UTILITY LINEMAN Electrical Line Worker Mississippi Curriculum Framework

Program CIP: 46.0303-Utility Lineman CIP 46.0301-Electrical Line Worker

2018







Published by: Mississippi Community College Board Division of Workforce, Career, and Technical Education 3825 Ridgewood Road Jackson, MS 39211 Phone: 601-432-6155 Email: curriculum@mccb.edu

FACULTY WRITING TEAM MEMBERS

Randy Henry, Pearl River Community College Doyle Perkins, East Mississippi Community College David Eubanks, Mississippi Gulf Coast Community College

Administrator Writing Team Members

Brock Clark, Dean, Mississippi Gulf Coast Community College James Rush, Dean, East Mississippi Community College Dr. Ed Pinero, Dean, Pearl River Community College

BUSINESS AND INDUSTRY CONTRIBUTING TEAM MEMBERS

*Denotes industry members who attended the writing meeting *Andy Robinson, East Mississippi Electric Power Association *Tom Davis, Singing River Electric, Engineering Manager Jason Havard, Singing River Electric Cooperative, Safety Manager Aaron Achord, Magnolia Electric Power, E&O Manager Raymond May, Pearl River Valley Electric Power Association Daniel Evans, Magnolia Electric Power, Engineer Sherry Wallace, East Mississippi Electric Power Association Chris Sharp, McElroy Electric, Vice President Andy Robinson, EMEPA, Line Supervisor Ed Morrow, EMEPA, Line Foreman Zane Royal, Logistc Engineering and Development, Owner Becky Canull, Four County EPA, Training Coordinator Joe Miller, Four County EPA, Safety Coordinator

OFFICE OF CURRICULUM AND INSTRUCTION TEAM MEMBERS

Scott Kolle, Ph.D., Director of Curriculum, Mississippi Community College Board LaToya Sterling, Ph.D., Curriculum Specialist, Mississippi Community College Board Sheriece Robinson, Ed.D. Curriculum Specialist, Mississippi Community College Board 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.

Copyright[©] 2018 by Mississippi Community College Board For information, please contact <u>curriculum@mccb.edu</u>

Contents

NATIONAL CER	RTIFICATION & STANDARDS	6
INDUSTRY JO	B PROJECTION DATA	7
ARTICULATIC	DN	
ONLINE AND B	LENDED LEARNING OPPORTUNITIES	9
ASSESSMENT S	TRATEGIES	9
RESEARCH AE	3STRACT	
REVISION HIS	STORY	
Credit by Ex	AMINATION	
PROGRAM DE	SCRIPTION	
SUGGESTED C	COURSE SEQUENCE	
Accelerate	ed Integrated Career Pathway	
16- Week	Line Worker Certificate Required Courses	
Career Ce	rtificate Required Courses	
Technical	Certificate Required Courses	
GENERAL EDU	JCATION CORE COURSES	
UTILITY LINE	MAN COURSES	
Course Desc	CRIPTIONS	
ULT 1112	Interpersonal Skills for Line Workers	
ULT 1118	Electrical Lineman I	
ULT 1122	Line Worker Safety	20
ULT 1128	Electrical Lineman II	21
ULT 1133	Safety for Line Workers	22
ULT 1144	AC and DC Circuits for Utility Line Worker Technology	23
ULT 1152	AC and DC Circuits for Utility Line Worker Technology	24
ULT 1192	Fundamentals of Electricity for Line Workers	25
ULT 1213	Electric Power	26
ULT 1213	Electric Power	27
ULT1223	Transformer Operation and Banking	
ULT 1232	Electrical Power and Transformer Banking for Line Workers	29
ULT 1313	Line Worker Truck Driver	
ULT 1324	Truck Driving for Line Workers	
ULT 1333	Basic Utility Equipment Operation	32
ULT 1413	Pole Climbing	
ULT 1514	Overhead, Underground, and Substation Construction	
ULT 1523	National Electric Safety Code (Safety Code)	35
ULT 1612	Computer Fundamentals for Line Workers	
ULT 1623	Lineworker Computer Fundamentals	

ULT 2133	Overhead Construction	38
ULT 2143	Underground Construction	39
ULT 2233	System Design and Operation	40
ULT 2244	Working in Elevated Work Sites	41
ULT 2333	Advanced Utility Equipment Operation	42
ULT 291(1-3)	Special Project	43
ULT 292(1-3)	Special Project	44
ULT 293. (1-3	3) Special Project	45
ULT 294 (1-3) Supervised Work Experience I	46
ULT 295 (1-3) Supervised Work Experience II	47
APPENDIX A REG	COMMENDED TOOLS AND EQUIPMENT	48
Appendix B Cu	RRICULUM DEFINITIONS AND TERMS	50
Appendix C: Re	COMMENDED TEXTBOOK LIST	52
APPENDIX D: CO	DURSE CROSSWALK	53

NATIONAL CERTIFICATION & STANDARDS

The National Center for Construction Education and Research

NCCER is a not-for-profit 501(c) (3) education foundation created in 1996 as The National Center for Construction Education and Research. It was developed with the support of more than 125 construction CEOs and various association and academic leaders who united to revolutionize training for the construction industry. Sharing the common goal of developing a safe and productive workforce, these companies created a standardized training and credentialing program for the industry. This progressive program has evolved into curricula for more than 70 craft areas and a complete series of more than 70 assessments offered in over 4,000 NCCER-accredited training and assessment locations across the United States.

NCCER develops standardized construction and maintenance curriculum and assessments with portable credentials. These credentials are tracked through NCCER's Registry System that allows organizations and companies to track the qualifications of their craft professionals and/or check the qualifications of possible new hires. NCCER's Registry System also assists craft professionals by maintaining their records in a secure database.

For more information, please visit <u>www.nccer.org</u>.

INDUSTRY JOB PROJECTION DATA

The Utility Lineman requires Postsecondary Career and Technical Award. There is expected to be a 6.25% increase in occupational demand at the regional level and the state level and 2.09% increase at the national level. Median annual income for this occupation is \$55,971.00 at the state level. A summary of occupational data from www.swib.ms.gov/DataCenter/ is displayed below:

Table 1: Education Level

Program Occupations	Education Level
FIRST-LINE SUPERVISORS/MANAGERS OF MECHANICS, INSTALLERS,	WORK EXPERIENCE IN RELATED FIELD
AND REPAIR	
ELECTRICAL POWER-LINE INSTALLERS AND REPAIRS	LONG TERM ON THE JOB TRAINING

Table 2: Occupational Overview

	Region	State	United States
2016 Occupational Jobs	5,950	5,950	597, 127
2026 Occupational Jobs	6,046	6,046	613,147
Total Change	96	96	16,020
Total % Change	1.16%	1.16%	2.68%
2016 Median Hourly Earnings	\$26.91	\$26.91	\$31.27
2016 Median Annual Earnings	\$55,971	\$55,971	\$65,035
Annual Openings	10	10	55,100

Table 3: Occupational Breakdown

Description	2016 Jobs	2026 Jobs	Annual Openings	2016 Hourly Farnings	2026 Annual Farnings
				Lannigs	2,080 Work
	4 1 2 7	1 1 6 1	2	¢26.71	CE EEZ
AND REPAIR	4,137	4,101	2	\$20.71	، دכ, د د ډ
ELECTRICAL POWER-LINE INSTALLERS AND REPAIRS	1,813	1,885	7	\$27.45	\$57,096
TOTAL	5 <i>,</i> 950	6,046	10	\$26.91	\$55,973

Table 4: Occupational Change

Description	Regional Change	Regional % Change	State % Change	National % Change
FIRST-LINE SUPERVISORS/MANAGERS OF MECHANICS, INSTALLERS,	24	0.58%	0.58%	2.09%
AND REPAIR				
ELECTRICAL POWER-LINE INSTALLERS AND REPAIRS	72	3.97%	3.97%	4.53%

ARTICULATION

At this time, there is no secondary Utility Lineman program to articulate into this postsecondary program.

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. To use the approved Alternate Assessment for the following programs of study, colleges should provide a Letter of Notification to the Director of Career Technical Education at the MS Community College Board. Please see the following link for further instructions: http://www.mccb.edu/wkfEdu/CTDefault.aspx.

CIP Code	Program of Study	
46.0303	Utility Lineman	
	Standard Assessment	
	MS CPAS	
CIP Code	Program of Study	
46.0301	Electrical Line Worker	
	Standard Assessment	
	NCCER Core NCCER Utility Lineman Level I	Career Certificate

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.

ASSESSMENT STRATEGIES

The Office of Curriculum and Instruction's professional development offer assessment strategies to faculty members implementing the curriculum. Additionally, standards were included in course content when appropriate.

RESEARCH ABSTRACT

In the fall of 2018, the Office of Curriculum and Instruction (OCI) met with the different industry members who made up the advisory committees for the Utility Lineman program. An industry questionnaire was used to gather feedback concerning the trends and needs, both current and future, of their field. Program faculty, administrators, and industry members were consulted regarding industry workforce needs and trends.

Industry advisory team members from the college involved with this program were asked to give input related to changes to be made to the curriculum framework. Specific comments related to soft skills needed in this program include having a positive attitude, being at work every day and on time, being able to work extended hours, weekend and holidays. Occupation-specific skills stated include knowing material identification, pole climbing, tool identification, underground and overhead construction, and knowledge of system operation.

REVISION HISTORY

2011, Research and Curriculum Unit, Mississippi State University 2018, Office of Curriculum and Instruction, Mississippi Community College Board

CREDIT BY EXAMINATION

The following **NCCER** modules are aligned to courses listed below. Each module will serve as the state recommended exam to reward credit for prior learning experiences. Colleges have the local autonomy to create a college-level exam when awarding credit.

Course Number and Name	NCCER Credential and Module
ULT 1133 Safety for Line	NCCER Core Curriculum
workers	1. Module 00101-15 Basic Safety
	2. Module 00102-15 Introduction to Construction Math
	3. Module 00103-15 Introduction to Hand Tools
	4. Module 00104-15 Introduction to Power Tools
	5. Module 00105-15 Introduction to Construction Drawing
	6. Module 00106-15 Basic Rigging
	7. Module 00107-15 Basic Communication Skills
	8. Module 00108-15 Basic Employability Skills
	9. Module 00109-15 Introduction to Materials Handling
	10. Module 00101-15 Basic Safety
	11. Module 00102-15 Introduction to Construction Math
	12. Module 00103-15 Introduction to Hand Tools
	13. Module 00104-15 Introduction to Power Tools
	14. Module 00105-15 Introduction to Construction Drawing
	15. Module 00106-15 Basic Rigging
	16. Module 00107-15 Basic Communication Skills
	17. Module 00108-15 Basic Employability Skills
	18. Module 00109-15 Introduction to Materials Handling
	NCCER Pole Line Worker Level 1 Modules
	1. Module 49102 Power Line Worker Safety
	2. Module 49107 Tools of the Trade
	3. Module 49113 Introduction to Electrical Test Equipment
ULT 1192 Fundamental of	NCCER Pole Line Worker Level 1 Module
Electricity for Line workers	1. Module 49103 Introduction to Electrical Circuits
	2. Module 49104 Introduction to Electrical Theory
ULT 1333 Basic Utility	NCCER Pole Line Worker Level 1 Module
Operations	1. Module 49109
ULT 1413 Pole Climbing	NCCER Pole Line Worker Level 1 Module
	1. Module 49105 Climbing Wooden Poles
	2. Module 49106 Climbing Structures Other Than Wood
ULT 2133 Overhead	NCCER Pole Line Worker Level 1 Module
Construction	1. Module 49108 Aerial Framing
	2. Module 49110 Rigging
	3. Module 49111 Setting and Pulling Poles
ULT 2143 Underground	NCCER Pole Line Worker Level 1 Module
Construction	1. Module 49112 Trenching. Excavating. Boring Equipment
	2. Module 49109 Utility Service Equipment

PROGRAM DESCRIPTION

The Lineworker Technology curriculum is designed to prepare the student for entry-level employment in the field of utility power transmission and distribution construction, troubleshooting, and repair. The curriculum includes Climbing in Elevated Work Site (Pole Climbing), Overhead Construction, Underground Construction, System Design and Operation, National Electric Safety Code, AC and DC Circuits, and Electric Power. Electives are available in advanced levels of utility line worker technology.

The line worker competencies required in this curriculum were developed to coincide with the standards for the electric power generation, distribution, and transmission industry as described in the United States Department of Labor Occupational Safety and Health Administration.

SUGGESTED COURSE SEQUENCE Accelerated Integrated Career Pathway

			SCH Breakdown			Program Certifications
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	
ULT 1122	Line Worker Safety	2				
ULT 1192	Fundamentals of Electricity for Lineworkers	2				
ULT 1144 OR ULT 1152 OR ULT 1213	AC and DC Circuits for Line Workers OR AC/DC for Lineworker OR Utility Lineman Pole Cimbing	2 OR 3 OR 4				
	Technical Electives	7				
	Total	15				

16- Week Line Worker Certificate Required Courses

						Program Certifications
			SCH Breakdown			Certifications
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	
ULT 1122	Line Worker Safety	2				
ULT 1192	Fundamentals of Electricity for Lineworkers	2				
ULT 1144 OR ULT 1152 OR ULT 1213	AC and DC Circuits for Line Workers OR AC/DC for Lineworker OR Utility Lineman Pole Cimbing	2 OR 3 OR 4				
ULT 1413	Pole Climbing	3				
ULT 1313 OR ULT 1324 OR DTV 1114	Line Worker Truck Driving OR Truck Driving Line Workers OR Commercial Truck Driving	3 OR 4				
ULT 1514	Overhead, Underground, and Substation Construction	4				
	Electives	5				
	TOTAL	30				

Career Certificate Required Courses

						Program Certifications
			эсн ві	еакцомп		
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	
ULT 1122	Line Worker Safety	2				
ULT 1133	Safety for Line Workers	3				
ULT 1313 OR ULT 1324 OR	Line Worker Truck Driving OR Truck Driving Line Workers OR					
DTV 1114	Commercial Truck Driving	3 OR 4				
ULT 1333	Basic Utility Equipment Operations	3				
ULT 1144	AC and DC Circuits for Line Workers	4				NCCER CORE NCCER Level 1
ULT 1413	Pole Climbing	3				
ULT 1523	National Electrical Safety Code	3				
ULT 1514	Overhead, Underground, and Substation Construction	4				
ULT 1192	Fundamentals of Electricity for Lineworkers	2				
ULT 2133	Overhead Construction	3				
ULT 2143	Underground Construction	3				
	Technical Elective	6				
	TOTAL	30				

Technical Certificate Required Courses

			SCH Breakdown			Program Certifications
Course Number	Course Name	Semester Credit Hours	Lecture	Lab	Total Contact Hours	
ULT 2233	System Design and Operation	3				
ULT 2244	Working in Elevated Work Sites	4				
	Technical Electives	8				
	Total	15				

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.

			SCH Breakdow	'n		Contact Ho Breakdowr	our า	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						

General Education Courses

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

UTILITY LINEMAN COURSES

*Any course not listed as a required course may be used as an elective.

			SCH	- Break	lown		Program Certifications
Course	Course Name	Semester Credit Hours	lecture	Lab	Externshin	Total Contact Hours	
DTV 1114	Commercial Truck Driving	4	Lecture	Lub	Externiship	Tiours	
ULT 1118	Electric Lineman I	8					
ULT 1128	Electric Lineman II	8					
ULT 1122	Line Worker Safety	2					
ULT 1133	Safety for Line Workers	3					
ULT 1313	Line Worker Truck Driving	3					
ULT 1324	Truck Driving Line Workers	4					
ULT 1333	Basic Utility Equipment Operations	3					
ULT 1144	AC and DC Circuits for Line Workers	4					
ULT 1413	Pole Climbing	3					
ULT 1523	National Electrical Safety Code	3					
ULT 1514	Overhead, Underground, and Substation Construction	4					
ULT 1623	Lineworker Computer Fundamentals	3					
ULT 1192	Fundamentals of Electricity for Lineworkers	2					
ULT 2133	Overhead Construction	3					
ULT 2143	Underground Construction	3					
ULT 2233	System Design and Operation	3					
ULT 2244	Working in Elevated Work Sites	4					
	All other electives approved by instructor per local community college policy						

COURSE DESCRIPTIONS

Course Number and Name:

Interpersonal Skills for Line Workers

This course is designed to cover the basic communication skills for interaction with others.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	2	2	0	30

Prerequisite:

Description:

Instructor Approved

ULT 1112

Student Learning Outcomes:

1. Discuss customer service.

2. Discuss listening skills.

3. Discuss communication.

Course Number and Name: ULT 1118 Electrical Lineman I

Description:This course covers basic electricity, OSHA standards, CPR instruction and basic
computer technology.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	8	4	8	180

Prerequisite: Instructor Approved

- 1. Demonstrate effective communication by diagramming a pre-trip inspection.
- 2. Demonstrate a present a pre-trip inspection.
- 3. Demonstrate the ability to perform basic operations of the hydraulic systems of the Derrick and Bucket Trucks.
- 4. Demonstrate proficiency using a basic word processor to produce a job resume to present to sponsoring companies on Job Fair Day.
- 5. Demonstrate the ability to discuss customer service.

Course Number and Name: ULT 1122 Line Worker Safety

Description:This course is designed to provide fundamental safety rules and procedures
needed in performing basic line worker skills.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	2	2	0	30

Prerequisite:

Instructor Approved

- 1. Discuss OSHA standards 269
- 2. Provide approved CPR and first aid training and certification
 - a. Discuss transference and avoidance of blood borne pathogens.
- 3. Demonstrate the proper use of personal protective equipment as prescribed by OSHA.
- 4. Discuss job-site safety.
 - a. Demonstrate safety procedures relating to chain saws.
 - b. Discuss safety procedures relating to hydraulic tool operations.
 - c. Discuss pole safety inspection procedures.
- 5. Discuss the importance of the proper handling of HazMat (Hazardous Materials) and MSDSs (Material Safety Data Sheets) as required by OSHA.
- 6. Discuss/ Demonstrate proper testing, grounding , and flagging.

Course Number and Name: ULT 1128 Electrical Lineman II

Description:This course covers transformers, electric codes, pole climbing, and RUS
specifications.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	8	4	8	180

Prerequisite:

Instructor Approved

Student Learning Outcomes:

1. Demonstate critical thinking skills to correctly perform banking and rigging.

2. Manipulate Ohm's Law of math formulas to solve values of voltage, current, resistance, and power.

ULT 1133 **Course Number and Name:** Safety for Line Workers

Description: This course is designed to provide fundamental safety rules and procedures needed in performing basic line worker skills.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

Prerequisite: Instructor Approved

Student Learning Outcomes:

- Discuss OSHA standards. 269 NCCER CORE,NCCER Level 1 Module 49102,Module 49107, Module 49133 1.
- Provide American Red Cross CPR and first aid training and certification. NCCER CORE, Module 49102, Module 49107, Module 2. 49133
 - a. Discuss transference and avoidance of blood-borne pathogens
- Demonstrate the proper use of personal protective equipment as prescribed by OSHA. NCCER CORE, Module 3. 49102, Module 49107, Module 49133
- Discuss job-site safety NCCER CORE 4.
 - a. Demonstrate safety procedures relating to hydraulic tool operations.
 - b. Demonstrate safety procedures relating to hydraulic tool operations.
 - c. Apply pole safety inspection procedures.
- Explain the importance of the proper handling of HazMat (Hazardous Materials) and MSDSs (Material Safety Data Sheets) as required by OSHA. ^{NCCER CORE, Module 49102, Module 49107, Module 49133} Discuss Lockout Tagout procedures. ^{NCCER CORE, Module 49102, Module 49107, Module 49133} 5.
- 6.
- Discuss/Demonstrate proper grounding techniques. NCCER CORE, Module 49102, Module 49107, Module 49133 7.
- Discuss/ Demonstrate proper testing, grounding and flagging for emergency restorations. NCCER CORE, Module 49102, Module 49107, Module 49133 8.

National Center for Construction Education and Research Standards

NCCER Pole Line Worker Core Modules

Module 00101-15	Basic Safety
Module 00102-15	Introduction to Construction Math
Module 00103-15	Introduction to Hand Tools
Module 00104-15	Introduction to Power Tools
Module 00105-15	Introduction to Construction Drawing
Module 00106-15	Basic Rigging
Module 00107-15	Basic Communication Skills
Module 00108-15	Basic Employability Skills
Module 00109-15	Introduction to Materials Handling
Module 00101-15	Basic Safety
Module 00102-15	Introduction to Construction Math
Module 00103-15	Introduction to Hand Tools
Module 00104-15	Introduction to Power Tools
Module 00105-15	Introduction to Construction Drawing
Module 00106-15	Basic Rigging
Module 00107-15	Basic Communication Skills
Module 00108-15	Basic Employability Skills
Module 00109-15	Introduction to Materials Handling

NCCER Pole Line Worker Level 1 Modules

Module 49102	Power Line Worker Safety
Module 49107	Tools of the Trade

Module 49113	Introduction to Electrical Test Equipment				
Course Number and Name:	ULT 1144 AC a	nd DC Circuits	<mark>s for Line Worke</mark> r	[.] Technology	
Description:	Principles and theories associated with AC and DC circuits used in the electrical trades. Includes the study of electrical circuits, law, and formulas and the use of test equipment to analyze AC and DC circuits.				
Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours	
	4	3	2	75	
Prerequisite:	Instructor Approved				

Student Learning Outcomes:

- 1. Demonstrate and practice general safety procedures in the school and work-site environments.
 - a. Apply relevant and appropriate safety techniques.
 - b. Demonstrate and comply with relevant OSHA safety standards.
- 2. Demonstrate and apply a basic AC/DC electrical circuit.
- Demonstrate the meaning of and relationships among and between voltage, current, resistance, and power in AC and DC circuits.
 - a. Explain the relationship between voltage, current, and resistance in AC and DC circuits.
 - b. Explain how power is developed in a circuit.
 - c. Explain proper techniques for connecting a voltmeter or current meter to make measurements.
- 4. Analyze and evaluate the parameters of AC and DC series, parallel, and series-parallel circuits.

5. Analyze transformer voltage, current, impedance transformations, and applications.

a. Calculate primary and secondary transformer voltage and current as related to the transformer's turns ratio.

- b. Explain the theory of reflected impedance between the primary and secondary, or secondaries, of utility transformers.
- c. Explain various transformer ratings, such as voltage, current, power, impedance, frequency, and efficiency.
- d. Explain various transformer losses such as winding losses and core losses.
- e. Construct transformer circuits, and measure voltages and currents as calculated.

ULT 1152 AC and DC Circuits for Utility Line Worker Technology

Description:

Principles and theories associated with AC and DC circuits used in the electrical trades. Includes the study of electrical circuits, laws and formulas, and the use of test equipment to analyze DC circuits.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	2	1	2	30

Prerequisite:

.

Student Learning Outcomes:

1. Demonstrate and practice general safety procedures in the school and work-site environments.

Instructor Approved

- a. Apply relevant and appropriate safety techniques.
- b. Demonstrate and comply with relevant OSHA safety standards.
- 2. Demonstrate and apply a basic AC/DC electrical circuit.
- 3. Demonstrate the meaning of and relationships among and between voltage, current, resistance, and power in AC and DC circuits.
 - a. Explain the relationship between voltage, current and resistance in AC and DC circuits.
 - b. Explain how power is developed in a circuit.
 - c. Explain proper techniques for connecting a voltmeter or current meter to make measurements.
- 4. Analyze and evaluate the parameters of AC and DC series, parallel, and series-parallel circuits.
- 5. Analyze transformer voltage, current, impedance transformations and applications.
 - a. Calculate primary and secondary transformer voltage and current as related to the transformer turns ratio.
 - b. Explain the theory of reflected impedance between the primary and secondary or secondary's, of utility transformers.
 - c. Explain various transformer ratings, such as voltage, current, power, impedance, frequency, and efficiency.
 - d. Explain various transformer losses such as winding losses and core losses.
 - e. Construct transformer circuits, and measure voltage and currents as calculated.

Fundamentals of Electricity for Line Workers ULT 1192

Description:

Fundamental skills associated with all electrical courses. Safety, basic tools, special tools, equipment, and introduction to AC and DC circuits.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	2	1	2	30

Prerequisite:

Instructor Approved

Student Learning Outcomes:

- 1. Apply general safety procedures in the shop, lab, and industrial environment. NCLER Level 1 49103
 - Apply proper safety techniques for all types of circuits and components used in the utility craft. a. Demonstrate an understanding of and comply with relevant OSHA, NEC, and NESC safety b. standards.
- Demonstrate use of electrical tools, equipment, and references. NCCER Level 1 49103 2.
 - Identify and demonstrate proper use of basic tools such as meters, drills, and other hand held a. equipment.
 - Demonstrate the use of and reading of a rule and/or measuring tape. b.
 - c. Locate and interpret information in the NESC relative to a specific job. Solve problems using Ohm's law.
- 3.
 - List three formulae for Ohm's law. а

4. Solve problems for an unknown voltage, amperage, resistance, and wattage. NCCER Level 1 49103

National Center for Construction Education and Research Standards

Module 49103	Introduction to Electrical Circuits
Module 49104	Introduction to Electrical Theory

Course Number and Name:	ULT 1213	Electric Power
-------------------------	----------	----------------

Description:

Electrical motors and their installation. Instruction and practice in using the different types of motors, protection devices, switches, transformers, and alternators found in utility transmission

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

Prerequisite:

Instructor Approved

Student Learning Outcomes:

- Discuss safety and environmental protection concerns associated with electrical power 1 equipment
 - a. List safety precautions associated with motors and transformers.
 - b. Explain the procedures for working with an disposing of hazardous materials. Wire single phase electrical components. NCCER Level 1 49103, NCCER Level 149104
- 2.
 - a. Sketch and connect a single phase transformer for high and low voltage applications.
 - b. Identify, sketch and wire different types of three phase motors to include low and high voltage requirements.
 - c. Explain and demonstrate the applications of an AC generator. $^{\text{NCCER Level 1 49104}}$
- 3. Wire three- phase electrical components.
 - a. Identify, draw, and wire different types of three-phase motors to include low and high voltage requirements.
 - Wire three-phase electrical components found in utility transmission.
 - a. Sketch and connect components found in power grids such as lighting arrestors, surge protectors, high voltage switches, arc arrestors, and others as required by the instructor. NCCER Level 1 49107
 - b. Identify low and high voltage requirements. NCCER Level 1 49109
 - Basic overview of electric power generation, transmission and distribution to the consumer meter. NCCER C. Basic Level 49109

National Center for Construction Education and Research Standards

Module 49102

4.

- Module 49103
- Module 49104
- Module 49107
- Module 49109

Course Number and Name:	ULT 1213	Electric Power

Description:Electrical motors and their installation. Instruction and practice in using the
different types of motors, protection devices, switches, transformers, and
alternators found in utility transmission.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

Prerequisite:

Instructor Approved

- 1. Discuss safety and environmental protection concerns associated with electrical power equipement. (ELT 2.2 ELT 3.7)
 - a. List safety precautions associated with motors and transformers.
 - b. Explain the procedures for working with and disposing of hazardous materials.
- 2. Wire single phase electrical components.
 - a. Sketch and connect a single phase transformer for high and low voltage applications.
 - b. Identify sketch, and wire different types of single phase motors.
 - c. Explain and demonstrate the application of an AC generator.
- 3. Wire three-phase electrical components.
 - a. Identify, draw, and wire different types of three-phase motors to include low and high voltage requirements.
- 4. Wire three-phase electrical components found in utility transmission.
 - a. Sketch and connect components found in power grids such as lighting arrestors, surge protectors, high voltage switches, arc arrestors, and others as required by the instructor.
 - b. Identify, draw, and wire different types of three phase protection devices to include low and high voltage requirements.
 - c. Basic overview of electric power generation, transmission, and distribution to the consumer meter.

Description:	This course is designed "Wye" Transformer Ba 120/240—277/480.	d to cover basic anks including h	single phase operation bookups for 120/208—	ns and Delta and 240/480/
Hour Breakdown:	Semester Credit	Lecture	Lab	Contact Hours

r Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

Transformer Operation and Banking

Prerequisite:

Instructor Approved

Student Learning Outcomes:

Course Number and Name:

- 1. Discuss safety and environmental protection concerns associated with electrical power. Equipment.
 - a. List safety precautions associated with motors and transformers.

ULT1223

- b. Explain the procedures for working with and disposing of hazardous materials.
- 2. Wire single phase electrical components.
 - a. Sketch and connect a single phase transformer
- 3. Wire three-phase electrical components.
 - a. Sketch and connect AC transformers to include delta and wye and three wire and four-wire systems.
 - b. Demonstrate installation of a three-phase open and closed transformer bank.
 - c. Discuss troubleshooting techniques.
 - d. Discuss rotation and phasing

Course Number and Name: ULT 1232 Electrical Power and Transformer Banking for Line Workers

Description:

This course is designed to cover basic single phase operations and Delta and "Wye" Transformer Banks including hookups for 120/208-240/480/--120/240_227/480.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	2	1	2	30

Prerequisite: Instructor Approved

- 1. Discuss safety and environmental protection concerns associated with electrical power equipment.
- 2. List safety and environmental protection concerns associated with electrical power equipment.
- 3. Explain the procedures for working with and disposing of hazardous materials.
- 4. Wire single and three phase electrical components.
 - a. Sketch and connect a single and three phase transformers including delta wye and three wire and four wire systems.
- 5. Discuss troubleshooting techniques.
- 6. Discuss rotation and phasing.

Course Number and Name: ULT 1313 Line Worker Truck Driver

Description:

This course is designed to provide a line worker with fundamental skills needed to obtain a Class A CDL (Commercial Driver's License) with air brake endorsement.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

Prerequisite: Instructor Approved

- 1. Demonstrate the ability to discuss safety precautions in the operation of a DOT regulated combination vehicle with air brake endorsement.
 - a. Discuss rules of the road.
 - b. Discuss precautions to take in driving during daylight and nighttime under various road conditions.
 - c. Identify and discuss highway signs and the meaning of each.
 - d. Discuss DOT rules and regulations.
- 2. Demonstrate the ability to plan a route and perform a pre-trip inspection.
 - a. Identify safety precautions needed prior to a trip.
 - b. Discuss the procedures to follow prior to a trip.
 - c. Perform a pre-trip inspection.
- 3. Demonstrate the ability to perform basic operations of the DOT regulated combination vehicle with air brake endorsement.
 - a. Safely couple and uncouple a DOT regulated combination vehicle with air brake endorsement.
 - b. Upshift and down shift a manual truck transmission.
 - c. Explain and demonstrate the use of rear and side mirrors while driving and safe spacing behind vehicles.
- 4. Safely perform maneuvers listed in the skills assessment as prescribed by MDOT of a combination vehicle.
- 5. Obtain Class A CDL with air brake endorsement.

Description:	This course is designed to provide a line worker with fundamental skills needed to obtain a Class A CDL (Commercial Driver's License) with air brake endorsement.			
Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	4	1	6	90

Truck Driving for Line Workers

Prerequisite:

Instructor Approved

ULT 1324

Student Learning Outcomes:

Course Number and Name:

- 1. Demonstrate the ability to discuss safety precautions in the operation of a DOT regulated combination vehicle with air brake endorsement.
 - a. Discuss rules of the road.
 - b. Discuss precautions to take in driving during daylight and nighttime under various road conditions.
 - c. Identify and discuss highway signs and the meaning of each.
 - d. Discuss DOT rules and regulations.
- 2. Demonstrate trip planning procedures.
- 3. Demonstrate the ability to do a pre-trip inspection
 - a. Identify safety procedures needed prior to a trip.
 - b. Discuss the procedures to follow prior to a trip
 - c. Perform a pre-trip inspection
- 4. Demonstrate the ability to perform basic operations of the DOT regulated combination vehicle with air brake endorsement.
 - a. Safely couple and uncouple a DOT regulated combination vehicle with air brake endorsement.
 - b. Upshift and downshift manual truck transmission.
 - c. Explain and demonstrate the use of rear and side mirrors while driving.
 - d. Explain and demonstrate the correct spacing behind vehicles.
 - e. Park a combination vehicle.
- 5. Develop the ability to safely maneuver a combination vehicle.
 - a. Maneuver a combination through a 12 ft opening.
 - b. Maneuver a combination through a left-hand turn at an intersection.
 - c. Maneuver a combination through right hand turn at an intersection.
- 6. Obtain Class A CDL with air brake endorsement.

ULT 1333 Basic Utility Equipment Operation

Description: This course is designed to prepare students in the basic operation of line worker equipment.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

Prerequisite:

Instructor Approved

Student Learning Outcomes:

- 1. Demonstrate the safe use and operation of an aerial lift truck. NCCER Level 1 49109
- 2. Demonstrate the safe use and operation of a digger derrick. NCCER Level 1 49109
- 3. Demonstrate the safe use and operation of a fork lift. NCCER Level 1 49109
- 4. Demonstrate the safe use and operation of a chain saw. NCCER Level 1 49109
- 5. Demonstrate the safe use and operation of an ATV/RTV/UTV. NCCER Level 1 49109

National Center for Construction Education and Research Standards Module 49109 Utility Service Equipment

Course Number and Name:	ULT 1413	Pole Climbing
-------------------------	----------	---------------

Description:

This course is designed to provide a line worker with fundamental skills needed to perform basic pole climbing.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

Prerequisite:

Instructor Approved

Student Learning Outcomes:

- 1. Discuss and demonstrate use and inspection of pole climbing equipment. $^{\tt NCCER\,Level\,1\,49105}$
- 2. Demonstrate pole climbing skills as prescribed by industry to include 100% fall protection. NCCER Level 1 49106

National Center for Construction Education and Research Standards

Module 49105 Climbing Wooden Poles

Module 49106 Climbing Structures Other Than Wood

Course Number and Name:	ULT 1514	ULT 1514 Overhead, Underground, and Substation Construction				
Description:	This course is d electric line wo substation con	lesigned to provide fu ork dealing with the o struction.	urther fundam verhead/unde	ental training in the field of erground line construction and		
Hour Breakdown:	Semester Credit	Lecture	Lab	Contact Hours		

ur Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	4	2	4	90

Prerequisite:

Instructor Approved

ULT 1514

- Apply industry standard specifications, materials, framing, and tool nomenclature for power system 1. construction
- 2. Demonstrate framing and working on poles up to full height.
- 3. Demonstrate transformer change out
 - a. Demonstrate rigging for transformer change out.
 - b. Demonstrate proper equipment lifting.
 - c. Demonstrate proper roper and knot tying techniques.
- 4. Demonstrate proper protective grounding procedures for power systems.
- 5. Discuss various types of devices used in substation construction.
- 6. Discuss the makeup of outdoor termination, elbows, and splices.
- 7. Discuss the fault finding techniques and various repairs.

Course Number and Name:	ULT 1523	National Electric Sa	fety Code (Sa	fety Code)
Description:	This course is d safety requiren power line indu	esigned to introduce nents as set forth in t ustry	the students he National El	to the basic fundamentals and ectric Safety Code for the
Hour Breakdown:	Semester Credit	Lecture	Lab	Contact Hours

Breakdown:	Semester Credit	Lecture	Lab	Contact Hours
	Hours			
	3	2	2	60

Prerequisite:

Instructor Approved

- 1. Use the NESC as a reference manual to locate information and give a reference of where the information can be found.
- 2. Use the NESC to identify safety clearances in power line construction that includes other utilities: both overhead and underground.

ULT 1612 Computer Fundamentals for Line Workers

Description:

This course is designed to introduce students to basic computer skills.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	2	1	2	30

Prerequisite:

Instructor Approved

Student Learning Outcomes:

- 1. Apply a basic understanding of an operating system.
 - a. Show basic commands of operating system software
 - b. Illustrate the use of work processing software.
 - c. Demonstrate the use of spreadsheet software.

2. Demonstrate use of Internet.

- a. Browse the World Wide Web.
- b. Send electronic mail.

ULT 1623 Lineworker Computer Fundamentals

Description:

This course is designed to introduce students to basic computer skills.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

Prerequisite:

Instructor Approved

Student Learning Outcomes:

1. Apply a basic understanding of an operating system.

- a. Show basic commands of operating system software.
- 2. Demonstrate use of the Internet.
 - a. Browse the World Wide Web
 - b. Send electronic mail.
- 3. Demonstrate the use of Blackboard.
- 4. Illustrate the use of word processing software.
- 5. Demonstrate the use of spreadsheet software.
- 6. Demonstrate the use of presentation software.

ULT 2133 **Overhead Construction**

Description: This course is designed to provide further fundamental training in the field of electric line work dealing with the overhead line construction.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	1	4	75

Prerequisite:	Instructor Approved
---------------	---------------------

Student Learning Outcomes:

- Apply industry standard specifications for pole framing. NCCER Level 1 49108 Discuss material and tool nomenclature 1.
- 2.
- Demonstrate framing and working on poles up to full height. NCCER Level 1 49118 Demonstrate transformer change out from pole. NCCER Level 1 49110 3.
- 4.
 - a. Demonstrate rigging for transformer change out.
 - b. Demonstrate proper equipment lifting.
 - c. Demonstrate proper roper and knot tying techniques.
- Demonstrate proper protective pole grounding procedures for power systems. NCCER Level 1 49110 5.

National Center for Construction Education and Research Standards

- Module 49108 Aerial Framing
- Module 49110 Rigging

Module 49111 Setting and Pulling Poles

ULT 2143 **Underground Construction**

This course is designed to provide further fundamental training in the field of **Description:** electric line work dealing with the overhead to the underground line construction.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	1	4	75

Prerequisite:

Instructor Approved

Student Learning Outcomes:

- 1. Apply industry standard specifications for underground construction. NCCER Level 1 491019
- 2. Discuss material and tool nomenclature.
- 3. Demonstrate transformer change out. NCCER Level 1 491019
 - a. Demonstrate rigging for transformer change out.
 - Demonstrate proper equipment lifting b.
 - Demonstrate proper rope and knot tying techniques c.
- 4. Demonstrate proper protective grounding procedures for power systems. NCCER Level 1 49112
- 5. Demonstrate proper protective grounding NCCER Level 1 49112
- Demonstrate the makeup of outdoor termination, elbows and splices.
 Demonstrate the repairs of various secondary faults.
- Demonstrate the fault finding techniques.

National Center for Construction Education and Research Standards

Module 49112 Trenching, Excavating, Boring Equipment

Module 49109 **Utility Service Equipment**

ULT 2233 System Design and Operation

Description:This course includes operation basics for protection of the electrical systems
overhead, underground, and substation

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	1	4	75

Prerequisite:

Instructor Approved

- 1. Discuss types and uses of fuses. NCCER Level 1 49109
- Discuss types and uses of oil circuit recloses NCCER Level 1 49109
- Discuss the types and uses of regulators. NCCER Level 1 49109
- 4. Discuss the types and uses of capacitor banks. NCCER Level 1 49109
- Discuss the types and uses of sectionalizes. NCCER Level 1 49109
- 6. Discuss the protective equipment use on lateral and dip/riser poles. NCCER Level 1 49109

ULT 2244 Working in Elevated Work Sites

Description:

This course is designed to provide a line worker with fundamental skills needed to perform basic pole climbing.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	4	1	6	105

Prerequisite:

Instructor Approved

- 1. Discuss and demonstrate use and inspection of pole climbing equipment. NCCER Level 1 49106
- 2. Demonstrate pole climbing skills as prescribed by industry on full length poles. NCCER Level 1 49105
- 3. Discuss and demonstrate proper structural inspection procedures of full length pole, cross members, and support. NCCER Level 1 49106
- 4. Demonstrate the proper method of sharpening gaffs. NCCER Level 1 49105
- 5. Demonstrate proper climbing techniques on full length poles. NCCER Level 1 49105
- 6. Demonstrate bucket truck rescue procedures. NCCER Level 1 49105

ULT 2333 **Advanced Utility Equipment Operation**

Description: This course provides an in-depth understanding of the operation of line worker equipment.

Hour Breakdown:	Semester Credit Hours	Lecture	Lab	Contact Hours
	3	2	2	60

Prerequisite:

Instructor Approved

- 1. Demonstrate the safe use and operation of an aerial lift truck. NCCER Level 1 49109
- Demonstrate the safe use and operation of a digger derrick.
- Demonstrate the safe use and operation of a trencher/other equipment ^{NCCER Level 1 49109}
 Demonstrate the safe use and operation of a fork lift. ^{NCCER Level 1 49109}
- 5. Demonstrate the safe use and operation of a chainsaw. NCCER Level 1 49109
- 6. Demonstrate the safe use and operation of an ATV/RTV/UTV. NCCER Level 1 49109

Description:	Practical application of skills and knowledge gained in other electrical or electrical related technical courses. This 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	0	2	30	
	2	0	4	60	

0

6

90

ULT 291(1-3) Special Project

Prerequisite: Instructor Approved

Student Learning Outcomes:

Course Number and Name:

- 1. Develop a written plan an blueprints that detail the activities and projects to be completed.
 - a. Utilize a written plan that details the activities and projects to be completed.
 - b. Perform written occupational objectives in the special project.

3

- 2. Assess accomplishment of objectives.
 - a. Prepare daily written assessment of accomplishment of objectives.
 - b. Present weekly written reports to the instructor in activities performed and objectives accomplished.
- 3. Utilize a set of written guidelines for the special project.
 - a. Develop and follow a set of written guidelines for the special project.

Course Number and Name:ULT 292(1-3) Special ProjectDescription:Practical application of skills and knowledge gained in other electrical or
electrical related technical courses. This 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	0	2	30
	2	0	4	60
	3	0	6	90

Prerequisite:

Instructor Approved

- 1. Develop a written plan an blueprints that detail the activities and projects to be completed.
 - a. Utilize a written plan that details the activities and projects to be completed.
 - b. Perform written occupational objectives in the special project.
- 2. Assess accomplishment of objectives.
 - a. Prepare daily written assessment of accomplishment of objectives.
 - b. Present weekly written reports to the instructor in activities performed and objectives accomplished.
- 3. Utilize a set of written guidelines for the special project.
 - a. Develop and follow a set of written guidelines for the special project.

 Course Number and Name:
 ULT 293. (1-3)
 Special Project

 Description:
 Practical application of skills and knowledge gained in other electrical or electrical related technical courses. This 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	0	2	30
	2	0	4	60
	3	0	6	90

Prerequisite:

Instructor Approved

- 1. Develop a written plan an blueprints that detail the activities and projects to be completed.
 - a. Utilize a written plan that details the activities and projects to be completed.
 - b. Perform written occupational objectives in the special project.
- 2. Assess accomplishment of objectives.
 - a. Prepare daily written assessment of accomplishment of objectives.
 - b. Present weekly written reports to the instructor in activities performed and objectives accomplished.
- 3. Utilize a set of written guidelines for the special project.
 - a. Develop and follow a set of written guidelines for the special project.

ULT 294 (1-3) Supervised Work Experience I

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

Hour Breakdown:	Semester Credit Hours	Lecture	Externship	Contact Hours
	1-6	0	3-9	45-135

Prerequisite:

Instructor Approved

- 1. Apply technical skills needed to be a viable member of the workforce.
 - a. Prepare a description of technical skills to be developed in the supervised work experience program b. Develop technical skills needed to be a viable member of the workforce.
- 2. Apply skills developed in other program area courses.
- a. Perform skills developed in other program area courses in the supervised work experience program3. Apply human relationship skills.
- a. Practice human relationship skills in the supervised work experience program.
- 4. Apply and practice positive work habits and responsibilities.
 - a. Perform assignments to develop positive work habits and responsibilities.
- 5. Work with the instructor and employer to develop written occupational objectives to be accomplished.a. Perform written occupational objectives in the supervised occupational experience program
- 6. Assess accomplishment of objectives.
 - a. Prepare daily written assessment of accomplishment of objectives.
 - b. Present weekly written reports to instructor in activities performed and objectives accomplished
- 7. Utilize a set of written guideline for the supervised work experience
 - a. Develop and follow a set of written guidelines for the supervised work experience.

Course Number and Name: ULT 295 (1-3) Supervised Work Experience II Description: A cooperative program between industry and education and is designed to integrate the student's technical studies with industrial experience. Variable credit is awarded on the basis of semester hour per 45 industrial contact hours. Н

Hour Breakdown:	Semester Credit Hours	Lecture	Externship	Contact Hours
	1-6	0	3-9	45-135

Prerequisite:

Instructor Approved

- 1. Apply technical skills needed to be a viable member of the workforce.
 - a. Prepare a description of technical skills to be developed in the supervised work experience program b. Develop technical skills needed to be a viable member of the workforce.
- 2. Apply skills developed in other program area courses.
- a. Perform skills developed in other program area courses in the supervised work experience program 3. Apply human relationship skills.
- a. Practice human relationship skills in the supervised work experience program.
- Apply and practice positive work habits and responsibilities. 4.
 - a. Perform assignments to develop positive work habits and responsibilities.
- 5. Work with the instructor and employer to develop written occupational objectives to be accomplished. a. Perform written occupational objectives in the supervised occupational experience program
- 6. Assess accomplishment of objectives.
 - a. Prepare daily written assessment of accomplishment of objectives.
 - b. Present weekly written reports to instructor in activities performed and objectives accomplished
- Utilize a set of written guideline for the supervised work experience 7.
 - a. Develop and follow a set of written guidelines for the supervised work experience.

APPENDIX A RECOMMENDED TOOLS AND EQUIPMENT

Capitalized Items

- 1. Bucket truck
- 2. Trailer/Truck required for CDL Class A License
- 3. Utility truck with derrick (2)

Non-Capitalized Items

- 1. Hole Digger *(3)
- 2. Tamp-Wood*(2)
- 3. Tamp-Metal*(1)
- 4. Rock Bar* (1)
- 5. Chain Hoist (1-1/2 TON COFFING)* (1)
- 6. Chain Hoist (1-TON) *(1)
- 7. Strap Hoist* (2)
- 8. 14-ft Pike Poles*
- 9. 12-ft Pike Poles*
- 10. Nylon Slings*(1)
- 11. Pulling Grip (may need wire grip and guy grip depends on the type bought)*(10)
- 12. 18-ft Bolt Cutter
- 13. 36-ft BOLT CUTTERS* (1 per student)
- 14. Cant Hook* (1)
- 15. Shovel-Round Nose* (1 per student)
- 16. Transformer Gin (1)
- 17. Bit-Wood 11/16*(2)
- 18. Bit Wood 13/16*(2)
- 19. GAFF Maintenance Kit (1)
- 20. Ground Rod Driver* (1)
- 21. Pulling Eye* (1)
- 22. Hand Line Hook* (6)
- 23. Hand Line Block* (6)
- 24. Hand Line Snap* (6)
- 25. Hand Line Rope 600 ft *
- 26. Guy Wire Dispenser
- 27. Bit Brace* (3)
- 28. Body Belt (1 per student)
- 29. Safety Strap (1 per student)
- 30. Tool Pouch (1 per student)
- 31. Nut and Bolt Bag (1 per student)
- 32. Climbers (1 pair per student)
- 33. Top Straps (1 pair per student)
- 34. Top Pads (1 pair per student)
- 35. Gutt Strap (1 per student)
- 36. Tool Bag (1 per student)
- 37. Gaff Guards (1 per student)
- 38. Body Harness (1 per student)
- 39. 18-in. Lanyard (1 per student)
- 40. Orange barrels, plastic (10)
- 41. Orange traffic cones, 18 in., plastic (50)

RECOMMENDED INSTRUCTIONAL AIDS

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

- 1. Computer with operating software with multimedia kit (1)
- 2. Data projector (1)
- 3. Interactive display board (1)
- 4. Laptop computer (1)
- 5. Printer (1)
- 6. Projector, overhead (1)
- 7. DVD (1)

Fall Arrest System

- 1. BUCKINGHAM BEAM (5203)*
- 2. BUCKINGHAM LIFE LINE (5201-50)*
- 3. ROPE GRAB (3/4)*
- 4. 100% fall safety

* Will depend on number of students

Tools Students Will Need (one per student)

- 1. 9-in. KLEIN SIDE CUT PLIERS
- 2. 12-in. CREASENT WRENCH
- 3. SCREWDRIVER
- 4. CHANNLOCK PLIERS
- 5. RULER
- 6. BALL-PEEN HAMMER
- 7. HARD HAT
- 8. SAFETY GLASSES
- 9. WORK GLOVE

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:
 - Career Certificate Required Course A required course for all students completing a career certificate.

Technical Certificate Required Course – A required course for all students completing a technical certificate.

- 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 course
- 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, schoolto-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. Program must include 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: RECOMMENDED TEXTBOOK LIST

Recommended Utility Lineman Text Book List

Book Title	Author (s)	ISBN			
Safety Manual Promoting a safe					
and injury free work environment					
for public power	American Public Association				
The Lineman's and Cableman's	Thomas M. Shoemaker				
Handbook	James E. Mack	978-0-07-174258-0			
The Guidebook for Linemen &					
Cablemen 2 nd Edition	Wayne Van Soelen	13:978-1-1110-3501-3			
NESC Handbook		10:1259584151			
Power Lineworker		10:0132571099			
NCCER CORE	NCCER				
NCCER Level 1 Lineman	NCCER				

APPENDIX D: COURSE CROSSWALK

Course Crosswalk						
Utility Lineman (CIP: 43.0303)						
^	lote: Courses that have been added or	changea	l in the 2018 c	urriculum are highlighted.		
	Existing			Revised		
	2011 MS Curriculum Framework		201	8 MS Curriculum Framework		
Course	Course Title	Hours	Course	Course Title	Hours	
Number			Number			
AEL 1118	Electric Lineman I	8	ULT 1118	Electric Lineman I	8	
AEL 1123	Electric Lineman II	8	ULT 1128	Electric Lineman II	8	
ULT 1122	Line Worker Safety	2	ULT 1122	Line Worker Safety	2	
ULT 1133	Safety for Line Workers	3	ULT 1133	Safety for Line Workers	3	
ULT 1152	AC and DC Circuits for Line Workers	2	ULT 1152	AC and DC Circuits for Line Workers		
ULT 1192 OR	Fundamentals of Electricity for Lineworkers		ULT 1192	Fundamentals of Electricity for		
ELT 1192	OR Fundamentals of Electricity	2		Lineworkers	2	
ULT 1213	Electric Power	3	ULT 1213	Electric Power	3	
ULT 1313 OR			ULT 1313 OR	Line Worker Truck Driving OR		
ULT 1324 OR	Line Worker Truck Driving OR Truck Driving		ULT 1324 OR	Truck Driving Line Workers OR		
DTV 1114	Line Workers OR Commercial Truck Driving	3 OR 4	DTV 1114	Commercial Truck Driving	3 OR 4	
				Basic Utility Equipment		
ULT 1333	Basic Utility Equipment Operations	3	ULT 1333	Operations	3	
ULT 1413	Pole Climbing	3	ULT 1413	Pole Climbing	3	
	Overhead, Underground, and Substation			Overhead, Underground, and		
ULT 1514	Construction	4	ULT 1514	Substation Construction	4	
ULT 1144 OR	AC and DC Circuits for Line Workers OR AC			AC and DC Circuits for Line		
ELT 1144	and DC Circuits for Electrical Technology	4	ULI 1144	Workers	4	
ULT 1413	Pole Climbing	3	ULT 1413	Pole Climbing	3	
	Overhead, Underground, and Substation			Overhead, Underground, and		
ULT 1514	Construction	4	ULT 1514	Substation Construction	4	
ULT 1523	National Electrical Safety Code	3	ULT 1523	National Electrical Safety Code	3	
ULT 2133	Overhead Construction	3	ULT 2133	Overhead Construction	3	
ULT 2143	Underground Construction	3	ULT 2143	Underground Construction	3	
ULT 2233	System Design and Operation	3	ULT 2233	System Design and Operation	3	
ULT 2244	Working in Elevated Work Sites	4	ULT 2244	Working in Elevated Work Sites	4	