An interactive guide to all resources available for Training

INTERNATIONAL TRAINING FUND

e-RESOURCE
TRAINING GUIDE

e-Resources

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INTRODUCTION

Welcome to the United Association (UA) e-Resource Training Guide. Here you will find a one-stop resource for all of the e-Learning tools that are available to you for your use in the classroom, at home, or on the road, and to assign as homework for apprentices and journeyworkers. The purpose of the UA e-Resource Training Guide is to provide UA training centers with blended learning materials that accompany and or complement UA textbooks, Blackboard™ courses and JATC programs.

The United Association's training system consists of numerous components, one of which is the UA Online Learning Resources online portal to your e-Learning resources. Here you will find our online Instructor Resource Library (IRL), Student Resource Library (SRL) and gateway to Washtenaw Community College's Blackboard™ system.

By visiting www.uaolr.org you will find IRL subjects that complement current UA textbooks by providing instructors with:

- Instructional Guides
- PowerPoint® Presentations
- Interactive Illustrations
- Exams
- Answer Keys
- Quick Quizzes®
- Illustrated Glossaries
- Flash Cards
- Course Outlines
- Worksheets
- Media Resources
- Student Resource Libraries

The Student Resource Library is a digital resource available to students online. To access the Student Resource Library, students need to be enrolled by their local union training center. Here students will find a pared-down version of the IRL for studying, taking Quick Quizzes®, viewing Flash Cards and access to Videos and the new UAwebBooks™ if available for the selected title.

Next you will find the UA's Blackboard™ courses. The UA's Blackboard™ courses are an additional resource designed to complement UA textbooks and assist in the training of apprentices and journeyworkers. Certain Blackboard™ courses serve as a platform for virtual reality simulations in crane signaling, HVACR, and plumbing service work, with plans to expand into other subject matters.

Finally, this guide will cover two applications developed for the membership. The apps can be used via a smart phone or a tablet. The first is the UA Training App. Here you can access UA training news, videos, regional training schedule, and recruitment materials. The second app is meant to supplement UA textbooks with an augmented reality component.

Take a few moments to browse the e-Resource Training Guide, learn more about what is available to you, and how to access these resources.

UA Online Learning Resources (UAOLR)

- **UAOLR: How do I get started?**
- **UAALLY**

The United Association's training system consists of the Great Lakes Training Center, which is located in Ann Arbor, Michigan, and over 300 local union training centers across the United States and Canada.

The UA Training system provides common curricula for all five of the trades in the piping industry. Our system was designed to support and enhance training by sharing resources. These resources consist of various methods to train instructors by utilizing distance education, such as webinars, regional training courses at onsite locations, and internet-based classes using the Blackboard™ LMS and the UAOLR.

The UA Online Systems allow access for local union training centers to offer specialized courses, enabling instructors to provide training on specialized equipment.

UAOLR also provides a portal where our instructors can access and download e-Learning resources through our Instructor Resources Library (IRL). The IRL provides UA instructors with instructor's guides to the UA's textbooks, PowerPoint® presentations, exams, quizzes and multi-media training materials. UA Online Learning Resource site, offers a portal for UA students too —the Student Resources Library (SRL). Here a student can study and take quick quizzes, and sample exams to bring their skills up prior to taking an exam at their school. The SRL also allows students to access illustrated glossaries, flash cards, media and documents, with selected titles available in Spanish. This content can be displayed in either English or Spanish and an audio pronunciation of each term can be played to reinforce comprehension.

We are proud of the resources and tools we are able to provide UA instructors and apprentices through UA Online Learning Resources. Whether in a brick and mortar school or via distance education, UA is leading the way in training the piping industry professionals today.

How do I get started?

The training director/coordinator must approve access to UA Online Learning Resources. All users, instructors, apprentices and students need to have a username and password to access the system.

The local union training center must have at least one designated local administrator to upload and manage their apprentices and students (Local Dashboard Access.) If you do not have access, contact your local training center.

Business managers, please have your training director/coordinator contact Lauren Friedman by email at: lfriedman@uanet.org if you have any questions.
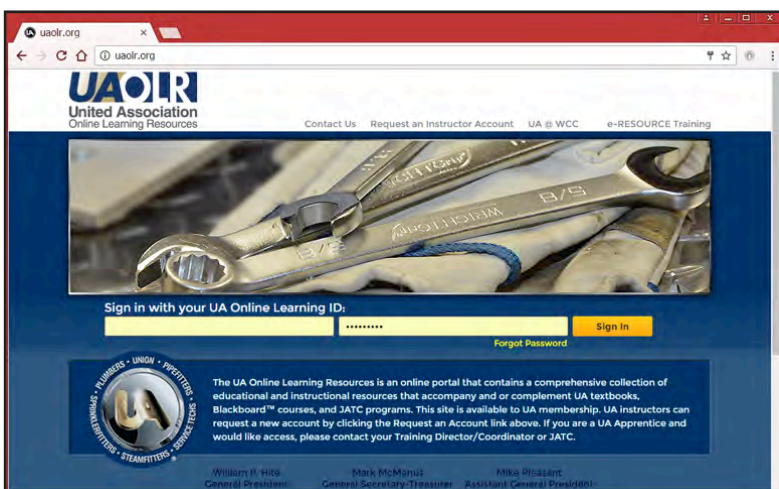
UAALLY is a peer-supported resource sharing system. Instructors are encouraged to submit their own work, as well as to browse and download the work of other UA Instructors. You will find UAALLY linked in every IRL.

UAOLR

Instructor Resource Library (IRL) / Student Resource Library (SRL)

- **Descriptions**
- **Material Available**

The Instructor Resource Library (IRL) and the Student Resource Library (SRL) are portals where instructors and students can access and download e-Learning resources.

Below are the course materials, descriptions and resources that are available to complement a textbook or are a stand alone course.

Students need to have a username and password to access the Student Resource Library. Access needs to be provided by the student's local training center "Dashboard" Administrator.
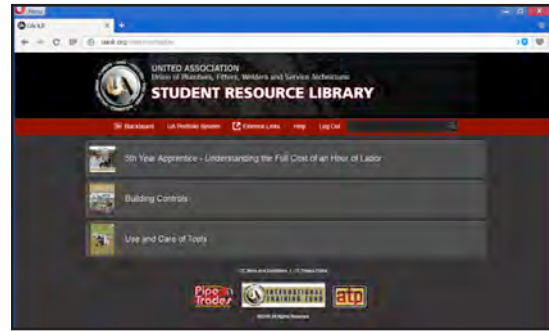
UA Blackboard™ Learning Management System

This resource is a beginner's guide on how to use Blackboard™ in your classroom.

Student Resource Library (SRL)
- Frequently Asked Questions (FAQs)
- Login to UA Blackboard
- UA Blackboard Overview
- UA Blackboard System Support
- Using the UAOLR with UA Blackboard
- Updates / Comments

Advanced Plan Reading

Advanced Plan Reading and Related Drawing (R/2021): This all-new manual contains seven chapters, which cover topics including the history of blueprints, computer-aided design (CAD), the stages of a construction project, using construction documentation, laying out systems, and the use of virtual design and construction (VDC).

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Assignments
- BIM 360 - Instructor
- Exams
- Exercises
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- PowerPoint® Presentations
- UAALLY Instructor Shared Resource System

Student Resource Library (SRL)
- Advanced Plan Reading and Related Drawing UAwebBook
- BIM 360 - Student
- Forms and Documents
- Illustrated Glossary

- Media
- Online Resources
- Quick Quizzes®
- Software and Applications
- Updates / Comments

Advanced Valve Repair

The newly revised Advanced Valve Repair manual goes beyond the basics. It covers mindset procedures and emphasizes the importance of precision measuring instruments. It guides readers through error-free maintenance and also narrates and illustrates the repair and disassembly of a pressure seal bonnet and how to assemble and disassemble a pneumatic control valve. The manual includes multiple illustrations of various actuators and control valves with diagrams and charts to aid in identifying the appropriate parts.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- PowerPoint® Presentations
- UAALLY Instructor Shared Resource System

Student Resource Library (SRL)
- Advanced Valve Repair UAwebBook
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®
- Repair and Maintenance Procedures
- Updates / Comments

Applied Science of Instrumentation

The Instrumentation resource has been designed to provide a foundation of knowledge for the prospective instrumentation technician. Topics covered include fundamentals of process and control systems; instrumentation symbols and diagrams; principles of pressure, level, flow, and temperature; control valves, actuators, and accessories; installation of control systems; process control loop checking, start-up and tuning, and troubleshooting; and distributed control systems.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments / Student Resource Library (SRL) Access

Student Resource Library (SRL)
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®
- Updates / Comments / Student Resource Library (SRL) Access

Backflow Prevention Reference Manual

This resource is designed to teach the basics of backflow prevention and cross-connection control. The user will be able to identify and test the wide variety of backflow preventers, and recognize the devices that cannot be tested. The tester will be able to identify backflow preventers that have failed and properly report those failures.

In its entirety, this resource will supply the information necessary to certify individuals as backflow prevention testers, certified repair technicians, and certified backflow prevention surveyors. Once you have completed training, you should be a competent member of this vital field of UA tradesmen, water suppliers, and engineers dedicated to "protecting the health of the nation."

Instructor Resource Library (IRL)
- Answer Keys
- Exams

- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outlines
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®
- Updates / Comments

Basic Electricity

This instructional guide describes the value and intended use of each component of the Basic Electricity theory training package. This guide also provides information about key elements that determine instructional program format, the instructional methods used by successful instructors, and detailed instructional plans that correspond to each chapter of the manual.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Assignments
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)
- Flash Cards
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®

Building Controls

The Building Controls resource is a comprehensive guide to the operation of modern building control systems. The topics covered include an introduction to building control systems, control concepts, network data communications, and electrical system control devices and applications. Also covered are HVACR system energy sources, HVACR system control devices and applications, plumbing system control devices and applications, automated building operation, system integration, and trends in building automation.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Building Controls UAwebBook
- Flash Cards
- Illustrated Glossary
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- Premium PowerPoint® Presentations
- Quick Quizzes®
- Updates / Comments

Student Resource Library (SRL)
- Building Controls UAwebBook
- Flash Cards
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®
- Updates / Comments

Conservation and Safe Handling of Refrigerants

Conservation and Safe Handling of Refrigerants (R/19): The primary objective of this newly revised manual is to prepare United Association journeyworkers and apprentices to successfully pass the EPA Section 608 Technician Certification examinations. The manual features 11 sections, including information on the history of refrigerants; ozone and global warming; refrigerant recovery, recycling, and reclaiming; safety, storage, and transportation of refrigerants; leaks and leak repair; refrigerant recovery tools and equipment; and sections on the Type I, Type II, and Type III areas of the certification exam.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- PowerPoint® Presentations
- UAALLY Instructor Shared Resource System

Student Resource Library (SRL)
- Conservation and Safe Handling of Refrigerants UAwebBook
- EPA 608 Practice Exam
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®
- UAdaptive Quizzes
- Updates / Comments

Customer Service for the UA Craftsperson

This resource encourages public relations through good customer skills - gaining knowledge of how to communicate - through your speech and actions (attitude); how your overall appearance plays an important role in the customer's evaluation; how you learn to discipline and present yourself to each customer as your company's liaison.

Student Resource Library (SRL)
- Training Videos

Drainage Systems

The Drainage Systems resource covers content related to the sanitary disposal of wastes, the efficient disposal of storm water, the use of proper wastewater disposal systems, and alternative water sources. Topics include an introduction to drainage, drainage system piping materials and supports, traps and fixture connections, sanitary drainage piping installation, vent systems, DWV sizing, storm drainage, sewers and sewage treatment, private sewage disposal systems, and alternate water source drainage systems.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Resource Library

Drainage Systems *(continued)*

Student Resource Library (SRL)
- Flash Cards
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®

Energy Auditing Practices

Where energy used to be treated as a limitless, cheap commodity, efforts now are concentrated on conservation, cost, efficiency, and environmental responsibility. Innovation in equipment and system controls has allowed us to improve efficiency without sacrificing comfort, health, or safety. These strategies, however, rely on skilled and knowledgeable technicians who must identify opportunities for increased efficiency and implement the most cost-effective retrofits. The Energy Auditing Practices manual will help train UA personnel in the entire energy auditing process.

Instructor Resource Library (IRL)

- Audit Forms
- Energy Auditing Practices UAwebBook
- Flash Cards
- Illustrated Glossary
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)
- Audit Forms
- Energy Auditing Practices UAwebBook
- Flash Cards
- Illustrated Glossary
- Online Resources
- Quick Quizzes®
- UA Curriculum Material

Fire Protection — Fire Pumps

The installation of fire pumps in new and existing buildings are performed by UA Sprinkler Fitters and Apprentices per NFPA 20 requirements. Once these life safety components are installed and commissioned, these systems must be inspected, tested, maintained and serviced on a periodic basis as per NFPA 25. Maintenance and service represent a high percentage of the total work performed in the sprinkler in-

dustry. The Sprinkler Fitter – Fire Pump resource provides methods and guides to successfully preform inspection, testing maintenance and repair on fire pumps and their components to ensure these systems are performing as designed. The code requirements per NFPA 20 and NFPA 25 for installation, inspection, testing and maintenance for fire pumps along with requirements for proper PPE per NFPA 70E are addressed within this training resource.

Instructor Resource Library (IRL)
- Answer Keys
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- PowerPoint® Presentations
- UAALLY Logo Instructor Shared Resource System
- Worksheets

Student Resource Library (SRL)
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®
- Updates / Comments

Fire Protection — Special Hazards

Special hazards in fire protection are utilized in environments or situations where traditional fire suppression systems may not be effective or appropriate. These hazards can include flammable liquids, gases, combustible dusts, or electrical equipment. Special hazard suppression systems are designed to detect and extinguish fires in these environments to protect both property and lives. These systems typically involve the use of specialized systems such as inert gas, carbon dioxide, hybrid or foam to suppress fires without causing damage to sensitive equipment or materials.

Student Resource Library (SRL)
- Course Evaluation
- Fire Suppression Systems
- Media
- Victaulic Vortex System and Installation Fundamentals Guide

Foreman Training Manual

The Foreman Training Manual will serve potential foremen by instilling the principles of the UA Standard for Excellence, enabling him or her to effectively convey these principles on each and every job site. It takes the user through a realistic realm of the daily duties of a foreman, including chapters titled "Planning and Scheduling," "Documentation and Record-Keeping," "Managing, Measuring, and Improving Productivity," "Change Orders," and "Close-out." It encompasses the behavioral mindsets of individuals on the job, and how to properly deal with each issue that may arise, inclusive in chapters titled "Image and Professionalism," "Relationships," and "Understanding and Resolving Conflict and the Art of Negotiation." Each student will walk away with a complete knowledge of what is expected of a certified UA foreman.

Instructor Resource Library (IRL)

- Exercises
- Exercises Answer Keys
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)

- Exercises
- Exercises Answer Keys
- Flash Cards
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®

- Flash Cards
- Forms and Documents
- Fuel Gas Systems UAwebBook
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- UA Curriculum Material
- UAdaptive Quizzes
- Updates/Comments

Student Resource Library (SRL)

- Flash Cards
- Forms and Documents
- Fuel Gas Systems UAwebBook
- Illustrated Glossary
- Media
- Online Resources
- UAdaptive Quizzes
- Updates / Comments

GPRO

The GPRO training program is designed for experienced building professionals who seek to integrate green practices into the core knowledge of their trade. As such, the program materials and exam cover the "green gap" between standard trade skills and the new knowledge, awareness, and skills required to successfully implement green building.

Student Resource Library (SRL)

- GPRO - Fundamentals of Building Green
- GPRO - Green Mechanical Systems
- GPRO - Green Plumbing Systems

Fuel Gas Systems

Installation of a fuel gas system is one of the most important skills a pipe trades worker can learn. Fuel gas is flammable and potentially dangerous which emphasizes the need for proficiency in proper piping and appliance installation, combustion air and venting applications including proper sizing practices. This comprehensive guide covers the related science, history, safe installation and operation of fuel gas systems.

Instructor Resource Library (IRL)

- Answer Keys
- Assessments

HVACR and Refrigeration Systems

This training manual covers all aspects of residential and light commercial heating, ventilation, and air conditioning systems, focusing specifically on the operation, installation, service maintenance, and troubleshooting of these systems. The textbook covers heating and refrigeration fundamentals, psychrometrics, building mechanical systems, and electrical and electronic devices and controls. The textbook covers air-and water-source heat pump and chiller systems and includes 100 installation and 65 step-by-step service procedures. Energy efficiency practices, energy auditing, building commissioning, and retrofitting are covered as part of Energy Star and LEED certifications.

Resource Library

HVACR and Refrigeration Systems

(continued)

Instructor Resource Library (IRL)
- Answer Keys
- Exams
- Flash Cards (English/Spanish)
- Forms and Documents
- HVAC and Refrigeration Systems UAwebBook
- Illustrated Glossary (English/Spanish)
- Instructor's Guide
- Interactive Animations
- Interactive Illustrations
- Library
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- Review Questions
- Step-by-Step Procedures
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)
- Flash Cards (English/Spanish)
- Forms and Documents
- HVAC and Refrigeration Systems UAwebBook
- Illustrated Glossary (English/Spanish)
- Interactive Animations
- Library
- Media
- Online Resources
- Quick Quizzes®
- Review Questions
- Step-by-Step Procedures
- Updates / Comments

Hydronic Heating and Cooling

This instructional guide describes the value and intended use of each component of the Hydronic Heating and Cooling training package. This guide also provides information about key elements that determine instructional program format, the instructional methods used by successful instructors, and detailed instructional plans that correspond to each chapter of the textbook.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Flash Cards (English/Spanish)
- Forms and Documents
- Hydronic Heating and Cooling UAwebBook
- Illustrated Glossary (English/Spanish)
- Instructional Outlines
- Instructor's Guide

- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)
- Flash Cards (English/Spanish)
- Hydronic Heating and Cooling UAwebBook
- Illustrated Glossary (English/Spanish)
- Media
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Medical Gas Certification

The resources provided in the Medical Gas Certification Instructor's Resource Library highlight the code concepts required by medical gas system installers and are designed to serve as a basis for instruction. Like an artisan using specialized tools, an instructor uses many instructional tools, including personal experience, to further supplement this material.

Instructor Resource Library (IRL)
- Course Outline
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outline
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments
- Worksheet Answer Keys
- Worksheets

Student Resource Library (SRL)
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®

Resource Library

NFPA Codes and Standards

NFPA codes and standards are developed by subject matter experts from around the globe and serve as the leading resource on fire, electrical, and life safety guidelines and requirements. These codes and standards that dictate the installation, inspection, testing and maintenance of the piping systems which are adopted by the uniform and international codes. All standards are consensus based and peer reviewed so you can trust you're working with the most up to date and thorough requirements in the industry.

Instructor and Student Resource Library
Note: IRL only for material marked with an (*)

- NFPA Technical Committee Members
    - Committee Reports Form*****
    - Submit Committee Reports*****
    - Submit Public Input*****
    - Submit Public Comment*****
    - Submit NITMAM*****
- NFPA Membership
    - NFPA Membership*****
    - NFPA Apprentice Membership (FREE)
- NFPA Publications
    - Codes
    - Electrical and Safety
    - Fire Protection
    - Mechanical and Plumbing
    - Welding
    - Full list of Codes and Standards on NFPA.org
    - Assessments*****
- NFPA Code Development Process
    - Overview
    - Joining an NFPA Committee*****
    - Robert's Rules of Order
- Updates / Comments
- Online Resources

Other UA Book Resources (14 Titles)

- **Advanced Plan Reading and Related Drawings**
  The Advanced Plan Reading manual covers advanced plan reading, working sketches, the development of sleeve and coordinated drawings and an introduction to computer-aided drafting. A set of specifications and building plans (44 drawings) in addition to special drawing sheets are included with the manual.

  Instructor Resource Library (IRL)
    - Assessments
    - Assignments and Answers
    - Instructor's Guide
    - Review Exams and Answers

- **Drawing Interpretation**
  The Drawing Interpretation and Plan Reading manual contains seven chapters that cover an introduction to basic drawing tools, measuring tools and lettering skills; three-view, plan view and elevation view drawings; graphic symbols for pipe fittings and valves; interpretation of technical diagrams; piping drawings; interpretation of building plans and building specifications. The manual also comes with a complete set of building plans with specifications and ruled isometric and blocked paper.

  Instructor Resource Library (IRL)
    - Assessments
    - Assignments and Answers
    - Exercise and Answers
    - Figures
    - Review Exams and Answers

- **Electric Controls**
  This manual was designed for apprentices and journeyworkers who know the fundamentals of basic electricity. The purpose of this course is to teach those fundamentals of electric controls a journeyworker must know in order to service mechanical equipment installations such as air conditioning, heating, fuel burning, water heating, and refrigeration, just to name a few. The 60 electrical diagrams and troubleshooting guide which accompany this manual provide a practical approach to learning about servicing and troubleshooting electrical devices and systems.

  Instructor Resource Library (IRL)
    - Assessments
    - Assignments and Answers
    - Diagrams
    - EC Errata Sheet
    - Figures and Tables

- **Gas Installations**
  The resources provided in the Gas Installations Instructor's Resource Library are:

  Instructor Resource Library (IRL)
    - Assessments
    - Assignments and Answers
    - Figures and Tables
    - Review Exams and Answers

- **Job Safety and Health**
  The Job Safety and Health manual includes information concerning many types of work processes in the pipe trades that can lead to occupational safety and health hazards and how to eliminate these hazards or safeguard against them. The manual is designed to meet two important training needs. The first is to provide practical text materials that can be easily added or adapted to pipe trades apprenticeship and journeyworker training programs. The second important purpose is to provide a refresher course for journeyworkers.

- **Job Safety and Health** *(continued)*

  Instructor Resource Library (IRL)
  - Assessments
  - Assignments and Answers
  - Figures and Tables
  - Review Exams and Answers

- **Oxy-Fuel Practices**
  The seven chapters of this manual focus on oxyacetylene cutting and welding, with chapters on oxyacetylene and other types of oxy-fuel gases, cutting and welding equipment, and procedures for setting up the equipment. Also included are oxy-fuel cutting and welding exercises. Safety is stressed throughout the manual.

  Instructor Resource Library (IRL)
  - Assessments
  - Assignments and Answers

- **Pipe, Fittings, Valves, Supports and Fasteners**
  This manual is designed for use by all new apprentices. It will familiarize them with piping materials, joining methods and how to support them. It also includes information on types of valves, understanding the function and the use of valves. This manual is an excellent resource guide that contains numerous step-by-step joining procedures for various types of piping materials. This text contains the actual dimensions for most of the fittings and piping materials common to the pipe trades.

  Instructor Resource Library (IRL)
  - Assessments
  - Assignments and Answers
  - Review Exams and Answers

- **Pneumatic Controls**
  This textbook is limited in scope to the study of basic pneumatic control principles. It is not designed to produce "pneumatic control journeyworkers" but is aimed at providing a general knowledge of the subject to all pipe tradespeople.

  Instructor Resource Library (IRL)
  - Assessments
  - Assignments and Answers
  - Exercises and Answers
  - Review Exams and Answers

- **Pumps**
  The Pumps manual describes the operating principles of many of the pumps currently in use in the piping industry. Even though there are many different manufacturers of this equipment and many different sizes and capacities within each type of pump, the principles contained in the manual can be applied to almost any type or make of pump encountered. The manual covers pump theory, types of pumps, pump installation, pump systems, and troubleshooting.

Instructor Resource Library (IRL)
- Assessments
- Assignments and Answers
- Review Exams and Answers

- **Refrigerant Controls**
  This textbook covers the principles of operation, the installation and the servicing of the devices and equipment required to control the flow of refrigerant in all types of air conditioning and refrigeration systems.

  Instructor Resource Library (IRL)
  - Assessments
  - Assignments and Answers
  - Figures
  - Review Exams and Answers

- **Refrigeration**
  The Refrigeration manual was developed to train service journeyworkers in all aspects of refrigeration. A step-by-step procedure is followed from the basic cycle through centrifugal and absorption systems, the related equipment, controls, start-up, testing and repair of various types of refrigeration equipment.

  Instructor Resource Library (IRL)
  - Assessments
  - Assignments and Answers

- **Related Science**
  The Related Science manual covers topics including the properties of water, the laws of hydraulics and pneumatics as they are related to piping systems, and how the basic principles of mechanics apply to the tools of the pipe trades. Additional topics covered include the metals used in the piping industry and corrosion and how it affects piping materials.

  Instructor Resource Library (IRL)
  - Assessments
  - Assignments and Answers
  - Classroom Experiments
  - Review Exams and Answers

- **Standard of Excellence**
  The UA Standard for Excellence policy not only outlines the obligations of UA members on the job, it also spells out the obligations for our signatory contractors. This publication also presents an overview of the opportunities provided for apprentices in a pipe trades career as well as the responsibilities and attitudes required for success.

  Instructor Resource Library (IRL)
  - Assessments

- **Valve Repair**

  Valves are so commonplace and so widely used in industry that often little attention is paid to them until they fail to perform as required. The Valve Repair Program manual features topics including error-free maintenance, precision measuring instruments, fasteners and torquing, valve packing, and various types of valves.

  Instructor Resource Library (IRL)
  - Assessments
  - Assignments and Answers
  - Figures

Plumbing Fixtures and Appliances

The newly revised Plumbing Fixtures and Appliances manual updates, reorganizes, and expands the information contained in previous editions. Updated and new material includes chapters on the historical perspectives and research undertaken to improve plumbing fixtures, appliances, and appurtenances; standards and plumbing code requirements; water closets, urinals, and bidets; bathtubs and showers; sinks; receptacles; plumbing appliances; and plumbing appurtenances and accessories.

Instructor Resource Library (IRL)

- Answer Keys
- Assessments
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- PowerPoint® Presentations
- UAALLY Instructor Shared Resource System

Student Resource Library (SRL)
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Plumbing Fixtures and Appliances UAwebBook
- UA Virtual Toolbox™
- UAdaptive Quizzes
- Updates / Comments

Plumbing Service, Maintenance, and Repair

The installation of plumbing systems in new construction is performed by pipe trades journeyworkers and apprentices. Once these new piping systems and fixtures are installed, they must be maintained and serviced. Maintenance and service represent a high percentage of the total work per-

formed in the plumbing industry. The Plumbing Service, Maintenance, and Repair manual covers 11 major plumbing topics and includes service and repair troubleshooting tables and internet resources.

Instructor Resource Library (IRL)

- Chapter Exam Answer Keys
- Chapter Exams
- Flash Cards (English/Spanish)
- Forms and Documents
- Illustrated Glossary (English/Spanish)
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- Plumbing Service, Maintenance, and Repair UAwebBook
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)
- Flash Cards (English/Spanish)
- Illustrated Glossary (English/Spanish)
- Media
- Online Resources
- Plumbing Service, Maintenance, and Repair UAwebBook
- Quick Quizzes®

Related Mathematics

This textbook contains six chapters: Chapter 1 covers Basic Math Review; Chapter 2 covers Pipe Measurements--One; Chapter 3 deals with the Formulas for Related Mathematics in the Pipe Trades; Chapter 4 covers Pipe Measurements--Two; Chapter 5 is on Metric Measurements and Chapter 6 covers the Instruments Used for the Layout of Piping Systems.

Instructor Resource Library (IRL)

- Assessments
- Answer Keys
- Review Exams and Answers
- Shop Projects and Answers

Student Resource Library (SRL)
- Appendix Reference Tables
- Glossary
- Related Mathematics UAwebBook

Related Mathematics, 2nd Edition

This newly revised math manual focuses on math used in the pipe trades. The book's nine chapters cover whole number math, decimal and common fractions, pipe measurements, pipe trades plane geometry, pipe trades solid geometry, piping system layout, and piping offsets. Each chapter features multiple examples and practice problems.

Instructor Resource Library (IRL)

- Answer Keys
- Assessments
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- PowerPoint Presentations
- UAALLY Instructor Shared Resource System

Student Resource Library (SRL)

- Flash Cards
- Glossary
- HVACR Math (Coming Soon)
- Online Resources
- Pipefitting Math—57¼" (Coming Soon)
- Plumbing Math (Coming Soon)
- Reference Material
- Related Mathematics, 2nd Edition UAwebBook
- Sprinkler Fitting Math (Coming Soon)
- UAdaptive Quizzes
- Updates / Comments
- Welding Math (Coming Soon)

Related Science

This manual contains eight chapters on topics ranging from chemical elements and heat to fluids and pressure. Also covered are compressibility and the thermal expansion of fluids, metallic and nonmetallic piping materials, corrosion of piping materials, fluid flow in piping, and mechanics.

Instructor Resource Library (IRL)

- Answer Keys
- Assessments
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- PowerPoint® Presentations
- UAALLY Instructor Shared Resource System

Student Resource Library (SRL)

- Flash Cards
- Forms and Documents
- Glossary
- Media
- Online Resources
- Related Science UAwebBook
- UAdaptive Quizzes
- Updates / Comments

Residential Wiring and Smart Home Technology

This manual focuses on the principles, installation, and operation of wired and wireless residential electrical and electronic systems. This edition provides expanded material on utility power generation and distribution, electrical safety, and NEC® guidelines. New topics include smart home infrastructure, security and fi re alarm systems, and energy management applications supported by the smart grid. A lifestyle applications chapter covers improvements to convenience and comfort provided by smart home technology.

Instructor Resource Library (IRL)

- Answer Keys
- Assessments
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Premium PowerPoint® Presentations
- UAALLY Instructor Shared Resource System

Student Resource Library (SRL)

- Flash Cards
- Illustrated Glossary
- Interactive Wiring Activities
- Media
- Online Resources
- Quick Quizzes®
- Residential Wiring and Smart Home Technology UAwebBook
- Smart Home Technology
- Updates / Comments

Rigging

The Rigging resource provides an instructional platform to aid in the teaching of this essential skill. From differentiating between types of rope, to determining load weights, rigging instructors can use these tools to create more effective lesson plans and help their students succeed.

Instructor Resource Library (IRL)

- Answer Keys
- Assignments
- Exams
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Rigging *(continued)*

Student Resource Library (SRL)
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®

Solar Water Heating Systems: Fundamentals and Installation

This resource is a comprehensive guide to the installation of residential and light commercial domestic hot water and swimming pool solar water heating systems. The topics covered include solar thermal principles, system operation fundamentals, system design and sizing, site assessment, system startup and maintenance, system installation safety, and installation and service of system components, such as collectors, storage tanks, and operational control systems.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- Solar Radiation Data Sets
- Solar Radiation Data Sheets
- Sun Path Charts
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)
- Flash Cards
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®
- Solar Radiation Data Sheets
- Solar Water Heating Systems UAwebBook
- Sun Path Charts

Soldering & Brazing

This instructional guide describes the value and intended use of each component of the Soldering & Brazing training package. This guide also provides information about key elements that determine instructional program format, the instructional methods used by successful instructors, and detailed instructional plans that correspond to each chapter of the manual.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Assignments
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)
- Assignments
- Flash Cards
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®

STAR Study Guides

This resource is where you will find the study guides for the UA STAR certification exams.

The study guides are found in the Forms and Documentation tab. The resources are:

UA STAR HVACR Commercial Refrigeration Study Guide
UA STAR HVACR Residential/Light Commercial Study Guide
UA STAR HVACR Study Guide 4-13-15
UA STAR Pipefitter Study Guide
UA STAR Plumbers Study Guide
UA STAR Sprinkler Fitter Study Guide

- Update Contents:
    - Forms and Documents
    - Updates / Comments

Resource Library

Start, Test and Balance

This manual contains instructions for the safe use of various types of tools and equipment that are used in the installation, testing, repair, maintenance and servicing of equipment related to the subject matter. Those instructions, along with the tables, charts, drawings and photographs which appear in this training manual, are not intended to set standards for their use and application and manufacturers' type. Rather, they are designed to familiarize journeyworkers and apprentices with some of the factors and considerations involved.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Premium PowerPoint® Presentations
- UAALLY Instructor Shared Resource System

Student Resource Library (SRL)
- Flash Cards
- Illustrated Glossary
- Interactive Wiring Activities
- Media
- Online Resources
- Quick Quizzes®
- Residential Wiring and Smart Home Technology UAwebBook
- Smart Home Technology
- Updates / Comments

Steam Systems

The Steam Systems resource contains instructional and multi-media content on scientific principles pertaining to the properties and characteristics of water and steam, hydraulics and pneumatics, mechanics, metals, alloys, synthetics, and corrosion. Other main topics include: steam systems, steam heating principles, low-pressure boilers, steam piping systems, heat transfer units, steam traps, gravity condensate return, one and two pipe systems, two pipe mechanical return steam heating systems, vapor, vacuum and variable vacuum steam heating systems, high-pressure boilers, steam generation plants, and steam system operation and maintenance in all types of buildings – residential, commercial, institutional, and industrial.

Instructor Resource Library (IRL)
- Assessments Answer Keys
- Flash Cards
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Media

- Online Resources
- Steam Systems UAwebBook
- UA Curriculum Material
- UAdaptive Quizzes
- Updates / Comments

Student Resource Library (SRL)
- Flash Cards
- Illustrated Glossary
- Media
- Online Resources
- Steam Systems UAwebBook
- UA Curriculum Material
- UAdaptive Quizzes
- Updates / Comments

Technology for the Piping Industry

The Technologies IRL is designed to help orient apprentices with the tools of the trades and educate them on the proper and appropriate use. From administrative software like Autodesk and TSheets to trade-specific apps and tools, the industry is changing, and helping out apprentices remain abreast of the latests tools and tricks will help them get ahead in their careers.

Instructor and Student Resource Library
Note: IRL only for material marked with an (*)

- Global eTraining
  - Global eTraining - Instructor Access*****
  - Global eTraining - Learner Access
- Autodesk® Skilled Trades Program
  - Autodesk® Licenses - Training Center*****
  - Autodesk® Licenses - Learn at Home
- Social Media and News
  - Tech Tuesday Archive
  - Slack
  - Podcasts
  - Technology News
- Classroom Technology
  - The Connected Apprentice - Devices for Training*****
  - Mobile Apps
  - Virtual Desktop Infrastructure (VDI)*****
  - eInstruction Training - Mobi*****
  - eInstruction Training - ExamView*****
  - eInstruction Training - CPS*****
- Virtual Design and Construction (VDC)
  - Revit
  - Navisworks
  - Autodesk® Construction Cloud - BIM 360™
  - Revizto Licenses - Training Center*****
  - Revizto
  - MSuite
  - GTP Stratus

Technology for the Piping Industry
(continued)

- Jobsite Technology
    - Robotic Total Station (RTS)
    - Reality Capture
    - Autodesk® Construction Cloud - BIM 360™
    - Bluebeam Licenses – Training Center*****
    - BlueBeam
    - Procore Licenses - Training Center*****
    - Procore
    - XOi
- AR/VR/XR
    - Augmented Reality (AR)
    - Virtual Reality (VR)
    - Mixed Reality (XR)
- Updates / Comments

Understanding the Full Cost of an Hour of Labor

This resource is vital in providing detailed explanations to apprentices of the full cost to the employer in putting a UA employee to work.

Student Resource Library (SRL)
- 2nd Year Apprentice - Understanding the Full Cost of an Hour of Labor
- 5th Year Apprentice - Understanding the Full Cost of an Hour of Labor

Use and Care of Tools

The pipe trades industry continues to go through rapid changes in installation technologies and material development in all phases of the trade, including the residential, commercial, industrial, maintenance, and service industries. The type of materials used and the kinds of tools required for the installation of complex piping systems and equipment continue to evolve; however, many basic fundamentals still exist and apply to the industry today. This illustrated manual covers seven major manual and power tool topics, including safe use of tools, ladders and scaffold use, measuring and layout tools, hand tools, power tools, piping system joining tools, and specialty tools.

Instructor Resource Library (IRL)
- Answer Keys
- Exams
- Flash Cards (English/Spanish)
- Forms and Documents
- Illustrated Glossary (English/Spanish)
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations

- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments
- Use and Care of Tools UAwebBook

Student Resource Library (SRL)
- Flash Cards (English/Spanish)
- Forms and Documents
- Illustrated Glossary (English/Spanish)
- Media
- Online Resources
- Quick Quizzes®
- Use and Care of Tools UAwebBook

Water Supply Systems

The newly revised manual includes chapters on historical perspectives of water supply systems, water sources and treatment, water piping materials, water distribution systems, building water supply systems, sizing building water supply systems, water heating, and water conservation. Elements of these topics include fittings and supports, system design, thermal expansion, water heaters, and protection of the water supply and building occupants. Current water conservation technologies are included, such as alternative water sources, and water-saving fixtures, appliances, and methods.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates/Comments
- Water Supply Systems UAwebBook

Student Resource Library (SRL)
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments
- Water Supply Systems UAwebBook

Welding Practices and Procedures for the Pipe Trades

The Welding Practices and Procedures resource covers welding fundamentals and the proper processes, techniques, and procedures to become competent in the welding field. Topics include an introduction to welding, shielded metal arc welding (SMAW), gas tungsten arc welding (GTAW), gas metal arc welding (GMAW), other welding and joining processes, weld evaluation and testing, and welding technology.

Instructor Resource Library (IRL)
- Answer Keys
- Assessments
- Flash Cards
- Form and Documents
- Instructional Outlines
- Instructor's Guide
- Interactive Illustrations
- Ilustrated Glossary
- Media
- Online Resources
- PowerPoint® Presentations
- Quick Quizzes®
- UA Curriculum Material
- Updates / Comments

Student Resource Library (SRL)
- Flash Cards
- Forms and Documents
- Illustrated Glossary
- Media
- Online Resources
- Quick Quizzes®
- Updates / Comments

Welding Fundamentals – GTAW

This resource contains material to aide instructors with the teaching of Gas Tungsten Arc Welding (GTAW) in the classroom and the lab. This is an INSTRUCTOR ONLY RESOURCE.

Instructor Resource Library (IRL)
- Electrode, Cup, and Filler Metal Identification
- Material Fit-Up and Alignment
- Open V-Groove on Pipe Examples
- Open V-Groove on Plate Examples
- Preparation of Material
- Single and Overlapping Bead on Pipe with Filler Metal Examples
- Single and Overlapping Bead on Plate Examples
- Single and Overlapping Bead on Plate with Filler Metal Examples
- Socket Welding
- Striking the Arc
- Student Performance Evaluation Forms
- TIG Torch Basics

- Updates / Comments
- Walking the Cup
- Welding Safety

Welding Fundamentals – Orbital Welding

This resource contains material to aide instructors with the teaching of Orbital Welding in the classroom and the lab. It also includes resources for how to set up an Orbital program at your local.

Instructor Resource Library (IRL)
- Collets and Tungsten
- Orbital Welding Overview
- Power Supply and Weld Head Overview
- Preparation of Material
- Programming Power Supplies
- References
- Weld Head Calibration
- Weld Schedule Development — Program Sheets
- Welding Safety

Student Resource Library (SRL)
- Teaching Orbital Welding at the Local Level

Welding Fundamentals – SMAW

This resource contains material to aide instructors with the teaching of Shielded Metal Arc Welding (SMAW) in the classroom and the lab. This is an INSTRUCTOR ONLY RESOURCE.

Instructor Resource Library (IRL)
- Common Weld Positions
- Electrode Identification
- Flash Cards
- I-Beam to Plate
- Interactive Bend Test Samples
- Interactive Welding Defects Identification
- Left- and Right-Hand Welding
- Open V-Groove on Pipe Examples
- Open V-Groove on Plate Examples
- Preparation of Material
- Single and Overlapping Bead on Pipe Examples
- Single and Overlapping Bead on Plate Examples
- Socket Welding
- Student Performance Evaluation Forms
- UA Certification 2 Practice Activity
- Updates / Comments
- Weld Testing Methods
- Welding Safety

Blackboard™

- **Blackboard™ Request Procedure**
- **Blackboard™ Support**
- **Computer Requirements**
- **Required Computer Skills**
- **Canvas**

Blackboard™ is the home of the WCC-UA Blackboard™ LMS (Learning Management System.) It is a secure site which requires a user name and password issued by Washtenaw Community College (WCC). This system is for online teaching of particular courses or it can also be used to supplement existing Apprenticeship Programs.

The Blackboard™ LMS is a web based interactive learning environment that supports learning and teaching in face to face, blended learning, and can be used as a supplemental resource for your local training classes too.

Instructors can post grades, information, assignments and interact with class participants by way of email, discussion board or Wikis. Students can get class materials, submit homework, and communicate with their instructors and classmates, all online.

UA Training Department has developed several "Blackboard™ Course Template Shells" for local unions to request and use as needed in their own local training programs.

There are three basic types of Blackboard™ Course Site Template Shells:

1. *A fully populated <u>Master Course</u> site which is designed to be used with the UA textbook for the course topic. The site includes syllabus, chapter units, assignments and assessments. All content may be customized to meet the local's requirements for teaching the subject. These courses may include content from the UA Online Learning Resource Library.*

2. *<u>Resource Course</u> includes reference material, training documents, PowerPoints, links and other information that pertains to a specific subject. These documents are shared by other UA instructors and stored in a shell where you will be added as a student and may download course content to supplement any courses you are currently teaching. Instructors will be added to these courses to access materials but will not be able to enroll students.*

3. *Course Sites hosting the <u>Interactive Module</u> for the specific topic. These include sites such as Crane Signaling, HVAC Troubleshooting, Industrial Rigging and others. These Blackboard™ course sites do not have any additional material. However, the local union instructor may customize the site to include content for training or reinforcing the particular module topic.*

The UA provides the WCC Blackboard™ system at no additional cost to your local JATC as part of our partnership with Washtenaw Community College.

Blackboard™ Request Procedure

To request a Blackboard™ course you must have an UAnet account or an OLR (Online Learning Resource) account. The form can be found on the Home page of <u>UANet.org</u> under Quick Links and it can also be found on <u>UAOLR.org</u> Instructor Resource Library website in the navigation bar at the top of the page.

WCC/UA Blackboard™ Help Desk Support

UA Instructor Blackboard™ Live Support: 734-477-8908 or (734) 219-2831 8:00 am – 4:00 pm EST

24/7 Blackboard™ Support: 1-800-218-4341

Blackboard™

Blackboard™ Online Student Help: https://en-us.help.blackboard.com/Learn/Student

Blackboard™ Online Instructor Help: https://en-us.help.blackboard.com/Learn/Instructor

Computer Requirements for Blackboard™ Online Training

To use Blackboard™, the UA recommends a Windows PC or equivalent Mac computer to take online or blended classes. It should have a high-speed internet connection, such as a DSL or cable connection. Other devices, such as a phone, tablet, or chromebook can be used, but you may experience limited functionality with some activities in Blackboard™.

Blackboard™ does offer an app for instructors and students, but it is not currently recommended by the UA. If you are using a phone or tablet, it is best to access Blackboard™ through your internet browser.

To access Blackboard™, you will need one of the following browsers:

- Chrome
- Firefox
- Microsoft Edge
- Safari

You will also need the following software:

- Adobe Acrobat Reader
- Microsoft Office or equivalent word processing software

For the most current list of computer hardware and software requirements for WCC/UA Blackboard™, including version numbers, go to: https://help.blackboard.com/Learn/Student/Getting_Started/Browser_Support.

Computer Skills Required by Instructors

To provide a quality learning experience for both instructors and students, training centers requesting a course shell should have an experienced Blackboard™ instructor. Instructors looking to gain proficiency in Blackboard™ or expand their skills, can attend free online Blackboard™ teaching courses. These courses are taught by UA instructors online and can be found at our UA Members Only website. Training directors can sign-up their instructors by logging into UANet.org and clicking the following link for Regional Training Registration: Regional Training.

Please contact Cathy Merkel for additional assistance at cathym@uanet.org.

Computer Skills Required by Participants

To participate successfully in an online or blended class, you should be able to:

- Perform basic word processing.
- Use a web browser to visit websites and print web documents.
- Use email to send and receive messages, reply to messages, cut and paste text between messages, open attachments, and attach files to messages.

Blackboard™

Canvas

The ITF and WCC are in the process of moving their Learning Management System to Canvas over the course of 2024-2025. To begin your local's adoption of Canvas, Training Directors/Coordinators should schedule a meeting with Arista Williams to discuss your needs and current training system. This meeting will also help to determine which existing courses need to be migrated to Canvas. This meeting will also begin the process of enrolling your instructors into a Canvas Instructor Learn-as-you-go (on-demand/asynchronous) course.

Because Canvas training at ITP filled up extremely quickly, we will be offering additional Regional Canvas training across 2024 and 2025.

All Instructors have access to:
- *Canvas Instructor Guides*
- *Canvas Instructor Videos*
- *Canvas Course Clean-up Webinar Recording*
- *One-On-One sessions with a Canvas Course Designer*
- *Weekly live Q & A sessions*

Canvas

Virtual Reality Simulations

- **Crane Signaling Simulation**
- **HVACR Troubleshooting Simulation**
- **UA Plumbing Service, Maintenance, and Repair Simulation**

The UA Training Department has developed various virtual reality simulation training aids, two of which are now available via the Blackboard™ platform. A request for a Master Course will have to be made following the procedures used to request other Blackboard™ courses. See Blackboard™ section.

These courses engage a student in a virtual world using today's gaming technology. Please read further to get a better understanding of how the course is used and what the student will experience once engaged in the training via virtual reality.

Virtual Crane Simulator

UA apprentices are currently taught how to signal crane operators and tested using various forms of instruction, from using live cranes to simulating a crane with a fishing pole. The UA has developed a 3D simulation system that will be used to test a person's knowledge of crane signals without actually having a crane present.

This course was designed to facilitate teaching in the classroom for crane signals as well as a self-paced online activity. By providing apprentices or journeyworkers an engaging, highly illustrative tool to understand the signals and their outcomes, effective learning transference is expected.

A signal person (using hand or audible signals) will be able to give instructions to another person playing the role of crane operator. The results of the signal person's instructions will be displayed on a computer screen, which may be projected onto a larger area if desired. The crane operator may be allowed to see the results of operations on a computer display or not, as determined by the situation.

An evaluator will be able to see the same display that the signal person sees and will be able to evaluate the signal person's ability based on the results displayed. The crane operator will be given a keyboard to perform 10 to 12 crane signal commands. When instructed by the signal person, the crane operator will execute one of the programmed commands.

There are two different Virtual Crane Simulators, one is for the use of the instructor and is a software package that is downloaded. To get started with the instructors Virtual Crane Simulator application you will need to perform some basic setup procedures.

Download Application Files

First, download the application from the following URL:

http://www.itfinteractivelearningresources.com/ua_craneSimulator_install.exe

This installation file (.exe) is a self-contained file that will allow you to extract all necessary files to your local system.

Extract Application Files

After downloading the file to your computer, navigate to the directory where the file was downloaded. In this example, the file was downloaded to the user's Desktop.
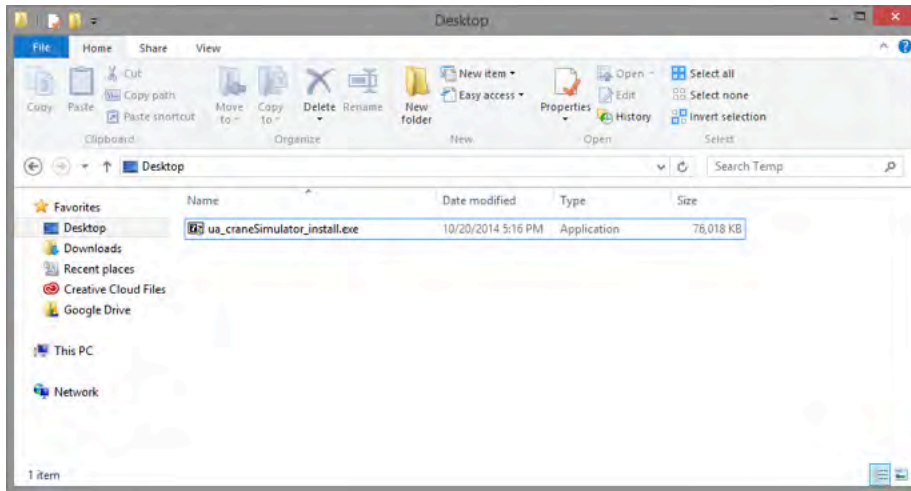

Double-click the "ua_craneSimulator_install.exe" file to start the extraction process. The current directory will be displayed as a default.
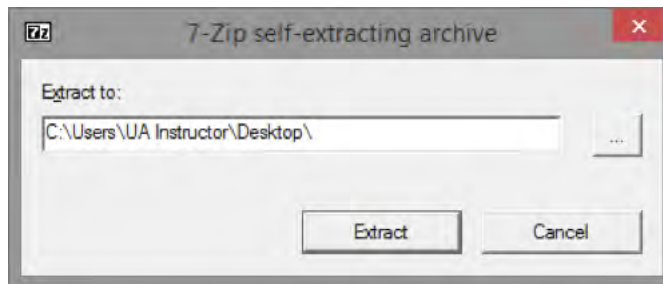
Enter the location to which you would like to install these files. Remember this location as you will need to navigate to this directory to start the application in the future.

Once the files have been extracted, you will see a folder with the following contents.
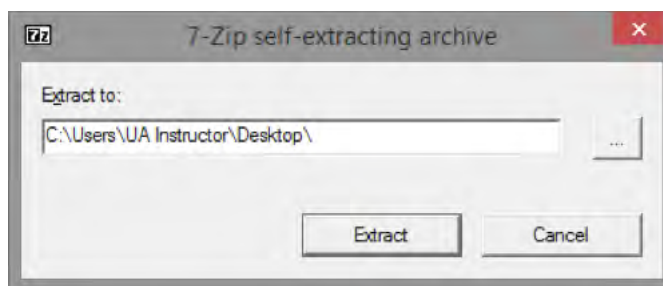
Running the Application

The first time you attempt to run the software you will be required to enter and validate a serial number. Be sure to have this number available before you begin.

Use one of the licenses you have been issued. Remember, each serial number can only be activated one (1) time. Double-click on the application named "ua_craneSimulator.exe."

If you are having problems activating your software or need an additional serial number, please contact Kiva Straser at kivas@uanet.org.

Select Screen Resolution

After running the application, you will be presented with an initial set of configuration options. This screen will allow you to select a desired screen resolution and graphics quality setting. Most likely you can accept the values that are selected by default. If your system seems to run the application poorly you can choose a lower screen resolution and lesser graphics quality to increase performance. Note that leaving the "Windowed" option unchecked will force the application to run Full Screen.

The second version of the Virtual Crane Simulator is available through Blackboard™ and is intended to be used as a self-paced teaching aid. Please see the Blackboard™ section of this catalog for description and procedure instruction on how to obtain a Master copy for use at your training center.

HVACR Virtual System Troubleshooting and UA Plumbing Service, Maintenance, and Repair
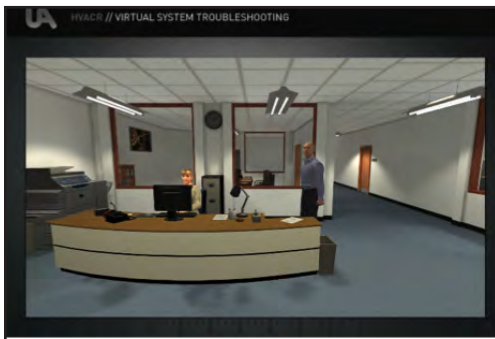
For today's apprentices, game-based systems are becoming more prevalent in many aspects of their experiences.

For this training the apprentice will be informed at the start of the simulation that they are the repair technician tasked with keeping the HVACR system operational. They will be presented with various 3D simulation based activities (Service Calls) and will need to troubleshoot the system as problems arise to keep it running effectively.

This training module will be presented by a virtual instructor that will introduce the students to the simulation activities. The topics introduced are listed below:

1. Learning objectives of the training
2. Game Scenario – Who are you in this game?
3. Meters available in your toolbox
4. How to navigate within the virtual environment
5. How to interact with systems / equipment
6. Tools and tips for successfully working within the simulated environment

The service calls will be the actual "game-play" where the apprentices will be allowed to explore the work environments and own the learning experience. They will be given issues to solve and the tools to do so, but they will not be told how to do so step-by-step. Successfully troubleshooting the system will be achieved when the problem has been identified and the remedy performed. How the student "gets there" is under their control.

The environment for each service call will be as real-world as possible. If the trouble has ramifications that can be displayed in the environment they will be evident to the student. Meters are programmed via truth tables to display accurately, regardless of correct or incorrect placement or meter settings. If an apprentice performs a task during the service call that is dangerous they will be notified that they have done so but the system will not correct their actions. An example of this is placing meter leads across a 3-phase disconnect with the meter set to Ohms. The apprentice will be notified of the danger, but after that notification, the meter dial will be left on the Ohms setting. The student must rectify the situation.

Interactive Curriculum App

- **Apps Utilized**
- **Supporting Platforms**

The UA's Interactive Curriculum App was designed to provide additional teaching resources to UA instructors and UA students. The App takes pages of the textbooks and overlays Augmented Reality (AR) over live view world, utilizing the camera on the students phone or tablet. The AR appears as a three-dimensional image that seems to jump off the pages of the textbooks.

The Interactive Curriculum App can be downloaded by visiting your App Store and searching for "Interactive Curriculum" or scan the QR code below.

Current UA Textbooks Utilizing Augmented Reality

- Basic Electricity Theory
- Drawing Interpretation and Plan Reading
- HVAC and Refrigeration Systems
- Hydronic Heating and Cooling
- Plumbing: Service, Maintenance, and Repair
- Pumps
- Soldering and Brazing
- Use and Care of Tools
- 360° Video HVAC-R Scenario (*New*)
  This allows students to walk-through the first scenario of the HVAC-R training in a virtual world using 360° video technology. Using the Oculus Rift or the YouTube app on a mobile device, users can freely navigate video segments in a panoramic environment

Supporting Platforms

- Apple
- Apple iPhone
- Apple iPad
- Android
- Android phones
- Android tablets

Apple   **Android**

Apple: https://itunes.apple.com/us/app/ua-training/id533092122?mt=8&ign-mpt=uo%3D4

Android: https://play.google.com/store/apps/details?id=com.InternationalTrainingFund.UAInteractiveCurriculum

Interactive Curriculum App

Apprentice Hours App

Apprentice Hours Application

The Apprentice Hours Application (or AHA) is a web-based application that eliminates the tedious paper-based systems currently used to track apprentice work hours. It will allow apprentices to log their job hours, allow instructors, journeymen or employers to review and modify time entry information, and allow users to generate reports for compliance. Training directors/coordinators register at http://uaworkhoursapp.com/.
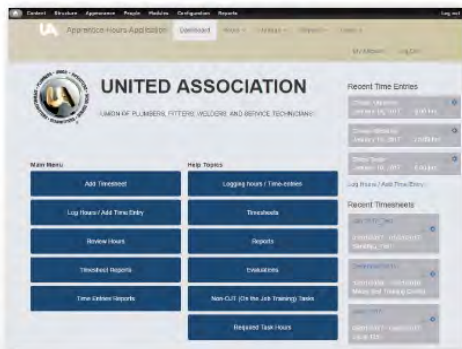
Questions about registration? Contact Kiva Straser at kivas@uanet.org or (410) 269-2000.

Recruitment Resources

Please click on the following link for all recruitment and outreach resources offered by the UA International Training Fund:

https://uaolr.org/gateway/recruitment

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