

# ADVANCED MANUFACTURING TECHNOLOGY

## Associate in Applied Science (AAS)

**Program Code: 10-664-2**

**Total Credits: 63**

The Advanced Manufacturing Technology program combines foundational coursework in the areas of electromechanical and automation systems with advanced coursework in Industry 4.0 concepts and quality manufacturing. Students gain hands-on experience with tools and equipment used in the field.

In this program you'll learn to operate and program robotics, troubleshoot computer networks, and interface digital logic circuits. You'll set up, make, and maintain automated systems, such as machines interacting with machines and machines making decisions (AI). You'll also use sensors within the system to map, explore, and execute a variety of tasks, such as deliver, pick up, and sort.

To learn more about this program, visit [mstc.edu/programs](https://mstc.edu/programs).

### ACADEMIC ADVISOR

To schedule an appointment with an academic advisor, call 715-422-5300. Academic advisors will travel to other campuses as necessary to accommodate student needs. For more information about advising, visit [mstc.edu/advising](https://mstc.edu/advising).

### NEW STUDENT CHECKLIST

Complete the following steps to prepare for your New Student Advising appointment with your academic advisor:

- Submit a Mid-State application at [mstc.edu/apply](https://mstc.edu/apply).
- Send official transcripts to:  
Mid-State Technical College  
Student Services  
500 32nd Street North  
Wisconsin Rapids, WI 54494
- Complete the Free Application for Federal Student Aid (FAFSA) at [fafsa.gov](https://fafsa.gov). Mid-State's Financial Aid team is available to assist with your FAFSA application and to answer your financial aid questions. Contact Financial Aid or schedule an appointment at [mstc.edu/financial-aid](https://mstc.edu/financial-aid).
- Set up student MyCampus account at [mstc.edu/mycampus-assistance](https://mstc.edu/mycampus-assistance).
- Schedule a New Student Advising appointment at [mstc.edu/advising](https://mstc.edu/advising).

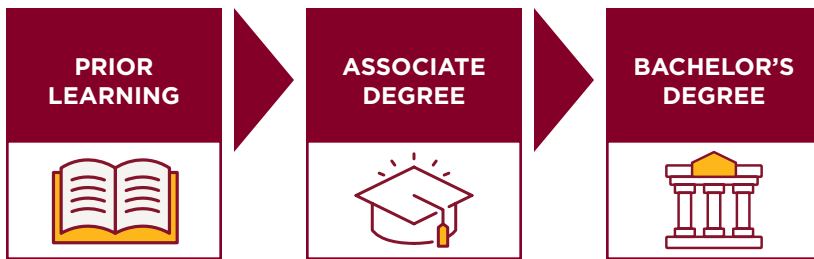
[mstc.edu](https://mstc.edu) • 888-575-6782 • TTY: 711



Adams Campus • Marshfield Campus • Stevens Point Downtown Campus • Wisconsin Rapids Campus • Virtual Campus • AMETA® Center

Mid-State does not discriminate on the basis of race, color, national origin, sex, disability, or age in its program, activity, or employment. The following person has been designated to handle inquiries regarding the nondiscrimination policies: Vice President - Human Resources; 500 32nd Street North, Wisconsin Rapids, WI 54494; 715-422-5325 • AAEO@mstc.edu. 3/2026-AC

## CAREER PATHWAY



Career pathways help you build your education step by step. Each stage offers one or more credentials that are recognized by employers and lead to real jobs—and you can keep building toward your career goals as you go.

**Begin at any point.**

### **Prior Learning**

#### **Credit for Prior Learning**

- Certifications and Licenses
- Military Experience
- National/Standardized Exams
- Transfer Credit
- Work and Life Experience

Learn about Credit for Prior Learning at [mstc.edu/cpl](https://mstc.edu/cpl).

### **High School Credit**

- High School Dual Credit
- Mid-State Fast Track

Learn about High School Credit at [mstc.edu/dc](https://mstc.edu/dc).

### **Associate Degree**

- Advanced Manufacturing Technology (63 Credits)  
Start Your Career: Automation Technician, Control Systems Technician, Electromechanical Technician, Mechatronics Technician, Robotics Technician

### **Bachelor's Degree**

For those interested in continuing their education, Mid-State offers transfer guides with various four-year colleges and universities. For more information, visit [mstc.edu/transfer](https://mstc.edu/transfer).

### **Other Options**

Related Programs: Automation & Instrumentation Technology, Industrial Mechanical Technician, Manufacturing Operations Management

Apprenticeship Opportunity: Electrical & Instrumentation Technician

## OUTCOMES

Employers will expect you, as an Advanced Manufacturing Technology graduate, to be able to:

- Apply state and national safety rules to the manufacturing systems environment.
- Analyze automation within a complex manufacturing system.
- Manage advanced manufacturing systems for operational efficiency and cost control.
- Analyze technical specifications for implementation of manufacturing systems, modules, and components.
- Explore a Proportional Integral Derivative (PID) control system to achieve a desired outcome in a manufacturing outcome.
- Integrate industrial control systems into manufacturing processes.
- Apply electronic principles to devices within complex manufacturing systems.

## TECHNICAL SKILLS ATTAINMENT

The Wisconsin Technical College System (WTCS) has implemented a requirement that all technical colleges measure outcomes attained by students. This requirement is called Technical Skills Attainment (TSA). The main objective of TSA is to ensure graduates have the technical skills needed by employers. Faculty will let students know when and how the TSA is being assessed in the program.

## STUDENT HANDBOOK

Visit [mstc.edu/studenthandbook](http://mstc.edu/studenthandbook) to view Mid-State's student handbook, which contains information about admissions, enrollment, appeals processes, services for people with disabilities, financial aid, graduation, privacy, Mid-State's Student Code of Conduct, and technology.

## GRADUATION REQUIREMENT

The GPS for Student Success course is required for all Mid-State program students and is recommended to be completed before obtaining 12 credits. Some students are exempt from this requirement. Please see your academic advisor for more information.

## ADDITIONAL COURSES AS NEEDED

The following courses may be recommended or required if the student does not achieve minimum placement scores.

### College Reading and Writing 1

**10831104**

**3 credits**

Provides learners with opportunities to develop and expand reading and writing skills to prepare for college-level academic work. Students will employ critical reading strategies to improve comprehension, analysis, and retention of texts. Students will apply the writing process to produce well-developed, coherent, and unified written work.

### Pre-Algebra

**10834109**

**3 credits**

Provides an introduction to algebra. Includes operations on real numbers, solving linear equations, percent and proportion, and an introduction to polynomials and statistics. Prepares students for elementary algebra and subsequent algebra-related courses.

## MULTIPLE MEASURES

Students can place into courses using high school GPA and completed classes. Placement can be determined in the following ways:

- **Multiple Measures Writing (MMW)**  
High school GPA of 2.6 & successful completion of 2.0 credits of high school writing courses with a "C" or better
- **Multiple Measures Reading (MMR)**  
High school GPA of 2.6 & successful completion of 2.0 credits of high school literature courses with a "C" or better
- **Multiple Measures Math 1 (MMM\_1)**  
High school GPA of 2.6 & successful completion of 1.0 credit of high school math (Algebra 1 or equivalent) with a "C" or better
- **Multiple Measures Math 2 (MMM\_2)**  
High school GPA of 2.6 & successful completion of 2.0 credits of high school math including Algebra 1 and Algebra 2 with a "C" or better
- **Multiple Measures Science 1 (MMS\_1)**  
High school GPA of 2.6 & successful completion of 1.0 credit of high school lab science course with a "C" or better
- **Multiple Measures Science 2 (MMS\_2)**  
High school GPA of 2.6 & successful completion of 1.0 credit of high school chemistry with a "C" or better

*Past high school and college transcripts are used in making course placement decisions.*

## SAMPLE FULL-TIME CURRICULUM OPTION

### Advanced Manufacturing Technology • 63 Total Credits

Term 17 Credits	Course Number	Course Name	CPL	Credits
	10462106	Mechanical Power Transmission	No	3
	10605105	Electrical Circuits I	Yes	3
	10605117	Automation 1 - Beginning PLC	Yes	3
	10801136	English Composition 1	Yes	3
	10804118	Intermediate Algebra with Applications	Yes	4
	10890102	GPS for Student Success	Yes	1

Term 14 Credits	Course Number	Course Name	CPL	Credits
	10462133	Electric Controls for Industrial Automation	No	3
	10605118	Automation 2 - Advanced PLC	No	3
	10623114	Intro to Inventor	Yes	1
	10664110	Intro to Mechatronics	No	2
	10664120	Intro to Industrial Internet of Things	No	2
	10801198	Speech	Yes	3

Term 15 Credits	Course Number	Course Name	CPL	Credits
	10605119	Automation 3 - HMI's & Robotics	No	2
	10605145	Industrial Networking	No	2
	10623112	Manufacturing Practices	No	2
	10664121	Vision and Smart Sensors	No	2
	10664104	Industrial Control Systems Applications	No	2
	10664128	AutoCAD Electrical	No	2
	10809198 or 10809188	Introduction to Psychology or Developmental Psychology	Yes	3

Term 17 Credits	Course Number	Course Name	CPL	Credits
	10196189	Team Building and Problem Solving	No	3
	10462120	Industrial Hydraulics & Pneumatics	No	3
	10664123	Advanced Industrial Robotics	No	2
	10664124	Integrated Systems Capstone	No	3
	10809195	Economics	Yes	3
	10804196	Trigonometry with Applications	No	3

#### Please Note

- Credit for Prior Learning (CPL) options are available for some courses. You can visit [mstc.edu/cpl](http://mstc.edu/cpl) or contact your academic advisor for details.
- This curriculum sequence is only for student planning. Actual student schedules will vary depending on course availability.
- Program completion time may vary based on student scheduling and course availability. For details, go to [mstc.edu/schedule](http://mstc.edu/schedule).
- Get the latest updates online at [mstc.edu](http://mstc.edu).

## SAMPLE PART-TIME CURRICULUM OPTION

Advanced Manufacturing Technology • 63 Total Credits

<b>Term</b>	<b>Course Number</b>	<b>Course Name</b>	<b>CPL</b>	<b>Credits</b>
<b>Term 11 Credits</b>	10605105	Electrical Circuits I	Yes	3
	10605117	Automation 1 - Beginning PLC	Yes	3
	10804118	Intermediate Algebra with Applications	Yes	4
	10890102	GPS for Student Success	Yes	1
<b>Term 8 Credits</b>	10605118	Automation 2 - Advanced PLC	No	3
	10623114	Intro to Inventor	Yes	1
	10664110	Intro to Mechatronics	No	2
	10664120	Intro to Industrial Internet of Things	No	2
<b>Term 8 Credits</b>	10462106	Mechanical Power Transmission	No	3
	10605119	Automation 3 - HMI's & Robotics	No	2
	10801136	English Composition 1	Yes	3
<b>Term 6 Credits</b>	10462133	Electric Controls for Industrial Automation	No	3
	10801198	Speech	Yes	3
<b>Term 6 Credits</b>	10623112	Manufacturing Practices	No	2
	10664128	AutoCAD Electrical	No	2
	10664121	Vision and Smart Sensors	No	2
<b>Term 9 Credits</b>	10196189	Team Building and Problem Solving	No	3
	10462120	Industrial Hydraulics & Pneumatics	No	3
	10804196	Trigonometry with Applications	No	3
<b>Term 7 Credits</b>	10605145	Industrial Networking	No	2
	10664104	Industrial Control Systems Applications	No	2
	10809198 or 10809188	Introduction to Psychology or Developmental Psychology	Yes	3
<b>Term 8 Credits</b>	10664123	Advanced Industrial Robotics	No	2
	10664124	Integrated Systems Capstone	No	3
	10809195	Economics	Yes	3

### **Advanced Industrial Robotics**

**10664123**

**2 credits**

In this course, students explore advanced programming techniques for industrial robots. They examine interfacing peripheral devices such as programmable logic controllers, industrial sensors, and human-machine interfaces to a robot. Upon completion of the course, students will be able to apply advanced programming techniques to industrial robots.

*Corequisite: Automation 3 - HMI's & Robotics 10605119*

### **AutoCAD Electrical**

**10664128**

**2 credits**

In this course, students will learn to navigate and apply AutoCAD Electrical software to design and document electrical control systems. Emphasis is placed on creating accurate schematics, panel layouts, and project files using industry-standard tools and workflows. Students will gain hands-on experience developing electrical plans that meet professional standards and support real-world applications in electrical and industrial design.

*Prerequisite: Electrical Circuits 1 10605105*

### **Automation 1 - Beginning PLC**

**10605117**

**3 credits**

An overview of programmable logic controllers (PLCs) that provides a foundation of knowledge of the programming techniques, operation, and maintenance of PLCs used in typical industrial automation.

### **Automation 2 - Advanced PLC**

**10605118**

**3 credits**

A lab intensive course covering advanced PLC topics and programming techniques, analog I/O, VFDs, basic HMI interfaces, industrial robotics and troubleshooting.

*Prerequisite: Automation 1 - Beginning PLC 10605117 or consent of instructor*

### **Automation 3 - HMI's & Robotics**

**10605119**

**3 credits**

A lab intensive course covering advanced PLC programming techniques, HMI programming, industrial robotic systems interface, networking basics and troubleshooting of automation systems.

*Prerequisite: Automation 2 - Advanced PLC 10605118*

### **Developmental Psychology**

**10809188**

**3 credits**

Studies human development throughout the lifespan and explores developmental theory and research with an emphasis on the interactive nature of the biological, cognitive, and psychosocial changes that affect the individual from conception to death. Application activities and critical thinking skills enable students to gain an increased knowledge and understanding of themselves and others.

*Prerequisite: High School GPA of 2.6 and MMR and MMW or Accuplacer Reading Skills of 236 and Writing of 237 or ACT of 15 Reading/16 English*

### **Economics**

**10809195**

**3 credits**

Provides an overview of how a market-oriented economic system operates and surveys the factors that influence national economic policy. Basic concepts and analyses are illustrated by reference to a variety of contemporary problems and public policy issues. Concepts include scarcity, resources, alternative economic systems, growth, supply and demand, monetary and fiscal policy, inflation, unemployment and global economic issues.

*Prerequisite: High School GPA of 2.6 and MMR and MMW or Accuplacer Reading Skills of 236 and Writing of 237 or ACT of 15 Reading/16 English*

### **Electric Controls for Industrial Automation**

**10462133**

**3 credits**

Introduces the fundamentals of industrial motor controls, relay logic, ladder diagrams, industrial automation, and integrated manufacturing systems. The purpose of the course is to familiarize students with the terminology, capabilities, applications, and limitations of automated industrial controls through classroom and lab activities.

*Prerequisite: Electrical Circuits 1 10605105*

### **Electrical Circuits**

**10605105**

**3 credits**

The study of Ohm's Law and its application to D.C. circuits. Major topics include: Ohm's Law, series circuits, parallel circuits, combination circuits, Kirchhoff's Laws, and power relationships.

*Corequisite: Intermediate Algebra with Applications 10804118 or College Mathematics 10804107*

### **English Composition 1**

**10801136**

**3 credits**

Learners develop and apply skills in all aspects of the writing process. Through a variety of learning activities and written documents, learners employ rhetorical strategies, plan, organize and revise content, apply critical reading strategies, locate and evaluate information, integrate and document sources, and apply standardized English language conventions.

*Prerequisite: High School GPA of 2.6 and MMW or Accuplacer Writing of 262 or Accuplacer Reading 253 or ACT English score of 20 or ACT Reading 21 or completion of College Reading and Writing 110831104 with a "C" or better*

### **Industrial Control Systems Applications**

**10664104**

**2 credits**

In this course, learners develop machine process automation control systems with temperature, pressure, flow, and level controls. Learners investigate the utilization of PID loops in PLC program design. Learners program a PLC using vision, smart sensors, Servos, motor controls, and analog IO. Learners develop PLC programs including Human Machine Interface (HMI) with displays for machine input and output data. Upon completion of the course, learners will be able to build a PLC motion project for basic machine process automation control systems.

*Prerequisite: Automation 3 - HMI's & Robotics 10605119*

## **Industrial Hydraulics & Pneumatics**

**10462120**

**3 credits**

Studies basic principles of hydraulics and pneumatics. Covers the advantages, disadvantages, and inherent problems with these systems. Includes the principles of operation and the constructional features of pumps, motors, valves, seals, packing, and conductors as well as the physical properties of liquids. Students learn to identify various parts of a circuit and analyze them for their use.

*Corequisite: Intermediate Algebra with Applications 10804118*

## **Industrial Networking**

**10605145**

**2 credits**

Students will study network infrastructure and communication languages commonly found in the industrial setting.

*Corequisite: Automation 1 - Beginning PLC 10605117*

## **Integrated Systems Capstone**

**10664124**

**3 credits**

In this course, students design a complex integrated automation system. They use industrial robotics, programmable logic controllers, pneumatics/hydraulics, and sensors to develop the system. Upon successful completion, students will be able to design, program, troubleshoot, and improve a functional industrial automation system.

*Corequisite: Industrial Control Systems Applications 10664104*

## **Intermediate Algebra with Applications**

**10804118**

**4 credits**

This course offers algebra content with applications. Topics include properties of real numbers; order of operations; algebraic solution for linear equations and inequalities; operations with polynomial and rational expressions; operations with rational exponents and radicals; and algebra of inverse, logarithmic, and exponential functions.

*Prerequisite: High School GPA of 2.6 and MMM\_1 or Accuplacer Arithmetic of 263 and QAS 234 or ACT Math score of 19 or QAS of 245 or Pre-Algebra 10834109 with a "C" or better*

## **Intro to Industrial Internet of Things**

**10664120**

**2 credits**

In this course, learners are introduced to theoretical and practical topics of the Industrial Internet of Things (IIoT). The learner investigates the range of sensor and actuator devices available, ways in which they communicate and compute, methods for getting information to and from IIoT-enabled devices, and ways of visualizing and processing data acquired from the IIoT. Upon completion, learners will utilize hardware and software to construct a sensor network within an existing system and utilize industry standard tools to visualize the acquired data.

## **Intro to Inventor**

**10623114**

**1 credit**

Learners will create 3D models in Inventor using a variety of feature and modify tools, analyze the volume of the models, and apply a material to determine weight of the finished product. Learners will generate 2D representations of the 3D model in appropriate views, and add dimensions and annotations before formatting drawings to print out. Prior experience with computers is recommended.

## **Intro to Mechatronics**

**10664110**

**2 credits**

In this course, learners are introduced to microprocessor controlled electromechanical systems. The learner examines how individual components work, and how they are integrated into simple systems. Upon completion of the course, learners will understand what technicians do in the workplace and how industry utilizes Mechatronics in advanced manufacturing.

*Prerequisite: High School GPA of 3.0 or Accuplacer Reading Skills of 236, Writing of 237 or ACT of 15 Reading/16 Writing. Students are encouraged to bring transcripts for further evaluation if they do not meet these requirements; Corequisite: Automation 1 - Beginning PLC 10605117*

## **Introduction to Psychology**

**10809198**

**3 credits**

This science of psychology course is a survey of multiple aspects of behavior and mental processes. It provides an overview of topics such as research methods, theoretical perspectives, learning, cognition, memory, motivation, emotions, personality, abnormal psychology, physiological factors, social influences, and development.

*Prerequisite: High School GPA of 2.6 and MMR and MMW or Accuplacer Reading Skills of 236 and Writing of 237 or ACT of 15 Reading/16 English*

## **Manufacturing Practices**

**10623112**

**2 credits**

As competition for market share continues to increase, manufacturers rely on innovations in technology, methods, and practices to give them the edge they need. To remain competitive globally, the watchwords are productivity, efficiency, and quality. In this course, students examine some of the practices that many manufacturing operations have come to rely on to make their operations competitive, efficient, and cost-effective. Topics covered in this class include the principles of lean manufacturing, value versus non-value added waste, 5S methodology, value stream mapping, setup reduction and quick changeover, cellular flow, building a lean culture, total productive maintenance, and statistical process control (SPC).

## **Mechanical Power Transmission**

**10462106**

**3 credits**

A study of the systems and components that transmit power from the prime mover through the system. Gear trains, linkages, clutches, couplings, and flexible drives are evaluated mathematically in lab situations.

**Speech****10801198****3 credits**

Explores the fundamentals of effective oral presentation to small and large groups. Topic selection, audience analysis, methods of organization, research, structuring evidence and support, delivery techniques, and other essential elements of speaking successfully, including the listening process, form the basis of this course. Includes informative, persuasive, and occasion speech presentations.

*Prerequisite: High School GPA of 2.6 and MMR and MMW or Accuplacer Reading Skills of 253 and Writing of 262 or ACT of 21 Reading/19 English or completion of College Reading and Writing 1 10831104 with a "C" or better*

**Team Building & Problem Solving****10196189****3 credits**

Applies skills and tools necessary to facilitate problem solving in a team environment. Each learner assumes the roles and responsibilities of team leadership in the stages of team development, uses a systematic problem-solving process, and employs consensus-building and conflict-management strategies.

**Trigonometry with Applications****10804196****3 credits**

Topics include circular functions, graphing of trigonometry functions, identities, equations, trigonometric functions of angles, inverse functions, solutions of triangles, complex numbers, DeMoivre's Theorem, polar coordinates, and vectors.

*Prerequisite: ACT Math score of 22 or Intermediate Algebra with Applications 10804118 with a "C" or better*

**Vision and Smart Sensors****10664121****2 credits**

In this course, learners will utilize 2D cameras, lighting systems and smart sensors in machine applications to provide imaging-based automatic inspection and analysis for such applications as automatic inspection, process control, and robot guidance. Learners will use vision systems to: sort good and bad parts; identify, position and orient objects images for robot guidance and orientation using edge detection; blob detection; pattern recognition; image acquisition; and bar code and QR code recognition. Learners will integrate smart sensors into PLC machine applications. Upon completion of this course learners will apply camera and smart sensors into a machine process application.

*Prerequisite: Automation 2 - Advanced PLC 10605118*