An interactive guide to all resources available for Training

INTERNATIONAL TRAINING FUND

e-RESOURCE TRAINING GUIDE

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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 the e-Learning tools that are available to you for you and your students to use in the classroom, at home, or on the road. 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, Canvas 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 Canvas system, as well as multiple other tools to enhance your teaching and learning experience.

By visiting www.uaolr.org you will find materials 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
- And more!

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 teaching material for studying, taking Quick Quizzes®, viewing Flash Cards and access to Videos and UAwebBooks™ if available for the selected title.

Next you will find the UA's Canvas courses. Created and maintained by our team of learning experience designers, the UA's Canvas courses are an additional resource meant to complement UA textbooks and assist in the training of apprentices and journeyworkers. Certain Canvas courses serve as a platform for simulations in crane signaling, HVACR, and plumbing service work, with plans to expand into other subject matters.

Finally, this guide will cover a few applications developed for the membership. The first is a set of Virtual reality simulations and games. The second app, the Interactive Curriculum App, is meant to supplement UA textbooks with an augmented reality component. The last one is a web-based solution for hours recording and reporting.

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.

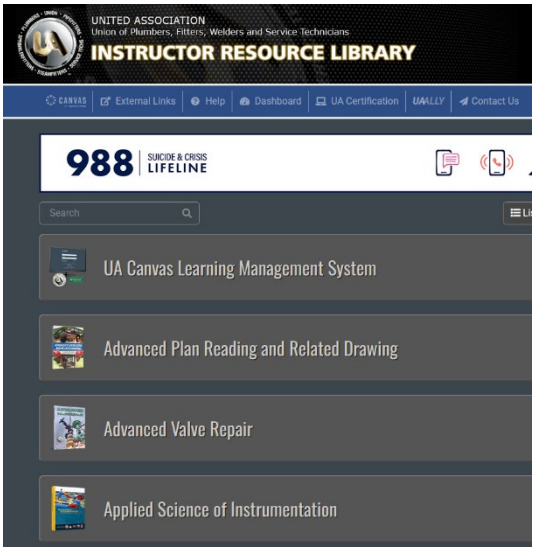
UA Online Learning Resources (UAOLR)

- **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 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 and students by utilizing distance education, such as webinars, regional training courses at onsite locations, and internet-based classes using the Canvas 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.

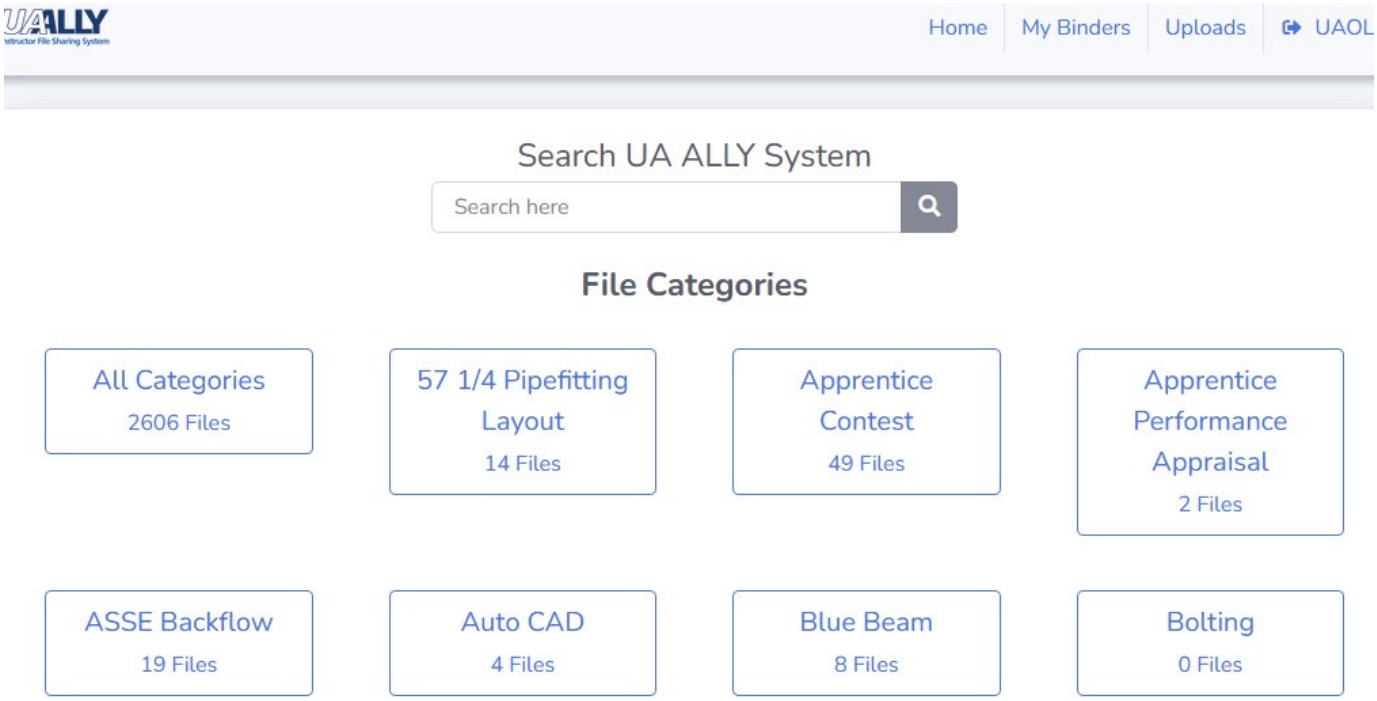
How do I get started?

The training director/coordinator must approve access to UA Online Learning Resources. All users, instructors, apprentices, and other 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.

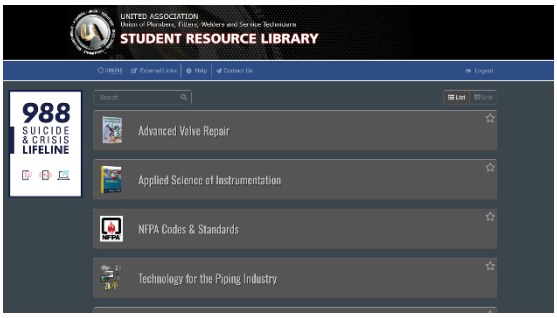
UAALLY is a peer-supported resource sharing system. Instructors are encouraged to submit their own work, as well as to browse and download the work of other UA Instructors. You will find UAALLY linked in every IRL.



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

- Descriptions
- Material Available

The Instructor Resource Library (IRL) and the Student Resource Library (SRL) are complimentary sides of the Online Learning Resources (OLR). They act as 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 standalone course. Materials under "Instructor Resource Library" are only ever seen by instructors. Materials under "Student Resource Library" will be seen by both instructors and students who are given access to the resource.

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 Canvas Learning Management System

Canvas is an interactive web-based learning environment that supports teaching and learning in face-to-face, online, or blended-learning classes at your local.

Student Resource Library (SRL)

- Canvas LMS - Login
- Blackboard Archive - FAQs
- Getting Started
  - Canvas LMS - Overview
  - Canvas LMS - Technology Requirements
  - Using Canvas at your Training Center
- Help, Support, & Training
  - Canvas LMS - Help and Support
  - Canvas LMS - Instructor Training
  - Canvas LMS - Student Training
- UA Pre-Built Master Courses and Custom Home Pages
  - Pre-Built Master Courses
  - Custom Home Page Designs
  - What is the Difference between Canvas LMS and the UAOLR

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)

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

Student Resource Library (SRL)

- Advanced Plan Reading and Related Drawing UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Forms and Documents
- Media
- BIM 360 - Student
- Software and Applications
- Updates / Comments
- Online Resources

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)

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

Student Resource Library (SRL)

- Advanced Valve Repair UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Repair and Maintenance Procedures
- Media
- Updates / Comments
- Online Resources

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)

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

Student Resource Library (SRL)

- Applied Science of Instrumentation UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

Backflow Prevention, 4th Edition

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)

- Instructor's Guide
- Instructional Outline
- PowerPoint® Presentations
- Interactive Illustrations
- Assessments
- Answer Keys

Student Resource Library (SRL)

- Backflow Prevention, 4th Edition, UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates/Comments
- Online Resources

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)

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

Student Resource Library (SRL)

- Basic Electricity UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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)

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

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

Build Stronger Together

Build Stronger Together is a program developed by the UA ITF to promote safety, productivity, and workplace professionalism on UA jobsites.

Student Resource Library (SRL)
- Overview of Build Stronger Together
- Train the Trainer Training Courses
- Classroom Training Resources
- Updates/Comments

Conservation and Safe Handling of Refrigerants

The primary objective of this 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)
- Instructor's Guide
- Instructional Outlines
- PowerPoint® Presentations
- Interactive Illustrations
- Assessments
- Answer Keys
- 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)
- Instructor's Guide
- Instructional Outlines
- PowerPoint® Presentations
- Interactive Illustrations
- Assessments
- Answer Keys
- UAALLY Instructor Shared Resource System

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

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)

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

Student Resource Library (SRL)

- Energy Auditing Practices UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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 industry. The Sprinkler Fitter – Fire Pump resource provides methods and guides to successfully perform 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)

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

Student Resource Library (SRL)

- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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)

- Clean Agent Systems
  - Viking® OXEO™
- Hybrid Extinguishing Systems
  - Victaulic Vortex
- Fixed Foam Systems
  - Viking Fixed Foam Systems
- Water Mist Systems
  - Fike DuraQuench
  - Fike MicroMist

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)

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

Student Resource Library (SRL)

- Foreman Training Manual UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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)

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

Student Resource Library (SRL)

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

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

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.

Instructor Resource Library (IRL)

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

Student Resource Library (SRL)

- HVAC and Refrigeration Systems UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- XOi
- Interactive Animations
- Library
- Step-by-Step Procedures
- Review Questions
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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)

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

Student Resource Library (SRL)

- Hydronic Heating and Cooling UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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.

This resource contains materials for the 2024, 2021, 2018, 2015,2012, and 2005 code revisions.

Instructor Resource Library (IRL)

- Instructor's Guide
- Course Outline
- 2024 Code Highlighting PowerPoint® Presentations
- Interactive Illustrations
- 2024 Assessments
- 2024 Worksheets
- Answer Keys
- Forms and Documents
- UAALLY Instructor Shared Resource System

Student Resource Library (SRL)

- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Media
- Updates/Comments
- Online Resources

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 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 Link Subscription
  - Access Complimentary NFPA LiNK Subscription
  - Transfer Personal NFPA LiNK Account to Complimentary UA Subscription
- NFPA Forms & Reports
  - Committee Reports Form*
  - 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 (13 Titles)

- **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 trouble-shooting 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 add- ed or adapted to pipe trades apprenticeship and journeyworker training programs. The second important purpose is to provide a refresher course for journeyworkers.

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

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

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 performed 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)
- Instructor's Guide
- Instructional Outlines
- PowerPoint® Presentations
- Interactive Illustrations
- Chapter Exams
- Chapter Exam Answer Keys
- UAALLY Instructor Shared Resource System

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

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

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

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

Student Resource Library (SRL)
- Related Science UAwebBook
- UAdaptive Quizzes
- Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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 fire 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.

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

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

Rigging (Gray Cover)

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)
- Instructor's Guide
- Instructional Outlines
- PowerPoint® Presentations
- Interactive Illustrations
- Exams
- Assignments
- Answer Keys
- 5009—Industrial Rigging Technologies
- 5011—Industrial Rigging
- UAALLY Instructor Shared Resource System

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

Rigging (Brown Cover)

This all-new Rigging manual provides United Association pipe trades workers with the information necessary to perform rigging operations safely. The new manual includes chapters on rigging safety; slings, including wire rope, synthetic, and chain slings and sling hitches; fiber rope and knots; hoists; material handling; signaling; cranes; and rigging math.

Instructor Resource Library (IRL)
- Instructor's Guide
- Instructional Outlines
- PowerPoint® Presentations
- Interactive Illustrations
- Exams
- Assignments
- Answer Keys
- 5009—Industrial Rigging Technologies
- 5011—Industrial Rigging
- UAALLY Instructor Shared Resource System

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

Signaling

Aligning with the UA's Crane Signal Person Certification Program, the all-new Signaling manual features chapters on standard voice and hand signals, signal person operations and limitations, power line safety, and hoisting personnel. The book is filled with color pictures depicting various hand signals as well as the text of the relevant OSHA regulations.

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

Student Resource Library (SRL)
- Signaling UAwebBook
- UAdaptive Quizzes
- Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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

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

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

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

STAR Study Guides

This resource is where you will find the study guides for the 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

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

Student Resource Library (SRL)
- Start, Test and Balance UAwebBook
- UAdaptive Quizzes
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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

Student Resource Library (SRL)

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

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 latest 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
  - IT Infrastructure & Security*
  - 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
  - Hydratec – Instructor Access*
  - Hydratec – Learner Access
- 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)

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

Student Resource Library (SRL)

- Use and Care of Tools UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

Water Supply Systems

This 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)

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

Student Resource Library (SRL)

- Water Supply Systems UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media
- Updates / Comments
- Online Resources

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 met- al arc welding (GMAW), other welding and joining processes, weld evaluation and testing, and welding technology.

Instructor Resource Library (IRL)

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

Student Resource Library (SRL)

- Welding Practices and Procedures for the Pipe Trades UAwebBook
- Quick Quizzes®
- Illustrated Glossary
- Flash Cards
- Forms and Documents
- Media Library
- UA Welding Certifications
- Variable-Amperage Welding Activity
- Updates / Comments
- Online Resources

Welding Fundamentals – GTAW

This resource contains material to aid 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)

- Welding Safety
- TIG Torch Basics
- Preparation of Material
- Electrode, Cup, and Filler Metal Identification
- Material Fit-Up and Alignment
- Striking the Arc
- Walking the Cup
- Student Performance Evaluation Forms
- Single and Overlapping Bead on Plate Examples
- Single and Overlapping Bead on Plate with Filler Metal Examples
- Single and Overlapping Bead on Pipe with Filler Metal Examples
- Socket Welding
- Open V-Groove on Plate Examples
- Open V-Groove on Pipe Examples
- Updates / Comments

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)

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

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)

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

Canvas

- **WCC/UA Canvas Learning Management System (LMS)**
- **Access for Individuals and Locals**
- **Request Forms**
- **Training**
- **Help and Support**

Canvas Learning Management System (LMS) is an interactive, web-based learning environment that supports teaching and learning in face-to-face, online, or blended classes at your local.

The UAOLR and WCC/UA Canvas LMS are two separate websites that, when used together, can deliver the most engaging training experience for today's students. Most of the books on the UAOLR have complimentary courses created in Canvas and live in the Canvas Commons. The Commons enables Canvas Admins and Instructors the ability to find and import full courses content, course assessments, and Interactive Resources into an existing Canvas Course

How do I get started?

The training director/coordinator must approve the adoption of Canvas at the Local level. All users, instructors, apprentices, and other students need to have a username and password to access the system. More information on account creation can be found below, under Canvas User Type.

The local union training center must have at least one designated local administrator to upload and manage their apprentices and students; create, copy and manage Canvas courses for the Local.

Business managers, please have your training director/coordinator contact Arista Williams by email at: arista@wccnet.edu, if you have any questions.

Web and Mobile App Access

The Canvas LMS can be accessed:

- From a compatible desktop computer, laptop, or other device using a recommended web browser.
- From a compatible mobile device using the appropriate Canvas Teacher or Student app. To get the mobile app, please search “Canvas” on the App Store or Google Play.
    - Once the app is downloaded you will be prompted to enter an institution name. Please enter “Washtenaw Community College”.

Canvas User Types

Each local has its own dedicated Canvas LMS Account and Administrator (designated by the Business Manager or Training Coordinator/Director). The Local Union Account Admin manages the courses and enrollments for the Local’s Canvas account.

Within a local’s Canvas account, there are three types of user roles - Students, Instructors, and Admins, each of which has different access permissions.

To become a Local Union Admin, Business Managers should have their Training Director/Coordinator contact Arista Williams by email at: arista@wccnet.edu, to review the Admin role and have the role assigned.

These privileges given to each account type are:

Admins

- Can oversee local Canvas account
- Can manage all user accounts for their sub-account
- Can create and manage all courses for their sub account

Instructors

- Can post assignments, announcements, and grades
- Can make changes to the classes they instruct
- Can communicate with students

Students

- Can access assigned courses, and class materials within an assigned course
- Can submit assignments
- Can communicate with instructors and other students in their courses

All Canvas accounts need to have a username and password. Instructors and Local Union Admins may request a new account to be created to enroll a new instructor or student users.

Once created, new users will receive an email from Instructure.com that contains a link to the Canvas Login page where they will be prompted to log in using their email address and set a password for their account. If a user forgets their password, they can click the Forgot Password link on the login page to create a new password.

Video Resources

- Login to Canvas on a desktop
- Login to the Canvas app on a mobile device

Canvas Commons Pre-Built Master Courses

The Canvas Commons is a file- and course-sharing resource which enables Canvas Admins and Instructors to find and import full courses content, course assessments, and Interactive Resources into an existing Canvas Course. Most of the books on the UAOLR have complimentary courses created in Canvas, which are available to import from the Canvas Commons

Instructors and Admins need to request access to the UA Master Courses and Interactive Resources in the Canvas Commons.

You can view a list of all UA courses and resources that are available in the Canvas Commons.

Access and import content from the Canvas Commons.

Training & Resources

Instructors

To help UA instructors develop, interact with, and deliver quality training from your local, we have made a collection of informational and training resources available.

- Self-Enroll into the UA Instructor Resource Course. This resource contains Frequently Asked Questions, Request forms, links to training resources and links to the Weekly Q&A Sessions hosted by the WCC Canvas team. Join the Weekly Q&A Sessions where your questions about efficient course design and deployment can be answered.
- Self-Enroll into the UA Canvas Instructor Training Course. This self-paced course goes through the essentials of course creation in the Canvas LMS and examines features that can be used together for efficient course design and deployment.
- One-on-One sessions with a Canvas Course Designer Schedule an appointment with the WCC/UA Educational Technologies Team at uahelp@wccnet.edu.

Students

- When the WCC/UA Educational Technologies Team creates a student account, the student is automatically enrolled into the Canvas Student Training Course located in their local's Canvas Account. This course introduces students to Canvas and provides a walk-through on the features and functions of the LMS.

Regional and ITP Training

- 3001 - Introduction to Teaching Online Using Canvas LMS Offered in-person as well as online. Instructors will learn the essentials of course creation in Canvas. Training directors can sign up instructors by logging into UANet.org and clicking the link for Regional Training Registration.

Canvas Developed Training Resources

- Canvas' Training Services Portal A downloadable guide to the Training Services Portal which details information regarding logging in, navigating, and using courses which are led by Canvas' own trainers.
- Canvas Videos for Instructors A library of tutorial videos covering the fundamental use of the Canvas LMS, course development and delivery features.
- Canvas Instructor Guides A library of technical help guides, troubleshooting information, and answers to frequently asked questions related to the Canvas LMS system.
- Canvas Videos for Students A library of tutorial videos which covers the fundamental use of the Canvas LMS and course features.
- Canvas Student Guides A library of technical help guides, troubleshooting information, and answers to frequently asked questions related to Canvas LMS.

Technical Support Contacts

WCC/UA Educational Technologies Team at the UA Help Desk
Hours: Monday – Friday, 8:30am - 4:30 pm (EST)
Email: uahelp@wccnet.edu
Phone: 734-249-5966

Virtual Reality Simulations

- **Trenching VR**
- **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 Canvas platform. A request for a Master Course can be made following the procedures used to request other Canvas courses.

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.

Trenching and Excavation

In the interest of teaching our students how to best maintain safe and healthy worksites, the UA Training Department has developed a new VR Trenching and Excavation Experience.

In the simulation, the learner begins on a job site, where they are introduced to several key ideas including trench inspection, air quality, safe distances, and trench box safety.

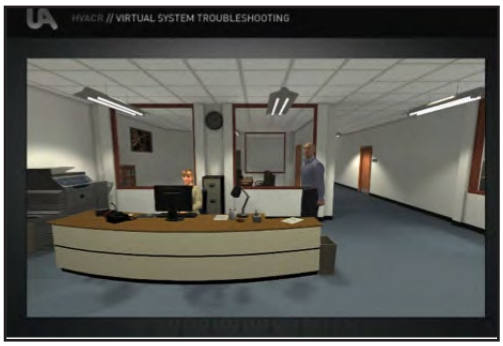
Once the learner has become familiar with the basics in the "learn" level, there is a second "practice" level where they are asked to repeat the same actions with limited instruction, to make sure they have absorbed the lesson.

The Trenching and Excavation Experience is available through our Virtual Reality Kit grant, or by contacting Lauren Friedman at lfriedman@uanet.org.

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.

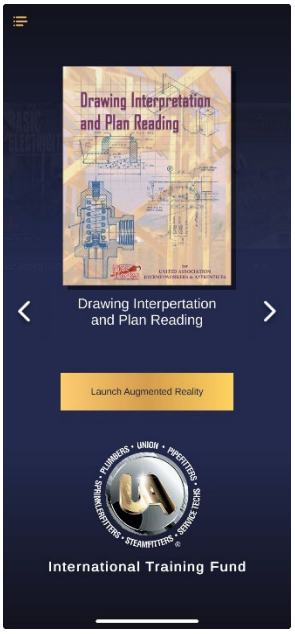
The environment for each service call will be as real-world as possible. If the trouble has ramifications that can be displayed in the environment they will be evident to the student. Meters are programmed via truth tables to display accurately, regardless of correct or incorrect placement or meter settings. 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 uses the camera of a phone or table to view pages of the textbooks and overlays computer Graphics on top of them, which is called Augmented Reality (AR). 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
- 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

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

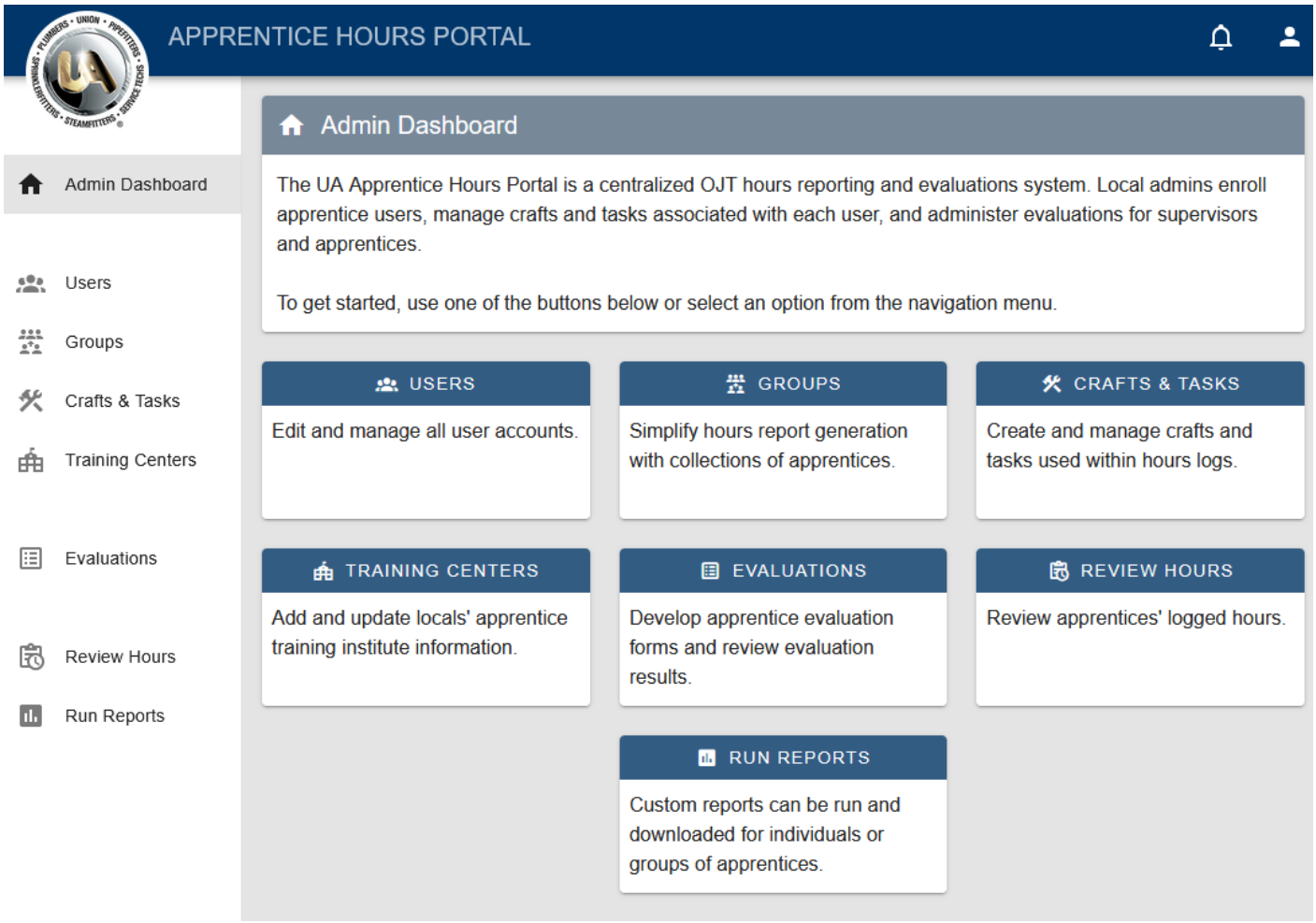
Android: https://play.google.com/store/apps/details?id=com.InternationalTrainingFund.UAInteractiveCurriculum

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 https://uaojt.com/.

Questions about registration? Contact Lauren Friedman at lfriedman@uanet.org or (410) 269-2000.



Recruitment Resources

All recruitment and outreach resources offered by the UA International Training Fund are available on the UAOLR.

International Training Fund
Three Park Place
Annapolis, Maryland 21401