Washtenaw Community College Comprehensive Report

UAT 257 Teaching Hydronic Heating and Cooling (UA 6006)
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: 257
Org Number: 28200
Full Course Title: Teaching Hydronic Heating and Cooling (UA 6006)
Transcript Title: Hydronic Heat & Cool (6006)
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Course Change
Change Information:
Course title
Course description
Outcomes/Assessment
Objectives/Evaluation
Rationale: Course updates are reflective to current trends and technology in the industry.
Proposed Start Semester: Spring/Summer 2025
Course Description: In this course, students will review the principles of hydronics heating and cooling. Topics will include equipment, design, operation, control, and installation methods. Maintenance and troubleshooting techniques will also be reviewed. Students will also review instructional resources, methods and materials for teaching an effective hydronics course at the local level. The title of this course was previously Hydronic Heating and Cooling (UA 6006). 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. Present a customized lesson plan using UA Online Learning Resources (UAOLR) and other online resource materials.
   Assessment 1
   Assessment Tool: Outcome-related presentation
   Assessment Date: Spring/Summer 2025
   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: 80% of the students will score 80% or higher.
   Who will score and analyze the data: U.A. Instructors

2. Create instructional outlines to present hydronic topics to a class.
   Assessment 1
   Assessment Tool: Outcome-related assignment
   Assessment Date: Spring/Summer 2025
   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: 80% of the students will score 80% or higher.
   Who will score and analyze the data: U.A. Instructors

3. Identify hydronic heating and cooling components and controls using online resources.
   Assessment 1
   Assessment Tool: Outcome-related quiz
   Assessment Date: Spring/Summer 2025
   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. Recognize how velocity, pressure, and volume affect hydronic flow.
2. Recognize how energy works in hydronic systems, transmission of heat, and thermal expansion.
3. Explain the hydronics involved in heating and cooling processes.
4. Discuss the equipment design and installation of heating and cooling systems.
5. Discuss the basic theory and operation of heating and cooling systems.

6. Navigate United Association Online Learning Resources (UAOLR), learning management systems (LMS), and student access to course material.
7. Prepare and present a lesson plan based on course material.
8. Research hydronic heating and cooling system topics to create an instructional outline.
9. Present a classroom lab activity using the instructional outline created.
10. Discuss activities other students have created and write a constructive peer review.
11. Review hydronic heating and cooling systems used in the Heating, Ventilation, and Air Conditioning (HVAC) industry.
12. Review water, air, and piping material science properties as they pertain to heating and cooling equipment.
13. Identify resources available on the UAOLR website.
14. Identify resources available for purchase through the UA bookstore.
15. Identify resources available in the LMS Canvas course.
16. Review pedagogical techniques for the lecture and lab environment.
17. Discuss and demonstrate effective communication of the material to students.

New Resources for Course

Course Textbooks/Resources

Textbooks

International Pipe Trades Joint Training Committee. *Hydronic Heating and Cooling*, first ed. International Pipe Trades Joint Training Committee, 2016

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Tony Esposito	*Faculty Preparer*	*Jan 23, 2025*
Department Chair/Area Director:		
Marilyn Donham	*Recommend Approval*	*Jan 28, 2025*
Dean:		
Eva Samulski	*Recommend Approval*	*Jan 28, 2025*
Curriculum Committee Chair:		
Randy Van Wagnen	*Recommend Approval*	*Jun 04, 2025*
Assessment Committee Chair:		
Jessica Hale	*Recommend Approval*	*Jun 09, 2025*
Vice President for Instruction:		
Brandon Tucker	*Approve*	*Jun 10, 2025*

Washtenaw Community College Comprehensive Report

UAT 257 Hydronic Heating and Cooling (UA 6006)
Effective Term: Fall 2020

Course Cover

Division: Advanced Technologies and Public Service Careers
Department: United Association Department
Discipline: United Association Training
Course Number: 257
Org Number: 28200
Full Course Title: Hydronic Heating and Cooling (UA 6006)
Transcript Title: Hydronic Heat & Cool (6006)
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 title
Course description
Outcomes/Assessment
Objectives/Evaluation
Rationale: Updating United Association course
Proposed Start Semester: Fall 2020
Course Description: In this course, students will identify the principles of hydronics heating and cooling. Topics include time and control theory, equipment and controlling components, design, installation methods and operation. Students will demonstrate maintenance and troubleshooting techniques with hands-on activities. In addition, students will locate and navigate instructional resources, methods and materials for teaching an effective hydronics course at their local Training Center. The title of this course was previously Hydronic Heating and Cooling. 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
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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. Identify and define the principles and advantages of hydronics heating and cooling.
   Assessment 1
   Assessment Tool: Outcome-related written 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

2. Identify and define hydronic equipment, installation, operation and maintenance.
   Assessment 1
   Assessment Tool: Outcome-related written 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. Prepare and present a customized troubleshooting activity and lesson plan using UA Online Learning Resources (UAOLR) and other online resource materials.
   Assessment 1
   Assessment Tool: Presentation
   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 the students will score 80% or higher.
   Who will score and analyze the data: U.A. instructors

Course Objectives

1. Identify concepts related to the streamline and turbulent flow in hydronic systems.
2. Recognize how velocity, pressure, and volume affect hydronic flow.
3. Identify the impact of buoyancy, atmospheric pressure, and expansion and compression of gases.

4. Recognize how energy works in hydronic systems, transmission of heat, and thermal expansion.
5. Identify the causes of friction within pipe.
6. Explain how to calculate static pressure based on altitude.
7. Identify the various types of compression/expansion tanks and the use of various air vents.
8. Explain the various components of a pump curve.
9. Explain the hydronics involved in heating and cooling processes.
10. Compare and contrast the advantages and disadvantages of hydronic temperature control to other methods.
11. Explain the design and construction of heating and cooling systems with independently controlled zones.
12. Discuss the equipment design and installation of heating and cooling systems.
13. Discuss the basic theory and operation of heating and cooling systems.
14. Discuss and demonstrate troubleshooting tips and maintenance techniques for hydronic systems.
15. Locate and navigate United Association Online Learning Resources (UAOLR), Blackboard, and student access.
16. Practice utilizing webbooks, assessments, and other instructional resources for customized use at the student's local Training Center.
17. Prepare and present a lesson plan based on course material.

New Resources for Course

Course Textbooks/Resources

Textbooks

International Pipe Trades Joint Training Committee. *Hydronic Heating and Cooling*, first ed. International Pipe Trades Joint Training Committee, 2016

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Periodicals

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Dean:		
Jimmie Baber	*Recommend Approval*	*Jun 09, 2020*
Curriculum Committee Chair:		
Lisa Veasey	*Recommend Approval*	*Sep 25, 2020*
Assessment Committee Chair:		
Shawn Deron	*Recommend Approval*	*Sep 30, 2020*
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Oct 06, 2020*