

**OFFICE OF INSTRUCTIONAL ENHANCEMENT AND INTERNAL OPERATIONS**  
**Summary of State Board of Education Agenda Items**  
**May 20, 2011**

**OFFICE OF VOCATIONAL EDUCATION AND WORKFORCE DEVELOPMENT**

12. Approval to revise the *Mississippi Secondary Curriculum Frameworks in Vocational Education and Workforce Development: Welding, Teacher Academy, Metal Fabrication, Marketing, Industrial Maintenance, Heating Ventilation and Air Conditioning, Digital Media Technology, Culinary Arts, Collision Repair Technician, and Automotive Service Technician*  
(Has cleared Administrative Procedures Act process with no public comments)

**EXECUTIVE SUMMARY**

The following secondary curriculum frameworks are recommended for approval:

1. Welding
2. Teacher Academy
3. Metal Fabrication
4. Marketing
5. Industrial Maintenance
6. Heating Ventilation and Air Conditioning (HVAC)
7. Digital Media Technology
8. Culinary Arts
9. Collision Repair Technician
10. Automotive Service Technician

Each curriculum framework follows the established format established for secondary vocational and technical programs. Draft curricula for each program were revised and reviewed with input from local district personnel and business/industry collaborators. Approved secondary curricula will be disseminated for implementation in the Fall 2011.

The *Executive Summary-Secondary Curricula Frameworks* contains the following elements for each revised secondary curricula:

- ❖ Program Description
- ❖ CIP Code and CIP Name
- ❖ Course Outline and Codes
- ❖ Curriculum Framework
  - Student Competencies
  - Suggested Student Objectives

All curricula frameworks are designed to provide local programs with a foundation that can be used to develop localized instructional management plans and course syllabi. Contents of each framework are not designed to limit the

content of a course, but to provide a minimum baseline of instruction, which all programs must meet.

Teachers, administrators, and instructional management personnel are encouraged to expand and enhance the statewide frameworks to better meet the needs of their students.

Note: Copies of the secondary curriculum frameworks will be provided electronically upon request.

Recommendation: Approval

Back-up material attached

FRAMEWORKS FOR  
VOCATIONAL-TECHNICAL PROGRAMS  
REVISED IN  
2011

SECONDARY  
EXECUTIVE SUMMARY  
2011

**Direct inquiries to**

Director of Bureau of Vocational Instructional Development  
Office of Vocational Education and Workforce  
Development  
Mississippi Department of Education  
P.O. Box 771  
Jackson, MS 39205  
(601) 359-3940

Robin Parker  
Curriculum Coordinator  
Research and Curriculum Unit  
P.O. Drawer DX  
Mississippi State, MS 39762  
(662) 325-2510  
[robin.parker@rcu.msstate.edu](mailto:robin.parker@rcu.msstate.edu)

**Additional copies**

Research and Curriculum Unit for Workforce Development  
Vocational and Technical Education  
Attention: Reference Room and Media Center Coordinator  
P.O. Drawer DX  
Mississippi State, MS 39762  
<https://cia.rcu.msstate.edu/curriculum/download.asp>  
(662) 325-2510

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Office of Vocational Education and Workforce  
Development  
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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## Foreword

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 III, 1998; and No Child Left Behind Act of 2001).

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75-80 percent of the time in the course.
- Competencies and Suggested Objectives
  - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies.
  - The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.
- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.
- Integrated Academic Topics, Workplace Skills, Technology Standards, and Occupational Standards - This section identifies related academic topics as required in the Subject Area Assessment Program (SATP) in Algebra I, Biology I, English II, and U. S. History from 1877, which are integrated into the content of the unit. It also identifies the 21<sup>st</sup> Century Skills, which were developed by the Partnership for 21<sup>st</sup> Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills

learned in school and those needed in communities and the workplace. A portion of the 21<sup>st</sup> Century Skills addresses learning skills needed in the 21<sup>st</sup> century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills have been recognized for some time and the 21<sup>st</sup> Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21<sup>st</sup> century involves technology skills, and the International Society for Technology in Education, developers of the National Education Technology Standards (NETS), were strategic partners in the Partnership for 21<sup>st</sup> Century Skills.

- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

### Welding Technology Executive Summary

#### Program Description

Welding is an instructional program that prepares students for employment or continued education in the occupations of the welding field. The curriculum framework for this program was developed in partnership with the Mississippi Construction Education Foundation (MCEF). MCEF is the accredited sponsor for the National Center for Construction Education and Research (NCCER).

#### Industry Certification

The NCCER developed and published a set of industry standards that are taught nationwide by contractors, associations, construction users, and secondary and postsecondary schools called the **Contren Learning Series**. When developing this set of standards, the NCCER assembled a team of subject matter experts that represented construction companies and schools across the nation. Each committee met several times and combined experts' knowledge and experience to finalize the set of national industry standards.

As a part of the accreditation process, all Mississippi Construction Technology instructors will be required to successfully complete the **Instructor Certification Training Program**. This program ensures that instructors possess a deep knowledge of content of the standards.

This state-of-the-art curriculum is modeled after the eight Mississippi **NCCER Accredited Training and Education Facilities (ATEF)**. In order to become an NCCER ATEF program, school districts must meet a set of guidelines including the following:

1. Use the approved curriculum.
2. All instructors must be NCCER certified.
3. All completed Form 200s and release forms on all student completions are to be forwarded to MCEF for proper approval. MCEF will in turn forward to NCCER for processing.
4. Follow NCCER guidelines on test security and performance profiles.
5. Have an active advisory committee with at least two commercial contractors involved.
6. Follow safety practices and Occupational Safety and Health Administration (OSHA) standards used in the class and lab areas.
7. Involve commercial contractors in class presentations or field trips.
8. All construction programs must be included in the accreditation process.
9. Show active involvement in student leadership development (e.g., VICA and SkillsUSA).
10. Provide demonstrated placement into construction-related occupations, and provide timely reports to MCEF.

Districts will be required to complete a self-evaluation of all programs and host a site visit from industry to ensure proper lab, safety, and instructional procedures are in place.

## Articulation

The following articulation plans are in place for the Installation and Service Pathway:

High School Program	Community College Program	Community College Course
Welding Theory and Applications	Welding and Cutting Tech Industrial Maintenance Trades	WLV 1116 - Shielded Metal Arc Welding I (effective 2006) IMM 1734 - Maintenance Welding and Metals

## Assessment

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

## Student Prerequisites

In order for students to be successful in the Welding 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)
- or**
3. Instructor Approval and TABE Reading Score (eighth grade or higher)
- or**
4. Instructor Approval

## Proposed Applied Academic Credit

Applied Math content from the curriculum was aligned to the 2007 Mississippi Math Framework Revised Academic Benchmarks. It is proposed that upon the completion of this program, students will earn 1/2 Applied Math 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 (975) educator license is required to teach the Welding program. Requirements for the (975) endorsements are listed below:

1. Applicant must hold a 2-year college degree (associate's degree) or higher from an accredited institution of higher education.
2. Applicant with an associate's degree must have at least 2 years of verifiable occupational experience in the past 10 years. Experience must be appropriate to the subject to be taught. Applicant with a bachelor's or higher degree must have at least 1 year of verifiable occupational experience in the past 10 years. Experience must be appropriate to the subject to be taught.
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 earn a passing score on **Welding** assessment from National Craft Assessment and Certification Program.
6. Applicant must successfully complete the Contren Instructor Certification.
7. Applicant must successfully complete an MDE-approved computer literacy certification exam.
8. Applicant must successfully complete certification for an online learning workshop, module, or course that is approved by the MDE.
9. Applicant must successfully complete the **Welding** certification workshop, module, or course that is approved by the MDE.

Note: If the applicant meets all requirements listed above, that applicant will be issued a (975) endorsement—a 5-year license. If the applicant does not meet **all** requirements, the applicant will be issued a 3-year endorsement (license), and all requirements stated above must be satisfied prior to the ending date of that license.

### **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

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This curriculum framework allows options for local school districts to implement based on student needs and scheduling demands. This curriculum offers a four-Carnegie-unit program.

### Option 1

Upon completion of this option, the student will be trained to take the **NCCER Level 1 Core Certification and the Welding Level 1 Certification** exams. This curriculum consists of four one-credit courses, which should be completed in the following sequence:

Welding I ..... (Course Code: 993300)  
 Welding II ..... (Course Code: 993301)

**Course Description:** Welding I is a course in which students learn about welding technology including Math, Introduction to Blueprints, Hand and Power Tools, Orientation to the Trade, Introduction to Welding, and Shielding Metal Arc Welding. This is a two-Carnegie-unit course.

- Scheduling and operating more than one course in the same classroom/laboratory with the same instructor is not allowed.
- Safety will be reinforced and tested at the beginning of each course.

**Course Description:** Welding II is a continuation of Welding I with the emphasis on Gas Metal Arc Welding, Flux Core Arc Welding, Gas Tungsten Arc Welding, and applications of production welding processes. The course should be taken after the student has successfully passed Welding I. This is a two-Carnegie-unit course.

- Scheduling and operating more than one course in the same classroom/laboratory with the same instructor is not allowed.
- Safety will be reinforced and tested at the beginning of each course.
- Students must complete welding courses with a score of 80/C or higher in class work to advance to the next level.

### Welding I (Course Code: 993300)

Unit	Title	Hours
1	Orientation, Leadership, and Safety	15
2	Welding Math	15
3	Introduction to Blueprints, Hand and Power Tools, and Basic Rigging	50
4	Base Metal Preparation and Weld Quality, Oxy-fuel Cutting, Plasma Arc Cutting, and Carbon Arc Cutting	65
5	Shielded Metal Arc Welding (SMAW)	135
		280

**Welding II (Course Code: 993301)**

Unit	Title	Hours
6	Orientation and Safety (Review and Reinforcement of Unit 1)	10
7	Gas Metal Arc Welding (GMAW), Flux Core Arc Welding (FCAW), and Gas Tungsten Arc Welding (GTAW)	270
		280

**Welding III – COOP Option (Course Code: 993305)**

Unit	Title	Hours
6	Orientation and Safety (Review and Reinforcement of Unit 1)	10
8	Production Welding Processes	270
	COOP	???
		280

**Option 2**

Upon completion of this option, the student will be trained to take the **NCCER Level 1 Core Certification and the Welding Level 1 Certification** exams. This curriculum consists of four one-credit courses, which should be completed in the following sequence:

- Orientation and Cutting ..... (Course Code: 993302)
- Shielded Metal Arc Welding (SMAW) ..... (Course Code: 993303)
- Gas Metal, Flux Core, and Gas Tungsten Welding (GMAW, FCAW, and GTAW) (Course Code: 993304)
- Production Welding Processes ..... (Course Code: 993305)

**Course Description:** Orientation and Cutting (Course Code: 993302) includes an introduction to the field as well as Fundamentals of Safety, Math, Blueprint Reading, Hand and Power Tools, and Oxy-fuel and Plasma Cutting Devices. This is a one-Carnegie-unit course.

**Course Description:** Shielded Metal Arc Welding (Course Code: 993303) emphasizes an overview of safety and shielded metal arc welding processes and equipment. This course gives students real-world, hands-on practice in these areas. This one-Carnegie-unit course should only be taken after students successfully pass Orientation and Cutting.

**Course Description:** Gas Metal, Flux Core, and Gas Tungsten Welding (Course Code: 993304) includes an in-depth study of the gas metal arc welding, flux core arc welding, and gas tungsten arc welding processes and equipment. This one-Carnegie-unit course should only be taken after students successfully pass Orientation and Cutting.

**Course Description:** Production Welding Processes (Course Code: 993305) includes an overview of Resistance Welding, Robotic Welding, Frictional Stir Welding, and Induction Welding. This one-Carnegie-unit course should only be taken after students successfully pass Orientation and Cutting and Gas Metal, Flux Core, and Gas Tungsten Welding.

- ☒ Safety will be reinforced and tested at the beginning of each course.
- ☒ Students must complete previous welding courses with a score of 80/C or higher in class work to advance to the next level.

**Orientation and Cutting (Course Code: 993302)**

Unit	Title	Hours
1	Orientation, Leadership, and Safety	10
2	Welding Math	15
3	Introduction to Blueprints, Hand and Power Tools, and Basic Rigging	50
4	Base Metal Preparation and Weld Quality, Oxy-fuel Cutting, Plasma Arc Cutting, and Carbon Arc Cutting	65
		140

**Shielded Metal Arc Welding [SMAW] (Course Code: 993303)**

Unit	Title	Hours
6	Orientation and Safety (Review and Reinforcement of Unit 1)	5
5	Shielded Metal Arc Welding (SMAW)	135
		140

**Gas Metal, Flux Core, and Gas Tungsten Welding [GMAW, FCAW, and GTAW] (Course Code: 993304)**

Unit	Title	Hours
6	Orientation and Safety (Review and Reinforcement of Unit 1)	5
7	Gas Metal Arc Welding (GMAW), Flux Core Arc Welding (FCAW), and Gas Tungsten Arc Welding (GTAW)	135
		140

**Production Welding Processes (Course Code: 993305)**

Unit	Title	Hours
6	Orientation and Safety (Review and Reinforcement of Unit 1)	5
8	Production Welding Processes	135
		140

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Development  
Mississippi Department of Education  
P.O. Box 771  
Jackson, MS 39205  
(601) 359-3940

Robin Parker  
Curriculum Coordinator  
Research and Curriculum Unit  
P.O. Drawer DX  
Mississippi State, MS 39762  
(662) 325-2510  
[robin.parker@rcu.msstate.edu](mailto:robin.parker@rcu.msstate.edu)

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learned in school and those needed in communities and the workplace. A portion of the 21<sup>st</sup> Century Skills addresses learning skills needed in the 21<sup>st</sup> century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills have been recognized for some time and the 21<sup>st</sup> Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21<sup>st</sup> century involves technology skills, and the International Society for Technology in Education, developers of the National Education Technology Standards (NETS), were strategic partners in the Partnership for 21<sup>st</sup> Century Skills.

- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

# Teacher Academy

## Teacher Academy Executive Summary

### Program Description

Teacher Academy is a pathway for students in the Human Science, Art, and Humanities career cluster. The Teacher Academy program is a high school course designed to attract students to the field of education, to provide information and field experiences relevant to pursuing a degree in education, and to prepare students for the rigors of a career in education so they will remain long-term educators. The Teacher Academy pathway includes classroom and hands-on experiences that will prepare students for employment or continuing education in the education field.

The Teacher Academy is a pathway course that will do the following:

1. Recruit and hook high-quality high school students for the teaching profession
2. Give qualified high school students an opportunity to begin successful career paths to teaching
3. Offer the opportunity to recruit and train high-quality students who may return to the district as tomorrow's high-quality teachers. This is a "grow your own" solution to the current and looming shortage in the teaching profession.
4. Provide a framework for building solid partners with area institutions of higher education and offer exciting challenges and opportunities for the district's students

### Industry Certification

This curriculum was written to incorporate the National Council for Accreditation of Teacher Education (**NCATE preprofessional**) learning standards. The Teacher Academy curriculum includes three major units: Teachers as Professionals; Principles of Teaching, Learning, and Assessment; and The Learning Environment.

### Assessment

Students will be assessed using Teacher Academy MS-CPAS2 test. The MS-CPAS2 blueprint can be found at <http://redesign.rcu.msstate.edu/curriculum/>. If there are questions regarding assessment of this program, please contact the Human Sciences, Arts, and Humanities Instructional Design Specialists at the Research and Curriculum Unit at 662-325-2510.

### Suggested Student Prerequisites

1. Proficient or advanced on MCT
2. 92% attendance rate
3. Minimum GPA 2.5
4. C or higher in English from the previous year
5. Application (Including short essay)

6. Interview process
7. Discipline (No more than three referrals from the previous year; severity of infractions to be determined according to the Mississippi Discipline Codes)
8. Instructor approval

#### **Retention in Program (Semester/Annual Review)**

1. C average or better
2. Attendance review (maintain 92% ADA)
3. Grade review
4. Discipline review
5. Work ethic review
6. Teacher interview/conference

#### **Proposed Applied Academic Credit**

The academic credit is still pending for this curriculum.

#### **Licensure Requirements**

The 971 licensure endorsement is needed to teach the Teacher Academy pathway. The requirements for the 971 licensure endorsement are listed below:

1. Applicants must hold a 4-year college degree (bachelor's degree) from an accredited institution of higher education with a currently valid 5-year standard (or higher) teaching license.
2. Applicant must enroll immediately in the Vocational Instructor Preparation (VIP) or the Redesign Education Program (REP).
3. 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.
4. Applicants must have successfully completed or be in the process of completing the National Board Teacher Certification process or have a terminal degree in the field of education.
5. Applicants must successfully complete an MDE-approved computer literacy certification exam.
6. Applicants must successfully complete certification for an online learning workshop, module, or course that is approved by the MDE.
7. Applicants must successfully complete the Teacher Academy certification workshop, module, or course that is approved by the MDE.

#### **Admission to Teacher Education Requirements**

Contact hours required for admission to teacher education can be met by completing Teacher Academy (four Carnegie units) including documentation of 100 hours of field experience required.

## **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, you will need to contact the Research and Curriculum Unit at 662-325-2510 and ask for the Professional Learning Specialist.

## Course Outlines

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This curriculum framework allows options for local school districts to meet student needs and scheduling demands. Option one groups units into four one-Carnegie-unit courses. The second option groups units into two two-Carnegie-unit courses. Further discussion of each option is presented below.

### Option 1

This option groups units into four one-Carnegie-unit courses that should be completed in the following sequence:

1. Foundations of an Educator (Course Code: 996302)
2. Practices of an Educator (Course Code: 996303)
3. Exploring Diversities and Communication (Course Code: 996304)
4. Progressive Practices of Teacher Academy (Course Code: 996305)

**Course Description:** Foundations of an Educator provides students with the opportunity to gain foundational skills needed to enhance them as learners, future educators, and communicators. Students receive history, theory, and professionalism needed to understand the educational system. Students should have the opportunity to observe skills learned in class at various educational settings (one Carnegie unit).

**Course Description:** Practices of an Educator provides students with the opportunity to gain knowledge and practice needed to enhance themselves as future educators. Students receive practice in communication skills, planning, teaching, and assessment strategies needed to understand the educational system. Students should have the opportunity to observe and/or practice skills learned in class at various educational settings using school-to-career skills obtained in class (one Carnegie unit).

**Course Description:** Exploring Diversities and Communication provides students with the opportunity to gain knowledge and understand advanced information that must be instilled in educators. Students receive information pertaining to advanced communication skills, diverse learners, and various subject areas needed to work in the educational system. Students should have the opportunity to observe and/or practice skills learned in class at various educational settings using school-to-career skills obtained in class (one Carnegie unit). Before students can enroll in the Exploring Diversities and Communication course, they must meet the following requirements:

1. Score 80% or higher on the MC-CPAS2 summative assessment
2. Attendance rate of 92% or better in the Foundations of an Educator (Course Code: 996302) and the Practices of an Educator (Course Code: 996303)
3. Successfully complete a grade, discipline, and work ethic review by the teacher

4. Present an updated portfolio during the review by teacher session

**Course Description:** Progressive Practices of Teacher Academy provides students with the opportunity to gain knowledge and understand progressive practices that must be instilled in educators. Students receive information pertaining to advanced planning instruction, teaching strategies, assessment, and professional learning needed to work in the educational system. Students should have the opportunity to observe and/or practice skills learned in class at various educational settings (one Carnegie unit).

**Foundations of an Educator (One Carnegie Unit)**

**Course Code: 996302**

Unit	Title	Hours
1	Orientation and Safety	15
2	History and Trends in American Education	25
3	Human Growth and Development	30
4	Communication Skills I	30
5	Learning Environment	30
13	Observation Experience	10
		<b>140</b>

**Practices of an Educator (One Carnegie Unit)**

**Course Code: 996303**

Unit	Title	Hours
6	The Effective Teacher	40
7	Planning Instruction I	40
8	Assessing, Teaching, and Learning I	40
13	Field Experience/Observation	20
		<b>140</b>

**Exploring Diversities and Communication (One Carnegie Unit)**

**Course Code: 996304**

Unit	Title	Hours
9	Orientation and Safety	15
10	Communication Skills II	20
11	Appreciating Diverse Learners	40
12	Subject Area Knowledge	30
13	Field Experience/Observation	30
		<b>135</b>

**Progressive Practices of Teacher Academy (One Carnegie Unit)**

**Course Code: 996305**

Unit	Title	Hours
14	Planning Instruction II	30
16	Assessing, Teaching and Learning II	30
17	Professional Learning	30
13	Field Experience/Observation	40
		<b>130</b>

**Option 2**

This option groups units into two-Carnegie-unit courses that should be completed in the following sequence.

1. Teacher Academy I (Course Code: 996300)
2. Teacher Academy II (Course Code: 996301)

**Course Description:** Teacher Academy I is an entry-level course. Students in Education I gain foundation competencies related to students as learners, planning and assessing teaching, teaching strategies, and communication skills. Students receive hands-on field experiences (two Carnegie units).

**Course Description:** Teacher Academy II provides students with the opportunity to gain advanced skills needed to enhance them as learners, teachers, and communicators. Students receive advanced hands-on field experiences (two Carnegie units).

**Teacher Academy I (Two Carnegie Units)**

**Course Code: 996300**

Unit	Title	Hours
1	Orientation and Safety	15
2	History and Trends in American Education	25
3	Human Growth and Development	30
4	Communication Skills I	30
5	Learning Environment	30
6	The Effective Teacher	40
7	Planning Instruction I	40
8	Assessing Teaching and Learning I	40
13	Field Experience/Observation	30
		<b>280</b>

**Teacher Academy II (Two Carnegie Units)**

**Course Code: 996301**

Unit	Title	Hours
9	Orientation and Safety	15
10	Communication Skills II	20
11	Appreciating Diverse Learners	40
12	Subject Area Knowledge	30
13	Field Experience/Observation	70
14	Planning Instruction II	30

15		Assessing Teaching and Learning II	30
17		Professional Learning	30
			<b>265</b>

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Office of Vocational Education and Workforce  
Development  
Mississippi Department of Education  
P.O. Box 771  
Jackson, MS 39205  
(601) 359-3940

Robin Parker  
Curriculum Coordinator  
Research and Curriculum Unit  
P.O. Drawer DX  
Mississippi State, MS 39762  
(662) 325-2510  
[robin.parker@rcu.msstate.edu](mailto:robin.parker@rcu.msstate.edu)

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## Foreword

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 III, 1998; and No Child Left Behind Act of 2001).

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75-80 percent of the time in the course.
- Competencies and Suggested Objectives
  - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies.
  - The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.
- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.
- Integrated Academic Topics, Workplace Skills, Technology Standards, and Occupational Standards - This section identifies related academic topics as required in the Subject Area Assessment Program (SATP) in Algebra I, Biology I, English II, and U. S. History from 1877, which are integrated into the content of the unit. It also identifies the 21<sup>st</sup> Century Skills, which were developed by the Partnership for 21<sup>st</sup> Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills

learned in school and those needed in communities and the workplace. A portion of the 21<sup>st</sup> Century Skills addresses learning skills needed in the 21<sup>st</sup> century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills have been recognized for some time and the 21<sup>st</sup> Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21<sup>st</sup> century involves technology skills, and the International Society for Technology in Education, developers of the National Education Technology Standards (NETS), were strategic partners in the Partnership for 21<sup>st</sup> Century Skills.

- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

### **Metal Fabrication Executive Summary**

#### **Program Description**

The Metal Fabrication pathway is designed as a secondary program for preparation to enter the field of metalworking. The Metal Fabrication program includes an introduction to the basic machining metalworking processes as well as an introduction to the basic welding profession. The purpose of the course is to prepare students to continue study in a postsecondary metals program (Welding or Machine Tool Operation) or to begin work at the entry level in a metal occupation. The machining courses in this curriculum is written to the National Institute for Metalworking Skills (NIMS) credentialing standards and the welding courses are written to the National Center for Construction Education and Research (NCCER) certification standards.

#### **Industry Certification**

The NIMS is a nationally recognized nonprofit organization that was established in 1995 to help develop industry standards to maintain the United States' global competitiveness. NIMS sets industry standards and certifies individuals who meet the quality requirements contained in the industry standards. NIMS also accredit training programs and facilities that meet NIMS quality requirements. The NIMS organization and standards are accredited by the American National Standards Institute (ANSI) in the metalworking field.

NIMS metalworking standards reflect expertise in areas such as stamping, press brake, roll forming, machining, tool and die making, mold making, screw machining, and machine maintenance and repair. All NIMS standards are industry written and industry validated and is subject to regular, periodic reviews under the procedures accredited and audited by ANSI.

The NIMS Level 1 credential consists of bench work, layout, milling, drill press, surface grinding, and lathing between centers. The students are required to perform a NIMS-approved project in each area in order to attain credentialing in those areas. The student must be able to complete the NIMS project with 100% accuracy before being allowed to take an additional online written test. Once both the performance evaluation and the online test are administered and passed, the student will receive a NIMS certification for each area successfully completed, i.e. bench work, layout, milling, drill press, surface grinding, and lathing between centers. The NIMS organization awards credentials for each area of competency in the Level 1 module after successful completion of projects and written tests.

NIMS credentials are used throughout the United States by industry to recruit, hire, place, and promote individual workers. NIMS may also be used to measure performance of individuals pursuing metalworking careers. Articulation may be established using the NIMS credentials for articulation among training programs.

Students who study basic machine metalworking processes may pursue, at their cost, a certification with the National Institute for Metalworking Skills, Inc. (NIMS). Students who study this curriculum may pursue certification of the NIMS Level 1 standards for machining.

Attaining this certification is an option for the student; therefore, the student is responsible for the financial costs attributed with achievement of the certification.

This curriculum has also been aligned to modules in the Contren program as endorsed by the National Center for Construction Education and Research (NCCER). Students who study this curriculum using the CONTREN materials under the supervision of an instructor who has been certified by the NCCER are eligible to be tested on each module in the welding area. Students who successfully pass these tests may be certified to the NCCER by the instructor and will receive documentation from NCCER. The Manufacturing welding curriculum framework is aligned to the NCCER Core and Welding.

### Articulation

This program was designed to articulate to postsecondary Automotive Machinist Tech and postsecondary Machine Tool Operations.

High School Program	Community College Program	Community College Course
Metal Fabrication	Automotive Machinist Tech	MST 1114—Power Machinery I
	Machine Tool Operations	AUV 1116—Fundamentals for Automotive Machinists

### Assessment

Students will be assessed using the Metal Fabrication MS-CPAS2 test. The MS-CPAS2 blueprint can be found at <http://redesign.rcu.msstate.edu/curriculum/>. If there are questions regarding assessment of this program, please contact the Manufacturing Cluster Instructional Design Specialists at the Research and Curriculum Unit at 662.325.2510.

### Student Prerequisites

In order for students to be successful in the Metal Fabrication program, the following student prerequisites are in place:

1. C or Higher in English (the previous year)
2. C or Higher in Math
3. Instructor Approval and TABE Reading Score (eighth grade or higher)

OR

4. Instructor Approval

### Proposed Applied Academic Credit

The mathematics content in the Metal Fabrication program is meaningful and useful to students who are entering the manufacturing industry. Applied mathematics content was aligned to the 2007 Mississippi Mathematics Framework Revised Academic Benchmarks. It is proposed that upon the completion of this program, students will earn 1/2 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**

The 976 licensure endorsement is needed to teach the Metal Fabrication program. The requirements for the 976 licensure endorsement are listed below:

1. Applicant must hold a 2-year college degree (associate's degree) or higher from an accredited institution of higher education\*.
2. Applicant with an associate's degree must have at least 2 years of verifiable occupational experience in the past 10 years. Experience must be appropriate to the subject to be taught.  
Applicant with a bachelor's or higher degree must have at least 1 year of verifiable occupational experience in the past 10 years. Experience must be appropriate to the subject to be taught.
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 successfully complete the Certificate of Special Merit from the National Institution for Metalworking Skills (NIMS).
6. Applicant must successfully complete the Contren Instructor Certification Training Program (ICTP).
7. Applicant must successfully complete an MDE-approved computer literacy certification exam.
8. Applicant must successfully complete certification for an online learning workshop, module, or course that is approved by the MDE.
9. Applicant must successfully complete the manufacturing certification workshop, module, or course that is approved by the MDE.

Note: If the applicant meets all requirements listed above, that applicant will be issued a **976** endorsement—a 5-year license. If the applicant does not meet all requirements, the applicant will be issued a 3-year endorsement (license), and all requirements stated above must be satisfied prior to the ending date of that license.

\*Exception: Teachers with a currently valid license and endorsement #359 Machine Shop or #361 Metal Trades may earn this endorsement based on that #359 or #361 endorsement even if a 2-year college degree is not earned. All other requirements for this endorsement must be satisfied.

## **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, you will need to contact the Research and Curriculum Unit at 662.325.2510 and ask for the Professional Learning Specialist.

## Course Outlines

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This curriculum framework allows options for local school districts to meet students' needs and scheduling demands. A discussion of each option is listed in the following material.

### *Option 1*

This curriculum consists of two two-Carnegie-unit courses.

**Course Description:** Metal Fabrication I content includes orientation and leadership; basic safety; math, measuring tools, and instruments; blueprints; hand and power tools; lathe theory and operation; milling machine theory and operation; and grinding operations. Safety is emphasized in each unit and every activity.

**Course Description:** Metal Fabrication II included advanced precision machining techniques and an emphasis on welding processes. Welding topics include employability skills, safety, basic oxy-fuel cutting, plasma arc cutting (PAC), gas metal arc welding (GMAW), flux core arc welding (FCAW), gas tungsten arc welding (GTAW), and shielded metal arc welding (SMAW). The course should be taken after the student has successfully passed Metal Fabrication I.

- Scheduling and operating more than one course in the same classroom/laboratory with the same teacher is not allowed.
- Safety will be reinforced and tested at the beginning of each course.
- Students must complete Metal Fabrication courses with a score of 80/C or higher in class work to advance to the next level.

### **Option 1**

#### **Metal Fabrication I (Course Code: 993200)**

Unit	Title	Hours
1	Orientation, Leadership, and Basic Safety	25
2	Math, Measuring Tools, and Instruments	20
3	Introduction to Blueprints and Hand and Power Tools	25
4	Drill Press and Band Saw Theory and Operation	20
5	Milling Machine Theory and Operation	30
6	Lathe Theory and Operation	75
7	Grinding Theory and Operation	25
		<b>220</b>

## Metal Fabrication II (Course Code: 993201)

Unit	Title	Hours
8	Orientation, Advanced Leadership, and Employability Skills	10
9	Basic Safety (Review and Reinforcement)	10
10	Advanced Lathe Operation	55
11	Advanced Milling Operation	35
12	Computerized Numerical Control	10
13	Basic Oxy-fuel Cutting and Plasma Arc Cutting (PAC)	15
14	Shielded Metal Arc Welding (SMAW)	45
15	Gas Metal Arc Welding (GMAW) and Flux Core Arc Welding (FCAW)	25
16	Introduction to Gas Tungsten Arc Welding (GTAW)	15
		<b>220</b>

### *Option 2*

Upon completion of this option, the student will be trained to take the **NIMS Level 1 Certification and Contren Welding Module certification** exams. This curriculum consists of four one-credit courses, which should be completed in the following sequence:

1. Metal Fabrication I (Course Code: 993202)
2. Metal Fabrication II (Course Code: 993203)
3. Metal Fabrication III (Course Code: 993204)
4. Metal Fabrication IV (Course Code: 993205)

**Course Description:** Metal Fabrication I (Course Code: 993202) includes an introduction to the field as well as fundamentals of safety, tools, math, blueprint reading, and milling machinery. This is a one-Carnegie-unit course.

**Course Description:** Metal Fabrication II (Course Code: 993203) emphasizes an overview of safety and leadership, the lathe theory, and grinding operations. This course gives student's real-world, hands-on practice in these areas. This one-Carnegie-unit course should only be taken after students successfully pass Metal Fabrication I.

**Course Description:** Metal Fabrication III (Course Code: 993204) includes an study of precision machining techniques. This course also reinforces safety related to the construction industry. This one-Carnegie-unit course should only be taken after students successfully pass Metal Fabrication II.

**Course Description:** Metal Fabrication IV (Course Code: 993205) includes an study of basic oxy-fuel cutting, plasma arc cutting, gas metal arc, flux core arc, and introduction to gas tungsten arc and shielded metal arc welding. This course also reinforces safety related to the construction industry. This one-Carnegie-unit course should only be taken after students successfully pass Metal Fabrication III.

**Option 2**

**Metal Fabrication I (Course Code: 993202)**

Unit	Title	Hours
1	Orientation, Leadership, and Basic Safety	15
2	Math, Measuring Tools, and Instruments	20
3	Introduction to Blueprints and Hand and Power Tools	25
4	Drill Press and Band Saw Theory and Operation	20
5	Milling Machine Theory and Operation	30
		<b>110</b>

**Metal Fabrication II (Course Code: 993203)**

Unit	Title	Hours
8	Orientation, Advanced Leadership, and Employability Skills	5
9	Basic Safety (Review and Reinforcement)	5
4	Lathe Theory and Operation	75
6	Grinding Theory and Operation	25
		<b>110</b>

**Metal Fabrication III (Course Code: 993204)**

Unit	Title	Hours
7	Orientation, Advanced Leadership, and Employability Skills	5
8	Basic Safety (Review and Reinforcement)	5
10	Advanced Lathe Operation	55

11	Advanced Milling Operation	35
12	Computerized Numerical Control	10
		<b>110</b>

**Metal Fabrication IV (Course Code: 993205)**

Unit	Title	Hours
7	Orientation, Advanced Leadership, and Employability Skills	5
8	Basic Safety (Review and Reinforcement)	5
13	Basic Oxy-fuel Cutting and Plasma Arc Cutting (PAC)	15
14	Shielded Metal Arc Welding (SMAW)	45
15	Gas Metal Arc Welding (GMAW) and Flux Core Arc Welding (FCAW)	25
16	Introduction to Gas Tungsten Arc Welding (GTAW)	15
		<b>110</b>

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Curriculum Coordinator  
Research and Curriculum Unit  
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Mississippi State, MS 39762  
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- Unit Number and Title
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learned in school and those needed in communities and the workplace. A portion of the 21<sup>st</sup> Century Skills addresses learning skills needed in the 21<sup>st</sup> century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills have been recognized for some time and the 21<sup>st</sup> Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21<sup>st</sup> century involves technology skills, and the International Society for Technology in Education, developers of the National Education Technology Standards (NETS), were strategic partners in the Partnership for 21<sup>st</sup> Century Skills.

- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

### Marketing and Economics Executive Summary

#### Program Description

Business Marketing and Economics programs provide instruction in basic business and marketing skills. Courses in the program provide a foundation of skills and knowledge related to basic principles of marketing, related economic fundamentals, management, merchandising, communications and career development, personal and business finance, human relations, ethics, and business etiquette. Instruction is also provided on specialized topics related to fashion, international marketing, e-commerce, entrepreneurship, financial marketing/stock market, as well as sports, special events and entertainment marketing.

#### Industry Certifications

This document was developed according to national standards for marketing education, as prepared by the National Marketing Education Resource Center, 2000; the National Educational Technology Standards for Students (NETS), 2000–02, developed by the International Society for Technology in Education (ISTE); and the SCANS Competencies published by the U.S. Department of Labor, 1992.

#### Articulation

An articulation agreement is currently under development. As soon as the agreement is finalized, this document will be updated to reflect the proposed agreement.

#### Assessment

Students will be assessed using the Secondary Marketing and Economics CPAS2 test. This exam will be administered to students after the completion of the fourth Carnegie unit.

#### Student Pre-requisites

In order for students to be able to experience success in the Secondary Marketing and Economics program, the following student prerequisites are in place:

1. C or higher in English (the previous year)
2. C or higher in Pre-Algebra
3. Instructor approval

or

1. TABE Reading Score (Eighth grade or higher)

or

1. Instructor approval

## **Applied Academic Credit**

Personal Finance content from the curriculum was aligned to the 2004 Mississippi Personal Finance Framework Revised Academic Benchmarks. Upon the completion of this program, students will earn 1/2 Personal Finance credit that can be used for graduation requirements. The curriculum framework includes economics content aligned to the 2004 Mississippi Economics Framework Revised Academic Benchmarks. Upon completion of this program, students will earn 1/2 Economics credit to meet graduation requirements.

## **Licensure Requirements**

The 956 licensure endorsement is needed to teach the Marketing and Economics program. The requirements for the 956 licensure endorsement are listed below:

1. New teachers hired after June 30, 2008, must have a BS or BA degree in an appropriate field.
2. Hold one of the following endorsements:
  - a. 105 Business Education (7–12)
  - b. 318 Marketing (7–12)
  - c. 192 Social Studies (7–12)
  - d. 193 Economics (7–12)
3. Applicants must successfully complete the Master Teacher of Economics certification.
4. Applicants must successfully complete an approved computer literacy certification exam.
5. Applicants must successfully complete a certification for an online learning workshop, module, or course that is approved by the Mississippi Department of Education.
6. Applicants must successfully complete a 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

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### Options for Delivery

This curriculum framework provides multiple options for local school districts to implement based on the local needs of industry and students.

#### Option 1

- The Marketing and Economics program is presented in two courses: Marketing and Economics I, which is taken during the first year of the program, and Marketing and Economics II, which is taken during the second year. Marketing and Economics I includes training in basic business skills and provides a foundation for in-depth applications in the Marketing and Economics II course.

#### Business and Marketing Fundamentals (2 Carnegie Units)

Course Code: 992300

Unit	Title	Hours
1	Introduction to Business	10
2	Communication and Interpersonal Skills	20
3	Professional Development	15
4	Economics	70
5	Business, Management, and Entrepreneurship	55
6	Business Law	30
7	Personal Finance	30
	<b>Total</b>	<b>230</b>

#### Marketing and Economics (2 Carnegie Units)

Course Code: 992400

Unit	Title	Hours
8	Introduction to Marketing	25
9	Pricing	20
10	Promotion	35
11	Selling	35
12	Product/Service Management	20
13	Distribution	20
14	Marketing Planning	20
15	International Marketing	20
16	Fashion Marketing	20
17	Sports, Special Events, and Entertainment Marketing	20
	<b>Total</b>	<b>235</b>

## Option 2

- This option consists of four courses that should be completed in the following sequence:
- Introduction to Marketing includes basic business skills including introduction to business, communication and interpersonal skills, professional development, and economics. Business Management, Law, and Operations provides opportunities for students to apply management and entrepreneurship skills. Marketing Essentials encompasses introductory marketing concepts. Sales and Distribution provides advanced marketing skills.

### **Business and Marketing Fundamentals, Part A (1 Carnegie Unit)**

**Course Code: 992301**

Unit	Title	Hours
1	Introduction to Business	10
2	Communication and Interpersonal Skills	20
3	Professional Development	15
4	Economics	70
	<b>Total</b>	<b>115</b>

### **Business and Marketing Fundamentals, Part B (1 Carnegie Unit)**

**Course Code: 992302**

Unit	Title	Hours
5	Business, Management, and Entrepreneurship	55
6	Business Law	30
7	Personal Finance	30
	<b>Total</b>	<b>115</b>

### **Marketing Essentials (1 Carnegie Unit)**

**Course Code: 992401**

Unit	Title	Hours
8	Introduction to Marketing	25
9	Pricing	20
10	Promotion	35
11	Selling	35
	<b>Total</b>	<b>115</b>

**Sales and Distribution (1 Carnegie Unit)**

**Course Code: 992402**

Unit	Title	Hours
12	Product Service Management	20
13	Distribution	20
14	Marketing Planning	20
15	International Marketing	20
16	Fashion Marketing	20
17	Sports, Special Events, and Entertainment Marketing	20
	<b>Total</b>	<b>120</b>

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

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## Foreword

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 III, 1998; and No Child Left Behind Act of 2001).

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75-80 percent of the time in the course.
- Competencies and Suggested Objectives
  - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies.
  - The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.
- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.
- Integrated Academic Topics, Workplace Skills, Technology Standards, and Occupational Standards - This section identifies related academic topics as required in the Subject Area Assessment Program (SATP) in Algebra I, Biology I, English II, and U. S. History from 1877, which are integrated into the content of the unit. It also identifies the 21<sup>st</sup> Century Skills, which were developed by the Partnership for 21<sup>st</sup> Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills

learned in school and those needed in communities and the workplace. A portion of the 21<sup>st</sup> Century Skills addresses learning skills needed in the 21<sup>st</sup> century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills have been recognized for some time and the 21<sup>st</sup> Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21<sup>st</sup> century involves technology skills, and the International Society for Technology in Education, developers of the National Education Technology Standards (NETS), were strategic partners in the Partnership for 21<sup>st</sup> Century Skills.

- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

### Installation and Service: Industrial Maintenance Executive Summary

#### Program Description

Industrial Maintenance Trades is an instructional program that prepares individuals to repair and maintain industrial machinery, equipment, and buildings. It includes instruction in blueprint reading, metal repair, electricity, oxyfuel cutting, preventive maintenance, plumbing, rigging, hoisting, pumps, gear boxes, fasteners, and anchors.

Certification by the National Center for Construction Education and Research (NCCER):

This curriculum has been aligned to modules in the Contren Learning Series as endorsed by the National Center for Construction Education and Research (NCCER). Students who study this curriculum using the Contren Learning Series materials under the supervision of an instructor who has been certified by the NCCER are eligible to be tested on each module. Students who successfully pass these tests may be certified to the NCCER by the instructor and will receive documentation from NCCER.

## Course Outlines

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This curriculum framework allows options for local school districts to implement based on student needs and scheduling demands. This curriculum offers a four-Carnegie-unit program.

### Option 1

Upon completion of this option, the student will be trained to take the **NCCER Level 1 Certification and Industrial Maintenance Level 1 certification** exams. This curriculum consists of four one-credit courses, which should be completed in the following sequence:

- Installation and Service, Part A (Course Code: 993002)
- Installation and Service, Part B (Course Code: 993003)
- Installation and Service II—Industrial Maintenance, Part A (Course Code: 993012)
- Installation and Service II—Industrial Maintenance, Part B (Course Code: 993013)

**Course Description:** Installation and Service, Part A (Course Code: 993002) includes an introduction to the field as well as fundamentals of safety, math, blueprint reading, hand and power tools. This is a one-Carnegie-unit course.

**Course Description:** Installation and Service, Part B (Course Code: 993003) emphasizes an overview of safety and leadership, Introduction to HVAC. This course gives student's real-world, hands-on practice in these areas. This one-Carnegie-unit course should only be taken after students successfully pass Installation and Service, Part A.

**Course Description:** Installation and Service II—Industrial Maintenance, Part A (Course Code: 993012) includes an in-depth study of the industrial maintenance profession, maintenance tools, types of fasteners and anchors used in the maintenance field, gaskets and packing, pumps and pump drivers, types of valves, machine lubrication, and welding. This course also reinforces safety related to the industrial maintenance industry. This one-Carnegie-unit course should only be taken after students successfully pass Installation and Service, Part B.

**Course Description:** Installation and Service II—Industrial Maintenance, Part B (Course Code: 993013) includes an in-depth study of test equipment, material handling and rigging, and mobile and support equipment, National Electrical Code, electrical theory, conductor terminations and splices, and hydraulic and pneumatic controls. This course also reinforces safety related to the industrial maintenance industry. This one-Carnegie-unit course should only be taken after students successfully pass Installation and Service II—Industrial Maintenance, Part A.

- ☐ Safety will be reinforced and tested at the beginning of each course.
- ☐ Students must complete installation and service courses with a score of 80/C or higher in class work to advance to the next level.

**Installation and Service, Part A (Course Code: 993002)**

Unit	Title	Hours
1	Orientation and Safety	50
2	Math, Introduction to Blueprints, and Hand and Power Tools	90
		<b>140</b>

**Installation and Service, Part B (Course Code: 993003)**

Unit	Title	Hours
3	Orientation to the Trade, Tools of the Trade, Fasteners and Anchors, and Oxy-Fuel Cutting (IM)	70
4	Introduction to HVAC, Tools of the Trade (HVAC), Copper and Plastic Piping, Soldering and Brazing, and Basic Electricity (IM)	70
		<b>140</b>

**Installation and Service II—Industrial Maintenance, Part A (Course Code: 993012)**

Unit	Title	Hours
5	Orientation and Safety (Review and Reinforcement)	25
6	Gaskets and Packing, Pumps and Drivers, Introduction to Valves, Lubrication, and Welding	115
		<b>140</b>

**Installation and Service II—Industrial Maintenance, Part B (Course Code: 993013)**

Unit	Title	Hours
7	Related Construction Math, Construction Drawings, Introduction to Test Equipment, Material Handling and Rigging, and Mobile and Support Equipment	70
8	Introduction to the National Electrical Code, Electrical Theory, Conductor Terminations and Splices, and Hydraulic and Pneumatic Controls	70
		<b>140</b>

## Option 2

**Course Description:** Installation and Service I includes orientation and leadership; basic safety; math, measuring tools, and instruments; blueprints; hand and power tools; introduction to industrial maintenance; and heating, ventilation, and air-conditioning. Safety is emphasized in each unit and every activity.

**Course Description:** Installation and Service II—Industrial Maintenance is a continuation with the emphasis on industrial maintenance. Topics include employability skills, safety, gaskets, packing, pumps, drivers, valves, lubrication, test equipment, material handling, national electrical code, conductor termination, hydraulics, and pneumatics. The course should be taken after the student has successfully passed Installation and Service I.

- ☒ Scheduling and operating more than one course in the same classroom/laboratory with the same teacher is not allowed.
- ☒ Safety will be reinforced and tested at the beginning of each course.
- ☒ Students must complete installation and service courses with a score of 80/C or higher in class work to advance to the next level.

### Installation and Service I (Course Code: 993001)

Unit	Title	Hours
1	Orientation and Safety	45
2	Math, Introduction to Blueprints, and Hand and Power Tools	85
3	Orientation to the Trade, Tools of the Trade, Fasteners and Anchors, and Oxy-Fuel Cutting (IM)	75
4	Introduction to HVAC, Tools of the Trade (HVAC), Copper and Plastic Piping, Soldering and Brazing, and Basic Electricity (IM)	75
		<b>280</b>

### Installation and Service II—Industrial Maintenance (Course Code: 993011)

Unit	Title	Hours
5	Orientation and Safety (Review and Reinforcement)	5
6	Gaskets and Packing, Pumps and Drivers, Introduction to Valves, Lubrication, and Welding	105
7	Related Construction Math, Construction Drawings, Introduction to Test Equipment, Material Handling and Rigging, and Mobile and Support Equipment	85
8	Introduction to the National Electrical Code, Electrical Theory, Conductor Terminations and Splices, and Hydraulic and Pneumatic Controls	85
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Office of Vocational Education and Workforce  
Development  
Mississippi Department of Education  
P.O. Box 771  
Jackson, MS 39205  
(601) 359-3940

Robin Parker  
Curriculum Coordinator  
Research and Curriculum Unit  
P.O. Drawer DX  
Mississippi State, MS 39762  
(662) 325-2510  
[robin.parker@rcu.msstate.edu](mailto:robin.parker@rcu.msstate.edu)

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- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

### Heating Ventilation and Air Conditioning Executive Summary

#### Program Description

The Installation and Service: HVAC concentration is an instructional program that prepares students for employment or continued education in the occupations of heating, ventilation, and air-conditioning. The curriculum framework for this program was developed in partnership with the Mississippi Construction Education Foundation (MCEF). MCEF is the accredited sponsor for the National Center for Construction Education and Research (NCCER).

#### Industry Certification

The NCCER developed and published a set of industry standards that are taught nationwide by contractors, associations, construction users, and secondary and postsecondary schools called the **Contren Learning Series**. When developing this set of standards, the NCCER assembled a team of subject matter experts that represented construction companies and schools across the nation. Each committee met several times and combined experts' knowledge and experience to finalize the set of national industry standards.

As a part of the accreditation process, all Mississippi Construction Technology instructors will be required to successfully complete the **Instructor Certification Training Program**. This program ensures that instructors possess a deep knowledge of content of the standards.

This state-of-the-art curriculum is modeled after the eight Mississippi **NCCER Accredited Training and Education Facilities (ATEF)**. In order to become an NCCER ATEF program, school districts must meet a set of guidelines including the following:

1. Use the approved curriculum.
2. All instructors must be NCCER certified.
3. All completed Form 200s and release forms on all student completions are to be forwarded to MCEF for proper approval. MCEF will in turn forward to NCCER for processing.
4. Follow NCCER guidelines on test security and performance profiles.
5. Have an active advisory committee with at least two commercial contractors involved.
6. Follow safety practices and Occupational Safety and Health Administration (OSHA) standards used in the class and lab areas.
7. Involve commercial contractors in class presentations or field trips.
8. All construction programs must be included in the accreditation process.
9. Show active involvement in student leadership development (e.g., VICA and SkillsUSA).
10. Provide demonstrated placement into construction-related occupations, and provide timely reports to MCEF.

Districts will be required to complete a self-evaluation of all programs and host a site visit from industry to ensure proper lab, safety, and instructional procedures are in place.

### **Assessment**

Students will be assessed using the Installation and Service: HVAC MS-CPAS2 test. The MS-CPAS2 blueprint can be found at <http://redesign.rcu.msstate.edu/curriculum/>. If there are questions regarding assessment of this program, please contact the Construction and Manufacturing instructional design specialists at the Research and Curriculum Unit at 662.325.2510.

### **Student Prerequisites**

In order for students to be successful in the Installation and Service: HVAC 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)
- or**
3. Instructor Approval and TABE Reading Score (eighth grade or higher)
- or**
4. Instructor Approval

### **Proposed Applied Academic Credit**

Applied Math content from the curriculum was aligned to the 2007 Mississippi Math Framework Revised Academic Benchmarks. It is proposed that upon the completion of this program, students will earn 1/2 Applied Math 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 974 educator license is required to teach the Installation and Service: HVAC concentration program. Requirements for the 974 endorsement are listed below:

1. Applicant must hold a 2-year college degree (associate's degree) or higher from an accredited institution of higher education.
2. Applicant with an associate's degree must have at least 2 years of verifiable occupational experience in the past 10 years. Experience must be appropriate to the subject to be taught. Applicant with a bachelor's or higher degree must have at least 1 year of verifiable occupational experience in the past 10 years. Experience must be appropriate to the subject to be taught.
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 earn a passing score on Heating, Ventilation, and Air-Conditioning assessment from National Craft Assessment and Certification Program.
6. Applicant must successfully complete the Contren Instructor Certification.

7. Applicant must successfully complete an MDE-approved computer literacy certification exam.
8. Applicant must successfully complete certification for an online learning workshop, module, or course that is approved by the MDE.
9. Applicant must successfully complete the Installation and Service: HVAC certification workshop, module, or course that is approved by the MDE.

Note: If the applicant meets all requirements listed above, that applicant will be issued a 974 endorsement—a 5-year license. If the applicant does not meet **all** requirements, the applicant will be issued a 3-year endorsement (license), and all requirements stated above must be satisfied prior to the ending date of that license.

### **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

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This curriculum framework allows options for local school districts to implement based on student needs and scheduling demands. This curriculum offers a four-Carnegie-unit program.

### Option 1

Upon completion of this option, the student will be trained to take the **NCCER Core Level 1 Certification and HVAC Level 1 Certification** exams. This curriculum consists of four one-credit courses, which should be completed in the following sequence:

- Installation and Service, Part A (Course Code: 993002)
- Installation and Service, Part B (Course Code: 993003)
- Installation and Service II—HVAC, Part A (Course Code: 993022)
- Installation and Service II—HVAC, Part B (Course Code: 993023)

**Course Description:** Installation and Service, Part A (Course Code: 993002) includes an introduction to the field as well as fundamentals of safety, math, blueprint reading, and hand and power tools. This is a one-Carnegie-unit course.

**Course Description:** Installation and Service, Part B (Course Code: 993003) emphasizes an overview of safety and leadership, the lathe theory, and grinding operations. This course gives students real-world, hands-on practice in these areas. This one-Carnegie-unit course should only be taken after students successfully pass Installation and Service, Part A.

**Course Description:** Installation and Service II—HVAC, Part A (Course Code: 993022) includes an in-depth study of the heating, ventilation, and air-conditioning profession, HVAC math, ferrous metal piping practice, introduction to cooling, and introduction to heating. This course also reinforces safety related to the installation and service of HVAC applications. This one-Carnegie-unit course should only be taken after students successfully pass Installation and Service, Part B.

**Course Description:** Installation and Service II—HVAC, Part B (Course Code: 993023) includes an in-depth study of the heating, ventilation, and air conditioning profession, air distribution systems, leak detection evacuation recovery and charging, alternating current, and basic electronics. This course also reinforces safety related to the installation and service of HVAC applications. This one-Carnegie-unit course should only be taken after students successfully pass Installation and Service II—HVAC, Part A.

- Scheduling and operating more than one course in the same classroom/laboratory with the same instructor is not allowed.
- Safety will be reinforced and tested at the beginning of each course.
- Students must complete installation and service courses with a score of 80/C or higher in classwork to advance to the next level.

**Installation and Service, Part A (Course Code: 993002)**

Unit	Title	Hours
1	Orientation and Safety	50
2	Math, Introduction to Blueprints, and Hand and Power Tools	90
		140

**Installation and Service, Part B (Course Code: 993003)**

Unit	Title	Hours
3	Orientation to the Trade, Tools of the Trade, Fasteners and Anchors, and Oxy-Fuel Cutting (IM)	70
4	Introduction to HVAC, Tools of the Trade (HVAC), Copper and Plastic Piping, Soldering and Brazing, and Basic Electricity (IM)	70
		140

**Installation and Service II—HVAC, Part A (Course Code: 993022)**

Unit	Title	Hours
5	Orientation and Safety (Review and Reinforcement)	20
6	Trade Math, Ferrous Metal Piping Practice, Introduction to Cooling, and Introduction to Heating	120
		140

**Installation and Service II—HVAC, Part B (Course Code: 993023)**

Unit	Title	Hours
7	Air Distribution Systems, Leak Detection Evacuation Recovery and Charging, Alternating Current, and Basic Electronics	140
		140

**Option 2**

**Course Description:** Installation and Service I is a course that students learn about Heating, Ventilation, and Air-Conditioning. Topics include Math, Introduction to Blueprints, Hand and Power Tools, Orientation to the Trade, and Introduction to HVAC. This is a two-Carnegie-unit course.

- Scheduling and operating more than one course in the same classroom/laboratory with the same instructor is not allowed.
- Safety will be reinforced and tested at the beginning of each course.

**Course Description:** Installation and Service II—HVAC is a continuation with the emphasis on Heating, Ventilation, and Air-Conditioning. Topics include employability skills, safety, ferrous metal piping, introduction to cooling, introduction to heating, air distribution, leak detection evacuation recovery and charging, alternating current, and basic electronics. The course should be taken after the student has successfully passed Installation and Service I. This is a two-Carnegie-unit course.

- Scheduling and operating more than one course in the same classroom/laboratory with the same instructor is not allowed.
- Safety will be reinforced and tested at the beginning of each course.
- Students must complete manufacturing trade courses with a score of 80/C or higher in classwork to advance to the next level.

**Installation and Service I (Course Code: 993001)**

Unit	Title	Hours
1	Orientation and Safety	45
2	Math, Introduction to Blueprints, and Hand and Power Tools	85
3	Orientation to the Trade, Tools of the Trade, Fasteners and Anchors, and Oxy-Fuel Cutting (IM)	75
4	Introduction to HVAC, Tools of the Trade (HVAC), Copper and Plastic Piping, Soldering and Brazing, and Basic Electricity (IM)	75
		280

**Installation and Service II: HVAC (Course Code: 993021)**

Unit	Title	Hours
5	Orientation and Safety (Review and Reinforcement)	5
6	Trade Math, Ferrous Metal Piping Practice, Introduction to Cooling, and Introduction to Heating	140
7	Air Distribution Systems, Leak Detection Evacuation Recovery and Charging, Alternating Current, and Basic Electronics	135
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Robin Parker  
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Research and Curriculum Unit  
P.O. Drawer DX  
Mississippi State, MS 39762  
(662) 325-2510  
[robin.parker@rcu.msstate.edu](mailto:robin.parker@rcu.msstate.edu)

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learned in school and those needed in communities and the workplace. A portion of the 21<sup>st</sup> Century Skills addresses learning skills needed in the 21<sup>st</sup> century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills have been recognized for some time and the 21<sup>st</sup> Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21<sup>st</sup> century involves technology skills, and the International Society for Technology in Education, developers of the National Education Technology Standards (NETS), were strategic partners in the Partnership for 21<sup>st</sup> Century Skills.

- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

### Digital Media Technology Executive Summary

#### Program Description

This program is designed for students who wish to develop, design, and implement projects in the fast growing field of digital media. The program emphasizes the techniques and tools used in digital media and the creative design or content of such media. Both theoretical learning and activity-based learning are provided for students who wish to develop and enhance their competencies and skills. The course focuses on the basic areas of computer graphics, multimedia, and animation. Exposure to state-of-the-art equipment is given through advice by experts from industry. The comprehensive project component provides practical experience toward developing a portfolio of work.

#### Industry Certification

Research with Mississippi industry suggests that this curriculum should be written to the Adobe Certified Associate Certification. This exam assesses the foundation of digital communication skills students need to create effective communication using digital media tools. This certification was developed after a group of industries met with educators to design the entry-level skill industry standards for Web communication, rich media communication, and visual communication. Additionally, the Final Cut Pro 6.0 is the recognized industry software for video production. The Final Cut Express 4.0 software is a more inexpensive software package that has the same interface as Final Cut Pro 6.0. It is recommended that this curriculum meets the Final Cut Pro Level 1 Certification.

#### Assessment

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

#### Student Prerequisites

An eligible student will have completed the ninth grade and will have an overall B average. Prior to being enrolled in the course, a behavior reference must be obtained from an academic technology teacher.

#### Proposed Applied Academic Credit

The academic credit is still pending for this curriculum.

## Licensure Requirements

The 987 licensure is needed to teach the Digital Media Technology program. The requirements for the 987 licensure endorsement are listed below:

- 987– Digital Media  
Technology
1. Applicants with associate’s degrees must have at least 2 years of verifiable occupational experience in the past 10 years. Experience must be appropriate to the subject to be taught.
  2. Applicants with bachelor’s or higher degrees must have at least 1 year of verifiable occupational experience in the past 10 years. Experience must be appropriate to the subject to be taught.
  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 three-year vocational license.
  5. Applicants must possess a Final Cut Pro Level 1 Certification.
  6. Applicants must possess an Adobe Certified Associate Certification in each of the following areas: Web Communication, Rich Media Communication, and Visual Communication.
  7. Applicants must successfully complete an MDE-approved computer literacy certification exam.
  8. Applicants must successfully complete certification for an online learning workshop, module, or course that is approved by the MDE.
  9. Applicants must successfully complete a Digital Media Technology certification workshop, module, or course that is approved by the MDE.

**Note:** If an applicant meets all requirements listed above, that applicant will be issued a 987 endorsement—a 5-year license. If an applicant does not meet **all** requirements, the applicant will be issued a 3-year endorsement license, and all requirements stated above must be satisfied prior to the ending date of that license.

## **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

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This curriculum framework allows for local school districts to meet student needs and scheduling demands. The first option groups units into four one-Carnegie-unit courses. The second option groups units into two two-Carnegie-unit courses. A discussion of each option is listed below.

Introduction to Photography and Graphic Design and Web Design and Media Rich Content courses introduce students to the principles and skills associated with graphic and print production and Web site development as it is related to meeting the needs of clients and producing graphic design products. Video Production and the Directed Individual Project courses concentrate on video production, a directed individual project, and portfolio finalization. These courses must be taken in sequential order.

### Option 1

By following this course of study for Digital Media Technology, the students will progress through a series of four one-credit courses that should be completed in the following sequence:

1. Introduction to Photography and Graphic Design (Course Code: 994102)
2. Web Design and Media Rich Content (Course Code: 994103)
3. Video Production (Course Code: 994104)
4. Directed Individual Project (Course Code: 994105)

**Course Description:** Introduction to Photography and Graphic Design includes the foundation skills necessary in the digital media industry. Content such as safety, ethical issues and production, photography, graphic design, and print production will be offered to students. This is a one-Carnegie-unit course.

**Course Description:** Web Design and Media Rich Content emphasizes real-world, hands-on practice. Content related to Web design, building a basic client Web site, media rich content for Web design, and planning a digital narrative and creating a script will be offered to students. This one-Carnegie-unit course should only be taken after students successfully pass Introduction to Photography and Graphic Design (Course Code: 994102).

**Course Description:** Video Production focuses on career opportunities in audio and video technology, production systems, production process, and video and audio production. This one-Carnegie-unit course should only be taken after students successfully pass Web Design and Media Rich Content (Course Code: 994103).

**Course Description:** The Directed Individual Project is a culminating course that gives students the opportunity to produce a final video project that incorporates the skill and knowledge learned in the Video Production course, giving the students the chance to showcase what they have learned and accomplished. Upon the completion of this course, the students will have also put the finishing touches on a digital portfolio that is cumulative of their work throughout all

semesters of Digital Media Technology. This is a one-Carnegie-unit course and should be taken after students successfully pass Introduction to Photography and Graphic Design (Course Code: 994102), Web Design and Media Rich Content (Course Code: 994103), and Video Production (Course Code: 994104).

**Introduction to Photography and Graphic Design (One Carnegie Unit) - Course Code: 994102**

Unit	Title	Hours
1	Introduction, Safety, and Orientation	10
2	Ethical Content and Production	20
3	Photography	25
4	Graphic Design and Print Production	85
		140

**Web Design and Media Rich Content (One Carnegie Unit) - Course Code: 994103**

Unit	Title	Hours
5	Introduction to Web Design	30
6	Building a Basic Client Web Site	20
7	Media Rich Content for Web Design	55
8	Planning a Digital Narrative and Creating a Script	35
		140

**Video Production (One Carnegie Unit) - Course Code: 994104**

Unit	Title	Hours
9	Creating a Rough Cut	10
10	Refining a Rough Cut	35
11	Customizing and Capturing Footage	25
12	Completing the Cut	35

13		Adding Effects and Finishing Video Projects	35
			140

**Directed Individual Project (One Carnegie Unit) - Course Code: 994105**

Unit	Title	Hours
14	Developing Movie Ideas	15
15	Storyboarding a Movie	15
16	Producing a Movie	15
17	Lighting Elements in a Movie	15
18	Working with Audio in Movies	15
19	Creating the Perfect Camera Frame	15
20	Documentary Movies	15
21	Post-Production	35
		140

**Option 2**

**Course Description:** Digital Media Technology I encompasses the foundation skills necessary in the digital media industry. Content such as safety, ethical issues and production, photography, graphic design, and print production will be offered to students. The Web Design and Media Rich Content portion of the course emphasizes real-world, hands-on practice. Content related to Web design, building a basic client Web site, media rich content for Web design, and planning a digital narrative and creating a script will be offered to students. Students will receive two Carnegie units upon completion of the course.

**Course Description:** Digital Media Technology II focuses on the process of video production and editing as well as career opportunities in audio and video technology. Another component of the course is the Directed Individual Project that is a culminating assignment that gives students the opportunity to produce a final video project that incorporates the skill and knowledge learned throughout the course, giving the students the chance to showcase what they have learned and accomplished. Also upon completion of this course, the students will have also put the finishing touches on a digital portfolio that is cumulative of their work throughout their study of Digital Media Technology.

**Digital Media Technology I (Two Carnegie Unit) - Course Code: 994100**

Unit	Title	Hours
1	Introduction, Safety, and Orientation	10
2	Ethical Content and Production	20
3	Photography	25
4	Graphic Design and Print Production	85
5	Introduction to Web Design	30
6	Building a Basic Client Web Site	20
7	Media Rich Content for Web Design	55
8	Planning a Digital Narrative and Creating a Script	35
		280

**Digital Media Technology II (Two Carnegie Unit) - Course Code: 994101**

Unit	Title	Hours
9	Career Opportunities in Audio and Video Technology	10
10	Production Systems	35
11	Production Process	25
12	Video Production	35
13	Audio Production	35
14	Directed Individual Project	130
15	Portfolio Preparation	10
		280

FRAMEWORKS FOR  
VOCATIONAL-TECHNICAL PROGRAMS  
REVISED IN  
2011

SECONDARY  
EXECUTIVE SUMMARY  
2011

**Direct inquiries to**

Director of Bureau of Vocational Instructional Development  
Office of Vocational Education and Workforce  
Development  
Mississippi Department of Education  
P.O. Box 771  
Jackson, MS 39205  
(601) 359-3940

Robin Parker  
Curriculum Coordinator  
Research and Curriculum Unit  
P.O. Drawer DX  
Mississippi State, MS 39762  
(662) 325-2510  
[robin.parker@rcu.msstate.edu](mailto:robin.parker@rcu.msstate.edu)

**Additional copies**

Research and Curriculum Unit for Workforce Development  
Vocational and Technical Education  
Attention: Reference Room and Media Center Coordinator  
P.O. Drawer DX  
Mississippi State, MS 39762  
<https://cia.rcu.msstate.edu/curriculum/download.asp>  
(662) 325-2510

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Development  
Mississippi Department of Education  
Jackson, MS 39205

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Vocational and Technical Education  
Mississippi State University  
Mississippi State, MS 39762

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## Foreword

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 III, 1998; and No Child Left Behind Act of 2001).

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75-80 percent of the time in the course.
- Competencies and Suggested Objectives
  - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies.
  - The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.
- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.
- Integrated Academic Topics, Workplace Skills, Technology Standards, and Occupational Standards - This section identifies related academic topics as required in the Subject Area Assessment Program (SATP) in Algebra I, Biology I, English II, and U. S. History from 1877, which are integrated into the content of the unit. It also identifies the 21<sup>st</sup> Century Skills, which were developed by the Partnership for 21<sup>st</sup> Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills

learned in school and those needed in communities and the workplace. A portion of the 21<sup>st</sup> Century Skills addresses learning skills needed in the 21<sup>st</sup> century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills have been recognized for some time and the 21<sup>st</sup> Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21<sup>st</sup> century involves technology skills, and the International Society for Technology in Education, developers of the National Education Technology Standards (NETS), were strategic partners in the Partnership for 21<sup>st</sup> Century Skills.

- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

### Culinary Arts Executive Summary

#### Program Description

Culinary Arts is a pathway for students in the Human Science, Art, and Humanities career cluster. The following description is from the current Standard Course of Study, for Career–Technical Education, Mississippi Department of Education.

The Culinary Arts pathway program includes classroom and hands-on experiences that will prepare students for employment or continuing education in the foodservice industry. This program was written to incorporate the **National Restaurant Associations (NRA) ProStart** learning objectives. Any student who successfully completes this program and the mentoring requirements of the NRA can take the National ProStart Certificate of Achievement exam. This is a national certification program recognized throughout the foodservice industry. Each district should implement a maximum student number due to the size of each lab.

#### Industry Certification

This program was designed to articulate to postsecondary Food Production, Hotel and Restaurant Management, and Culinary Arts. Industry standards are based on the *National Restaurant Association ProStart Certification and the National Restaurant Association ServSafe Certification*.

#### Assessment

Students will be assessed using the Culinary Arts MS-CPAS2 test. The MS-CPAS2 blueprint can be found at <http://redesign.rcu.msstate.edu/curriculum/>. If there are questions regarding assessment of this program, please contact the Culinary Arts 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 Culinary Arts 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)

**or**

3. Instructor Approval and TABE Reading Score (eighth grade or higher)

**or**

4. Instructor Approval

## **Proposed Applied Academic Credit**

The mathematics content in the Culinary Arts program is meaningful and useful to students who are entering the foodservice industry. Applied mathematics content was aligned to the 2007 Mississippi Mathematics Framework Revised Academic Benchmarks. It is proposed that upon the completion of this program, students will earn ½ applied mathematical credit that can be used for graduation requirements.

The applied academic credit has *not* been approved by the MS 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**

Mississippi teacher license endorsement 972 is needed to teach the Culinary Arts pathway. Requirements for the 972 educator endorsement are listed below:

1. Applicant must have earned an AA degree or higher.
2. Applicant must enroll immediately in the Vocational Instructor Preparation (VIP) or the Redesign Education Program (REP).
3. 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.
4. Applicant must complete all components of the national Prostart Certification program.
5. Applicant must successfully complete the ServSafe certification exam (updated every 5 years).
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 Culinary Arts 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

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This curriculum provides options for local school districts to meet student needs and scheduling demands. The first option groups units into four 1-Carnegie unit courses. The second option groups units into two 2-Carnegie courses. Please see below for a description of each option.

### Option 1

This option consists of four 1-credit courses that should be completed in the following sequence:

1. Orientation to Culinary Arts (Course Code: 996002)
2. Theory and Applications of Culinary Arts, Part A (Course Code: 996004)
3. Theory and Applications of Culinary Arts, Part B (Course Code: 96005)
4. Advanced Studies in Culinary Arts (Course Code: 996006)

**Course Description:** Orientation to Culinary Arts includes the foundation skills necessary in the foodservice industry. Content such as food safety and sanitation, equipment, safety and security, culinary foundations and math, and an introduction to the hospitality industry are included in the course. Mastery of the competencies listed in the food safety and sanitation unit will prepare the student to take the NRA's ServSafe exam to become ServSafe Food Safety certified. As of January 1, 1999, every foodservice establishment in Mississippi must have a full-time certified food manager employed in order to meet the FDA Food Code requirements. Students are encouraged to take this exam.

**Course Description:** Theory and Applications of Culinary Arts, Part A emphasizes real-world, hands-on practice of food preparation. Food preparation techniques included in this course include breakfast foods, dairy, and sandwiches; fruits, vegetables, salads, and garnishes; and potatoes and grains. This one-Carnegie unit course should only be taken after students successfully pass Orientation to Culinary Arts (Course Code: 995002).

**Course Description:** Theory and Applications of Culinary Arts, Part B emphasizes real-world, hands-on practice of food preparation. Food preparation techniques included in this course include desserts and baked goods; meat, poultry, and seafood; and stocks, sauces, and soups. This one-Carnegie unit course should only be taken after students successfully pass Theory and Applications of Culinary Arts (Course Code: 995004).

**Course Description:** Advanced Studies in Culinary Arts is a culminating course that places emphasis on an internship experience. While they participate in the on-the-job training, the students will use their skills that are related to management and business concepts, customer communication, and customer service. Before students can complete the Advanced Placement Culinary Arts course, they must meet the following requirements:

Score 80% or higher on the MS-CPAS2 summative assessment.

Attendance rate of 92% or better in the Orientation to Culinary Arts (Course Code: 996002) and the Theory and Applications of Culinary Arts parts A and B (Course Code: 996004 and 996005)

Find a job related to the culinary industry.

**Orientation to Culinary Arts (One Carnegie Unit) - Course Code: 996002**

Unit	Title	Hours
1	Introduction	10
2	Human Relations Management	25
3	Food Safety and Sanitation	30
4	Foodservice Equipment, Safety, and Security	30
5	Culinary Foundations	35
		130

**Theory and Applications of Culinary Arts, Part A (One Carnegie Unit) - Course Code: 996004**

Unit	Title	Hours
6	Breakfast Foods, Dairy, and Sandwiches	25
7	Fruits, Vegetables, Salads, and Garnishes	35
8	Culinary Math	25
		85

**Theory and Applications of Culinary Arts, Part B (One Carnegie Unit) - Course Code: 996005**

Unit	Title	Hours
9	Orientation	20
10	Hospitality Industry	30
11	Potatoes and Grains	25
12	Customer Communication and Service	25
13	Desserts and Baked Goods	25
		125

**Advanced Studies in Culinary Arts (One Carnegie Unit) - Course Code: 996006**

Unit	Title	Hours
14	Culinary Business Concepts	45
15	Meat, Poultry, and Seafood	25
16	Stocks, Sauces, and Soups	25
		95

**Option 2**

This option consists of two 2-Carnegie unit courses that should be completed in the following sequence.

1. Culinary Arts I (Course Code: 996000)
2. Culinary Arts II (Course Code: 996001)

**Course Description:** Culinary Arts I is the first course of the program. Food preparation techniques included in this course are breakfast foods, dairy, sandwiches, salads, garnishes, fruits, and vegetables. Management skills emphasized are basic customer service, food safety and sanitation, workplace safety and security, culinary basics, equipment, nutrition, human resources, math, and food cost control. Mastery of the competencies listed in the food safety and sanitation unit will prepare students to take the NRA's ServSafe exam to become ServSafe Food Safety certified. As of January 1, 1999, every foodservice establishment in Mississippi must have

a full-time certified food manager employed in order to meet the FDA Food Code requirements. Students are encouraged to take this exam.

**Course Description:** Culinary Arts II is a continuation of the emphasis on management and food preparation. Management topics include marketing, accounting, purchasing, inventory, and advanced customer service. Food preparation techniques covered include potatoes, grains, desserts, baked goods, meat, poultry, seafood, stocks, sauces, and soups. An exploration of culinary history is also included in this course. The course should be taken after the student has successfully passed Culinary Arts I.

**Culinary Arts I (Course Code: 996000)**

Unit	Title	Hours
1	Introduction	10
2	Human Relations Management	25
3	Food Safety and Sanitation	30
4	Foodservice Equipment, Safety, and Security	30
5	Culinary Foundations	35
6	Breakfast Foods, Dairy, and Sandwiches	25
7	Fruits, Vegetables, Salads, and Garnishes	35
8	Culinary Math	25
		215

**Culinary Arts II (Course Code: 996001)**

Unit	Title	Hours
9	Orientation	20
10	Hospitality Industry	30
11	Potatoes and Grains	25
12	Customer Communication and Service	25
13	Desserts and Baked Goods	25
14	Culinary Business Concepts	45
15	Meat, Poultry, and Seafood	25
16	Stocks, Sauces, and Soups	25
		220

FRAMEWORKS FOR  
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REVISED IN  
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**Direct inquiries to**

Director of Bureau of Vocational Instructional Development  
Office of Vocational Education and Workforce  
Development  
Mississippi Department of Education  
P.O. Box 771  
Jackson, MS 39205  
(601) 359-3940

Robin Parker  
Curriculum Coordinator  
Research and Curriculum Unit  
P.O. Drawer DX  
Mississippi State, MS 39762  
(662) 325-2510  
[robin.parker@rcu.msstate.edu](mailto:robin.parker@rcu.msstate.edu)

**Additional copies**

Research and Curriculum Unit for Workforce Development  
Vocational and Technical Education  
Attention: Reference Room and Media Center Coordinator  
P.O. Drawer DX  
Mississippi State, MS 39762  
<https://cia.rcu.msstate.edu/curriculum/download.asp>  
(662) 325-2510

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Office of Vocational Education and Workforce  
Development  
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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- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

## Collision Repair Technology

### Collision Repair Technology Executive Summary

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://redesign.rcu.msstate.edu/curriculum/>. 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

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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
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
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.

FRAMEWORKS FOR  
VOCATIONAL-TECHNICAL PROGRAMS  
REVISED IN  
2011

SECONDARY  
EXECUTIVE SUMMARY  
2011

**Direct inquiries to**

Director of Bureau of Vocational Instructional Development  
Office of Vocational Education and Workforce  
Development  
Mississippi Department of Education  
P.O. Box 771  
Jackson, MS 39205  
(601) 359-3940

Robin Parker  
Curriculum Coordinator  
Research and Curriculum Unit  
P.O. Drawer DX  
Mississippi State, MS 39762  
(662) 325-2510  
[robin.parker@rcu.msstate.edu](mailto:robin.parker@rcu.msstate.edu)

**Additional copies**

Research and Curriculum Unit for Workforce Development  
Vocational and Technical Education  
Attention: Reference Room and Media Center Coordinator  
P.O. Drawer DX  
Mississippi State, MS 39762  
<https://cia.rcu.msstate.edu/curriculum/download.asp>  
(662) 325-2510

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## Foreword

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 III, 1998; and No Child Left Behind Act of 2001).

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - An estimated number of clock hours of instruction that should be required to teach the competencies and objectives of the unit. A minimum of 140 hours of instruction is required for each Carnegie unit credit. The curriculum framework should account for approximately 75-80 percent of the time in the course.
- Competencies and Suggested Objectives
  - A competency represents a general concept or performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to receive instruction on all competencies.
  - The suggested objectives represent the enabling and supporting knowledge and performances that will indicate mastery of the competency at the course level.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each competency. Emphasis has been placed on strategies which reflect active learning methodologies. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.
- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include rubrics, class participation, reflection, and journaling. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.
- Integrated Academic Topics, Workplace Skills, Technology Standards, and Occupational Standards - This section identifies related academic topics as required in the Subject Area Assessment Program (SATP) in Algebra I, Biology I, English II, and U. S. History from 1877, which are integrated into the content of the unit. It also identifies the 21st Century Skills, which were developed by the Partnership for 21st Century Skills, a group of business and education organizations concerned about the gap between the knowledge and skills

learned in school and those needed in communities and the workplace. A portion of the 21st Century Skills addresses learning skills needed in the 21st century, including information and communication skills, thinking and problem-solving skills, and interpersonal and self-directional skills. The need for these types of skills have been recognized for some time and the 21st Century Skills are adapted in part from the 1991 report from the U.S. Secretary of Labor's Commission on Achieving Necessary Skills (SCANS). Another important aspect of learning and working in the 21st century involves technology skills, and the International Society for Technology in Education, developers of the National Education Technology Standards (NETS), were strategic partners in the Partnership for 21st Century Skills.

- References - A list of suggested references is provided for each unit. The list includes some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

## Automotive Service Technology

### Automotive Service Technology Executive Summary

#### Program Description

Automotive Service 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.

#### Industry Certification

The Automotive Service pathway includes classroom and hands-on experiences that prepare students for employment or continuing education in the auto service industry. This program was written to incorporate the National Institute for Automotive Service Excellence (ASE) 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 automotive employment. This is a national certification program recognized throughout the automotive service industry. Each district should implement a maximum student number due to the size of each lab.

#### Assessment

Students will be assessed using the Automotive Service MS-CPAS2 test. The MS-CPAS2 blueprint can be found at <http://redesign.rcu.msstate.edu/curriculum/>. 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 Automotive Service pathway, 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

**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 1/2 Applied Mathematics credit that can be used for graduation requirements.

Applied Physics content from the curriculum was aligned to the 2007 Mississippi Science Framework Revised Academic Benchmarks. It is proposed that upon the completion of this program (option 1 or option 2), students will earn 1/2 Applied Physics 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 966 educator license is required to teach the Automotive Service pathway courses. The requirements for the 966 licensure endorsement are listed below:

1. Applicant must have earned a 2-year college degree (associate's degree) or higher from an accredited institution of higher education.
2. Applicant must have 2 years of documented automotive 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 brakes, electrical/electronics, engine performance, and steering and suspension.
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. The applicant must successfully complete an Automotive Service 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://rcu.redesign.edu>. If you have specific questions about the content of each training session provided, you will need to contact the Research and Curriculum Unit at 662.325.2510 and ask for the Professional Learning Specialist.

## Course Outlines

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This pathway provides options for local school districts to implement based on student needs and scheduling demand. The first option groups units into one-credit courses for a total of four Carnegie units. The second option groups units into two-credit courses. A description of each option is listed next.

### Option 1

The Automotive Service pathway emphasizes industry-based content with time being allocated between lecture and lab activities. Safety is an integral part of every course and activity. 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). There are four courses in this option: Fundamentals I, Brakes, and Introduction to Electrical/Electronic Systems; Advanced Electrical/Electronic Systems; Engine Performance I; and Engine Performance II and Suspension/Steering Systems and Alternative Fuels. Courses should be scheduled so the student completes all courses in 2 years.

**Course Description:** The Fundamentals I, Brakes, and Introduction to Electrical/Electronic Systems course contains an introduction, safety, measurement, and tool/technical references content. It also contains an introduction to brake systems: disc brakes, drum brakes, and antilock brakes. This course also contains an introduction to electrical/electronic systems information and terminology. The Basic Electrical/Electronic Systems course contains electrical/electronic system theory, battery systems, starting systems, and charging systems.

**Course Description:** The Advanced Electrical/Electronic Systems course contains information on lighting systems, concepts of gauges, warning devices, driver information systems, horn system, wiper/washer system, and accessories system diagnostic repair.

**Course Description:** The Engine Performance I courses contain information on safety, employability skills, basic automobile service, general engine components and theory of operation, concepts of computerized engine control systems, and ignition systems.

**Course Description:** The Engine Performance II and Suspension/Steering Systems and Alternative Fuels courses contain information on fuel, air induction, and exhaust systems; concepts of emission control systems; concepts of engine service; general suspension/steering theory; steering system inspection, diagnosis, and repair; concepts of front, rear, and miscellaneous systems; and wheel/tire alignment concepts, alternative fuels general information for service and maintenance.

**Automotive Service I, Part A (One Carnegie Unit) - Course Code: 997002**

Unit	Title	Hours
1	Fundamentals I, Brakes, and Introduction to Electrical/Electronic Systems	89
2	Basic Electrical/Electronic Systems	51
		130

**Note:** The hours listed above are based on 140 hours of instruction for one Carnegie unit credit. ASE-certified programs are required to spend the following hours of instruction for the following units:

- Brakes and Electrical/Electronic Systems (135 hours)
- Basic Electrical/Electronic Systems (60 hours)

**Automotive Service I, Part B (One Carnegie Unit) - Course Code: 997003**

Unit	Title	Hours
3	Advanced Electrical/Electronic Systems	140
		140

**Note:** The hours listed above are based on 140 hours of instruction for one Carnegie unit credit. ASE-certified programs are required to spend the following hours of instruction for the following units:

- Advanced Electrical/Electronic Systems (140 hours)

**Automotive Service II, Part A (One Carnegie Unit) - Course Code: 997004**

Unit	Title	Hours
4	Engine Performance I	140

			140
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**Note:** The hours listed above are based on 140 hours of instruction for one Carnegie unit credit. ASE-certified programs are required to spend the following hours of instruction for the following units:

- Engine Performance I (140 hours)

**Automotive Service II, Part B (One Carnegie Unit) - Course Code: 997005**

Unit	Title	Hours
5	Engine Performance II	45
6	Suspension/Steering Systems and Alternative Fuels	95
		140

**Note:** The hours listed above are based on 140 hours of instruction for one Carnegie unit credit. ASE-certified programs are required to spend the following hours of instruction for the following units:

- Engine Performance II (80 hours)
- Steering and Suspension (95 hours)
- Safety will be reinforced and tested at the beginning of each course.
  - ✓ Courses must be taken in order unless the instructor approves. Foundation knowledge in each course must be mastered to move to the next unit.
  - ✓ Students must complete automotive courses with a score of 80/C or higher in classwork to advance to the next level.
  - ✓ To effectively assess mastery respective to a course’s instructional hours, the pathway blueprint will test units upon completion of their last hour of instruction.

**Option 2**

This Automotive Service 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). The content is divided into two courses. The content of the first course is Introduction, Safety, and Tools/Technical References, along with Basic Automotive Service, Brakes,

Introduction to Electrical/Electronic Systems, and Basic Electrical/Electronic Systems. The second course content is Advanced Electrical/Electronic Systems, Steering and Suspension, and Engine Performance content. Safety is an integral part of every course and activity. A student must complete both courses to be a completer and to receive the 1/2 credit for physics and math.

**Course Description:** Automotive Service Technology I (Course CIP Code: 997000)

The Fundamentals, Brakes, and Introduction to Electrical/Electronic Systems course contains an introduction, safety, measurement, and tool/technical references content. It also contains an introduction to brake systems: disc brakes, drum brakes, and antilock brakes. This course also contains an introduction to electrical/electronic information and terminology. The Basic Electrical/Electronic Systems course contains electrical/electronic system theory, battery systems, starting systems, and charging systems. The Advanced Electrical/Electronic Systems course contains information on lighting systems, concepts of gauges, warning devices, driver information systems, horn system, wiper/washer system, and accessories system diagnostic repair.

**Course Description:** Automotive Service Technology II (Course CIP Code: 997001)

The Engine Performance I course contains information on safety, employability skills, basic automobile service, general engine components and theory of operation, concepts of computerized engine control systems, and ignition systems. The Engine Performance II and Steering and Suspension course contains information on fuel, air induction, and exhaust systems; concepts of emission control system; concepts of engine service; general suspension/steering theory; steering system inspection, diagnosis, and repair; concepts of front , rear, and miscellaneous systems; and wheel/tire alignment concepts; and alternative fuels general information for service and maintenance.

**Automotive Service I (Two Carnegie Units) - Course Code: 997000**

Unit	Title	Hours
1	Fundamentals I, Brakes, and Introduction to Electrical/Electronic Systems	89
2	Basic Electrical/Electronic Systems	51
3	Advanced Electrical/Electronic Systems	140
		280

**Note:** The hours listed above are based on 140 hours of instruction for one Carnegie unit credit. ASE-certified programs are required to spend the following hours of instruction for the following units:

- Brakes and Introduction to Electrical/Electronic Systems (135 hours)
- Basic Electrical/Electronic Systems (60 hours)
- Advanced Electrical/Electronic Systems (140 hours)

**Automotive Service II (Two Carnegie Units) - Course Code: 997001**

Unit	Title	Hours
4	Engine Performance I	140
5	Engine Performance II	45
6	Steering/Suspension and Alternative Fuels	95
		280

**Note:** The hours listed above are based on 140 hours of instruction for one Carnegie unit credit. ASE-certified programs are required to spend the following hours of instruction for the following units:

- Engine Performance I (140 hours)
- Engine Performance II (80 hours)
- Steering and Suspension (95 hours)
  - ✓ 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.
  - ✓ To effectively assess mastery respective to a course’s instructional hours, the pathway blueprint will test units upon completion of their last hour of instruction.