

MECHANICAL DESIGN TECHNOLOGY

Associate in Applied Science (AAS)

Program Code: 10-606-1

Total Credits: 63-64

This program prepares graduates to work with engineers to design, prepare, develop, and test all types of machines and products. Students learn to apply knowledge of mechanical engineering technology and use 2D and 3D computer-aided design applications. They also learn about manufacturing processes, material strength, basic mechanisms, and three-dimensional modeling. You'll gain an understanding of complex systems and how parts and pieces work together. You will also learn about and use research and development (R&D) processes, such as prototyping, testing, and QA, and how these are applied in the world of manufacturing. Hands-on projects include building parts to make mechanical systems as well as first-hand experience with scanning and modeling parts, 3D printing parts, and additive manufacturing.

To learn more about this program, visit 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.

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.
- 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. 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.
- Set up student MyCampus account at mstc.edu/mycampus-assistance.
- Schedule a New Student Advising appointment at mstc.edu/advising.

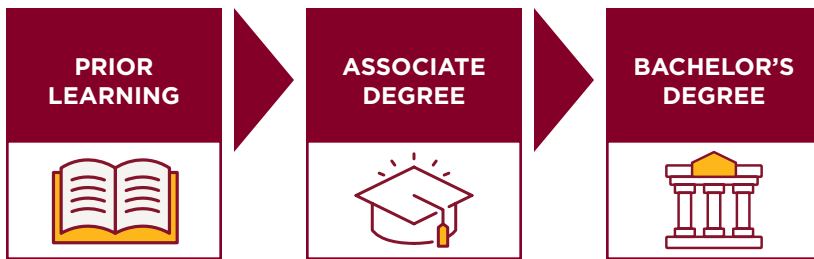
mstc.edu • 888-575-6782 • TTY: 711



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.

High School Credit

- High School Dual Credit
- Mid-State Fast Track

Learn about High School Credit at mstc.edu/dc.

Associate Degree

- Mechanical Design Technology (63-64 Credits)
Start Your Career: CAD Technician, Design Technician, Engineering Technician, Mechanical Design Technician, Product Designer

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.

Other Options

Related Programs: Automation & Instrumentation Technology, Civil Engineering Technology-Highway Technician, Precision Machining Technician

OUTCOMES

Employers will expect you, as a Mechanical Design Technology graduate, to be able to:

- Prepare detail and assembly drawings for documentation of mechanical components and products.
- Create CAD geometry, parts and assemblies.
- Design mechanical components and products.
- Analyze mechanical engineering problems.
- Select purchased parts.

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 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
Mechanical Design Technology • 63-64 Total Credits

Term 16 Credits	Course Number	Course Name	CPL	Credits
	10420101	Manufacturing Processes - Machining	No	2
	10606163	Materials of Industry	No	2
	10606164	Technical Detailing	No	2
	10623106	Introduction to AutoCAD	Yes	1
	10623114	Intro to Inventor	Yes	1
	10801136	English Composition 1	Yes	3
	10804118	Intermediate Algebra with Applications	Yes	4
	10890102	GPS for Student Success	Yes	1

Term 16 Credits	Course Number	Course Name	CPL	Credits
	10457119	Fabrication Fundamentals 1	No	1
	10457120	Fabrication Fundamentals 2	No	1
	10606165	Intro to Solidworks	No	1
	10606114	Machine Design 1	No	2
	10606131	Strengths of Materials	No	3
	10606145	Applied Mechanics	No	2
	10804196	Trigonometry with Applications	No	3
	10809166 or 10809172	Introduction to Ethics: Theory & Application or Introduction to Diversity Studies	Yes	3

Term 17-18 Credits	Course Number	Course Name	CPL	Credits
	10606115	Machine Design 2	No	3
	10606117	Designing for Manufacturability	No	3
	10606119	Mechanisms	No	3
	10623176	Quality Assurance	No	1
	10607106	Excel for Engineering	No	1
	10801198 or 10801196	Speech or Oral/Interpersonal Communication	Yes	3
	10806143 or 10806154	College Physics 1 or General Physics 1	No or Yes	3 or 4

Term 14 Credits	Course Number	Course Name	CPL	Credits
	10462120	Industrial Hydraulics & Pneumatics	No	3
	10606113	Tool and Fixture Design	No	2
	10606166	Intermediate Solidworks	No	1
	10623171	Lean Six Sigma	No	3
	10809198 or 10809188	Introduction to Psychology or Developmental Psychology	Yes	3
	32420325	Inspection with Geometric Dimensioning	No	2

Please Note

- Credit for Prior Learning (CPL) options are available for some courses. You can visit 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.
- Get the latest updates online at mstc.edu.

SAMPLE PART-TIME CURRICULUM OPTION
Mechanical Design Technology • 63-64 Total Credits

Term 11 Credits	Course Number	Course Name	CPL	Credits
	10420101	Manufacturing Processes - Machining	No	2
	10606163	Materials of Industry	No	2
	10623106	Introduction to AutoCAD	Yes	1
	10623114	Intro to Inventor	Yes	1
	10804118	Intermediate Algebra with Applications	Yes	4
	10890102	GPS for Student Success	Yes	1
Term 8-9 Credits	Course Number	Course Name	CPL	Credits
	10457119	Fabrication Fundamentals 1	No	1
	10457120	Fabrication Fundamentals 2	No	1
	10804196	Trigonometry with Applications	No	3
	10806143 or 10806154	College Physics 1 or General Physics 1	No or Yes	3 or 4
Term 8 Credits	Course Number	Course Name	CPL	Credits
	10606164	Technical Detailing	No	2
	10801136	English Composition 1	Yes	3
	10809166 or 10809172	Introduction to Ethics: Theory & Application or Introduction to Diversity Studies	Yes	3
Term 7 Credits	Course Number	Course Name	CPL	Credits
	10606114	Machine Design 1	No	2
	10606131	Strengths of Materials	No	3
	10606145	Applied Mechanics	No	2
Term 7 Credits	Course Number	Course Name	CPL	Credits
	10606115	Machine Design 2	No	3
	10607106	Excel for Engineering	No	1
	10801198 or 10801196	Speech or Oral/Interpersonal Communication	Yes	3
Term 9 Credits	Course Number	Course Name	CPL	Credits
	10462120	Industrial Hydraulics & Pneumatics	No	3
	10606165	Intro to Solidworks	No	1
	10809198 or 10809188	Introduction to Psychology or Developmental Psychology	Yes	3
	32420325	Inspection with Geometric Dimensioning	No	2
Term 7 Credits	Course Number	Course Name	CPL	Credits
	10606117	Designing for Manufacturability	No	3
	10606119	Mechanisms	No	3
	10623176	Quality Assurance	No	1
Term 6 Credits	Course Number	Course Name	CPL	Credits
	10606113	Tool and Fixture Design	No	2
	10606166	Intermediate Solidworks	No	1
	10623171	Lean Six Sigma	No	3

COURSE DESCRIPTIONS

Applied Mechanics

10606145

2 credits

Learners develop a thorough understanding of statics and mechanics principles found in mechanical design. Learners will apply mechanics principles in various assignments and lab activities.

Corequisites: Intermediate Algebra with Applications (10804118), Trigonometry with Applications (10804196)

College Physics 1

10806143

3 credits

Presents the applications and theory of basic physics principles. This course emphasizes problem solving, laboratory investigation and applications. Topics include laboratory safety, unit conversions and analysis, kinematics, dynamics, work, energy, power, temperature and heat.

Corequisite: Trigonometry with Applications 10804196

Designing for Manufacturability

10606117

3 credits

Utilize industry accepted methods for the design and development of customer focused products. Emphasis is placed on team building and the application of industry practices for the efficient and cost-effective design, development and production of products. The learner will incorporate design considerations for specific manufacturing processes into product design. Current industry methods of product design and re-engineering will be used to complete product design projects.

Prerequisites: Manufacturing Processes- Machining (10420101), Fabrication Fundamentals 1 (10457119), Fabrication Fundamentals 2 (10457120)

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

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 1 10831104 with a "C" or better

Fabrication Fundamentals 1

10457119

1 credit

An introduction to structural shapes and sheet metal fabrication. Presents fabrication techniques, metal selection, and layout, cutting, bending, drilling, threading, and joining using manual equipment and techniques. Information is presented to the student and followed up with lab activities to provide a hands-on experience. Emphasizes developing an understanding of the tools, techniques, safe work habits, and application of sheet metal fabrication skills.

Fabrication Fundamentals 2

10457120

1 credit

An introduction to plate steel and heavy fabrication. Presents fabrication techniques using heavy fabrication equipment. CNC Cutting, Plate and Tube bending, Sawing and Shearing equipment will be presented and followed up with lab activities to provide a hands-on experience. Emphasizes developing an understanding of the equipment, techniques, safe work habits, and application of heavy metal fabrication skills.

General Physics 1

10806154

4 credits

Presents the applications and theory of basic physics principles. This course emphasizes problem solving, laboratory investigation, and applications. Topics include unit conversion and analysis, vectors, translational and rotational kinematics, translational and rotational dynamics, heat and temperature, and harmonic motion and waves.

Corequisite: Trigonometry with Applications 10804196

GPS for Student Success

10890102

1 credit

Integrate necessary skills for student success by developing an academic plan, identifying interpersonal attributes for success, adopting efficient and effective learning strategies, and utilizing Mid-State resources, policies, and processes. This course is recommended to be completed prior to obtaining 12 credits and is a graduation requirement unless you receive an exemption from your program advisor.

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

Inspection with Geometric Dimensioning

32420325

2 credits

This course will familiarize learners with interpreting Geometric Dimensioning and introduce dimensional metrology. Activities and classroom presentations will provide insight into the use of direct and indirect measuring tools, instrument calibration, and the use of Coordinate Measuring Machines, and quality documentation. Emphasis of the course will be on interpretation of Geometric Dimensioning and using metrology fundamentals to ensure manufactured components meet design specifications.

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.

Intermediate Solidworks

10606166

1 credit

Introduces the learner to intermediate SolidWorks commands to produce 3- dimensional parts, assemblies and engineering drawings. The learner will utilize and practice their existing beginner level commands and skills while mastering intermediate level skills with an emphasis on mechanical engineering drafting and design.

Prerequisite: Intro to Solidworks 10606165

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 Solidworks

10606165

1 credit

Introduces the learner to basic SolidWorks commands to produce 3-dimensional parts, assemblies and engineering drawings. The learner will master beginner level commands and have a thorough understanding of the basic operation of the software.

Introduction to AutoCAD

10623106

1 credit

Learners will develop practical approaches to constructing basic 2D drawings in AutoCAD software by drawing, modifying, and assigning appropriate layer properties. Learners will also analyze length and area of shapes drawn in AutoCAD, summarize details through dimensions and annotations added to the drawings, and format the drawings for printing. Prior experience with computers is recommended.

Introduction to Diversity Studies

10809172

3 credits

This course introduces the study of diversity from a local to a global perspective using a holistic, interdisciplinary approach that encourages exploration and prepares students to work in a diverse environment. The course introduces basic diversity concepts, examines the impact of bias and power differentials among groups, explores the use of culturally responsive communication strategies, and compares forces that shape diversity in an international context.

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

Introduction to Ethics: Theory & Application

10809166

3 credits

Provides a basic understanding of the theoretical foundations of ethical thought. Diverse ethical perspectives are used to analyze and compare relevant issues. Students critically evaluate individual, social, and/or professional standards of behavior, and apply a systemic decision-making process to these situations.

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

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

Lean Six Sigma

10623171

3 credits

Learners will examine methods used in Lean Six Sigma to implement continuous improvement projects in the workplace. Concepts identified in this course cover problem solving tools, root cause analysis and project management using the DMAIC model. Learners will incorporate basic statistics to support projects and explore the Lean Six Sigma 'body of knowledge' providing skills to achieve Lean Six Sigma Green Belt certification.

Machine Design 1

10606114

2 credits

Emphasizes horsepower, torque and speed regarding machine design requirements. The learner will be capable of proper selection of commercially available power transmission chain and belt drives, couplings, clutches, brakes and gear reducers, as well as the selection of electric motors and small two and four cycle gasoline engines.

Corequisite: Applied Mechanics 10606145

Machine Design 2

10606115

3 credits

Incorporates the concepts learned in Strengths of Materials and applies them to 3-dimensional applications. The learner will master the basic concepts of fatigue strength, the use of stress concentration factors, de-rating factors and factors of safety in order to compare design loads to material properties of objects in their actual working environment. The learner will understand all aspects of shaft design and will be able to properly account for all considerations when designing common machine components.

Prerequisite: Machine Design 1 10606114, Strengths of Materials 10606131

Manufacturing Processes - Machining

10420101

2 credits

Learners will be introduced to manufacturing methods and the progression a part follows from raw material to finished product following supplied drawings. Learners will practice techniques in standard machining processes, methods, and procedures to safely machine materials using manufacturing equipment including manual milling machines and manual lathes.

Materials of Industry

10606163

2 credits

Learners are involved in the examination of manufacturing materials related to the ultimate design decision involved in part and product design. Students will learn the principles and theory of material selection, properties of materials, structures of materials and specific materials and their function in product application.

Mechanisms

10606119

3 credits

Analyzes existing mechanisms and their motion characteristics with application to the design of machines. Four bar linkages, slider cranks, cams, gears and other typical mechanisms are examined. The effects that displacement, velocity and acceleration have on mechanisms will be studied.

Prerequisite: Applied Mechanics 10606145

Oral/Interpersonal Communication

10801196

3 credits

Focuses on developing effective listening techniques and verbal and nonverbal communication skills through oral presentation, group activity, and other projects. The study of self, conflict, and cultural contexts will be explored, as well as their impact on communication.

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 or College Reading and Writing with a C or better

Quality Assurance

10623176

1 credit

Analyzes the philosophies and strategies the American industry has been focusing on to improve the quality of their products and services. The learner will explore their personal philosophy on quality, the cost of quality, total quality management, and nonconforming products and materials.

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

Strengths of Materials

10606131

3 credits

Examines how forces affect machine members and structural elements. The learner will calculate stress and strain, analyze connections and evaluate beams and columns. The learner will use these calculations to determine if a given design will perform or fail.

Corequisites: Applied Mechanics 10606145, Materials of Industry 10606163

Technical Detailing

10606164

2 credits

Expands basic knowledge and skill development of mechanical drawing. Emphasis is placed on fits and tolerances, geometric and positional dimensioning and tolerancing, assembly and detail drawings and parts lists.

Corequisites: Intro to Inventor 10623114 or Intro to Solidworks 10606165

Tool and Fixture Design

10606113

2 credits

Develops an in-depth understanding of production systems control and planning. The learner will acquire the skills necessary for the design and creation of engineering drawings of production tools and work holder devices such as jigs and fixtures.

Prerequisites: Intro to Solidworks 10606165, Designing for Manufacturability 10606117

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