

10/3/2024 DATE  
☒ REQUIRED COURSE  
☒ ELECTIVE COURSE

TEC DIVISION  
☒ NEW COURSE  
☐ REVISION

## Lake Land College

### Course Information Form

|                                      |                                                                                                                                                                                                                                                                                                       |                            |          |                        |     |                              |     |          |     |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|------------------------|-----|------------------------------|-----|----------|-----|
| COURSE NUMBER:                       | PLCC-056                                                                                                                                                                                                                                                                                              | TITLE: (30 Characters Max) |          | PLC Systems I          |     |                              |     |          |     |
| SEM CR HRS:                          | 2.0                                                                                                                                                                                                                                                                                                   | Lecture:                   | 1.0      | Lab:                   | 2.0 | ICCB Lab:                    | 2.0 | ECH:     | 3.0 |
| Course Level:                        | <input type="checkbox"/> Gen Ed/IAI <input checked="" type="checkbox"/> Career/Technical<br><input type="checkbox"/> Baccalaureate/Non-IAI <input type="checkbox"/> Dev Ed/Not in Degree Audit                                                                                                        |                            |          | Clinical Practicum:    | 0.0 | Work-based Learning:         | 0.0 | WBL ECH: | 0.0 |
| COURSE PCS #                         | 12 - 15.0613                                                                                                                                                                                                                                                                                          |                            | IAI Code | N/A                    |     | Contact Hours (Minutes/Week) |     |          |     |
| Repeatable (Y/N):                    | N                                                                                                                                                                                                                                                                                                     | Pass/Fail (Y/N):           | N        | Variable Credit (Y/N): | N   | Min:                         |     | Max:     |     |
| Prerequisites:                       | EET-072 or instructor consent                                                                                                                                                                                                                                                                         |                            |          |                        |     |                              |     |          |     |
| Corequisites:                        | None                                                                                                                                                                                                                                                                                                  |                            |          |                        |     |                              |     |          |     |
| Catalog Description: (40 Word Limit) | This course covers basic PLC operation and programming, using Rslogix software and Allen Bradley PLCs. Topics include basic ladder design, Input-Output, timers, counters, batch processes, shift registers, word compare and math. (Meets SACA Automation Specialist I C-207 and C-208 credentials.) |                            |          |                        |     |                              |     |          |     |

| List the Major Course Segments (Units)                                                    | Contact Lecture Hours | Contact Lab Hours | Clinical Practicum | Work-based Learning |
|-------------------------------------------------------------------------------------------|-----------------------|-------------------|--------------------|---------------------|
| Standard 207.8 & 207.12 Program and operate a basic PLC logic program                     | 4                     | 4                 |                    |                     |
| Standard 207.13 Program and operate a basic PLC sequence program                          | 2                     | 4                 |                    |                     |
| Standard 207.12 Program and operate a basic PLC motor sequence program                    | 2                     | 4                 |                    |                     |
| Standard 207.10 Program and operate a PLC logic program that uses comparison instructions | 2                     | 4                 |                    |                     |
| Standard 207.11 Program and operate a PLC project that uses math instructions             | 2                     | 4                 |                    |                     |
| Standard 208.6 & 208.7 Program and operate a multi-step PLC sequence program              | 3                     | 4                 |                    |                     |
| Troubleshooting                                                                           | 1                     | 8                 |                    |                     |
| TOTAL                                                                                     | 16                    | 32                | 0                  | 0                   |

|                                              |                                              |                                     |                                 |
|----------------------------------------------|----------------------------------------------|-------------------------------------|---------------------------------|
| EVALUATION                                   |                                              |                                     |                                 |
| QUIZZES <input checked="" type="checkbox"/>  | EXAMS <input type="checkbox"/>               | ORAL PRES <input type="checkbox"/>  | PAPERS <input type="checkbox"/> |
| LAB WORK <input checked="" type="checkbox"/> | PROJECTS <input checked="" type="checkbox"/> | COMP FINAL <input type="checkbox"/> | OTHER <input type="checkbox"/>  |

|                     |                     |
|---------------------|---------------------|
| COURSE MATERIALS    |                     |
| TITLE:              | Instructor supplied |
| AUTHOR:             |                     |
| PUBLISHER:          |                     |
| VOLUME/EDITION/URL: |                     |
| COPYRIGHT DATE:     |                     |

| MAJOR COURSE SEGMENT                                                  | HOURS | LEARNING OUTCOMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                       |       | <b>The student will be able to:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Standard 207.8 & 207.12 Program and operate a basic PLC logic program | 8     | Performance Indicators:<br>1. Interpret a basic PLC ladder logic program.<br>2. Interpret a basic PLC I/O diagram.<br>3. Interpret a basic PLC power diagram.<br>4. Design and test a basic PLC ladder program.<br>5. Interpret the operation of PLC motor control sequence program.<br>6. Design and test operation of a PLC motor control sequence program.<br>Knowledge Indicators:<br>1. Describe operation of a basic PLC logic instructions: normally-open, normally-closed, output coil, internal coils, timers and up/down counters.<br>2. Describe the symbolic, absolute discrete I/O address system.<br>3. Describe the operation of a seal-in logic program.<br>4. Describe the operation of a PLC-controlled motor control circuit.<br>5. Describe the operation of a reversing motor |

|                                                                                           |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| Standard 207.13 Program and operate a basic PLC sequence program                          | 6 | <p>Performance Indicators:</p> <ol style="list-style-type: none"> <li>1. Interpret the operation of an event-driven 2-step PLC sequence program.</li> <li>2. Interpret the operation of a time-driven 2-step PLC sequence program.</li> <li>3. Design and test a basic event-driven PLC sequence program.</li> <li>4. Design and test a time-driven PLC sequence program.</li> </ol> <p>Knowledge Indicators:</p> <ol style="list-style-type: none"> <li>1. Describe the operation of an event-driven PLC sequence program.</li> <li>2. Describe the operation of a time-driven PLC sequence program.</li> </ol>                                                                                                                         |
| Standard 207.12 Program and operate a basic PLC motor sequence program                    | 6 | <p>Performance Indicators:</p> <ol style="list-style-type: none"> <li>1. Interpret the operation of PLC motor control sequence program.</li> <li>2. Design and test operation of a PLC motor control sequence program.</li> </ol> <p>Knowledge Indicators:</p> <ol style="list-style-type: none"> <li>1. Describe the operation of a seal-in logic program.</li> <li>2. Describe the operation of a PLC-controlled motor control circuit.</li> <li>3. Describe the operation of a reversing motor control.</li> </ol>                                                                                                                                                                                                                    |
| Standard 207.10 Program and operate a PLC logic program that uses comparison instructions | 6 | <p>Performance Indicators:</p> <ol style="list-style-type: none"> <li>1. Interpret a PLC logic program that uses comparison instructions.</li> <li>2. Enter and operate a PLC logic program that uses comparison instructions.</li> <li>3. Interpret the operation of a PLC logic program that uses comparison instructions.</li> </ol> <p>Knowledge Indicators:</p> <ol style="list-style-type: none"> <li>1. Describe the operation of PLC comparison instructions.</li> </ol>                                                                                                                                                                                                                                                         |
| Standard 207.11 Program and operate a PLC project that uses math instructions             | 6 | <p>Performance Indicators:</p> <ol style="list-style-type: none"> <li>1. Interpret a PLC logic program that uses basic math instructions: Add, Subtract, Divide and Multiply.</li> <li>2. Enter and operate a PLC program that uses basic math instructions.</li> <li>3. Interpret a PLC logic program that uses a Compute instruction.</li> <li>4. Enter and operate a PLC program that uses a Compute instruction.</li> <li>5. Design and test a PLC program that uses math instructions.</li> </ol> <p>Knowledge Indicators:</p> <ol style="list-style-type: none"> <li>1. Describe operation and applications of basic PLC math instructions.</li> <li>2. Describe operation and applications of PLC Compute instruction.</li> </ol> |

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| Standard 208.6 & 208.7 Program and operate a multi-step PLC sequence program | 7 | Performance Indicators:<br>1. Interpret the operation of a multi-step event-driven PLC sequence program.<br>2. Interpret the operation of a multi-step time-driven PLC sequence program.<br>3. Design and test a PLC multi-step PLC sequence program.<br>4. Troubleshoot a multi-step PLC sequence program with event-driven and time-driven steps.<br>Knowledge Indicators:<br>1. Describe the operation of a multi-step event-driven and time-driven PLC sequence programs.<br>2. Describes types of PLC documentation: truth table, sequence of operation.<br>3. Describe how to interpret a multi-step PLC sequence program.<br>4. Describe how to troubleshoot a PLC sequence programs. |
| Troubleshooting                                                              | 9 | 1. Identify the problems in various PLC program and correct them.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 48                                                                           |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| Outcomes*                           | At the successful completion of this course, students will be able to:                                                             |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Course Outcome                      | Create an interlock properly.                                                                                                      |
| Course Outcome                      | Create cascading timers properly.                                                                                                  |
| Course Outcome                      | Demonstrate the use of CTU, CTD timers and RES                                                                                     |
| Course Outcome                      | Demonstrate the use of basic math function.                                                                                        |
| Course Outcome                      | Demonstrate the use of Word compare functions.                                                                                     |
| Course Outcome                      | Demonstrate the operation of a sequencer.                                                                                          |
| Primary Laker Learning Competency   | Creative Thinking & Problem Solving: Students think creatively and solve problems by successfully combining knowledge in new ways. |
| Secondary Laker Learning Competency | Communication: Students communicate effectively and appropriately through the exchange of information.                             |

\*Course and program outcomes will be used in the software for outcomes assessment and should include at least 1 primary and 1 secondary Laker Learning Competency. Limit to 3-5.