

# UAT 283: ADVANCED TUBE BENDING (UA 5015)

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## History

1. Dec 5, 2025 by Sera Bird (sabird)

**Viewing: UAT 283 : Advanced Tube Bending (UA 5015)**

**Last approved: 2025-12-05T08:04:16Z**

**Last edit: 2025-12-04T19:45:18Z**

**Effective Term**

Winter 2026

**Rationale and proposal summary**

Update title and course to reflect current technologies and trends in the industry.

## Course Cover

**Full Course Title**

Advanced Tube Bending (UA 5015)

**Transcript Title**

Advanced Tube Bending 5015

**Subject Code**

UAT - United Association Training

**Course Number**

283

**Department**

United Assoc Dept (UAT Only) (UATD)

**Banner Division**

ATP

**Division/College**

Adv Tech/Public Serv Careers (AT)

**Org Code**

28200

**Course Description**

In this course, students will demonstrate both the simple and Set Back, Advance, and Gain (SAG) tube bending methods. Students will apply trigonometry to identify the degree of bend required and use the SAG method to layout and create the bend using tube benders. Discussions, explanations, and demonstrations will enable students to lay out multiple parallel offsets with an accuracy of 1/16th inch. The title of this course was previously Art of Tube Bending. Limited to United Association program participants.

**Has this course been approved for online or online blended?**

No

**Grading method**

Standard Letter, Audit

**CIP Code**

469999 - Construction Trades, Other.

**Occupational Indicator**

Yes

**ACS Code**

130

**Degree Attributes**

BCL - Below College Level Pre-Reqs

**Credit hours, contact hours, repeatability****Repeatable for additional credit**

No

**Course credits**

1.5

**Lecture contact hours**

22.5

**Lab contact hours**

1.5

**Total Contact Hours**

24

**Expected Total Contact Hours**

24

**Prerequisites and prerequisite skill levels****College-Level Math**

No Level Required

**College-Level Reading and Writing**

College-level Reading and Writing

**Approved Level I Prerequisite:**

Academic Reading and Writing Levels of 6

**Course Assessment Plan****Learning Outcome****Outcome**

Demonstrate the "simple method" of bending to make accurate 90-degree and 45-degree bends.

**Assessment #1****Assessment Tool**

Outcome-related demonstration

**Anticipated Next Assessment Year**

2025

**Anticipated Next Assessment Term**

Summer

**Assessment Cycle**

Every Three Years

**Anticipated assessment population**

All students from all sections

**How the assessment will be scored**

Observational checklist

**Who does the scoring?**

U.A. Instructors

**Standard of success**

80% of the students will score 80% or higher.

**Assessment #2**

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**Learning Outcome****Outcome**

Apply the SAG method to lay out and bend the tubing accurately.

**Assessment #1****Assessment Tool**

Outcome-related demonstration

**Anticipated Next Assessment Year**

2025

**Anticipated Next Assessment Term**

Summer

**Assessment Cycle**

Every Three Years

**Anticipated assessment population**

All students from all sections

**How the assessment will be scored**

Observational checklist

**Who does the scoring?**

U.A. Instructors

**Standard of success**

80% of the students will score 80% or higher.

**Assessment #2**

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**Learning Outcome****Outcome**

Apply the Set Back formula to calculate equal spread offsets.

**Assessment #1****Assessment Tool**

Outcome-related exam questions

**Anticipated Next Assessment Year**

2025

**Anticipated Next Assessment Term**

Summer

**Assessment Cycle**

Every Three Years

**Anticipated assessment population**

All students from all sections

**How the assessment will be scored**

Answer key

**Who does the scoring?**

U.A. Instructors

**Standard of success**

80% of the students will score 80% or higher.

**Assessment #2****Course Objectives**

	Objective(s)
1.	Identify bending terminology, tools, and issues, such as setbacks, advance and gain.
2.	Recognize the parts of a bender.
3.	Compare and contrast the types of tubing needed for bending.
4.	Explain how to solve for unknown angles used in piping systems.
5.	Identify the use of various props and tools used for bending pipe.
6.	Explain how to solve angles for a rolling offset bend.
7.	Describe the process of bending right and left-hand 90-degree and 45-degree bends using marks from a bender.
8.	Practice the SAG method to calculate measurements of any angle for any radius of bender.
9.	Calculate the steps for equal spread offsets of any angle and spread using the Set Back formula.
10.	Calculate, mark, and bend two equal spread offsets.
11.	Practice bending right/left-hand 90-degree- and 45-degree bends using the marks stamped into the bender.
12.	Lay out four bends on one piece of tubing using the SAG method with an accuracy of $\pm$ , - 1/16" per bend.
13.	Calculate the step ahead for equal spread offsets of any angle and spread using the Set Back formula.
14.	Calculate, mark, and bend two equal spread offsets with an accuracy of $\pm$ , - 1/16".

**General Education Area(s)****Area 1: Writing**

No

**Area 2: 2nd Writing or Communication/Speech**

No

**Area 3: Mathematics**

No

**Area 4: Natural Science**

No

**Area 5: Social and Behavioral Science**

No

**Area 6: Arts and Humanities**

No

**MTA General Education**

No

**Review****Is conditional approval requested?**

No

**Is this course currently conditionally approved, and you are now submitting it for full approval?**

No

Key: 8948

## Washtenaw Community College Comprehensive Report

### UAT 283 Art of Tube Bending Effective Term: Spring/Summer 2020

#### Course Cover

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

**Department:** United Association Department

**Discipline:** United Association Training

**Course Number:** 283

**Org Number:** 28200

**Full Course Title:** Art of Tube Bending

**Transcript Title:** Art of Tube Bending

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

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

**Reason for Submission:** Course Change

**Change Information:**

Consultation with all departments affected by this course is required.

Course description

Outcomes/Assessment

Objectives/Evaluation

**Rationale:** Revise course for UA

**Proposed Start Semester:** Spring/Summer 2020

**Course Description:** In this course, students will demonstrate both the simple and Set Back, Advance and Gain (SAG) measurement method of tube bending. Students will identify the bender procedure while using trigonometry as it relates to degree bends and layout. Discussions, explanations and hands-on demonstrations will allow students to layout multiple parallel offsets, along with lineup/leveling of tubing in the bending process. An emphasis will be placed on the reading of isometric drawings, wire templates, and numbering of the bending order. 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. Demonstrate the “simple method” of bending.

#### **Assessment 1**

Assessment Tool: Demonstration

Assessment Date: Fall 2020

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Observational checklist

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

2. Calculate the Set Back, Advance and Gain (SAG) measurement using the formulas identified in the Tube Bending Manual.

#### **Assessment 1**

Assessment Tool: Outcome-related exam questions

Assessment Date: Fall 2020

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 the students will score 80% or higher.

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

3. Calculate equal spread offsets using the Set Back formula.

#### **Assessment 1**

Assessment Tool: Outcome-related exam questions

Assessment Date: Fall 2020

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 the students will score 80% or higher.

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

### **Course Objectives**

1. Identify bending terminology, tools, and issues, such as setbacks, advance and gain.
2. Recognize the parts of a bender.
3. Compare and contrast the types of tubing needed for bending.
4. Explain how to solve for unknown angles used in piping systems.
5. Identify the use of various props and tools used for bending pipe.
6. Explain how to solve angles for a rolling offset bend.

7. Describe the process of bending right and left-hand 90-degree and 45-degree bends using marks from a bender.
8. Practice the SAG method to calculate measurements of any angle for any radius of bender.
9. Lay out four bends on one piece of tubing using the SAG method.
10. Calculate the steps for equal spread offsets of any angle and spread using the Set Back formula.
11. Calculate, mark, and bend two equal spread offsets.

## **New Resources for Course**

### **Course Textbooks/Resources**

Textbooks  
Manuals  
Periodicals  
Software

### **Equipment/Facilities**

<b><u>Reviewer</u></b>	<b><u>Action</u></b>	<b><u>Date</u></b>
<b>Faculty Preparer:</b> <i>Tony Esposito</i>	<i>Faculty Preparer</i>	<i>Apr 15, 2020</i>
<b>Department Chair/Area Director:</b> <i>Marilyn Donham</i>	<i>Recommend Approval</i>	<i>Apr 16, 2020</i>
<b>Dean:</b> <i>Jimmie Baber</i>	<i>Recommend Approval</i>	<i>Apr 21, 2020</i>
<b>Curriculum Committee Chair:</b> <i>Lisa Veasey</i>	<i>Recommend Approval</i>	<i>May 07, 2020</i>
<b>Assessment Committee Chair:</b> <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>May 10, 2020</i>
<b>Vice President for Instruction:</b> <i>Kimberly Hurns</i>	<i>Approve</i>	<i>May 12, 2020</i>