Handliners, Fan Coil Units, Coils)
D. Cooling Towers
E. Compression-Expansion Tanks

Who Should Attend: This class is designed for the Master Heat Pump Technician, Commercial Technician, and other advanced level technicians.

Spring 2021 HVAC Course Registration

Student Name:_____ Date:_____

Company:_____ Position:_____

***E-mail:_____

Mailing Address:_____

City:_____ State:_____ Zip:_____

Daytime Phone:_____ ***Fax #:_____

Person/Company responsible for payment:_____Contact:_____

Are you a member of the ELA? ❑ Yes ❑ No

***We may use this fax number or email address to inform you of similar educational courses.

(All credit card receipts will be sent to the email address you provide above.)

Rates	Non-Member Rate	Member Rate
❑ **HPC 101** Refrigeration Theory & Systems Diagnosis	$150	$120
❑ **HPC 102** Charging, Piping & Dehydration	$170	$140
❑ **HPC 103** Electric Fundamentals for Heat Pumps	$144	$114
❑ **HPC 104** Control Systems for Heat Pumps	$144	$114
❑ **HPC 106** HVAC Code & Safety	$204	$174
❑ **HPC 107** Airflow Dynamics	$144	$114
❑ **HPC 147** Commercial Refrigeration	$134	$104
❑ **HPC 165** Design & Operation of Commercial Chilled Water Systems	$144	$114

❑ I have completed the Facility Maintenance Technician Program and want a certificate of completion for this course.

*The Heat Pump Council provides appetizers & beverages served from 5:30 p.m. - 6:00 p.m.

Cancellation Policy and No-Shows

A full refund will be issued as long as **written notice is received 48 hours prior** to the class starting time. Due to the number of courses held and registrations received, we do not provide written or verbal confirmation. Returned checks are subject to a $30.00 returned check fee. **All registrations received by mail or fax are confirmed registrations unless cancelled within the proper time frame or unless notification of full or cancelled classes is received from the Arizona Heat Pump Council. Participants are charged the full fee amount if they register but do not attend. There are no refunds for no-shows.**

** _____ **Please initial here to indicate you have read, understood, and agreed to this cancellation policy.**

Method of Payment Payment must be received prior to start of class.

Total: $_____ ❑ Check enclosed #:_____ ❑ M/C ❑ Visa ❑ AMEX

Credit Card #:_____3 Digit Code:_____ Exp Date:_____

Exact name on card:_____Signature:_____

Billing Address if different:_____ State:AZ Zip:_____

REGISTER ONLINE AT: EDU.ELAZ.ORG

Please mail registration and payment to: Arizona Heat Pump Council • 2702 N. 3rd Street, Suite 2020 Phoenix, AZ 85004 Or fax to: 602-274-0029 • Call 602-263-0115 for more information

GO TO THE HEAD OF YOUR FIELD
With These Certificate Programs

Register at the Electric League, attend most classes at Gateway Community College

RESIDENTIAL WIRING CERTIFICATE

Prerequisites: None

Description: This certificate program is specifically designed to provide a foundation of fundamental electrical knowledge and skills in residential applications. These include use of tools, applied calculations, theories and concepts of electricity and electronics, residential wiring and codes. The Certificate of Completion (CCL) lays the framework for the International Code Council (ICC) and International Association of Electrical Inspectors (IAEI) certification exams. Students are admitted to the Certificate of Completion (CCL) in Electrical Technology-Residential Wiring Program only through the Electric League of Arizona. Upon successful completion, the student will be prepared to progress to the Commercial Wiring Certificate Program.

Required Courses:

ELC 103	Electrical/Mechanical Calculations
ELC 119	Concepts of Electricity & Electronics
ELC 123	Residential Electrical Wiring & Codes
ELC 160	Applied Electrical Codes
ELC 164	Grounding & Bonding

COMMERCIAL WIRING CERTIFICATE

Prerequisites: Completion of the Residential Wiring Certificate Program or permission of instructor.

Description: This Certificate Program builds upon your knowledge of residential applications and provides you with greater depth in skills and commercial electrical applications. Upon successful completion of the series you will be awarded a Certificate of Completion and will be prepared to advance to the Industrial Wiring Certificate Program.

Required Courses:

ELC 120	Solid State Fundamentals
ELC 161	Applied Electrical Codes II
ELC 217	Electric Motor Controls
ELC 125	Commercial Electrical Wiring & Codes

INDUSTRIAL WIRING CERTIFICATE

Prerequisites: Completion of Commercial Certificate Program or permission of the instructor.

Description: This Certificate Program continues to develop your knowledge of advanced electrical skills, typical of industrial applications. Upon successful completion of this series you will be awarded a Certificate of Completion and will be prepared to advance to the Electrical Technology Associate's degree program.

Required Courses:

ELC 124	Industrial Wiring and Codes
ELC 144	Basic Automated Systems Using Programmable Controllers
ELC 210	AC/DC Machinery
ELC 218	Variable Frequency Drives

CERTIFICATE OF COMPLETION IN ELECTRICAL TECHNOLOGY

Description: This Electrical Technology Program is designed to provide students with a broadened educational background and leadership skills in facilities management. This expertise will allow employment within the industry in the areas of management, sales, field service, business ownership or instruction.

Requirements: Completion of the Electrical Technology Wiring Certificate Program in Residential Wiring, Commercial Wiring, and Industrial Wiring (39 Credits Total)

Cancellation Policy
A full refund will be issued only if written notice of cancellation is received 7 days prior to class starting date. All classes subject to cancellation if minimum enrollment requirements are not met. Financial aid students must pay ELA the full fee and claim back the financial aid from Gateway.

ASSOCIATE OF APPLIED SCIENCE IN ELECTRICAL TECHNOLOGY

(Issued by GateWay Community College)

Requirements: 60-64 Credits Total
2.0 GPA Overall

Technical Program: 39 Credits
General Studies: 22-25

Classes		Credits
Technical Program:		
ELC 144	Basic Automated Systems Using Programmable Controllers	3
ELC 119	Concepts of Electricity & Electronics	3
ELC 120	Solid State Fundamentals	3
ELC 123	Residential Electrical Wiring & Codes	3
ELC 124	Industrial Electrical Wiring & Codes	3
ELC 125	Commercial Electrical Wiring & Codes	3
ELC 160	Applied Electrical Codes	3
ELC 161	Applied Electrical Codes II	3
ELC 164	Grounding & Bonding	3
ELC 210	AC/DC Machinery	3
ELC 217	Electric Motor Controls	3
ELC 218	Variable Frequency Drives	3
ELC 103	Electrical/Mechanical Calculations	3
General Studies:		
ENG 101	First Year Composition	3
ENG 111	Technical Writing	3
COM 230	Small Group Communication	3
CRE 101	Critical Reading (Or equivalent by assessment)	3
MAT 122	Intermediate Algebra (Or equivalent by assessment)	3
HUM 101	General Humanities	3
CHM 130	Fundamental Chemistry	3
CHM 130LL	Fundamental Chemistry	3
SOC 101	Introduction to Sociology	3

Electrical Courses

Unless noted, ELC classes earn three college credits and meet once a week at Gateway Community College, 108 N. 40th Street, Phoenix, AZ 85034. **Fees for ELC classes are $297 for ELA Members* and $333 for Non-Members.* Plus a $15 Gateway registration fee (per student).

Textbooks are additional and may be purchased from the publisher or online retailer.

SPRING BREAK - WEEK OF MARCH 8

16-Week Classes
Once a week Online

ELC 160
APPLIED ELECTRICAL CODES

Dates: Tues., Jan. 19 – May 4, 2021
Time: 6:00 p.m. - 9:10 p.m.
Instructor: Elmer Tepper
Fees: $297 Mbr/$333 Non-Mbr
Reg Fees: $15 per student

Analysis of diagrams and application of current code interpretations. Includes local exceptions and practices. Review of the National Electrical Code (NEC) related to definitions, installations, wiring and protection, wiring methods, materials, and equipment.

Who Should Attend: This course is of great value to the electrical apprentice, journeyman, contractor or anyone seeking to improve their "Code" knowledge.

Prerequisites: A grade of C or better in ELC119 or permission of Instructor.

16-Week Classes
***Once a week at ELA Training Cntr.**

ELC 120
SOLID STATE FUNDAMENTALS

Dates: Mon., Jan. 25 - May 10, 2021
Time: 5:50 p.m. - 9:15 p.m.
Instructor: Steve Holmquist
Fees: $297 Mbr/$333 Non-Mbr
Reg Fee: $15 per student

Theory of operation of semi-conductor devices, component and system construction, operation, installation, and service. Specific and practical applications in relations to temperature, light, speed and pressure control as used in industry today. Includes amplifiers, power supplies, integrated circuits, alternating current (AC) and direct current (DC) drives, fiber optics, and safety.

Who Should Attend: Entry level electrical or electronic workers, utility and distributor personnel or anyone wanting to understand the basic of electronics.

Prerequisites: None

16-Week Classes
***Once a week at ELA Training Cntr.**

ELC 210
AC MACHINERY AND DC MACHINERY

Dates: Wed., Jan. 20 - May 5, 2021
Time: 6:00 p.m. - 9:10 p.m.
Instructor: Brian Moen
Fees: $297 Mbr/$333 Non-Mbr
Reg Fee: $15 per student

Principles and operation of AC (Alternating current) and DC (direct current) motors, generators, and alternators. Includes singlephase motors along with induction, synchronous, and wound-rotor types of threephase motors. DC motors including shunt-field, series field, wound rotor, permanent magnet, stepper and brushless types.

Who Should Attend: Anyone needing a working knowledge of AC/DC motors, generators, and alternators. This includes electricians, contractors, engineers, facility maintenance, equipment sales and service, supervisors, managers and planners.

Prerequisites: None

ELC 164
GROUNDING & BONDING

Dates: Thurs., Jan. 21 – May 6, 2021
Time: 6:00 p.m. - 9:10 p.m.
Instructor: Marc Ramirez
Fees: $297 Mbr/$333 Non-Mbr
Reg Fee: $15 per student

Electrical theory and calculation of electrical current. Grounding and bonding terminology including National Electric Code (NEC) Articles 250. Interpreting code requirements for grounding and bonding. Code requirements for field installation and sizing.

Who Should Attend: Contractors, engineers, draftsmen, distributors, building owners and managers, plant maintenance personnel.

Prerequisites: None

One-Day Seminars
***Non-College Credit at ELA Training Cntr.**

ELA 70
ELECTRICAL SAFETY FOR COMMERCIAL/INDUSTRIAL FACILITIES

Date: Wednesday April 14, 2021
Time: 9:00 a.m. - 5:00 p.m.
Instructor: Marc Ramirez
Fees: $270 Mbr/$300 Non-Mbr

(Fees include Continental breakfast, lunch and hand-outs).

This full-day class will cover an overview of NFPA 70E including: Arc Flash & Arc Blast Hazards, Flash Protection & approach boundaries, Hazard Risk Categories & selection of appropriate PPE. Lockout Tagout procedures, general Electrical Safety related to electricity in Commercial and Industrial facilities. Recommended Safety practices and OSHA Codes.

Who Should Attend: Highly recommended for Facility Maintenance Technicians and Building Operators, Electricians, HVAC technicians and their Supervisors.

Note: Fees include a copy of NFPA 70E 2018.
*ELA Training Center
2702 N. 3rd St. Phoenix, AZ 85004

ELA 13
NEC CODE UPDATE

Date: Wednesday April 21, 2021
Time: 9:00 a.m. - 5:00 p.m.
Instructor: Marc Ramirez
Fees: $270 Mbr/$300 Non-Mbr

This full-day class will cover modifications in the NEC and discuss why the rule changes were made. Topics also include safety aspects of the NEC changes, conflicting rule changes, how to apply rule changes to real-world projects, and how the rule changes affect overhead costs.

Note: Course fees include a copy of the 2020 National Electric Codebook and lunch. ($50 off for those w/Codebooks)
*ELA Training Center
2702 N. 3rd St. Phoenix, AZ 85004

Please Remember Register Early
to avoid disappointments

REGISTER ONLINE AT: EDU.ELAZ.ORG

Spring 2021 Electrical Course Registration

*Please read all areas of the registration portion of this form carefully and complete all necessary lines.

Student Name:_____ Date:_____

Company:_____ **Email_____

Position: _____ Student ID: _____

Mailing Address: _____ City:_____

State: AZ Zip: _____ Daytime Phone:_____ **Fax#: _____

Contact Person/Company Responsible for Payment: _____

**We may use this fax number to inform you of similar educational courses.

Are you a member of the ELA? ❑ yes ❑ no Are you enrolled in our certificate program? ❑ yes ❑ no

*New Proposition 300 Policy requires that ALL new students provide **Gateway** a copy of their AZ ID or DL for in-state tuition.

***Date present stay in Arizona began** ___ / ___ / ___ (If born in Arizona and resided here continuously since birth use birthdate.) Fees are subject to an out of state/out of county tuition assessment by GateWay if:

1. You have resided in Maricopa County for less then one year.
2. You are not a legal resident.

You may still attend all classes, but an additional flat rate per credit hour may be applied.

_____ Please initial here indicating you have read and understood the GCC Out of State Tuition Policy.

Do you require reasonable accommodations: Explain _____

Please note textbooks are not included and may be purchased from the publisher or online retailer.

Course Title	Member Fees*	Non-Member Fees*	Gateway Registration Fees
❑ ELC 120 Solid State Fundamentals	$297	$333	+$15
❑ ELC 160 Applied Electrical Codes	$297	$333	+$15
❑ ELC 164 Grounding & Bonding	$297	$333	+$15
❑ ELC 210 AC Machinery & DC Machinery	$297	$333	+$15
❑ ELA 13 NEC Code Update	$255	$285	Non College Credit
❑ ELA 70 Electrical Safety for Commercial Facilities	$255	$285	Non College Credit

Note:
One (1) $15.00 GateWay fee per student
ELC course fees do not include text books

Certificate Programs	Member Fees*	Non-Member Fees*
❑ Residential Certificate Fee	$ 30	$ 30
❑ Commercial Certificate Fee	$ 30	$ 30
❑ Industrial Certificate Fee	$ 30	$ 30
❑ Technical Certificate Fee	$ 30	$ 30
	Sub Total_____	Sub Total_____ Sub Total_____

Full Fee is due at the time of registration. Also valid state ID must be presented when appropriate, or an out-of-state fee will be charged. Fee Total $_____

Do you intend to use financial aid for a portion of class payment(s)? ❑ Yes ❑ No (please check one)

❑ Check Enclosed #: _____ ❑ M/C ❑ Visa ❑ AMEX

(All credit card receipts will be sent to the email address you provide above.)

❑ Credit Card #: _____ 3 Digit Code: _____Exp Date: _____

Exact Name on Card:_____ Signature: _____

CC Billing Address if Different: _____Zip:_____

***Cancellation Policy:** A full refund will be issued only if written notice of cancellation is received **seven (7) days** prior to the class start date. All registrations received by mail or fax are confirmed registrations, unless cancelled within the proper time frame. All courses are subject to cancellation if minimum enrollment requirements are not met. **No-shows:** Participants are charged the full amount if they register but do not attend. Due to the number of classes we hold each season, we do not provide confirmation. *_____ (Please initial here indicating you have read and understood the cancellation policy.)

*These areas must be read and completed for registration.

REGISTER ONLINE AT: EDU.ELAZ.ORG

Please return completed application and fees to: Electric League of Arizona, 2702 N. 3rd Street, Suite 2020, Phoenix, AZ 85004.
Email: education@elaz.org • Fax: 602-274-0029 • Phone: 602-263-0115

The ELA Institute's Faculty

Don Happ, Lighting Instructor - Mr. Happ is the owner of D.H. Lighting Solutions, a lighting design and consultation firm for commercial, industrial and public projects. He is Past President and an instructor for the Arizona section, Illuminating Engineering Society, a CEM, certified by the EPA and holds LC certification in lighting.

Derrick A. Denis, CIAQP, CAC, CIEC - Mr. Denis has been providing professional environmental consulting and industrial hygiene services for over 25 years. Mr. Denis has been Vice President of Indoor Environmental Quality (IEQ) for Clark Seif Clark, Inc. (CSC) for 9 years. Mr. Denis has performed and/or managed over 7,000 IEQ investigations. He has acquired various industry-relevant certifications in addition to a B.S. in Environmental Science. Mr. Denis is an active participant in the IEQ industry: he sat on the Indoor Air Quality Association (IAQA) Board of Directors, acts as Director of IAQA Phoenix Chapter, and is a member of the American Indoor Air Quality Council (AmIAQC) National Advisory Board.

Ed Weiss, Power Quality Instructor - Mr. Weiss has a distinguished background in Power Quality Engineering for the past nineteen years and is a published author, seminar speaker, holds two P.Q. related patents and is currently President of Applied Power Quality Solutions.

Elmer Tepper, Electrical Instructor - Mr. Tepper entered the electrical field as an electrician and worked in this field for fifteen years. After receiving his BSEE degree, he worked in electrical engineering design and project management for a variety of industrial, commercial and institutional facilities

.**Steve Holmquist** - Mr. Holmquist worked for several Fortune 500 companies over the last 40 years, Steve is experienced in every phase of facilities management, construction, maintenance, production systems and system integration projects from planning to completion. Expert level knowledge and proficiency in critical building infrastructure design, construction, manufacturing and operations. Designed and managed construction of data centers, industrial and commercial buildings and the systems that reside within these facilities.

Vic Pietkiewicz - Mr. Pietkiewicz has over 45 years of experience in the engineering and construction industry. He is the Owner of Dove Valley Services, LLC a consultant to the construction industry. Previously he owned his own air-conditioning company. Many of his years included creating training programs for mechanical and electrical engineers, managers, estimators, construction workers, and technicians. In addition to holding a technical school certificate in AC Engineering, and a B.Sc. in Engineering Technology (HVAC) he holds three AZ Registrar of Contractors licenses and a Federal EPA license.

Pat Wolpert - Pat comes to us from the East Coast. As master electrician in six jurisdictions, Pat has an Associate's Degree in Electrical Technologies from Thaddeus Stevens College of Technologies in Lancaster, PA, and is certified by the University of Alabama to teach Electrical Safety in the Workplace (NFPA 70E). Pat has over 40 years' experience in the electrical trade. Currently, Pat is an electrical estimator for Arizona State University in Tempe, Arizona. Pat is an active Member of the International Association of Electrical Inspectors since 2008. He has served on the advisory board of Thaddeus Stevens College for Electrical Technologies, and was an Industry Mentor for the class of 2015-2016.

Marc Ramirez - Marc has worked in the electrical industry for over 50 years. He owned and operated Mr. Electric Service Co., Inc. located in Hicksville, New York focusing primarily on service, sold the company and retired in 2001. With over 40 years of business experience in service operations management, he was recruited by Hatfield-Reynolds Electric, an IES Company, as V.P. of Service Operations from 2001 - 2008. He has been an adjunct faculty member of Gateway Community College teaching the third year Electrical Apprenticeship Program for the IEC Arizona Chapter from 2006 till 2017 and is a member of the IEC Safety & Codes and Standards Committee. He served as principle member of the NFPA National Electrical Code Panel 17 from 1993 to 2014, and an OSHA Authorized Construction 10/30 hour Trainer.

Electric League of Arizona
2702 N. 3rd Street, Suite 2020
Phoenix, AZ 85004