

# Washtenaw Community College Comprehensive Report

## ABR 201 Lightweighting Composite Repair Effective Term: Fall 2024

### Course Cover

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

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

**Department:** Transportation Technologies

**Discipline:** Auto Body Repair (new)

**Course Number:** 201

**Org Number:** 14100

**Full Course Title:** Lightweighting Composite Repair

**Transcript Title:** Lightweighting Composite Repai

**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.**

**Pre-requisite, co-requisite, or enrollment restrictions**

**Objectives/Evaluation**

**Rationale:** Updating course based on changes to industry needs.

**Proposed Start Semester:** Fall 2023

**Course Description:** In this course, students learn about composite materials and their uses in modern vehicles. Students are introduced to material types (such as resins with reinforcing carbon fiber) and their construction uses, specialty equipment, and the importance of vacuum bagging. Additionally, students will develop and execute project plans to build composite parts such as a composite laminate and a 3D laminate utilizing a core material.

### Course Credit Hours

**Variable hours:** No

**Credits:** 4

**Lecture Hours: Instructor: 45 Student: 45**

**Lab: Instructor: 60 Student: 60**

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

**Total Contact Hours: Instructor: 105 Student: 105**

**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**

ABR 111 minimum grade "C"

or

**Prerequisite**

ASV 131 minimum grade "C"

**General Education**

**Request Course Transfer**

**Proposed For:**

**Student Learning Outcomes**

1. Recognize and apply shop rules, procedures and safety standards associated with composite materials.

**Assessment 1**

Assessment Tool: Outcome-related departmentally-developed safety test questions

Assessment Date: Winter 2026

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: 75% of students will score 100% on their first attempt.

Who will score and analyze the data: Departmental faculty

2. Create projects utilizing composite materials.

**Assessment 1**

Assessment Tool: Outcome-related student project plan

Assessment Date: Winter 2026

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: 75% of students will score 80% or better.

Who will score and analyze the data: Departmental faculty

3. Perform repairs to various composite materials including the application, infusion and curing of polymer resins.

**Assessment 1**

Assessment Tool: Outcome-related student repair project

Assessment Date: Winter 2026

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: 75% of students will score 80% or better.

Who will score and analyze the data: Departmental faculty

**Course Objectives**

1. Identify and apply all safety standards and equipment associated with composite materials.
2. Read and interpret uses of composite materials in lightweighting vehicles.
3. Diagnose and evaluate damage to a composite repair site.
4. Identify and interpret fiber cloth axial orientation.
5. Demonstrate proper use of pre-preg and non-resin carbon fiber cloth.
6. Demonstrate proper use of resin in composite materials.
7. Recognize and perform repairs to damaged composite structures.
8. Demonstrate proper use of a composite material in a laminate that utilizes a core.

9. Recognize and apply proper techniques in cutting and applying composite material.
10. Demonstrate use of short-wave infrared and autoclave as heating sources to cure a laminate.
11. Demonstrate proper use of tools as associated with composite materials.
12. Diagnose and repair various types of composite and lightweight materials in the automotive industry.
13. Demonstrate the proper use of a mold shape in creating a three-dimensional part with a composite material.

## New Resources for Course

### Course Textbooks/Resources

#### Textbooks

Wanberg, John. *Composite Materials: Fabrication Handbook*, Volumes 1-3 ed. Wolfgang Publications, 2012

#### Manuals

#### Periodicals

#### Software

### Equipment/Facilities

Level III classroom

Computer workstations/lab

<b><u>Reviewer</u></b>	<b><u>Action</u></b>	<b><u>Date</u></b>
<b>Faculty Preparer:</b> <i>Robert Lowing</i>	<i>Faculty Preparer</i>	<i>Jul 25, 2023</i>
<b>Department Chair/Area Director:</b> <i>Rocky Roberts</i>	<i>Recommend Approval</i>	<i>Aug 16, 2023</i>
<b>Dean:</b> <i>Jimmie Baber</i>	<i>Recommend Approval</i>	<i>Aug 17, 2023</i>
<b>Curriculum Committee Chair:</b> <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Mar 09, 2024</i>
<b>Assessment Committee Chair:</b> <i>Jessica Hale</i>	<i>Recommend Approval</i>	<i>Mar 13, 2024</i>
<b>Vice President for Instruction:</b> <i>Brandon Tucker</i>	<i>Approve</i>	<i>Mar 15, 2024</i>

## Washtenaw Community College Comprehensive Report

### ABR 201 Lightweighting Composite Repair Effective Term: Winter 2020

#### Course Cover

**Division:** Advanced Technologies and Public Service Careers  
**Department:** Transportation Technologies  
**Discipline:** Auto Body Repair (new)  
**Course Number:** 201  
**Org Number:** 14100  
**Full Course Title:** Lightweighting Composite Repair  
**Transcript Title:** Lightweighting Composite Repai  
**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.**

**Course description**

**Outcomes/Assessment**

**Rationale:** Update of master syllabus after assessment. We found the assessment tools very difficult to use and in need of an update.

**Proposed Start Semester:** Fall 2019

**Course Description:** In this course, students learn about composite materials and their uses in modern vehicles. Students are introduced to material types (such as resins with reinforcing carbon fiber) and their construction uses, specialty equipment, and the importance of vacuum bagging. Students develop and execute repair plans using composite materials and make molds as part of the "light-weighting" and repair process.

#### Course Credit Hours

**Variable hours:** No

**Credits:** 4

**Lecture Hours: Instructor:** 45 **Student:** 45

**Lab: Instructor:** 60 **Student:** 60

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

**Total Contact Hours: Instructor:** 105 **Student:** 105

**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**

ABR 123 minimum grade "B-"

or

**Prerequisite**

ASV 131 minimum grade "C"

**General Education****Request Course Transfer**

**Proposed For:**

**Student Learning Outcomes**

1. Recognize and apply shop rules, procedures and safety standards associated with composite materials.

**Assessment 1**

Assessment Tool: Departmentally-developed safety test

Assessment Date: Winter 2022

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: 75% of students will score 100% on their first attempt, and all students must score 100%.

Who will score and analyze the data: Departmental faculty

2. Create projects utilizing composite materials.

**Assessment 1**

Assessment Tool: Student project

Assessment Date: Winter 2020

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: 75% of students will score 80% or better.

Who will score and analyze the data: Departmental faculty

3. Perform repairs to various composite materials including the application, infusion and curing of polymer resins.

**Assessment 1**

Assessment Tool: Student repair project

Assessment Date: Winter 2020

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: 75% of students will score 80% or better.

Who will score and analyze the data: Departmental faculty

**Course Objectives**

1. Identify and apply all safety standards and equipment associated with composite materials.
2. Read and interpret uses of composite materials in lightweighting vehicles.
3. Diagnose and evaluate damage to a composite repair site.
4. Identify and interpret fiber cloth axial orientation.
5. Demonstrate proper use of pre-preg and non-resin carbon fiber cloth.
6. Demonstrate proper use of resin in composite materials.
7. Recognize and perform repairs to damaged composite structures.
8. Demonstrate proper use of a vacuum bag compression mold for creating a composite part.

9. Recognize and apply proper techniques in cutting and applying composite material.
10. Demonstrate use of hot bonding and/or heat blanket systems.
11. Demonstrate proper use of tools as associated with composite materials.
12. Diagnose and repair various types of composite and lightweight materials in the automotive industry.

### New Resources for Course

#### Course Textbooks/Resources

##### Textbooks

Wanberg, John. *Composite Materials: Fabrication Handbook*, Volumes 1-3 ed. Wolfgang Publications, 2012

##### Manuals

##### Periodicals

##### Software

#### Equipment/Facilities

Level III classroom

Computer workstations/lab

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
<b>Faculty Preparer:</b> <i>Robert Lowing</i>	<i>Faculty Preparer</i>	<i>Aug 06, 2019</i>
<b>Department Chair/Area Director:</b> <i>Justin Morningstar</i>	<i>Recommend Approval</i>	<i>Aug 07, 2019</i>
<b>Dean:</b> <i>Brandon Tucker</i>	<i>Recommend Approval</i>	<i>Aug 22, 2019</i>
<b>Curriculum Committee Chair:</b> <i>Lisa Veasey</i>	<i>Recommend Approval</i>	<i>Sep 14, 2019</i>
<b>Assessment Committee Chair:</b> <i>Shawn Deron</i>	<i>Recommend Approval</i>	<i>Sep 20, 2019</i>
<b>Vice President for Instruction:</b> <i>Kimberly Hurns</i>	<i>Approve</i>	<i>Sep 26, 2019</i>