

**GREAT PLAINS TECHNOLOGY CENTER
COURSE OF STUDY**

Career Cluster: Manufacturing (MN)

Career Pathway: Maintenance, Installation, & Repair

Local Program: Industrial Automation (MN0036001)

Program Hours: Secondary Students: 500 Hours
Adult Students: 500 Hours

<u>Instructors:</u>	Name	Office	E-Mail
	Brandon Atwood	(580) 250-####	batwood@greatplains.edu
	Trace Browning	(580) 250-5652	tbrowning@greatplains.edu

Academic Credit: Secondary Students: 3 high school credits
Adult Students: Transcript

Prerequisites: None

Program Description:

Industrial Automation is designed to prepare students to successfully enter the manufacturing/industrial maintenance industry. Students learn the principles of industrial safety, electrical theory, electronics in manufacturing, fluid power including pneumatics and hydraulics, motor theory and operation, and mechanical systems. The program includes training in Programmable Logic Controllers (PLCs), to include both programming and troubleshooting.

Program Goals:

Students enrolled in this program will be given the opportunity to develop the skills and attitude needed to successfully enter the industrial maintenance field.

Related Career Opportunities:

- Industrial Automation Technician
 - Assembly, food processing, chemical, petroleum plants
 - Energy production facilities, utility companies
 - Precision instrument companies
- Instrumentation and Engineering Technician
- Maintenance Technician
- Industrial Maintenance Technician
- Electronics Technician
- Programmable Logic Control Technician
- Programmable Logic Controller
- Controls Technician
- Electromechanical Technician

Program Objectives:

Upon successful completion of this program, the student should:

- Demonstrate competence in the fundamental skills of the occupation.
- Be prepared for further related education and/or entry into the job market.

- Participate as responsible citizens.
- Develop positive and realistic self-images.
- Develop the ability to work with limited or no supervision.
- Accept and abide by the rules and regulations established by the school and/or place of employment.
- Pass certification exams

DESCRIPTION OF COURSES

<u>Course #</u>	<u>Course Name</u>	<u>Theory</u>	<u>Lab</u>	<u>Total</u>
TI00000	Industrial Automation Safety Fundamentals	15	15	30
<p>In this course, students will learn essential skills related to workplace safety and hazard recognition and prevention. Students will gain OSHA 10 certification as well as gain an understanding of Lockout/Tagout protocols to control hazardous energy sources.</p>				
TI00204	Electricity & Electronics	40	60	100
<p>Students will learn fundamentals of electrical theory and electronics in manufacturing maintenance. This course covers essential concepts such as circuits, components, and troubleshooting techniques. Ideal for maintenance professionals, this course equips learners with the skills needed to ensure efficient operation and upkeep of manufacturing equipment.</p>				
TI00600	Fluid Power	40	70	110
<p>This course provides instruction in the fundamentals of safely operating hydraulic, pneumatic, and pump and piping systems. Theory and practical application concepts are discussed. Topics include hydraulic system principles and components, pneumatic system principles and components, and the installation, maintenance, and troubleshooting of pump and piping systems.</p>				
TI00164	Motor Controls	40	70	110
<p>This course introduces the fundamental concepts, principles, and devices involved in industrial motor controls, including theories and applications. Topics include, but are not limited to, motor theory and operating principles, control devices, symbols and schematic diagrams, and preventative maintenance and troubleshooting.</p>				
TI01544	Mechanical Systems	40	80	120
<p>This course integrates the principles of mechanics, electronics, and computer control. Students will learn the fundamentals of Programmable Logic Controllers (PLCs), including operation, programming, and applications across diverse industries. Participants will gain practical skills in designing, implementing, and troubleshooting PLC systems and mechatronic setups.</p>				
TI00000	Machining & Welding	15	15	30
<p>In this hands-on course, students will learn the basics of MIG welding for use and application in industrial automation maintenance. Students will be introduced to computer numerical control (CNC) machines and other precision fabrication equipment.</p>				
Program Total:		Theory	Lab	Total
Secondary Student:		190	310	500
Adult Student:		190	310	500

Evaluation Policy:

Employability Grades (100 points per week; 35% of final grade)

The employability skills grade is based on 20 points per day (which may include: attitude, attendance, safety, punctuality, cooperation, participation, clean-up, class preparation, school/classroom rules, and time management). Points will be deducted if these responsibilities are not met at the instructor's discretion. Students will be allowed to make up unearned employability points for **excused** absences only. Full credit will be given for assignments/tests that have been made up due to excused absences only (see Student Handbook).

Performance Grades (35% of final grade)

- Live projects
- Performance or skill tests
- Homework
- Written Assignments

Test Grades (30% of final grade)

- Test grades will be based on a 100-point scale.
- Test grades include written and/or skills tests.
- A test will be given for each unit of instruction.
- Tests are to be taken as a unit is completed.
- Tests must be completed within allotted time.

Final Grade (9 Weeks Period)

9-weeks grade will be calculated by averaging grades in each category and summing each category according to their assigned weight. Progress reports will be sent to home schools at six and twelve-week intervals each semester as required or requested. Grades are accessible on-line at <http://sonisweb.greatplains.edu/studsect.cfm>

Grading Scale:

The grading scale as adopted by the Board of Education is as follows:

A =	90 – 100	F =	Below 60
B =	80 – 89	W =	Withdrawn
C =	70 – 79	I =	Incomplete
D =	60 – 69	N =	No Grade (Refer to Student Handbook)

Make-Up Work Policy:

All Make-Up Work Is The Responsibility Of The Student. Make-up work will be handled as specified in the Student Handbook. Please be sure to read and understand all student policies, especially make-up of assignments, tests and employability due to absences. Students should always arrange for any make-up work with the instructor as per the Student Handbook. Students should keep track of his or her progress and grades.

Attendance Policy:

For specific information related to attendance and tardiness refer to the Student Handbook. Students should keep a written record of their absences and tardiness.

Course Requirements and Expectations:

The general course requirements and expectations include:

- Teaching methods consist of lecture and “hands on” projects.
- Student must demonstrate ability to apply safety to all aspects of the industrial automation field.

- It is recommended that the student meet with the teacher and their parents at least once per semester.
- All students must adhere to the policies and procedures in the GPTC Student Handbook.

Student Behavior Includes:

- Safety precautions prohibit the wearing of tank tops, sleeveless shirts and visible body piercings.
- Students will also be expected to wear their student ID badge appropriately any time they are on campus. This includes break times.
- Student ID badges will not be altered in any way or be required to purchase a new one.
- Students will wear shoes that completely cover the feet.
- Students will wear clear safety glasses at all times while in the shop environment and may not be altered without specific permission of the instructor. Clear prescription glasses will be permitted.

These rules are in addition to the Student Handbook. Students will be provided a wall-locker and lock to secure all items.

NOTE: For additional information or questions regarding the GPTC School policies and procedures, please refer to the Student Handbook and/or the Instructor.

Industry Alignments:

- ISO (International Organization for Standardization)
- ISA (International Society of Automation)
- A3 (Association for Advancing Automation)

Certification Outcomes:

Tier 1 – Certifications Recognized, Administered and/or Endorsed by Industry

- NC3: Multimeter certification
- OSHA 10 General Industry
- OSHA Lockout-Tagout
- SACA Silver or Gold Certification: Certified Industry 4.0 Associate

Tier 2 – Certifications Endorsed by Industry Organizations

- ODCTE: Industrial Maintenance Mechanic
- ODCTE: Fluid Power Mechanic
- ODCTE: Electrical/Electronic Mechanic

CIP Code and SOC Code Crosswalk:

- CIP Code – 15.0406
- SOC Code – 17-3024.00

OCAS program code:

- 9723 – Mechatronics

Instructional Materials:

Students are required to purchase the following list of textbooks and/or supplemental reference materials. The prices listed are approximate and subject to change.

Textbooks: