



ADVANCED MANUFACTURING TECHNOLOGY

Associate in Applied Science (AAS) Program Code: 10-664-2 Total Credits: 62

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.

Estimated tuition and fees: mstc.edu/programcosts

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.

CHECKLIST:

This section will be completed when meeting with your academic advisor.

- FAFSA (www.fafsa.gov)
- Financial Aid Form(s)
Form(s): _____
- Follow-Up Appointment:
Where: _____
When: _____
With: _____
- Official Transcripts
Mid-State Technical College
Student Services Assistant
1001 Centerpoint Drive
Stevens Point, WI 54481
- Other: _____



mstc.edu • 888.575.6782 • TTY: 711



ADAMS CAMPUS
401 North Main
Adams, WI 53910

MARSHFIELD CAMPUS
2600 West 5th Street
Marshfield, WI 54449

STEVENS POINT CAMPUS
1001 Centerpoint Drive
Stevens Point, WI 54481

WISCONSIN RAPIDS CAMPUS
500 32nd Street North
Wisconsin Rapids, WI 54494

CAREER PATHWAY • BEGIN AT ANY POINT

HIGH SCHOOL STUDENT

COLLEGE TRANSFER

RETURNING ADULT

CREDIT FOR PRIOR LEARNING AND EXPERIENCE

CREDIT FOR PRIOR LEARNING AND EXPERIENCE

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

Learn about Credit for Prior Learning at mstc.edu/cpl.

ASSOCIATE IN APPLIED SCIENCE (AAS)

ADVANCED MANUFACTURING TECHNOLOGY

Associate in Applied Science (AAS) • 62 Credits

Start Your Career

- Automation Technician
- Control Systems Technician
- Mechatronics Technician

BACHELOR'S DEGREE

BACHELOR'S DEGREE OPTIONS

UW-Stout.

For more information and additional opportunities, visit mstc.edu/transfer.

OTHER OPTIONS

RELATED PROGRAMS

- Industrial Mechanical Technician
- Manufacturing Operations Management
- Metal Fabrication
- Precision Machining Technician
- Stainless Steel Welding
- Welding

APPRENTICESHIP OPPORTUNITIES

- Electrical & Instrumentation Technician Apprenticeship

SAMPLE FULL-TIME CURRICULUM OPTION

| | | |
|-------------------------|---|-------------------|
| Term | | 16 credits |
| 10462106 | Mechanical Power Transmission | 3 |
| 10605105 | Electrical Circuits I | 3 |
| 10605117 | Automation 1 - Beginning PLC | 3 |
| 10801136 | English Composition 1 | 3 |
| 10804118 | Intermediate Algebra with Applications | 4 |
| Term | | 14 credits |
| 10462133 | Electric Controls for Industrial Automation | 3 |
| 10605118 | Automation 2 - Advanced PLC | 3 |
| 10623114 | Intro to Inventor | 1 |
| 10664110 | Intro to Mechatronics | 2 |
| 10664120 | Intro to Industrial Internet of Things | 2 |
| 10801198 | Speech | 3 |
| Term | | 15 credits |
| 10605119 | Automation 3 - HMI's & Robotics | 2 |
| 10605145 | Industrial Networking | 2 |
| 10623112 | Manufacturing Practices | 2 |
| 10664104 | Industrial Control Systems Applications | 2 |
| 10664115 | Engineering Drawings | 2 |
| 10664121 | Vision and Smart Sensors | 2 |
| 10809198 | Intro to Psychology -or- | |
| 10809188 | Developmental Psychology | 3 |
| Term | | 17 credits |
| 10196189 | Team Building and Problem Solving | 3 |
| 10462120 | Industrial Hydraulics & Pneumatics | 3 |
| 10664123 | Advanced Industrial Robotics | 2 |
| 10664124 | Integrated Systems Capstone | 3 |
| 10809195 | Economics | 3 |
| 10804196 | Trigonometry with Applications | 3 |
| Total credits 62 | | |

This course has options available to receive credit for prior learning (CPL) or work experience. Visit the website at mstc.edu/cpl or contact your advisor for details.

Please Note:

- 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.

SAMPLE PART-TIME CURRICULUM OPTION

| | | |
|-------------------------|---|-------------------|
| Term | | 10 credits |
| 10605105 | Electrical Circuits I | 3 |
| 10605117 | Automation 1 - Beginning PLC | 3 |
| 10804118 | Intermediate Algebra with Applications | 4 |
| Term | | 8 credits |
| 10605118 | Automation 2 - Advanced PLC | 3 |
| 10623114 | Intro to Inventor | 1 |
| 10664110 | Intro to Mechatronics | 2 |
| 10664120 | Intro to Industrial Internet of Things | 2 |
| Term | | 8 credits |
| 10462106 | Mechanical Power Transmission | 3 |
| 10605119 | Automation 3 - HMI's & Robotics | 2 |
| 10801136 | English Composition 1 | 3 |
| Term | | 6 credits |
| 10462133 | Electric Controls for Industrial Automation | 3 |
| 10801198 | Speech | 3 |
| Term | | 6 credits |
| 10623112 | Manufacturing Practices | 2 |
| 10664115 | Engineering Drawings | 2 |
| 10664121 | Vision and Smart Sensors | 2 |
| Term | | 9 credits |
| 10196189 | Team Building and Problem Solving | 3 |
| 10462120 | Industrial Hydraulics & Pneumatics | 3 |
| 10804196 | Trigonometry with Applications | 3 |
| Term | | 7 credits |
| 10605145 | Industrial Networking | 2 |
| 10664104 | Industrial Control Systems Applications | 2 |
| 10809198 | Intro to Psychology -or- | |
| 10809188 | Developmental Psychology | 3 |
| Term | | 8 credits |
| 10664123 | Advanced Industrial Robotics | 2 |
| 10664124 | Integrated Systems Capstone | 3 |
| 10809195 | Economics | 3 |
| Total credits 62 | | |

MULTIPLE MEASURES

Multiple Measures Writing (MMW): High school GPA of 2.6 and 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 and 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 and successful completion of 1.0 credits 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 and 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 and successful completion of 1.0 credits of high school lab science course with a "C" or better

Multiple Measures Science 2 (MMS_2): High school GPA of 2.6 and successful completion of 1.0 credits of high school chemistry with a "C" or better

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

COURSE DESCRIPTIONS

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.

Automation 1 - Beginning PLC

106051173 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

106051183 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

106051192 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 1 - Beginning PLC 10605117

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

108091953 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 I

106051053 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

Engineering Drawings

106641152 credits

This course will acquaint the apprentice with the interpretation of engineering prints and other technical and manufacturing documentation. The primary focus of the course will be on that part of manufacturing most closely related to machining and tooling. Background information is provided relative to the process used to create and finish the product or piece part on the prints being studied.

English Composition 1

108011363 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 ACT English score of 20 or completion of College Reading and Writing 1 10831104 with a "C" or better

Industrial Hydraulics & Pneumatics

104621203 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.

Prerequisite: Intermediate Algebra with Applications 10804118

COURSE DESCRIPTIONS

Industrial Control Systems Applications

106641042 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.

Industrial Networking

106051452 credits

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

Integrated Systems Capstone

106641243 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.

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

106641202 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

106641102 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.

Intro to Psychology ☑

108091983 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

106231122 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

104621063 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 ☑

108011983 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

COURSE DESCRIPTIONS

Team Building and Problem Solving

101961893 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

108041963 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

106641212 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.