Small Engine and Equipment Repair Technology
Mississippi Curriculum Framework

Program CIP 01.0299 Agricultural Mechanization, Other
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The Office of Curriculum and Instruction (OCI) was founded in 2013 under the Division of Workforce, Career, and Technical Education at the Mississippi Community College Board (MCCB). The office is funded through a partnership with The Mississippi Department of Education (MDE), who serves as Mississippi's fiscal agent for state and federal Career and Technical Education (CTE) Funds. The OCI is tasked with developing statewide CTE curriculum, programming, and professional development designed to meet the local and statewide economic demand.

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Research Abstract

The curriculum framework in this document reflect changes in the workplace and a number of other factors that impact local vocational–technical programs. Federal and state legislation calls for articulation between high school and community college programs, integration of academic and vocational skills, and the development of sequential courses of study that provide students with the optimum educational path for achieving successful employment. National skills standards, developed by industry groups and sponsored by the U.S. Department of Education and Labor, provide vocational educators with the expectations of employers across the United States. All of these factors are reflected in the framework found in this document.

The last validated and approved revision of this curriculum took place in 2011. In the fall of 2019, the Office of Curriculum and Instruction (OCI) met with different industry/program visits. An industry questionnaire was used to gather feedback concerning the trends and needs, both current and future, of the field. The Office of Curriculum and Instruction met with advisory committee members who agreed the curriculum needed some revisions in an effort to meet the workforce needs. Program faculty, administrators, and industry members were consulted regarding workforce needs and trends.

Revision History

2011- Research and Curriculum Unit, Mississippi State University
2019- Office of Curriculum & Instruction, Mississippi Community College Board

ADOPTION OF NATIONAL CERTIFICATION STANDARDS

The **Equipment & Engine Training Council** is a non-profit association whose goal is to address the shortage of qualified technicians in the outdoor power equipment industry. Membership consists of industry professionals from manufacturers, distributors, dealers, educational institutions, and associations.

EETC Technician Certification Program

In order to raise the level of qualified technicians in the power equipment industry, the EETC developed and maintains the **EETC Technician Certification Program**. Certified technicians demonstrate a higher level of technical proficiency in their work and in turn increases the level of professionalism at dealerships.

EETC certification tests are based on industry standards and are written and updated by a committee of manufacturers, distributors, dealers, schools, and associations. Tests are updated annually to ensure the latest technologies are included. Over 20,000 technicians and students have taken the certification test since it was developed.

More information related to the standards can be found at the following website: https://www.eetc.org/

INDUSTRY JOB PROJECTION DATA

The field of small engine and equipment repair is growing steadily. This field provides not only opportunities in direct farm equipment mechanics work but also other service technician work as well. There is a 0.24% increase in occupational demand at the state level. Median annual income is $33,155.20 at the state. A summary of occupational data from National Strategic Planning and Analysis Research Center (nSPARC) is displayed below:

Table 1: Education Level

Program Occupations	Education Level
Farm Equipment Mechanics and Service Technicians	Postsecondary Career and Technical Award

Table 2: Occupational Overview

	Region	State	United States
2016 Occupational Jobs	411	411	40,011
2026 Occupational Jobs	412	412	40,420
Total Change	1	1	409
Total % Change	0.24%	0.24%	1.02%
2016 Median Hourly Earnings	$15.94	$15.94	$18.18
2016 Median Annual Earnings	$33,155.20	$33,155.20	$37,814.40
Annual Openings	0	0	41

Table 3: Occupational Breakdown

Description	2016 Jobs	2026 Jobs	Annual Openings	2016 Hourly Earnings	2016 Annual Earnings 2,080 Work Hours
Farm Equipment Mechanics and Service Technicians	411	412	0	$15.94	$33,155.20
Total	411	412	0	$15.94	$33,155.20

Table 4: Occupational Change

Description	Regional Change	Regional % Change	State % Change	National % Change
Farm Equipment Mechanics and Service Technicians	1	0.24%	0.24%	1.02%

ARTICULATION

No articulated credit will be offered upon implementation of this curriculum. Local agreements and dual credit partnerships are encouraged.

TECHNICAL SKILLS ASSESSMENT

Colleges should report the following for students who complete the program with a career certificate, technical certificate, or an Associate of Applied Science Degrees for technical skills attainment.

The Equipment and Engine Training Council Examination will be used to assess students upon completion of this program, after meeting the requirements for the AAS degree.

CIP Code	**Program of Study**	
01.0299	Agricultural Mechanization, Other	
Level	**Standard Assessment**	
Career	Equipment and Engine Training Council	
Level	**Standard Assessment**	
Technical/AAS	Equipment and Engine Training Council	

ONLINE AND BLENDED LEARNING OPPORTUNITIES

Course content includes lecture and laboratory semester credit hours. Faculty members are encouraged to present lecture related content to students in an online or blended learning environment. Training related to online and blended learning will be available to faculty members through the MS Community College Board.

PROGRAM DESCRIPTION

Small Engine and Equipment Repair Technology is designed to provide students with entry-level skills needed to compete in today's small engine and equipment repair industry. Training is provided in the areas of engine repair, diagnostic skills, cutting systems, chassis repair, electrical systems, and shop management skills. Students may earn a technical certificate in Small Engine and Equipment Repair by completing 45 hours of the required courses and approved electives. Students desiring to earn an Associate of Applied Science degree in Small Engine and Equipment Repair must earn an additional 15 hours of required academic courses and approved electives.

Courses in the program have been correlated to standards for small engine and equipment repair programs as published by the Equipment and Engine Training Council, a nationally recognized association for the outdoor power equipment industry.

SUGGESTED COURSE SEQUENCE

Small Engine and Equipment Repair Technology Career Pathway

			SCH Breakdown			Credit Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lec-ture	Lab	Total Credit Hours	Lec-ture	Lab	Certification Name
SET 1113	Small Engine Mechanics I	3	2	2	60			
SET 1123	Small Engine Mechanics II	3	2	2	60			
SET 1212	Measurements	2	1	2	45			
	Electives approved by instructor	7						
TOTAL		**15**						

Career Certificate Required Courses Small Engine and Equipment Repair

			SCH Breakdown			Credit Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Credit Hours	Lec-ture	Lab	Certification Name
SET 1113	Small Engine Mechanics I	3	2	2	60			
SET 1123	Small Engine Mechanics II	3	2	2	60			
SET 1212	Measurements	2	1	2	45			
SET 1313	Four-Cycle Engines	3	2	2	60			
SET 1322	Two-Cycle Engines	2	1	2	45			
SET 1512	Frame Inspection and Maintenance	2	1	2	45			
SET 2153	Small Engine and Equipment Analysis and Repairs I	3	2	2	60			
SET 2523	Maintenance and Repair of Cutting Mechanisms	3	2	2	60			
SET 2543	Transmissions and Transaxles	3	2	2	60			
SET 2613	Small Engine Electrical Systems	3	2	2	60			
	Elective approved by instructor	3						
TOTAL		**30**						

*Students who lack entry-level skills in math, English, science, and so forth will be provided related studies.

Technical Certificate Required Courses Small Engine and Equipment Repair

			SCH Breakdown			Credit Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Credit Hours	Lec-ture	Lab	Certification Name
SET 2134	Small Engine Mechanics III	4	0	8	120			
SET 2144	Small Engine Mechanics IV	4	0	8	120			
SET 2533	Hydraulics	3	2	2	60			
	Electives approved by instructor	4						
	TOTAL	**15**						

*Students who lack entry-level skills in math, English, science, and so forth will be provided related studies.

Approved Program Electives

			SCH Breakdown			Credit Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Credit Hours	Lecture	Lab	Certification Name
SET 1413	Small Engine Shop Management							
SET 2165	Small Engine and Equipment Analysis and Repairs II							
SET 2333	Small Engine and Equipment Projects I							
SET 2343	Small Engine and Equipment Projects II							
SET 2353	Engine Troubleshooting							
SET 2363	Small Engine and Equipment Projects III							
SET 2373	Small Engine and Equipment Projects IV							
SET 281(1-3)	Special Problem in Small Engine and Equipment Repair Technology							
SET 2911-6	Supervised Work Experience in Small Engine and Equipment Repair Technology							
ATE 1213	Conversational Spanish							
BOT 1433 or ACC 1213	Business Accounting or Principles of Accounting							
BOT 1313 or BAD 1313	Applied Business Math or Business Mathematics							
BAD 2413	Legal Environment of Business							
EDU/RSV 1312	Freshman Orientation							
HLT 1222	Horticulture Principles							
HLT 1411	Leadership Management I							
HLT 1421	Leadership Management II							
HLT 1431	Leadership Management III							
HLT 1441	Leadership Management IV							
HLT 1614	Landscape Equipment Operation and Maintenance							
HLT 2113	Turfgrass Management							
PHY 1214	Survey of Physics							
WBL 191(1-3)	Work Based Learning							
	Other courses maybe approved by the instructor							
TOTAL								

Course Listing Small Engine and Equipment Repair

			SCH Breakdown			Program Certifications
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	
SET 1113	Small Engine Mechanics I					
SET 1123	Small Engine Mechanics II					
SET 1212	Measurements					
SET 1313	Four-Cycle Engines					
SET 1322	Two-Cycle Engines					
SET 1413	Small Engine Shop Management					
SET 1512	Frame Inspection and Maintenance					
SET 2134	Small Engine Mechanics III					
SET 2144	Small Engine Mechanics IV					
SET 2153	Small Engine and Equipment Analysis and Repairs I					
SET 2165	Small Engine and Equipment Analysis and Repairs II					
SET 2333	Small Engine and Equipment Projects I					
SET 2343	Small Engine and Equipment Projects II					
SET 2353	Engine Troubleshooting					
SET 2363	Small Engine and Equipment Projects III					
SET 2373	Small Engine and Equipment Projects IV					
SET 2523	Maintenance and Repair of Cutting Mechanisms					
SET 2533	Hydraulics					
SET 2543	Transmissions and Transaxles					
SET 2613	Small Engine Electrical Systems					
SET 281(1-3)	Special Problem in Small Engine and Equipment Repair Technology					
SET 2911-6	Supervised Work Experience in Small Engine and Equipment Repair Technology					
	Other courses maybe approved by the instructor					

GENERAL EDUCATION CORE COURSES

To receive the Associate of Applied Science degree, a student must complete all of the required coursework found in the Career Certificate option, Technical certificate option, and a minimum of 15 semester hours of General Education core. The courses in the General Education Core may be spaced out over the entire length of the program so that students complete some academic and Career Technical courses each semester or provided primarily within the last semester. Each community college will specify the actual courses that are required to meet the General Education Core Requirements for the Associate of Applied Science degree at their college. The Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) Section 9 Standard 3 of the *Principles of Accreditation: Foundations for Quality Enhancement*[1] describes the general education core.

Section 9 Standard 3:

3. The institution requires the successful completion of a general education component at the undergraduate level that

   a) is based on a coherent rationale.

   b) is a substantial component of each undergraduate degree program. For degree completion in associate programs, the component constitutes a minimum of 15 semester hours of the equivalent; for baccalaureate programs, a minimum of 30 semester hours or the equivalent.

   c) ensures breadth of knowledge. These credit hours include at least one course from each of the following areas: humanities/fine arts, social/behavioral sciences, and natural science/mathematics. These courses do not narrowly focus on those skills, techniques, and procedures specific to a particular occupation or profession.

<<<Add any additional general education standards as required for programmatic accreditation here and footnote below.>>>

General Education Courses

			SCH Breakdown			Contact Hour Breakdown		Certification Information
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	Lecture	Lab	Certification Name
	Humanities/Fine Arts	3						
	Social/Behavioral Sciences	3						
	Math/Science	3						
	Academic electives	6						
	TOTAL	**15**						

[1] Southern Association of Colleges and Schools Commission on Colleges. (2017). *The Principles of Accreditation: Foundations for Quality Enhancement.* Retrieved from http://www.sacscoc.org/2017ProposedPrinc/Proposed%20Principles%20Adopted%20by%20BOT.pdf

COURSE DESCRIPTIONS

Course Number and Name: **SET 1113** **Small Engine Mechanics I**

Description: Introduces students to the basic principles of engine mechanics. Includes instruction on lubrication, fuel, and ignition systems.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Apply personal and shop safety standards associated with engines. (EEC100, EEC200, EEC300)
   a. Describe and apply rules and procedures for personal safety when working on an engine.
   b. Describe and apply rules and procedures for general shop safety when working on an engine. (NOTE: Personal safety will be stressed and monitored on a continuous basis throughout all courses in the program.)

2. Describe the components of the lubrication, fuel and ignition systems. (EEC100, EEC200, EEC300)
   a. Identify and differentiate among the different types of lubrication systems, fuel systems and ignition systems commonly found on small engines.
   b. Select lubricants by grade and viscosity.
   c. Inspect and service the components of a crankcase ventilation system, fuel system and ignition system.

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: **SET 1123** **Small Engine Mechanics II**

Description: A continuation of Small Engine Mechanics I with emphasis on cooling systems, engine governance, multi-cylinder engines, and diesel fuel systems.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Analyze and apply theories and principles related to engine cooling systems. (EEC100, EEC300)
2. Inspect and apply theories and principles related to multi-cylinder engines. (EEC100, EEC300)
3. Inspect and apply theories and principles related to diesel engine service and repair. (EEC100, EEC300)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC300 Electrical Systems and Components

Course Number and Name: **SET 1212** **Measurements**

Description: A course to develop skills and knowledge related to measurement tools, measurement tool usage, and fasteners of small engine and equipment components.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
2	1	2	45

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Identify and describe tools/equipment, measurement practices, and fasteners for working in a shop/lab and industry. (EEC100, EEC200, EEC300)
2. Identify the different types of bolts, nuts, and washers, and describe their appropriate uses. (EEC100, EEC200, EEC300)
3. Identify bolts by grade, diameter, length, and thread pitch. (EEC100, EEC200, EEC300)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: **SET 1313** **Four-Cycle Engines**

Description: A course to develop skills and knowledge related to four-cycle small engine and equipment repair and maintenance. Includes instruction in assembly, lubrication, and fuel systems.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe and discuss basic principles of four-cycle engine operation. (EEC100, EEC200, EEC300)
2. Describe the components of the four-cycle basic engine assembly. (EEC100, EEC300)
3. Describe the components of the four-cycle engine lubrication system. (EEC100, EEC300)
4. Describe components of the four-cycle gasoline fuel system. (EEC100, EEC300)
5. Describe and service the four-cycle engine ignition system. (EEC100, EEC300)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: **SET 1322** **Two-Cycle Engines**

Description: A course to develop skills and knowledge related to two-cycle small engine and equipment repair and maintenance. Includes instruction in assembly, lubrication, and fuel systems.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
2	1	2	45

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe and discuss basic principles of two-cycle engine operation. (EEC100, EEC300)
2. Describe the components of the two-cycle basic engine assembly. (EEC100, EEC300)
3. Describe the components of the two-cycle engine lubrication system. (EEC100, EEC300)
4. Describe components of the two-cycle gasoline fuel system. (EEC100, EEC200, EEC300)
5. Describe and service the two-cycle engine ignition system. (EEC100, EEC300)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: SET 1413 Small Engine Shop Management

Description: Provides students with skills and knowledge related to management and operation of a small engine repair shop. Includes instruction in shop safety and OSHA regulations, shop tools and equipment, shop design, overall shop maintenance, and inventory control.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Apply personal safety practices and protective devices. (EEC100, EEC200, EEC300)
2. Apply practices associated with repair shop operations. (EEC100, EEC200, EEC300)
3. Demonstrate the safe and proper use of hand and small power tools and equipment. (EEC100, EEC200, EEC300)
4. Describe career opportunities in small engine and equipment repair. (EEC100, EEC200, EEC300)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: SET 1512 Frame Inspection and Maintenance

Description: A course to develop skills and knowledge related to small equipment frame (chassis) repair and maintenance. Includes instruction in oxyfuel cutting and arc welding as well as painting and other frame (chassis) maintenance.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
2	1	2	45

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Perform basic oxyfuel cutting operations. (EEC100, EEC200, EEC300)
2. Perform basic electrical arc welding. (EEC100, EEC200, EEC300)
3. Recondition and repair frame (chassis). (EEC100, EEC200, EEC300)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: SET 2134 Small Engine Mechanics III

Description: A continuation of Small Engine Mechanics II with emphasis on steering and suspension systems.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
4	0	8	120

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Analyze and apply principles of troubleshooting on small engines and equipment. (EEC100, EEC200, EEC300)
2. Inspect and apply diagnostic procedures on steering and suspension system problems. (EEC100, EEC200, EEC300)
3. Troubleshoot a multi-cylinder engine.

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: SET 2144 Small Engine Mechanics IV

Description: A continuation of Small Engine Mechanics III with emphasis on troubleshooting and performing maintenance on a variety of systems.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
4	0	8	120

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Apply general safety principles and safety requirements for working with landscape and turf equipment. (EEC100, EEC200, EEC300)
2. Troubleshoot and perform basic maintenance of landscape and turf equipment. (EEC100, EEC200, EEC300)
3. Troubleshoot transmission failure, troubleshoot transaxle failure, and troubleshoot Hydrostatic transaxle failure. (EEC100, EEC200, EEC300)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: SET 2153 Small Engine and Equipment Analysis and Repairs I

Description: A course to provide skills and knowledge related to the operation, troubleshooting, and repair of systems related to equipment. Includes instruction on a variety of equipment and troubleshooting techniques related to equipment.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Apply proper safety procedures, and perform preventative maintenance regarding failure analysis and repair of equipment. (EEC100, EEC200, EEC300)
2. Troubleshoot and repair of equipment. (EEC100, EEC200, EEC300)
3. Prepare a report on time and costs involved in repairing equipment.

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: SET 2165 Small Engine and Equipment Analysis and Repairs II

Description: A course to provide skills and knowledge related to the operation, troubleshooting, and repair of systems related to equipment. Includes instruction on a variety of equipment and troubleshooting techniques related to equipment.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
5	0	10	150

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Apply proper safety procedures, and perform preventative maintenance regarding failure analysis and repair of equipment. (EEC100, EEC200, EEC300)
2. Demonstrate advanced troubleshooting techniques and repair of equipment. (EEC100, EEC200, EEC300)
3. Perform preventive maintenance on equipment.

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: SET 2333 Small Engine and Equipment Project I

Description: A course designed for establishment of skills and knowledge for introductory projects related to small engine and equipment.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	0	6	90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Follow a set of instructor-written guidelines for the project.
2. Apply introductory skills needed to be a viable member of the workforce.
3. Develop a written occupational objective in the project.

Standards

Specific standards for this course will depend upon the nature of the problem under investigation.

Course Number and Name: SET 2343 Small Engine and Equipment Project II

Description: A course designed for establishment of skills and knowledge for basic projects related to small engine and equipment.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	0	6	90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Follow a set of instructor-written guidelines for the project.
2. Apply introductory skills needed to be a viable member of the workforce.
3. Develop a written occupational objective in the project.

Standards

Specific standards for this course will depend upon the nature of the problem under investigation.

Course Number and Name: SET 2353 Engine Troubleshooting

Description: A course to develop skills and knowledge associated with the basics of equipment diagnostics and trouble shooting. Instruction is provided on tools and equipment used in diagnosis, fasteners, fluids, and measurement devices.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Demonstrate the use of special tools, equipment, and supplies used in diagnosing and servicing small equipment. (EEC100, EEC200, EEC300)

2. Apply principles of failure analysis related to engine performance. (EEC100, EEC200, EEC300)

3. Apply principles of troubleshooting on small engines and equipment. (EEC100, EEC200, EEC300)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: SET 2363 Small Engine and Equipment Project III

Description: A course designed for establishment of skills and knowledge for intermediate projects related to small engine and equipment.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	0	6	90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Follow a set of instructor-written guidelines for the project.
2. Apply intermediate skills needed to be a viable member of the workforce.
3. Develop a written occupational objective in the project.

Standards

Specific standards for this course will depend upon the nature of the problem under investigation.

Course Number and Name: SET 2373 Small Engine and Equipment Project IV

Description: A course designed for establishment of skills and knowledge for advanced projects related to small engine and equipment.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	0	6	90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Follow a set of instructor-written guidelines for the project.
2. Apply advanced skills needed to be a viable member of the workforce.
3. Develop a written occupational objectives in the project.

Standards

Specific standards for this course will depend upon the nature of the problem under investigation.

Course Number and Name: SET 2523 Maintenance and Repair of Cutting Mechanisms

Description: A course to develop skills and knowledge related to the maintenance and repair of cutting mechanisms used in landscape and turf operations including mowers, trimmers, edgers, and saws. Includes instruction in drive systems, blade sharpening and height adjustment, reel grinding and adjustment, and chain saw chain sharpening and adjustment.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Compare features and uses of cutting devices used in landscape and turf maintenance. (EEC100, EEC200)
2. Inspect and repair rotary mowers. (EEC100, EEC200)
3. Inspect and repair reel mower assemblies. (EEC100, EEC200)
4. Inspect and repair trimmers and edgers. (EEC100, EEC200)
5. Inspect and repair/sharpen a chain saw bar and chain assembly. (EEC100, EEC200)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components

Course Number and Name: SET 2533 Hydraulics

Description: A course to develop skills and knowledge related hydraulics as it relates to small equipment chassis repair and maintenance. Includes instruction on hydraulics will be components, diagnosis, and repair of the hydraulic system.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe and discuss basic principles of a hydraulic system operation. (EEC200)
2. Inspect and evaluate general hydraulic system and components. (EEC200)
3. Identify causes of failure and corrections of hydraulic systems and their components.

Equipment and Engine Training Council Standards

EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components

Course Number and Name: SET 2543 Transmissions and Transaxles

Description: A course to develop skills and knowledge related to small equipment transmissions and transaxles. Includes instruction for transmission and transaxle service, diagnosis, and repair.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Describe and discuss basic principles and components of transmission and transaxle operation. EEC200
2. Explore the components of the transmission/transaxle lubrication system. (EEC200)
3. Disassemble, inspect/test components (replace as necessary), and reassemble a transmission/transaxle.

Equipment and Engine Training Council Standards

EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components

Course Number and Name: SET 2613 Small Engine Electrical Systems

Description: A course to develop skills and knowledge related to the operating principles of direct current circuits. Includes instruction on basic electrical principles, safety procedures, batteries, conductors, and switches.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Apply basic terms and principles of DC electricity. (EEC100, EEC200, EEC300)
2. Inspect and service a battery. (EEC300)
3. Demonstrate basic skills and knowledge related to electrical circuits in small engines. (EEC300)
4. Demonstrate basic skills related to starting and charging circuits. (EEC300)

Equipment and Engine Training Council Standards

EEC100 Two and Four Stroke Gasoline Engines, Systems, and Components
EEC200 Drivelines/Hydraulics/Hydrostatic Systems and Components
EEC300 Electrical Systems and Components

Course Number and Name: SET 281(1-3) Special Problem in Small Engine and Equipment Repair Technology

Description: A course designed to provide the student with practical application of skills and knowledge gained in other Small Engine and Equipment Repair Technology courses through the use of a special problem. The instructor works closely with the student to insure that the selection of a project will enhance the student's learning experience.

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
1-3	0	2-6	30-90

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Develop a written plan that details the activities and projects to be completed.
2. Assess accomplishment of objectives.
3. Use and follow a set of written guidelines for the special problem.

Standards

Specific standards for this course will depend upon the nature of the problem under investigation.

Course Number and Name: **S**ET 291(1-6) Supervised Work Experience in Small Engine and Equipment Repair Technology

Description: A course that is a cooperative program between industry and education designed to integrate the student's technical studies with industrial experience. Variable credit is awarded on the basis of one semester hour per 45 industrial contact hours.

Hour Breakdown:

Semester Credit Hours	Lecture	Externship	Contact Hours
1-6	0	3-18	45-270

Prerequisite: Instructor Approved

Student Learning Outcomes:

1. Follow a set of instructor-written guidelines for the supervised work experience program.
2. Apply skills needed to be a viable member of the workforce.
3. Practice human relationship skills in the supervised work experience program.
4. Practice positive work habits, responsibilities, and ethics.
5. Develop written occupational objectives in the supervised work experience program.
6. Assess performance of occupational skills.

Standards

Specific standards for this course will depend upon the nature of the problem under investigation.

Course Number and Name: WBL 191(1-3), WBL 192(1-3), WBL 193(1-3), WBL 291(1-3), WBL 292(1-3), and WBL 293(1-3) Work-Based Learning I, II, III, IV, V, and VI

Description: A structured work-site learning experience in which the student, program area teacher, Work-Based Learning Coordinator, and worksite supervisor/mentor develop and implement an educational training agreement. Designed to integrate the student's academic and technical skills into a work environment. Includes regular meetings and seminars with school personnel for supplemental instruction and progress reviews. (1-3 sch: 3-9 hours externship)

Hour Breakdown:

Semester Credit Hours	Lecture	Lab	Contact Hours
4	2	4	90

Prerequisite: Instructor approved

Student Learning Outcomes:

1. Apply technical skills and related academic knowledge needed to be a viable member of the workforce.
   a. Apply technical skills needed to be a viable member of the workforce.
   b. Apply skills developed in other related courses in a work-based setting.
   c. Perform tasks detailed in an educational training agreement at the work setting.

2. Apply general workplace skills to include positive work habits and responsibilities necessary for successful employment.
   a. Demonstrate pro-active human relationship skills in the work setting to include conflict resolution, team participation, leadership, negotiation, and customer/client service.
   b. Demonstrate time, materials, and resource management skills.
   c. Demonstrate critical thinking skills such as problem solving, decision making, and reasoning.
   d. Demonstrate acquiring, evaluating, organizing, maintaining, interpreting, and communicating information.
   e. Demonstrate positive work habits and acceptance of responsibilities necessary for successful employment.

APPENDIX A: RECOMMENDED TOOLS AND EQUIPMENT

CAPITALIZED ITEMS

1. Basic student tool set (1 per student)
    - ¼-in. drive socket set standard and deep 3/16 in. to 9/16 in. and metric (5 mm to 15 mm)
    - 1/4-in. drive ratchet, universal joint, and extensions
    - 3/8-in. drive socket set standard 5/16 in. to 7/8 in. and metric (10 mm to 19 mm)
    - 3/8-in. ratchet with universal joint and extensions
    - 1/2-in. socket set standard and deep 7/16 in. to 1 ¼ in. and metric (10 mm to 24 mm)
    - ¼-in., 3/8-in., and 1/2-in. pull handles
    - 1/4-in., 3/8-in., and 1/2-in. torque wrenches
    - Combination wrench set (1/4 in. to 1 ¼ in. and 10 mm to 24 mm)
    - Punch and chisel set
    - Tongue and grove, regular, needle nose, and cutting pliers
    - Open end adjustable wrenches (2)
    - Allen wrenches 1.5 mm to 10 mm and 0.028 in. to 3/8 in.
    - Screwdriver set - Standard and Phillips
    - Torx driver set
    - 16-oz ball-peen hammer
    - 1.5-oz brass hammer
    - Soft face hammer
    - 1/2-in. air impact driver
    - 1/2-in. Impact socket set socket set standard and deep 7/16 in. to 1 ¼ in. and metric (10 mm to 24 mm)
    - 3/8-in. cordless electric impact driver
    - 3/8-in. impact socket set standard 5/16 in. to 7/8 in. and metric (10 mm to 19 mm)
    - Convertible snap ring pliers
    - Digital volt-ohm meter
    - Circuit continuity tester
    - Gasket scrapper
    - Magnetic pickup tool
    - Locking jaw pliers (ViseGrip)
    - Tool chest or cabinet
    - Flashlight
    - Mechanics gloves
    - Rubber safety gloves
    - Battery terminal cleaner
    - Battery terminal pliers
    - Safety glasses
    - Hearing protection
2. Air compressor with regulator and hoses (1)
3. Mechanics benches with vise (1 per 2 students)
4. Oxyfuel cutting torch set
5. Hydraulic floor hoist
6. Hydraulic press with adapters
7. Parts cleaning tank with gloves

8. Hydraulic pressure testing kit
9. SMAW welder (2)
10. GMAW welder (2)
11. Pressure washer
12. Hydraulic or pneumatic lift table (2)
13. String trimmer (2)
14. Chain saw (2)
15. Reel mower
16. Reel and Bed knife grinder with accessories and attachments (1)
17. Rotary mower (residential) (2)
18. Zero turn hydrostatic mower
19. Edger (2)
20. Utility vehicle (Gator)
21. Commercial 20-in. rotary mower
22. Gasoline pole pruner
23. Compact diesel engine
24. Stationary two-stroke engines (4)
25. Stationary four-stroke engines (4)
26. Valve and seat grinder
27. Computer with monitor, printer, and Internet access (1 per 2 students)
28. Flammable material cabinet
29. Engine dynamometer (0-50 hp)
30. Tire machine

NON-CAPITALIZED ITEMS

1. Bench grinder (2)
2. Drill (1/2-in. variable speed reversible) with drill bits
3. Drill (3/3-in. variable speed reversible) with drill bits
4. Extension cords (1 per 2 students)
5. Hoists (2)
6. Master puller set
7. Oil filter wrench
8. Remote starter switch
9. Soldering gun
10. Tap and die set (standard and metric)
11. Thread repair kit (standard and metric)
12. Tire pressure gauge (4)
13. Trouble/work light (4)
14. Hose clamp pliers (4)
15. Impact screwdriver set (1)
16. Waste oil receptacle
17. Hack saw (4)
18. Battery charger/starter (2)
19. Battery load tester (2)
20. Battery hydrometer
21. 6-in. steel ruler (4)
22. Cylinder bore gauge (2)
23. Depth micrometer (2)
24. Inside micrometer set (2)
25. Outside micrometer set (2)
26. Feeler gauge set (4)
27. Dial calipers (metric and standard) (2)
28. Dial indicator with base (2)

29. Engine tachometer (2)
30. Multimeter (4)
31. Belt tension gauge
32. Piston ring expander (2)
33. Piston groove cleaning tool (2)
34. Antifreeze coolant tester (4)
35. Carburetor nozzle tool
36. Ridge reamer
37. Radiator and pressure cap tester
38. Cylinder hone
39. Valve spring compressor
40. Ring compressor
41. Strap wrench
42. Oil filter wrenches (assorted sizes)
43. Ignition wrenches
44. Spanner wrenches
45. Flywheel puller
46. Hand held side grinder (2)
47. Commercial blade grinder
48. Commercial chain saw sharpener
49. Electrical terminal connecting tool
50. Crankcase pressure tester
51. Spark tester
52. Timing light
53. Oil disposal container
54. Mechanics creeper (4)

(NOTE: Additional manufacturer specific tools will be required to work on specific engines.)

RECOMMENDED INSTRUCTIONAL AIDS

It is recommended that instructors have access to the following items:

1. Microcomputer integrated software package (word processing, spreadsheet, and database)
2. LCD video projector
3. VCR/DVD player
4. TV monitor
5. ELMO
6. Bore scope
7. Digital camera

APPENDIX B: CURRICULUM DEFINITIONS AND TERMS

Course Name – A common name that will be used by all community colleges in reporting students

Course Abbreviation – A common abbreviation that will be used by all community and junior colleges in reporting students

Classification – Courses may be classified as the following:

a. Career Certificate Required Course – A required course for all students completing a career certificate.
b. Technical Certificate Required Course – A required course for all students completing a technical certificate.
c. Technical Elective – Elective courses that are available for colleges to offer to students.

Description – A short narrative that includes the major purpose(s) of the

Prerequisites – A listing of any courses that must be taken prior to or on enrollment in the course

Corequisites – A listing of courses that may be taken while enrolled in the course

Student Learning Outcomes – A listing of the student outcomes (major concepts and performances) that will enable students to demonstrate mastery of these competencies

The following guidelines were used in developing the program(s) in this document and should be considered in compiling and revising course syllabi and daily lesson plans at the local level:
The content of the courses in this document reflects approximately 75% of the time allocated to each course. The remaining 25% of each course should be developed at the local district level and may reflect the following:

Additional competencies and objectives within the course related to topics not found in the state framework, including activities related to specific needs of industries in the community college district
Activities that develop a higher level of mastery on the existing competencies and suggested objectives
Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed or revised
Activities that include integration of academic and career–technical skills and course work, school-to-work transition activities, and articulation of secondary and postsecondary career–technical programs
Individualized learning activities, including work-site learning activities, to better prepare individuals in the courses for their chosen occupational areas.

Sequencing of the course within a program is left to the discretion of the local college. Naturally, foundation courses related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other courses related to specific skill areas and related academics, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors. Programs that offer an Associate of Applied Science Degree must include all of the required Career Certificate courses, Technical Certificate courses **AND** a minimum of 15 semester hours of General Education Core Courses. The courses in the General Education Core may be spaced out over the entire length of the program so that students complete some academic and Career Technical courses each semester. Each community college specifies the actual courses that are required to meet the General Education Core Requirements for the Associate of Applied Science Degree at their college.

In order to provide flexibility within the districts, individual courses within a framework may be customized by doing the following:

Adding new student learning outcomes to complement the existing competencies and suggested objectives in the program framework.
Revising or extending the student learning outcomes
Adjusting the semester credit hours of a course to be up 1 hour or down 1 hour (after informing the Mississippi Community College Board [MCCB] of the change)

APPENDIX C: COURSE CROSSWALK

COURSE CROSSWALK

Small Engine and Equipment Repair Technology

CIP 01.0299 Agricultural Mechanization, Other

Note: Courses that have been added or changed in the 2019 curriculum are highlighted.

Existing			Revised		
2012 MS Curriculum Framework			2019 MS Curriculum Framework		
Course Number	**Course Title**	**Hours**	**Course Number**	**Course Title**	**Hours**
SET 1114	Small Engine Mechanics I	4	SET 1113	Small Engine Mechanics I	3
SET 1124	Small Engine Mechanics II	4	SET 1123	Small Engine Mechanics II	3
SET 1212	Measurements	2	SET 1212	Measurements	2
SET 1313	Four-Cycle Engines	3	SET 1313	Four-Cycle Engines	3
SET 1322	Two-Cycle Engines	2	SET 1322	Two-Cycle Engines	2
SET 1413	Small Engine Shop Management	3	SET 1413	Small Engine Shop Management	3
SET 1512	Frame Inspection and Maintenance	2	SET 1512	Frame Inspection and Maintenance	2
SET 2134	Small Engine Mechanics III	4	SET 2134	Small Engine Mechanics III	4
SET 2144	Small Engine Mechanics IV	4	SET 2144	Small Engine Mechanics IV	4
SET 2155	Small Engine and Equipment Analysis and Repairs I	5	SET 2153	Small Engine and Equipment Analysis and Repairs I or Supervised Work Experience in Small Engine and Equipment Repair Technology	3
SET 2165	Small Engine and Equipment Analysis and Repairs II	5	SET 2165	Small Engine and Equipment Analysis and Repairs II	5
SET 2313	Small Engine and Equipment Projects I	3	SET 2333	Small Engine and Equipment Projects I	3
SET 2323	Small Engine and Equipment Projects II	3	SET 2343	Small Engine and Equipment Projects II	3
SET 2333	Small Engine and Equipment Projects III	3	SET 2363	Small Engine and Equipment Projects III	3
SET 2343	Small Engine and Equipment Projects IV	3	SET 2373	Small Engine and Equipment Projects IV	3
SET 2353	Engine Troubleshooting	3	SET 2353	Engine Troubleshooting	3
SET 2523	Maintenance and Repair of Cutting Mechanisms	3	SET 2523	Maintenance and Repair of Cutting Mechanisms	3
SET 2533	Hydraulics	3	SET 2533	Hydraulics	3
SET 2543	Transmissions and Transaxles	3	SET 2543	Transmissions and Transaxles	3
SET 2613	Small Engine Electrical Systems	3	SET 2613	Small Engine Electrical Systems	3
SET 281(1-3)	Special Problem in Small Engine and Equipment Repair Technology	1-3	SET 281(1-3)	Special Problem in Small Engine and Equipment Repair Technology	1-3
SET 291(1-6)	Supervised Work Experience in Small Engine and Equipment Repair	1-6	SET 291(1-6)	Supervised Work Experience in Small Engine and Equipment Repair Technology	1-6

APPENDIX D: RECOMMENDED TEXTBOOK LIST

Recommended Textbook List CIP 01.0299 Agricultural Mechanization, Other		
Book Title	**Author(s)**	**ISBN**
Small Gas Engines	Alfred C. Roth, Blake J. Fisher, & W. Scott Gauthier	978-1-63126-390-3
Two-Stroke Engines	Harry Senn	978-1-63126-862-5