

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 Systems

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

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

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

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

<input type="checkbox"/> Consultation with all departments affected by this course is required.	<input checked="" type="checkbox"/> Total Contact Hours (total contact hours were: <u>60</u>)
<input checked="" type="checkbox"/> Course discipline code & number (was <u>ASV 247</u>)* *Must submit inactivation form for previous course.	<input checked="" type="checkbox"/> Distribution of contact hours (contact hours were: lecture: <u>15</u> lab <u>45</u> clinical _____ other _____)
<input checked="" type="checkbox"/> Course title (was <u>Heating and Air Conditioning</u>)	<input checked="" type="checkbox"/> Pre-requisite, co-requisite, or enrollment restrictions
<input checked="" type="checkbox"/> Course description	<input type="checkbox"/> Change in Grading Method
<input checked="" type="checkbox"/> Course objectives (minor changes)	<input checked="" type="checkbox"/> Outcomes/Assessment
<input type="checkbox"/> Credit hours (credits were: _____)	<input type="checkbox"/> Objectives/Evaluation
	<input type="checkbox"/> 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 Lane Date: 10/29/09
 Dean's/Administrator's Signature

Curriculum Committee Review
 Recommendation Tabled Yes No Reservoir Date: 3/11/10
 Curriculum Committee Chair's Signature

Vice President for Instruction Approval
Phyllis Geyers Date: 3-12-10
 Vice President's Signature

Approval Yes No Conditional

Do not write in shaded area.
 Log File 11/10/09 Copy 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
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Credit hours: <u>2</u> If variable credit, give range: _____ to _____ credits	Contact hours per semester: <table style="width:100%"> <tr> <td></td> <td style="text-align:center"><u>Student</u></td> <td style="text-align:center"><u>Instructor</u></td> </tr> <tr> <td>Lecture:</td> <td style="text-align:center"><u>30</u></td> <td style="text-align:center"><u>30</u></td> </tr> <tr> <td>Lab:</td> <td style="text-align:center"><u>22.5</u></td> <td style="text-align:center"><u>22.5</u></td> </tr> <tr> <td>Clinical:</td> <td style="text-align:center">-</td> <td style="text-align:center">-</td> </tr> <tr> <td>Practicum:</td> <td style="text-align:center">-</td> <td style="text-align:center">-</td> </tr> <tr> <td>Other:</td> <td style="text-align:center">-</td> <td style="text-align:center">-</td> </tr> <tr> <td>Totals:</td> <td style="text-align:center"><u>52.5</u></td> <td style="text-align:center"><u>52.5</u></td> </tr> </table>		<u>Student</u>	<u>Instructor</u>	Lecture:	<u>30</u>	<u>30</u>	Lab:	<u>22.5</u>	<u>22.5</u>	Clinical:	-	-	Practicum:	-	-	Other:	-	-	Totals:	<u>52.5</u>	<u>52.5</u>	Are lectures, labs, or clinicals offered as separate sections? <input type="checkbox"/> Yes - lectures, labs, or clinicals are offered in separate sections <input checked="" type="checkbox"/> No - lectures, labs, or clinicals are offered in the same section	Grading options: <input type="checkbox"/> P/NP (limited to clinical & practica) <input type="checkbox"/> S/U (for courses numbered below 100) <input checked="" type="checkbox"/> Letter grades
	<u>Student</u>	<u>Instructor</u>																						
Lecture:	<u>30</u>	<u>30</u>																						
Lab:	<u>22.5</u>	<u>22.5</u>																						
Clinical:	-	-																						
Practicum:	-	-																						
Other:	-	-																						
Totals:	<u>52.5</u>	<u>52.5</u>																						

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 <small>Can be taken together</small>	Corequisites <small>Must be enrolled in this class also during the same semester</small>
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____	<input type="checkbox"/>	_____
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____	<input type="checkbox"/>	_____
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____	<input type="checkbox"/>	_____

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

Course	Grade	Test	Min. Score
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____
<input type="checkbox"/> and <input type="checkbox"/> or _____	_____	_____	_____

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

- and or Consent required
 and or Admission to program required
 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.

- | | |
|--|---|
| <input type="checkbox"/> E.M.U. as _____ | <input type="checkbox"/> _____ as _____ |
| <input type="checkbox"/> U of M as _____ | <input type="checkbox"/> _____ as _____ |
| <input type="checkbox"/> _____ as _____ | <input type="checkbox"/> _____ as _____ |

<p>Course: ASV 257</p>	<p>Course title: Heating and Air Conditioning Systems</p>	
<p>Course description State the purpose and content of the course. Please limit to <u>500</u> characters.</p>	<p>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.</p>	
<p>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.</p>	<p>Outcomes (applicable in all sections) Read and interpret vehicle service manuals Diagnose and repair electrical circuits and heating systems Diagnose and repair electrical components, blower motors, switches, vacuum actuators and A/C compressors Apply proper use of equipment and processes in air conditioning system diagnosis, repair, discharge and recharge</p>	<p>Assessment Methods for determining course effectiveness Common departmental exam; NATEF checklist Common departmental exam; NATEF checklist Common departmental exam; NATEF checklist Common departmental exam; NATEF checklist</p>
<p>Course Objectives Indicate the objectives that support the course outcomes given above.</p> <p>Course Evaluations Indicate how instructors will determine the degree to which each objective is met for each student.</p>	<p>Objectives (applicable in all sections)</p> <p>Outcome #1 and #2</p> <p>Recognize and apply shop safety practices</p> <p>Read and interpret electrical wiring diagrams</p> <p>Recognize the proper procedure for diagnosing and repairing HVAC electrical systems</p> <p>Apply theory and skills to the repair/replacement of electrical systems</p> <p>Recognize the proper procedure for diagnosing and repairing heating systems</p> <p>Recognize the proper procedure for diagnosing and repairing air conditioning systems</p> <p>Perform proper inspection, diagnosis and recognize needed repairs on heater systems</p> <p>Apply theory and skills to the repair/replacement of heater systems</p> <p>Outcomes #1 and #3</p> <p>Perform proper inspection, diagnosis and recognize needed replacement of air conditioning components</p> <p>Diagnose and repair electrical components and blower motors and switches</p> <p>Diagnose and repair vacuum actuators and A/C compressors</p> <p>Outcomes #1 and #4</p> <p>Perform repairs using the various types of testing equipment and A/C stations for automotive air conditioning systems</p> <p>Apply proper practices when discharging and recharging refrigerant.</p>	<p>Evaluation Methods for determining level of student performance of objectives</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p> <p>Quizzes and exams; NATEF checklist</p>

MASTER SYLLABUS

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.

<input type="checkbox"/> Level I classroom Permanent screen & overhead projector	<input type="checkbox"/> Off-Campus Sites
<input type="checkbox"/> Level II classroom Level I equipment plus TV/VCR	<input type="checkbox"/> Testing Center
<input checked="" type="checkbox"/> Level III classroom Level II equipment plus data projector, computer, faculty workstation	<input type="checkbox"/> Computer workstations/lab
	<input type="checkbox"/> ITV
	<input type="checkbox"/> TV/VCR
	<input type="checkbox"/> Data projector/computer
	<input type="checkbox"/> 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:

- 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).
- Indicate the standard of success to be used for this assessment.
70% of the students will score an overall average of 70% or higher
- Indicate who will score and analyze the data (data must be blind-scored).
Departmental faculty will blind-score data when possible.
- 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.