

## Washtenaw Community College Comprehensive Report

### UAT 251 Related Science (UA 2003) Effective Term: Spring/Summer 2025

#### Course Cover

**College:** Advanced Technologies and Public Service Careers

**Division:** Advanced Technologies and Public Service Careers

**Department:** United Association Department (UAT Only)

**Discipline:** United Association Training

**Course Number:** 251

**Org Number:** 28200

**Full Course Title:** Related Science (UA 2003)

**Transcript Title:** Related Science (UA 2003)

**Is Consultation with other department(s) required:** No

**Publish in the Following:** College Catalog , Web Page

**Reason for Submission:** Course Change

**Change Information:**

**Course description**

**Outcomes/Assessment**

**Objectives/Evaluation**

**Rationale:** Update UA course.

**Proposed Start Semester:** Fall 2024

**Course Description:** In this course, students will apply the principles of science and piping systems for pipe trades workers. Through teaching demonstrations, experiments and discussions, science principles will be applied to all portions of the pipefitting trade. These demonstrations will include heat/pressure effects on liquids and gases (fluid dynamics), metallic and nonmetallic piping materials, chemical reactions, and mechanics. Students will learn to apply scientific concepts to piping obstacles in all aspects of the piping trades. The title of this course was previously Related Science. Limited to United Association program participants.

#### Course Credit Hours

**Variable hours:** No

**Credits:** 1.5

**The following Lecture Hour fields are not divisible by 15: Student Min ,Instructor Min**

**Lecture Hours: Instructor: 22.5 Student: 22.5**

**The following Lab fields are not divisible by 15: Student Min, Instructor Min**

**Lab: Instructor: 1.5 Student: 1.5**

**Clinical: Instructor: 0 Student: 0**

**Total Contact Hours: Instructor: 24 Student: 24**

**Repeatable for Credit:** NO

**Grading Methods:** Letter Grades

Audit

**Are lectures, labs, or clinicals offered as separate sections?:** NO (same sections)

#### College-Level Reading and Writing

College-level Reading & Writing

#### College-Level Math

## Requisites

### General Education

#### Degree Attributes

Below College Level Pre-Reqs

### Request Course Transfer

#### Proposed For:

### Student Learning Outcomes

1. Explain and demonstrate, through experiments, the central concepts and skills of plumbing and pipefitting sciences utilizing UA approved resources.

#### Assessment 1

Assessment Tool: Outcome-related demonstrations

Assessment Date: Fall 2024

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Checklists

Standard of success to be used for this assessment: 80% of the students will score 80% or higher.

Who will score and analyze the data: U.A. Instructors

2. Apply gas laws to pressure and temperature changes inside of piping systems.

#### Assessment 1

Assessment Tool: Outcome-related exam questions

Assessment Date: Fall 2024

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 80% of students will score 80% or higher.

Who will score and analyze the data: U.A. Instructors

### Course Objectives

1. Discuss and demonstrate the heat and pressure effects of solids, liquids, and gases in metallic and non-metallic piping systems.
2. Discuss and demonstrate chemical relationships and the mechanics involved in chemical reactions of different compositions in piping systems.
3. Discuss the sequencing, safety precautions, materials, and personal protective equipment (PPE) needed for experiments.
4. Predict experiment outcomes using formulas and scientific data resources.
5. Identify and discuss the gas laws for liquids used in the piping industry.
6. Discuss piping composition used in compressed air piping systems.
7. Calculate the pressure, temperature, and volume changes in piping systems and compare with experiment results.

### New Resources for Course

### Course Textbooks/Resources

#### Textbooks

United Association. *Related Science for United Association Journeyworkers and Apprentices*, ed. United Association, 2022

Manuals  
Periodicals  
Software

### **Equipment/Facilities**

Level III classroom

Other: Chemistry laboratory classroom needed

| <b><u>Reviewer</u></b>  | <b><u>Action</u></b>      | <b><u>Date</u></b>  |
|---|---------------------------|---------------------|
| <b>Faculty Preparer:</b><br><i>Tony Esposito</i>                | <i>Faculty Preparer</i>   | <i>May 31, 2024</i> |
| <b>Department Chair/Area Director:</b><br><i>Marilyn Donham</i> | <i>Recommend Approval</i> | <i>Jun 11, 2024</i> |
| <b>Dean:</b><br><i>Eva Samulski</i>                             | <i>Recommend Approval</i> | <i>Jun 18, 2024</i> |
| <b>Curriculum Committee Chair:</b><br><i>Randy Van Wagnen</i>   | <i>Recommend Approval</i> | <i>Jan 11, 2025</i> |
| <b>Assessment Committee Chair:</b><br><i>Jessica Hale</i>       | <i>Recommend Approval</i> | <i>Jan 22, 2025</i> |
| <b>Vice President for Instruction:</b><br><i>Brandon Tucker</i> | <i>Approve</i>            | <i>Jan 30, 2025</i> |

# Washtenaw Community College Comprehensive Report

## UAT 251 Related Science Effective Term: Spring/Summer 2014

### Course Cover

**Division:** Advanced Technologies and Public Service Careers

**Department:** United Association Department

**Discipline:** United Association Training

**Course Number:** 251

**Org Number:** 28200

**Full Course Title:** Related Science

**Transcript Title:** Related Science

**Is Consultation with other department(s) required:** No

**Publish in the Following:** College Catalog , Web Page

**Reason for Submission:** Three Year Review / Assessment Report

**Change Information:**

**Credit hours**

**Total Contact Hours**

**Outcomes/Assessment**

**Objectives/Evaluation**

**Rationale:** Course update

**Proposed Start Semester:** Spring/Summer 2014

**Course Description:** In this course, students will learn about methods of teaching about the principles of science for plumbing and pipe fitting tradespeople. Following a review, students will discuss and develop skills to instruct on topics such as properties and characteristics of water and steam, hydraulics and pneumatics, mechanics, metals, alloys, synthetics and corrosion. Students will generate ideas for their own classrooms to teach the science related to both the plumbing and pipe fitting trades. Limited to United Association program participants.

### Course Credit Hours

**Variable hours:** No

**Credits:** 1

**Lecture Hours: Instructor: 15 Student: 15**

**The following Lab fields are not divisible by 15: Student Min, Instructor Min**

**Lab: Instructor: 5 Student: 5**

**Clinical: Instructor: 0 Student: 0**

**Total Contact Hours: Instructor: 20 Student: 20**

**Repeatable for Credit:** NO

**Grading Methods:** Letter Grades

**Audit**

**Are lectures, labs, or clinicals offered as separate sections?:** NO (same sections)

### College-Level Reading and Writing

College-level Reading & Writing

### College-Level Math

### Requisites

### General Education

**Degree Attributes**

Below College Level Pre-Reqs

## Request Course Transfer

Proposed For:

## Student Learning Outcomes

1. Explain the central concepts and skills of plumbing and pipefitting sciences utilizing UA approved materials.

### **Assessment 1**

**Assessment Tool:** Presentation

**Assessment Date:** Spring/Summer 2014

**Assessment Cycle:** Every Three Years

**Course section(s)/other population:** All

**Number students to be assessed:** All

**How the assessment will be scored:** Departmentally-developed rubric

**Standard of success to be used for this assessment:** 75% of students will score 75% or above.

**Who will score and analyze the data:** Departmental faculty

2. Demonstrate methods of teaching of the types of corrosion by using classroom experiments.

### **Assessment 1**

**Assessment Tool:** Student project

**Assessment Date:** Spring/Summer 2014

**Assessment Cycle:** Every Three Years

**Course section(s)/other population:** All

**Number students to be assessed:** All

**How the assessment will be scored:** Departmentally-developed rubric

**Standard of success to be used for this assessment:** 75% of students will score 75% or above.

**Who will score and analyze the data:** Departmental faculty

3. Explain the effects of atmospheric/vacuum pressures, boiling and freezing temperatures and densities at different states of matter on various materials.

### **Assessment 1**

**Assessment Tool:** Essay test

**Assessment Date:** Spring/Summer 2014

**Assessment Cycle:** Every Three Years

**Course section(s)/other population:** All

**Number students to be assessed:** All

**How the assessment will be scored:** Rubric

**Standard of success to be used for this assessment:** 75% of students will score 75% or above.

**Who will score and analyze the data:** Departmental faculty

## Course Objectives

1. Explain the theories and principles of atmospheric/vacuum pressure and densities at different states of matter.

### **Matched Outcomes**

2. Develop concepts and strategies needed to teach apprentices how to recognize the effects of electrolysis/corrosion, erosion, evaporation/condensation, and static pressures.

### **Matched Outcomes**

3. Demonstrate appropriate use of course materials.

### **Matched Outcomes**

4. Incorporate internet sites, video and other media options into their specific class curriculum.

### **Matched Outcomes**

5. Utilize the Related Science interactive CD in a class project.

### **Matched Outcomes**

6. Interpret results of experiments demonstrated in class.

### **Matched Outcomes**

7. Discuss cost and availability of materials needed to complete experiments.

### **Matched Outcomes**

8. Recognize and explain commonly misunderstood material in textbook.

### **Matched Outcomes**

9. Develop concepts and strategies needed to explain to apprentices the fundamental theories of physics through experiments.

### **Matched Outcomes**

## **New Resources for Course**

### **Course Textbooks/Resources**

#### Textbooks

International Pipe Trades Joint Training Committee. *Related Science for United Association Journeyworkers & Apprentices*, ed. International Pipe Trades Joint Training committee, 2012

#### Manuals

#### Periodicals

#### Software

Related Science for United Association Journeyworkers & Apprentices. International Pipe Trades Joint Training Committee, 1 ed.  
CD is supplemental with book

### **Equipment/Facilities**

Level III classroom

Other: Chemistry laboratory classroom needed

### **Reviewer**

### **Action**

### **Date**

#### **Faculty Preparer:**

*Amanda Scheffler*

*Faculty Preparer*

*Jun 27, 2013*

#### **Department Chair/Area Director:**

*Scott Klapper*

*Recommend Approval*

*Feb 03, 2014*

#### **Dean:**

*Marilyn Donham*

*Recommend Approval*

*Feb 05, 2014*

#### **Vice President for Instruction:**

*Bill Abernethy*

*Approve*

*Mar 31, 2014*