

Title 7: Education K-12

Part 69: Collision Repair Technology



2015 Collision Repair Technician

Mississippi Department of Education

Program CIP: 47.0603 - Autobody/Collision and Repair Technology/Technician

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Published by

Office of Career and Technical Education
Mississippi Department of Education
Jackson, MS 39205

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The Research and Curriculum Unit (RCU), located in Starkville, MS, as part of Mississippi State University, was established to foster educational enhancements and innovations. In keeping with the land grant mission of Mississippi State University, the RCU is dedicated to improving the quality of life for Mississippians. The RCU enhances intellectual and professional development of Mississippi students and educators while applying knowledge and educational research to the lives of the people of the state. The RCU works within the contexts of curriculum development and revision, research, assessment, professional development, and industrial training.

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Acknowledgments

The Collision Repair Technician curriculum was presented to the Mississippi Board of Education on November 20-21, 2014. The following persons were serving on the state board at the time:

Dr. Carey M. Wright, State Superintendent of Education
Dr. John R. Kelly, Chair
Mr. Richard Morrison, Vice-Chair
Dr. O. Wayne Gann
Mrs. Kami Bumgarner
Mr. William Harold Jones
Mr. Charles McClelland
Mrs. Rosemary G. Aultman
Mr. Danny J. Spreitler
Mr. Johnny Franklin

Jean Massey, Associate Superintendent of Education for the Office of Career and Technical Education at the Mississippi Department of Education, assembled a taskforce committee to provide input throughout the development of the *Collision Repair Technician Curriculum Framework and Supporting Materials*.

Lemond Irvin, Instructional Design Specialist for the Research and Curriculum Unit at Mississippi State University, researched and authored this framework. lemond.irvin@rcu.msstate.edu

Leon Hemphill, Sales and Marketing Director, Capitol Body Shop, Inc.

Also, special thanks are extended to the teachers who contributed teaching and assessment materials that are included in the framework and supporting materials:

Jerry Cox, Hinds Pearl Rankin Career and Technical Center, Pearl, MS
Eris Dowds, McKellar Technology Center, Columbus, MS
Joseph Glasper, Greenville Technical Center, Greenville, MS
Sheddrick Lewis, Amite County Vocational Complex, Liberty, MS
Charles McMillan, A.P. Fatherree, Jones County Career Tech, Laurel, MS
Mack Robinson, Canton Career Center, Canton, MS

Appreciation is expressed to the following professional, who provided guidance and insight throughout the development process:

Tim Bradford, Program Coordinator – Transportation, Office of Career and Technical Education and Workforce Development, Mississippi Department of Education, Jackson, MS

Betsey Smith, Associate Director for the Research and Curriculum Unit at Mississippi State University

Scott Kolle, Project Manager for the Research and Curriculum Unit at Mississippi State University

Jolanda Young, Educational Technologist for the Research and Curriculum Unit at Mississippi State University

Preface

Secondary career and technical education programs in Mississippi face many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing true learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, *Mississippi Code of 1972*, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, Ch. 487, §14; Laws, 1991, Ch. 423, §1; Laws, 1992, Ch. 519, §4 eff. from and after July 1, 1992; Carl D. Perkins Vocational Education Act IV, 2007; and No Child Left Behind Act of 2001).

Executive Summary

Pathway Description

Collision Repair is a pathway for students in the Transportation career cluster. The following description is from the current Standard Course of Study for Career-Technical Education, Mississippi Department of Education. Collision Repair is a hands-on program that will prepare students for employment or continuing education in the collision repair industry. The content is based on industry content. The content consists of fundamentals, mechanical/electrical components, nonstructural analysis and damage repair, structural analysis and damage repair, and painting and refinishing.

The program is aligned with the NATEF 2012 Collision Repair and Refinishing standards, which were retrieved November 12, 2013, from <http://www.natef.org>.

Industry Certification

The Collision Repair pathway was written to incorporate the **National Automotive Technicians Education Foundation (NATEF)** and the **Inter-Industry Conference on Auto Collision Repair (I-CAR)** learning objectives, content, and hours. Any student who successfully completes this program will be eligible to apply to obtain the ASE exams. ASE requires two years of employment before certificates are issued. Students receive one year of credit for completion of the secondary program. Students who take certifications before the two-year requirement is met will be granted certifications after they complete one year of collision repair employment. NATEF and I-CAR are national certifications recognized throughout the automotive service industry. Each district should implement a maximum student number due to the size of each lab. Programs seeking certification (NATEF) may receive certification in Painting and Refinishing. Programs can seek certification in other areas if they so desire.

Assessment

The latest assessment blueprint for the curriculum can be found at the following location: <http://www.rcu.msstate.edu/Curriculum/CurriculumDownload.aspx>

Student Prerequisites

In order for students to be able to experience success in the program, the following student prerequisites are suggested:

1. C or higher in English (the previous year)
2. C or higher in Math (last course taken or the instructor can specify the math)
3. Instructor Approval and TABE Reading Score (eighth grade or higher)

or

1. TABE Reading Score (eighth grade or higher)
2. Instructor Approval

or

1. Instructor Approval

Teacher Licensure

The latest teacher licensure information can be found at:

<http://www.mde.k12.ms.us/educator-licensure>

Professional Learning

If you have specific questions about the content of any of training sessions provided, please contact the Research and Curriculum Unit at 662.325.2510.

Course Outlines

Option 1—Four One-Carnegie-Unit Courses

This curriculum consists of four one-credit courses, which should be completed in the following sequence:

1. **Fundamentals of Collision Repair – Course Code: 997102**
2. **Intermediate Painting and Refinishing – Course Code: 997103**
3. **Advanced Fundamentals of Collision Repair – Course Code: 997104**
4. **Advanced Painting and Refinishing – Course Code: 997105**

Course Description: Fundamentals of Collision Repair (Course Code: 997102)

Fundamentals of Collision Repair contains information on safety, tool identification/use, employee information, collision estimating, paint mixing/matching, service specification and service information, measurement, personal/ business finance, introduction to steering and suspension systems, concepts of electronic/electrical systems, concepts of brake systems, introduction to heating/cooling systems, concepts of cooling systems, introduction to restraint systems, inspecting and analyzing body components, repairs to outer body panels, information on frame inspection and repair, unibody inspection and repair, and introductory welding/cutting applications.

Course Description: Intermediate Painting and Refinishing (Course Code: 997103)

The Intermediate Painting and Refinishing course contains information and skills relating to painting and refinishing operations and surface preparations.

Course Description: Advanced Fundamentals of Collision Repair (Course Code: 997104)

Advanced Fundamentals of Collision Repair contains information on safety, tool identification/use, employee information, collision estimating, paint mixing/matching, service specification and service information, measurement, personal and business skills, metal finishing and body filling, movable glass/hardware, advanced welding, unibody measurement and repair, fixed-glass procedures, and advanced welding/cutting applications.

Course Description: Advanced Painting and Refinishing (Course Code: 997105)

The Advanced Painting and Refinishing course contains information and skills relating to mixing and matching paint; paint defects, causes, and cures; and final detail practices.

Fundamentals of Collision Repair - Course Code: 997102

Unit	Unit Name	Hours
1	Introduction, Safety, and Student Organization	10
2	Fundamentals of Collision Repair	55
3	Basic Mechanical and Electrical Components	25
4	Basic Non-Structural Analysis and Damage Repair	25
5	Basic Structural Analysis and Damage Repair	25

Total		140
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Intermediate Painting and Refinishing - Course Code: 997103

Unit	Unit Name	Hours
6	Introduction to Painting and Refinishing	60
7	Intermediate Painting and Refinishing	80
Total		140

Advanced Fundamentals of Collision Repair - Course Code: 997104

Unit	Unit Name	Hours
8	Safety (Review), Employability Skills, and Business Skills	10
9	Advanced Non-Structural Analysis and Damage Repair	65
10	Advanced Structural Analysis and Damage Repair	65
Total		140

Advanced Painting and Refinishing – Course Code: 997105

Unit	Unit Name	Hours
11	Introduction to Advanced Painting and Refinishing	60
12	Advanced Painting and Refinishing	80
Total		140

Option 2—Two Two-Carnegie-Unit Courses

This curriculum consists of two two-credit courses, which should be completed in the following sequence:

- 1. Collision Repair Technician I — Course Code: 997100**
- 2. Collision Repair Technician II — Course Code: 997101**

Course Description: Collision Repair Technician I (Course Code: 997100)

Collision Repair Technician I contains information on safety, tool identification/use, employee information, collision estimating, paint mixing/matching, service specification and service information, measurement, and personal/business finance, introduction to steering and suspension systems, concepts of electronic/electrical systems, concepts of brake systems, introduction to heating /cooling systems, concepts of cooling systems, introduction to restraint systems, inspecting and analyzing body components, repairs to outer body panels, frame inspection and repair, unibody inspection and repair, and introductory welding/cutting applications.

Course Description: Collision Repair Technician II (Course Code: 997101)

Collision Repair Technician II contains information on safety, tool identification/use, employee information, collision estimating, paint mixing/matching, service specification and service information, measurement, personal and business skills, metal finishing and body filling, movable glass/hardware, advanced welding, frame inspection and repair, unibody measurement and repair, fixed-glass procedures, and advanced welding/cutting applications.

Collision Repair Technician I — Course Code: 997100

Unit	Unit Name	Hours
1	Introduction, Safety, and Student Organization	10
2	Fundamentals of Collision Repair	55
3	Basic Mechanical and Electrical Components	25
4	Basic Non-Structural Analysis and Damage Repair	25
5	Basic Structural Analysis and Damage Repair	25
6	Introduction to Painting and Refinishing	60
7	Intermediate Painting and Refinishing	80
Total		280

Collision Repair Technician II — Course Code: 997101

Unit	Unit Name	Hours
8	Safety (Review), Employability Skills, and Business Skills	10
9	Advanced Non-Structural Analysis and Damage Repair	65
10	Advanced Structural Analysis and Damage Repair	65
11	Introduction to Advanced Painting and Refinishing	60
12	Advanced Painting and Refinishing	80
Total		280

- Scheduling and operating more than one course in the same classroom/laboratory with the same teacher is not allowed.
- Students must complete the first year with a score of 80/C or higher in class work to advance to the next level.

Collision Repair Technology

Program CIP: 47.0603

Ordering Information

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Published by

Office of Vocational and Technical Education
Mississippi Department of Education
Jackson, MS 39205

Research and Curriculum Unit for Workforce Development
Vocational and Technical Education
Mississippi State University
Mississippi State, MS 39762

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The Research and Curriculum Unit (RCU), located in Starkville, MS, as part of Mississippi State University, was established to foster educational enhancements and innovations. In keeping with the land grant mission of Mississippi State University, the RCU is dedicated to improving the quality of life for Mississippians. The RCU enhances intellectual and professional development of Mississippi students and educators while applying knowledge and educational research to the lives of the people of the state. The RCU works within the contexts of curriculum development and revision, research, assessment, professional development, and industrial training.

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Unit 4: Fundamentals of Collision Repair (Basic Structural Analysis and Damage Repair)	Error! Bookmark not defined.
Unit 5: Intermediate Painting and Refinishing	Error! Bookmark not defined.
Unit 6: Safety (Review), Employability Skills, and Business Skills	Error! Bookmark not defined.
Unit 7: Advanced Non – Structural Analysis and Damage Repair	Error! Bookmark not defined.
Unit 8: Advanced Structural Analysis and Damage Repair	Error! Bookmark not defined.
Unit 9: Advanced Painting and Refinishing	Error! Bookmark not defined.
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Acknowledgments

The Collision Repair Technology curriculum was presented to the Mississippi Board of Education on January 16, 2009. The following persons were serving on the state board at the time:

Dr. Hank M. Bounds, Executive Secretary
Mr. Claude Hartley, Chair
Mr. William Harold Jones, Vice Chair
Mr. Howell "Hal" N. Gage
Dr. O. Wayne Gann
Ms. Rebecca Harris
Mr. Charles McClelland
Ms. Sondra Parker Caillavet
Ms. Rosetta Richards
Dr. David Sistrunk

Mike Mulvihill, Interim Associate State Superintendent of Education for the Office of Vocational Education and Workforce Development, at the Mississippi Department of Education assembled an oversight committee to provide input throughout the development of the *Collision Repair Technology Curriculum Framework and Supporting Materials*. Members of this task force were as follows:

Dean Batton, Simpson County Vocational Center
Annie Covington, Coffeeville Public Schools
Linda Davis, Millsaps Vocational Center
Dave Ellison, Hinds Community College
Jimmy Flynt, Empire Trucks
Scott Kelle, Research and Curriculum Unit
Rick McDonald, Mississippi Gulf Coast Community College
Ted Mangum, Jones County Vocational Center
Michael Myrick, Canton Career Center
Tommy Nance, Fowler Buick
Ray Orr, Itawamba Community College
Danny Owen, Tupelo Public Schools
Ben Pratt, Northeast Mississippi Community College
Rick Saucier, Hancock County Vo Tech Center
Chad Smith, Smith Brothers Collision Repair
Dale Smith, Thomson Machinery
Cravin Turnage, Holly Springs Public Schools
Earl White, Mississippi Department of Education

Also, a special thanks is extended to the teachers who contributed teaching and assessment materials that are included in the framework and supporting materials. Members who contributed were as follows:

Wade Jackson, Oakley Training School, Raymond, MS
Sheddrick Lewis, Amite County School District, Liberty, MS
James Terrell, Oakley Training School, Raymond, MS

Appreciation is expressed to the following staff members at the Mississippi Department of Education who provided guidance and insight throughout the development process:

Sam Davis, Program Coordinator and Division Director, Office of Vocational Education and Workforce Development, Mississippi Department of Education, Jackson, MS
Bill McGrew, Division Director of Instructional Programs and Student Organizations, Office of Vocational Education and Workforce Development, Mississippi Department of Education
Chris Wall, Bureau Director of Instructional Programs and Student Organizations, Office of Vocational Education and Workforce Development, Mississippi Department of Education

Finally, standards in the *Collision Repair Technology Curriculum Framework and Supporting Materials* are based on the following:

Industry Standards

NATEF was founded in 1983 as an independent, non-profit organization with a single mission: To evaluate technician training programs against standards developed by the automotive industry and recommend qualifying programs for certification (accreditation) by ASE, the National Institute for Automotive Service Excellence. For more information, visit <http://www.natef.org/>. Reprinted with permission.

I-CAR was formed in 1979 as a not-for-profit collision training organization. Its focus is on activities and resources that assist the collision repair industry achieve a high level of training for its technicians, and content is based on National Automotive Technicians Education Foundation (NATEF) standards. I-CAR technical training programs are developed and delivered to technicians in the collision industry. For more information, visit <http://www.i-car.com/>.

Applied Academic Credit Benchmarks

Mississippi Department of Education 2007 Mississippi Mathematics Framework Revised

21st Century Skills and Information and Communication Technologies Literacy Standards

In defining 21st century learning, the Partnership for 21st Century Skills has embraced five content and skill areas that represent the essential knowledge for the 21st century: Global awareness; civic engagement; financial, economic, and business literacy; learning skills that encompass problem solving, critical thinking, and self-directional skills; and Information and Communication Technology (ICT) literacy.

National Educational Technology Standards for Students

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ACT College Readiness Standards



The College Readiness Standards are sets of statements intended to help students understand what is expected of them in preparation for the ACT. These standards are integrated into teaching and assessment strategies throughout the curriculum framework.

Preface

Secondary vocational–technical education programs in Mississippi are faced with many challenges resulting from sweeping educational reforms at the national and state levels. Schools and teachers are increasingly being held accountable for providing true learning activities to every student in the classroom. This accountability is measured through increased requirements for mastery and attainment of competency as documented through both formative and summative assessments.

The courses in this document reflect the statutory requirements as found in Section 37-3-49, Mississippi Code of 1972, as amended (Section 37-3-46). In addition, this curriculum reflects guidelines imposed by federal and state mandates (Laws, 1988, ch. 487, §14; Laws, 1991, ch. 423, §1; Laws, 1992, ch. 519, §4 eff. from and after July 1, 1992; Carl D. Perkins Vocational Education Act IV, 2007; and No Child Left Behind Act of 2001).



Executive Summary

Program Description

Collision Repair is a pathway for students in the Transportation career cluster. The following description is from the current Standard Course of Study for Career-Technical Education, Mississippi Department of Education. Collision Repair is a hands-on program that will prepare students for employment or continuing education in the collision repair industry. The content is based on industry content. The content consists of fundamentals; mechanical/electrical components; nonstructural analysis and damage repair; structural analysis and damage repair; and painting and refinishing.

The program is aligned with the NATEF 2006 Collision Repair and Refinishing standards, which were retrieved May 1, 2006, from <http://www.natef.org>.

Industry Certification

The Collision Repair pathway was written to incorporate the **National Automotive Technicians Education Foundation (NATEF)** and the **Inter-Industry Conference on Auto Collision Repair (I-CAR)** learning objectives, content, and hours. Any student who successfully completes this program will be eligible to apply to obtain the ASE exams. ASE requires 2 years of employment before certificates are issued. Students receive 1 year of credit for completion of the secondary program. Students who take certifications before the 2-year requirement is met will be granted certifications after they complete 1 year of collision repair employment. NATEF and I-CAR are national certifications recognized throughout the automotive service industry. Each district should implement a maximum student number due to the size of each lab. Programs seeking certification (NATEF) may receive certification in Painting and Refinishing. Programs can seek certification in other areas if they so desire.

Assessment

Students will be assessed using the Collision Repair MS-CPAS2 test. The MS-CPAS2 blueprint can be found at <http://info.rcu.msstate.edu/services/curriculum.asp>. If there are questions regarding assessment of this program, please contact the transportation instructional design specialists at the Research and Curriculum Unit at 662.325.2510.

Student Prerequisites

In order for students to be able to experience success in the Collision Repair Technology program, the following student prerequisites are in place:

1. C or higher in English (the previous year)
2. C or higher in Math (last course taken or the instructor can specify the math)
3. Instructor Approval and TABE Reading Score (eighth grade or higher)

or

1. TABE Reading Score (eighth grade or higher)
2. Instructor Approval

or

1. Instructor Approval

Proposed Applied Academic Credit

Applied Mathematics content from the curriculum was aligned to the 2007 Mississippi Mathematics Framework Revised Academic Benchmarks. It is proposed that upon the completion of this program, students will earn one Applied Mathematics Credit that can be used for graduation requirements.

The applied academic credit has not been approved by the Mississippi Commission on School Accreditation or by the State Board of Education. If there are questions regarding applied academic credit, please contact the Coordinator of Workforce Education at the Research and Curriculum Unit at 662.325.2510.

Licensure Requirements

A 967 educator license is required to teach the Collision Repair pathway. The requirements for the 967 licensure endorsement are listed below:

1. Applicant must have earned a 2-year college degree (associate degree) or higher from an accredited institution of higher education.
2. Applicant must have 2 years of documented collision repair service experience.
3. Applicant must enroll immediately in the Vocational Instructor Preparation (VIP) or the Redesign Education Program (REP).
4. Applicant must complete the individualized Professional Development Plan (PDP) requirements of the VIP or REP prior to the expiration date of the 3-year vocational license.
5. Applicant must hold ASE certificates in Painting and Refinishing or I-CAR Paint and Refinishing certification.
6. Applicant must successfully complete an approved computer literacy certification exam.
7. Applicant must successfully complete a certification for an online learning workshop, module, or course that is approved by the Mississippi Department of Education.
8. Applicant must successfully complete a Collision Repair certification workshop, module, or course that is approved by the Mississippi Department of Education.

Professional Learning

The professional learning itinerary for the middle school or individual pathways can be found at <http://redesign.rcu.msstate.edu>. If you have specific questions about the content of each training session provided, please contact the Research and Curriculum Unit at 662.325.2510, and ask for the Professional Learning Specialist.

Course Outlines

This curriculum framework allows multiple options for local school districts to implement based on the local needs of industry and students. The first option groups units into four one-Carnegie-unit courses. The second option groups units into a 2-year, four-Carnegie-unit program. An in-depth discussion of each option is listed in the following material.

Option 1

This Collision Repair Pathway option emphasizes industry-based content with time being allocated between lecture and lab activities. The content is aligned with National Institute for Automotive Service Excellence (ASE) standards to ensure that programs can be recommended for certification by National Automotive Technicians Educational Foundation (NATEF) and the Inter-Industry Conference on Auto Collision Repair (I-CAR) learning objectives and content.

Collision Repair Pathway (four Carnegie units total) is a program that will prepare students for the collision repair industry. The content is divided into four one-credit courses. These courses are to be taken sequentially. Safety is an integral part of every course and activity. A student must complete all four courses to be a completer and to receive the one math credit.

- Safety will be reinforced and tested at the beginning of each year and throughout the content.
- Students are not to enroll into multiple courses at the same time.
- Courses cannot be taken out of the above order unless the instructor approves. Foundation knowledge in each course must be mastered to move to the next unit.
- Students must complete collision courses with a score of 80/C or higher in classwork to advance to the next level.

Course Description: Fundamentals of Collision Repair (Course Code: 997102)

Fundamentals of Collision Repair contains information on safety, tool identification/use, employee information, collision estimating, paint mixing/matching, service specification and service information, measurement, personal/business finance, introduction to steering and suspension systems, concepts of electronic/electrical systems, concepts of brake systems, introduction to heating/cooling systems, concepts of cooling systems, introduction to restraint systems, inspecting and analyzing body components, repairs to outer body panels, and introductory welding, information on frame inspection and repair, unibody inspection and repair, and introductory welding/cutting applications.

Course Description: Intermediate Painting and Refinishing (Course Code: 997103)

The Intermediate Painting and Refinishing course contains information and skills relating to painting and refinishing operations and surface preparations.

Course Description: Advanced Fundamentals of Collision Repair (Course Code: 997104)

Advanced Fundamentals of Collision Repair contains information on safety, tool identification/use, employee information, collision estimating, paint mixing/matching, service specification and service information, measurement, personal and business skills, metal finishing and body filling, movable glass/hardware, advanced welding, unibody measurement and repair, fixed glass procedures, and advanced welding/cutting applications.

Course Description: Advanced Painting and Refinishing (Course Code: 997105)

The Advanced Painting and Refinishing course contains information and skills relating to mixing and matching paint; paint defects, causes, and cures; and final detail practices.

Fundamentals of Collision Repair (One Carnegie Unit) – Course Code: 997102

Unit	Title	Hours
1	Fundamentals of Collision Repair	65
2	Fundamentals of Collision Repair (Basic Mechanical and Electrical Components)	25
3	Fundamentals of Collision Repair (Basic Non-Structural Analysis and Damage Repair)	25
4	Fundamentals of Collision Repair (Basic Structural Analysis and Damage Repair)	25
		140

Intermediate Painting and Refinishing (One Carnegie Unit) – Course Code: 997103

Unit	Title	Hours
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5		Intermediate Painting and Refinishing	140
			140

Advanced Fundamentals of Collision Repair (One Carnegie Unit) – Course Code: 997104

Unit	Title	Hours
6	Safety (Review), Employability Skills, and Business Skills	80
7	Advanced Non-Structural Analysis and Damage Repair	30
8	Advanced Structural Analysis and Damage Repair	30
		140

Advanced Painting and Refinishing (One Carnegie Unit) – Course Code: 997105

Unit	Title	Hours
9	Advanced Painting and Refinishing	140
		140

Option 2

This Collision Repair Pathway option also emphasizes industry-based content with time being allocated between lecture and lab activities. The content is aligned with National Institute for Automotive Service Excellence (ASE) standards to ensure that programs can be recommended for certification by National Automotive Technicians Educational Foundation (NATEF) and the Inter-Industry Conference on Auto Collision Repair (I-CAR) learning objectives and content.

The content is divided into two courses. Safety is an integral part of every course and activity. A student must complete both courses to be a completer and to receive the one math credit.

Course Description: Collision Repair I (Course Code: 997100) Fundamentals of Collision Repair contains information on safety, tool identification/use, employee information, collision estimating, paint mixing/matching, service specification and service information, measurement, and personal/business finance, introduction to steering and suspension systems, concepts of electronic/electrical systems, concepts of brake systems, introduction to heating/cooling systems, concepts to cooling systems, introduction to restraint systems, inspecting and analyzing body components, repairs to outer body panels, and introductory welding, frame inspection and repair, unibody inspection and repair, and introductory welding/cutting applications.

Course Description: Collision Repair Technology II (Course Code: 997101) Advanced Fundamentals of Collision Repair contains information on safety, tool identification/use, employee information, collision estimating, paint mixing/matching, service specification and service information, measurement, personal and business skills, metal finishing and body filling, movable glass/hardware, advanced welding, frame inspection and repair, unibody measurement and repair, fixed glass procedures, and advanced welding/cutting applications.

Collision Repair I (Two Carnegie Units) – Course Code: 997100

Unit	Title	Hours
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1	Fundamentals of Collision Repair	65
2	Fundamentals of Collision Repair (Basic Mechanical and Electrical Components)	25
3	Fundamentals of Collision Repair (Basic Non-Structural Analysis and Damage Repair)	25
4	Fundamentals of Collision Repair (Basic Structural Analysis and Damage Repair)	25
5	Intermediate Painting and Refinishing	140
		280

Collision Repair II (Two Carnegie Units) – Course Code: 997101

Unit	Title	Hours
6	Safety (Review), Employability Skills, and Business Skills	80
7	Advanced Non-Structural Analysis and Damage Repair	30
8	Advanced Structural Analysis and Damage Repair	30
9	Advanced Painting and Refinishing	140
		280

- Scheduling and operating more than one course in the same classroom/laboratory with the same teacher is not allowed.
- Students must complete the first year with a score of 80/C or higher in classwork to advance to the next level.