Washtenaw Community College Comprehensive Report

ATT 257 Heating and Air Conditioning Systems
Effective Term: Fall 2025

Course Cover

College: Advanced Technologies and Public Service Careers
Division: Advanced Technologies and Public Service Careers
Department: Transportation Technologies
Discipline: Automotive & Transportation Tech (new)
Course Number: 257
Org Number: 14100
Full Course Title: Heating and Air Conditioning Systems
Transcript Title: Heat & Air Conditioning Systms
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:
Consultation with all departments affected by this course is required.
Rationale: Update the course for the new discipline.
Proposed Start Semester: Fall 2024
Course Description: In this course, students will explore automotive heating and air conditioning (A/C) systems, including servicing procedures and diagnostic techniques. Students will perform A/C system diagnosis and repair with a focus on the multiple types of control systems used in current automobiles. This course also covers the proper use, recovery, and recycling of current refrigerants. This course was previously ASV 257.

Course Credit Hours

Variable hours: No
Credits: 2
Lecture Hours: Instructor: 30 **Student:** 30
The following Lab fields are not divisible by 15: Student Min, Instructor Min
Lab: Instructor: 22.5 **Student:** 22.5
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 52.5 **Student:** 52.5
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

Prerequisite
ATT 130 minimum grade "C"

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Read and interpret vehicle service manuals.
   Assessment 1
   Assessment Tool: Outcome-related exam questions
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
   Who will score and analyze the data: Departmental faculty

2. Diagnose and repair electrical circuits and heating systems.
   Assessment 1
   Assessment Tool: Outcome-related exam questions
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
   Who will score and analyze the data: Departmental faculty
   Assessment 2
   Assessment Tool: Outcome-related lab skills checklist
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
   Who will score and analyze the data: Departmental faculty

3. Diagnose and repair electrical components, blower motors, switches, vacuum actuators and A/C compressors.
   Assessment 1
   Assessment Tool: Outcome-related exam questions
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
   Who will score and analyze the data: Departmental faculty
   Assessment 2

Assessment Tool: Outcome-related lab skills checklist
Assessment Date: Fall 2025
Assessment Cycle: Every Three Years
Course section(s)/other population: All sections
Number students to be assessed: All students
How the assessment will be scored: Departmentally-developed rubric
Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
Who will score and analyze the data: Departmental faculty

4. Diagnose, repair, discharge and recharge air conditioning systems using specialized equipment.
   Assessment 1
   Assessment Tool: Outcome-related exam questions
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Answer key
   Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
   Who will score and analyze the data: Departmental faculty
   Assessment 2
   Assessment Tool: Outcome-related lab skills checklist
   Assessment Date: Fall 2025
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: All students
   How the assessment will be scored: Departmentally-developed rubric
   Standard of success to be used for this assessment: 70% of the students will score 70% or higher.
   Who will score and analyze the data: Departmental faculty

Course Objectives

1. Recognize and apply shop safety practices.
2. Read and interpret electrical wiring diagrams.
3. Recognize the proper procedure for diagnosing and repairing HVAC electrical systems.
4. Apply theory and skills to the repair/replacement of electrical systems.
5. Recognize the proper procedure for diagnosing and repairing heating systems.
6. Recognize the proper procedure for diagnosing and repairing air conditioning systems.
7. Inspect, diagnose and recognize needed repairs on heater systems.
8. Apply theory and skills to the repair/replacement of heater systems.
9. Inspect, diagnose and recognize needed replacement of air conditioning components.
10. Recognize the proper procedure for diagnosing and repairing electrical components, blower motors and switches.
11. Recognize the proper procedure for diagnosing and repairing vacuum actuators and A/C compressors.
12. Perform repairs using various types of testing equipment and A/C stations for automotive air conditioning systems.
13. Apply proper practices when discharging and recharging refrigerant.

New Resources for Course

Course Textbooks/Resources

Textbooks
Manuals
Periodicals

Software

Equipment/Facilities

Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Shawn Deron	*Faculty Preparer*	*Mar 27, 2024*
Department Chair/Area Director:		
Rocky Roberts	*Recommend Approval*	*Mar 27, 2024*
Dean:		
Eva Samulski	*Recommend Approval*	*Apr 03, 2024*
Curriculum Committee Chair:		
Randy Van Wagnen	*Recommend Approval*	*Mar 20, 2025*
Assessment Committee Chair:		
Jessica Hale	*Recommend Approval*	*Mar 20, 2025*
Vice President for Instruction:		
Brandon Tucker	*Approve*	*Mar 21, 2025*

Washtenaw Community College Comprehensive Report

ASV 257 Heating and Air Conditioning Systems
Effective Term: Spring/Summer 2020

Course Cover

Division: Advanced Technologies and Public Service Careers
Department: Transportation Technologies
Discipline: Auto Services (new)
Course Number: 257
Org Number: 14100
Full Course Title: Heating and Air Conditioning Systems
Transcript Title: Heat & Air Conditioning Systms
Is Consultation with other department(s) required: No
Publish in the Following: College Catalog , Time Schedule , Web Page
Reason for Submission: Three Year Review / Assessment Report
Change Information:
Consultation with all departments affected by this course is required.
Outcomes/Assessment
Other:
Rationale: Master syllabus update as a result of the three-year assessment report.
Proposed Start Semester: Winter 2020
Course Description: In this course, students will explore automotive heating and air conditioning (A/C) systems, including servicing procedures and diagnostic techniques. Students will perform A/C system diagnosis and repair with a focus on the multiple types of control systems used in current automobiles. This course also covers the proper use, recovery, recycling of current refrigerants.

Course Credit Hours

Variable hours: No
Credits: 2
Lecture Hours: Instructor: 30 **Student:** 30
The following Lab fields are not divisible by 15: Student Min, Instructor Min
Lab: Instructor: 22.5 **Student:** 22.5
Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 52.5 **Student:** 52.5
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

Prerequisite
ASV 130 minimum grade "C"

General Education

Request Course Transfer

Proposed For:

Student Learning Outcomes

1. Read and interpret vehicle service manuals.
   Assessment 1
   Assessment Tool: Common departmental exam
   Assessment Date: Winter 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: A random sample of students
   How the assessment will be scored: Common departmental exam will be scored using an answer sheet.
   Standard of success to be used for this assessment: 70% of the students will score an overall average of 70% or higher.
   Who will score and analyze the data: Departmental faculty

2. Diagnose and repair electrical circuits and heating systems.
   Assessment 1
   Assessment Tool: Common departmental exam
   Assessment Date: Winter 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: A random sample of students
   How the assessment will be scored: Common departmental exam will be scored using an answer sheet.
   Standard of success to be used for this assessment: 70% of the students will score an overall average of 70% or higher.
   Who will score and analyze the data: Departmental faculty
   Assessment 2
   Assessment Tool: Lab skills sheet
   Assessment Date: Winter 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: A random sample of students
   How the assessment will be scored: Checklist
   Standard of success to be used for this assessment: 70% of the students will score an overall average of 70% or higher.
   Who will score and analyze the data: Departmental faculty

3. Diagnose and repair electrical components, blower motors, switches, vacuum actuators and A/C compressors.
   Assessment 1
   Assessment Tool: Common departmental exam
   Assessment Date: Winter 2022
   Assessment Cycle: Every Three Years
   Course section(s)/other population: All sections
   Number students to be assessed: A random sample of students
   How the assessment will be scored: Common departmental exam will be scored using an answer sheet.

Standard of success to be used for this assessment: 70% of the students will score an overall average of 70% or higher.
Who will score and analyze the data: Departmental faculty

Assessment 2

Assessment Tool: Lab skills sheet
Assessment Date: Winter 2022
Assessment Cycle: Every Three Years
Course section(s)/other population: All sections
Number students to be assessed: A random sample of students
How the assessment will be scored: Checklist
Standard of success to be used for this assessment: 70% of the students will score an overall average of 70% or higher.
Who will score and analyze the data: Departmental faculty

4. Diagnose, repair, discharge and recharge air conditioning systems using specialized equipment.

Assessment 1

Assessment Tool: Common departmental exam
Assessment Date: Winter 2022
Assessment Cycle: Every Three Years
Course section(s)/other population: All sections
Number students to be assessed: A random sample of students
How the assessment will be scored: Common departmental exam will be scored using an answer sheet.
Standard of success to be used for this assessment: 70% of the students will score an overall average of 70% or higher.
Who will score and analyze the data: Departmental faculty

Assessment 2

Assessment Tool: Lab skills sheet
Assessment Date: Winter 2022
Assessment Cycle: Every Three Years
Course section(s)/other population: All sections
Number students to be assessed: A random sample of students
How the assessment will be scored: Checklist
Standard of success to be used for this assessment: 70% of the students will score an overall average of 70% or higher
Who will score and analyze the data: Departmental faculty

Course Objectives

1. Recognize and apply shop safety practices.
2. Read and interpret electrical wiring diagrams.
3. Recognize the proper procedure for diagnosing and repairing HVAC electrical systems.
4. Apply theory and skills to the repair/replacement of electrical systems.
5. Recognize the proper procedure for diagnosing and repairing heating systems.
6. Recognize the proper procedure for diagnosing and repairing air conditioning systems.
7. Inspect, diagnose and recognize needed repairs on heater systems.
8. Apply theory and skills to the repair/replacement of heater systems.
9. Inspect, diagnose and recognize needed replacement of air conditioning components.
10. Diagnose and repair electrical components and blower motors and switches.
11. Diagnose and repair vacuum actuators and A/C compressors.
12. Perform repairs using the various types of testing equipment and A/C stations for automotive air conditioning systems.
13. Apply proper practices when discharging and recharging refrigerant.

New Resources for Course

Course Textbooks/Resources

Textbooks

Kirk VanGelder. *Fundamentals of Automotive Technology*, 2nd ed. Jones and Bartlett Learning, 2016, ISBN: 9781284119558.

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Reviewer	Action	Date
Faculty Preparer:		
Jeremiah Pfahlert	*Faculty Preparer*	*Oct 24, 2019*
Department Chair/Area Director:		
Justin Morningstar	*Recommend Approval*	*Oct 24, 2019*
Dean:		
Brandon Tucker	*Recommend Approval*	*Oct 24, 2019*
Curriculum Committee Chair:		
Lisa Veasey	*Recommend Approval*	*Oct 24, 2019*
Assessment Committee Chair:		
Shawn Deron	*Recommend Approval*	*Oct 24, 2019*
Vice President for Instruction:		
Kimberly Hurns	*Approve*	*Oct 24, 2019*

MASTER SYLLABUS

WASHTENAW COMMUNITY COLLEGE

Course Discipline Code & No: ASV 257 **Title:** Heating and Air Conditioning Systems **Effective Term** Fall 2009

Division Code: VCT **Department Code:** AUTD **Org #:** _____

Don't publish: ☐ College Catalog ☐ Time Schedule ☐ Web Page

Reason for Submission. Check all that apply.

- ☒ New course approval
- ☐ Three-year syllabus review/Assessment report
- ☒ Course change
- ☐ Reactivation of inactive course
- ☐ Inactivation (Submit this page only.)

Change information: Note all changes that are being made. Form applies only to changes noted.

- ☐ Consultation with all departments affected by this course is required.
- ☒ Course discipline code & number (was ASV 247)*
  *Must submit inactivation form for previous course.
- ☒ Course title (was Heating and Air Conditioning)
- ☒ Course description
- ☒ Course objectives (minor changes)
- ☐ Credit hours (credits were: _____)
- ☒ Total Contact Hours (total contact hours were: 60)
- ☒ Distribution of contact hours (contact hours were: lecture: 15 lab 45 clinical _____ other _____)
- ☒ Pre-requisite, co-requisite, or enrollment restrictions
- ☐ Change in Grading Method
- ☒ Outcomes/Assessment
- ☐ Objectives/Evaluation
- ☐ Other _____

Rationale for course or course change. Attach course assessment report for existing courses that are being changed.

Course is being re-written as part of the overall program update.

Approvals Department and divisional signatures indicate that all departments affected by the course have been consulted.

Department Review by Chairperson ☒ New resources needed ☐ All relevant departments consulted

Print: Allen Day (Faculty/Preparer) Signature: Allen M Day Date: 10/29/2009

Print: Russ Ferguson (Department Chair) Signature: Russ Ferguson Date: 10/29/2009

Division Review by Dean

☐ Request for conditional approval

Recommendation ☒ Yes ☐ No — Dean's/Administrator's Signature — Date: 10/29/09

Curriculum Committee Review

Recommendation _____

☐ Tabled ☒ Yes ☐ No — Curriculum Committee Chair's Signature — Date: 3/11/10

Vice President for Instruction Approval

Vice President's Signature — Date: 3-12-10

Approval ☒ Yes ☐ No ☐ Conditional

Do not write in shaded area.
Log File 11/10/09 ☐ Ecopy ☐ Banner _____ C&A Database _____ C&A Log File _____ Basic skills ☐ Contact fee ☐

Please return completed form to the Office of Curriculum & Assessment and email an electronic copy to sjohn@wccnet.edu for posting on the website.

MASTER SYLLABUS

***Complete ALL sections which apply to the course, even if changes are not being made.**

Course: ASV 257	**Course title:** Heating and Air Conditioning Systems

Credit hours: 2

If variable credit, give range:

_____ to _____ credits

Contact hours per semester:

	Student	Instructor
Lecture:	30	30
Lab:	22.5	22.5
Clinical:	_	_
Practicum:	_	_
Other:	_	_
Totals:	52.5	52.5

Are lectures, labs, or clinicals offered as separate sections?

☐ Yes - lectures, labs, or clinicals are offered in separate sections

☒ No - lectures, labs, or clinicals are offered in the same section

Grading options:

☐ P/NP (limited to clinical & practica)

☐ S/U (for courses numbered below 100)

☒ Letter grades

Prerequisites. Select one:

☒ College-level Reading & Writing

☐ Reduced Reading/Writing Scores
(Add information at Level I prerequisite)

☐ No Basic Skills Prerequisite
(College-level Reading and Writing is not required.)

In addition to Basic Skills in Reading/Writing:

Level I (enforced in Banner)

	Course	Grade	Test	Min. Score	Concurrent Enrollment (Can be taken together)	Corequisites (Must be enrolled in this class also during the same semester)
					☐	
☐ and ☐ or					☐	
☐ and ☐ or					☐	
☐ and ☐ or					☐	

Level II (enforced by instructor on first day of class)

	Course	Grade	Test	Min. Score
☐ and ☐ or				
☐ and ☐ or				

Enrollment restrictions (In addition to prerequisites, if applicable.)

☐ and ☐ or Consent required

☐ and ☐ or Admission to program required
Program: _____

☒ and ☐ or Other (please specify):
Completion of Automotive Mechanic Certificate or comparable field experience

Please send syllabus for transfer evaluation to:

Conditionally approved courses are not sent for evaluation.

Insert course number and title you wish the course to transfer as.

☐ E.M.U. as _____

☐ U of M as _____

☐ _____ as _____

☐ _____ as _____

☐ _____ as _____

☐ _____ as _____

Course: ASV 257	**Course title:** Heating and Air Conditioning Systems

Course description State the purpose and content of the course. Please limit to 500 characters.	Automotive heating and A/C systems are explored including servicing procedures and diagnostic techniques. A/C system diagnosis and repair are performed with a focus on the multiple types of control systems used in modern automobiles. The proper recovery, recycling and use of modern refrigerants are covered in this course.	
Course outcomes List skills and knowledge students will have after taking the course. **Assessment method** Indicate how student achievement in each outcome will be assessed to determine student achievement for purposes of course improvement.	**Outcomes** (applicable in all sections)	**Assessment** Methods for determining course effectiveness
	Read and interpret vehicle service manuals	Common departmental exam; NATEF checklist
	Diagnose and repair electrical circuits and heating systems	Common departmental exam; NATEF checklist
	Diagnose and repair electrical components, blower motors, switches, vacuum actuators and A/C compressors	Common departmental exam; NATEF checklist
	Apply proper use of equipment and processes in air conditioning system diagnosis, repair, discharge and recharge	Common departmental exam; NATEF checklist

Course Objectives Indicate the objectives that support the course outcomes given above. **Course Evaluations** Indicate how instructors will determine the degree to which each objective is met for each student.	**Objectives** (applicable in all sections)	**Evaluation** Methods for determining level of student performance of objectives
	Outcome #1 and #2	
	Recognize and apply shop safety practices	Quizzes and exams; NATEF checklist
	Read and interpret electrical wiring diagrams	Quizzes and exams; NATEF checklist
	Recognize the proper procedure for diagnosing and repairing HVAC electrical systems	Quizzes and exams; NATEF checklist
	Apply theory and skills to the repair/replacement of electrical systems	Quizzes and exams; NATEF checklist
	Recognize the proper procedure for diagnosing and repairing heating systems	Quizzes and exams; NATEF checklist
	Recognize the proper procedure for diagnosing and repairing air conditioning systems	Quizzes and exams; NATEF checklist
	Perform proper inspection, diagnosis and recognize needed repairs on heater systems	Quizzes and exams; NATEF checklist
	Apply theory and skills to the repair/replacement of heater systems	Quizzes and exams; NATEF checklist
	Outcomes #1 and #3	
	Perform proper inspection, diagnosis and recognize needed replacement of air conditioning components	Quizzes and exams; NATEF checklist
	Diagnose and repair electrical components and blower motors and switches	Quizzes and exams; NATEF checklist
	Diagnose and repair vacuum actuators and A/C compressors	Quizzes and exams; NATEF checklist
	Outcomes #1 and #4	
	Perform repairs using the various types of testing equipment and A/C stations for automotive air conditioning systems	Quizzes and exams; NATEF checklist
	Apply proper practices when discharging and recharging refrigerant.	Quizzes and exams; NATEF checklist

List all new resources needed for course, including library materials.
None

Student Materials:

List examples of types		Estimated costs
Texts Supplemental reading Supplies Uniforms Equipment Tools Software	Today's Technician – Engine Repair; E. Dorries; Delmar Publishing; ISBN –	$ 100.00

Equipment/Facilities: Check all that apply. (All classrooms have overhead projectors and permanent screens.)

Check level only if the specified equipment is needed for all sections of a course.

☐ Level I classroom
Permanent screen & overhead projector

☐ Level II classroom
Level I equipment plus TV/VCR

☒ Level III classroom
Level II equipment plus data projector, computer, faculty workstation

☐ Off-Campus Sites
☐ Testing Center
☐ Computer workstations/lab
☐ ITV
☐ TV/VCR
☐ Data projector/computer
☐ Other _____

Assessment plan:

Learning outcomes to be assessed (list from Page 3)	Assessment tool	When assessment will take place (semester & year)	Course section(s)/other population	Number students to be assessed
Read and interpret vehicle service manuals	Common departmental exam; NATEF checklist	Fall 2011 and every three years thereafter	All sections	All
Diagnose and repair electrical circuits and heating systems	Common departmental exam; NATEF checklist	Fall 2011 and every three years thereafter	All sections	All
Diagnose and repair electrical components, blower motors, switches, vacuum actuators and A/C compressors	Common departmental exam; NATEF checklist	Fall 2011 and every three years thereafter	All sections	All
Apply proper use of equipment and processes in air conditioning system diagnosis, repair, discharge and recharge	Common departmental exam; NATEF checklist	Fall 2011 and every three years thereafter	All sections	All

Scoring and analysis of assessment:

1. Indicate how the above assessment(s) will be scored and evaluated (e.g. departmentally developed rubric, external evaluation, other). Attach the rubric/scoring guide.
   Common departmental exam will be scored using an answer sheet
   NATEF checklist will be scored using the departmentally-developed rubric (attached).

2. Indicate the standard of success to be used for this assessment.
   70% of the students will score an overall average of 70% or higher

3. Indicate who will score and analyze the data (data must be blind-scored).
   Departmental faculty will blind-score data when possible.

4. Explain the process for using assessment data to improve the course.
   Assessment data will be evaluated to identify any areas of weakness. Program and course instruction will be reviewed to identify ways to improve student performance.