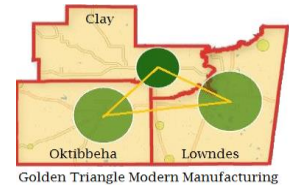This is a non-credit to credit articulation program developed to provide education pathways for individuals participating in the non-credit customized training developed for Yokohama Tire Manufacturing Mississippi.   Five courses, based on matched competences, were determined to articulate from non-credit to credit courses in EMCC's Manufacturing Technology and Engineering Division. This plan was developed through the Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant Program Round 3 Grant Golden Triangle Modern Manufacturing Project TC-25149-13-60-A-28.

East Mississippi Community College
Golden Triangle Modern Manufacturing Project

Non-credit to Credit Articulation Program - Action 1.4 Add capacity at the Golden Triangle campuses in Clay and Lowndes Counties to provide credential-based, non-credit customized training and credit training, and demonstrate non-credit to credit articulation based on those credentials.

Six courses, based on matched competences, were determined to articulate from non-credit customized technician training for Yokohama Tire Manufacturing Mississippi to credit courses in EMCC's Manufacturing Technology and Engineering Division. Each course has been cross-walked to determine equality of the customized non-credit and credit courses.

The following courses have been articulated to the Electro-Mechanical Technician program:

1. IMM-1935--Manufacturing Skills Basic
2. ELT-2613--Programmable Logic Controllers
3. INT-1214--Fluid Power (includes Pneumatics and Hydraulics)
4. ELT-2623--Advanced PLC
5. ELT-2424—Solid State Motor Controls (includes Electrical Drives)
6. ELT-1413--Motor Controls

The content for each of the courses is shown below.

1. **Manufacturing Skills Basic (IMM-1935)-** Manufacturing Skills is the initial course designed to provide the student with the basic skills needed to be successful in a high-performance manufacturing environment. The course covers 5 major areas of knowledge that are considered critical for employment in a high-performance manufacturing company. The topics covered include:
   - Basic Computer Literacy,
   - Interviewing Skills
   - 10 hour OSHA Safety training,
   - Blueprint Reading,
   - Precision Measurement,
   - High-performance manufacturing

   Emphasis is placed on developing the student's ability to diagram, wire, and troubleshoot the different circuits and mechanical control devices. (5 sch: 2 hr. lecture, 6 hr. lab)

   Non-credit Manufacturing Skills Basic
   - Basic Computer Literacy,
   - Interviewing Skills
   - 10 hour OSHA Safety training,
   - Blueprint Reading,
   - Precision Measurement,
   - High-performance manufacturing

2. **Programmable Logic Controllers (ELT-2613) -** This course provides instruction and practice in the use of programmable logic controllers (PLCs) in modern industrial settings. This course includes instruction in the operating principles of PLC's and practice in the programming, installation, and maintenance of PLC's. (3 sch: 2 hr. lecture, 2 hr. lab).

   The cross-walk showed the competencies listed in the two non-credit courses below match the competencies taught in this class.

   > Note: due to the numerous brands of PLCs used in the Golden Triangle area, instructors have developed a generic PLC training program suitable for PLC operators of any brand.

   Non-credit Programmable Logic Controllers (SLC500)
   - Basic Programming
   - PLC Motor Controls
   - Discrete I/O Interfacing
   - PLC System Troubleshooting
   - Event Sequencing
   - Application Development
   - PLC Timers
   - PLC Counters
   - Program Control Instructions
   - Math and Data Moves Instructions

   Non-credit Programmable Logic Controllers (Control Logix)
   - Basic Programming
   - PLC Motor Controls
   - Discrete I/O Interfacing
   - PLC System Troubleshooting
   - Event Sequencing
   - Application Development
   - PLC Timers
   - PLC Counters
   - Program Control Instructions
   - Math and Data Moves Instructions

3. **Fluid Power (INT-1214) -** This basic course provides instruction in hydraulics and pneumatics. The course covers actuators, accumulators, valves, pumps, motors, coolers, compression of air, control devices and circuit diagrams. Emphasis is placed on the development of control circuits and troubleshooting techniques. 4 sch: 3 hr. lecture, 2 hr. lab.

   The cross-walk showed the competencies listed in the two non-credit courses below match the competencies taught in this class.

Note: the non-credit courses, broken into two courses of Pneumatics and Hydraulics, have been combined into a 4 semester credit hours course.

Non-credit Pneumatics
- Power Systems
- Circuits
- Principles of Pressure and flow
- Speed control
- Air Logic
- Maintenance
- Electronic Sensors
- Moving Loads
- Vacuum Systems
- Air Compressors
- Electrical Control Systems
- Control Devices
- Power Devices
- Control relays
- Sequencing Controls
- Timer Control
- Pressure Control
- Circuit Applications

Non-credit Hydraulics
- Hydraulic Power Systems
- Hydraulic Circuits
- Principles of Pressure and flow
- Speed control
- Pressure Control Circuits
- Cylinder Applications
- Relief Valve Operation
- Check Valve Applications
- Accumulators
- Hydraulic Motors
- Hydraulic Pumps
- Fluids

4. **Advanced Programmable Logic Controllers (ELT 2623)-** This is an advanced PLC course which provides instruction in the various operations, installations, and maintenance of electric motor controls. This course will provide information in such areas a sequencer, program control, block transfer used in analog input and output programming, and logical and conversion instructions. Prerequisites:

Programmable Logic Controllers (ELT 2613) and Motor Control Systems (ELT 1413). (3 sch: 2 hr. lecture, 2 hr. lab)

The cross-walk showed the competencies listed in the non-credit course below match the competencies taught in this class.

Non-Credit Advanced PLC
- PLC Troubleshooting
- Event Sequencing
- Application Development
- Math and Data Moves
- Program Control Instructions

5. **Solid State Motor Control (ELT 2424)**-This course deals with the principles and operation of solid state motor control. This course includes instruction and practice in the design, installation, and maintenance of different solid state devices for motor control. Prerequisite: Motor Control Systems (ELT 1413). (4 sch: 2 hr. lecture, 4 hr. lab)

The cross-walk showed the competencies listed in the non-credit course below match the competencies taught in this class.

Non-credit Electrical Drives
- Variable Frequency Drives
- SCR Speed Control
- AC Electronic Drives

6. **Motor Control Systems (ELT 1413)-** This is a course in the installation of different motor control circuits and devices. Emphasis is placed on developing the student's ability to diagram, wire, and troubleshoot the different circuits and mechanical control devices. Prerequisite: Fundamentals of Electricity (ELT 1193) or equivalent. (3 sch: 2 hr. lecture, 2 hr. lab.)

The cross-walk showed the competencies listed in the non-credit course below match the competencies taught in this class.

Non-credit Motor Controls
- Electric Motor Control
- Electronic Sensors
- Electronic Counters
- Reduced Voltage Starting
- Motor Braking