



# CIVIL ENGINEERING TECHNOLOGY-HIGHWAY TECHNICIAN

## Associate in Applied Science (AAS) Program Code: 10-607-4 Total Credits: 67-68

Mid-State's Civil Engineering Technology-Highway Technician program prepares students to work in the design and construction of public projects like roads, bridges, parking structures, and stormwater management systems. This important work also includes railroad, pipeline, power line, dam, canal, wastewater treatment facility, and airport construction. Through hands-on exercises and a capstone design project, you'll learn how to support the work of civil engineers, designers, surveyors, and city planners. You'll also receive training in surveying, soils, construction material testing, computer drafting, estimating, site design, mapping, and inspection procedures.

Mid-State's Civil Engineering Technology-Highway Technician program courses provide the required educational hours to obtain the Professional Land Surveyor license; however, students need to complete four years of on-the-job experience in order to be eligible for licensure in the state of Wisconsin. The College does not guarantee its curriculum matches the requirements for preparation, examinations, or licensure for other states.

**Estimated tuition and fees:** [mstc.edu/programcosts](http://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](http://mstc.edu/advising).

### CHECKLIST:

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

- FAFSA ([www.fafsa.gov](http://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: \_\_\_\_\_  
\_\_\_\_\_



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**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](https://mstc.edu/cpl).

## CERTIFICATE

### CIVIL DRAFTING

Certificate • 7 Credits

For more information and additional opportunities, visit [mstc.edu/career-accelerator](https://mstc.edu/career-accelerator).

## ASSOCIATE IN APPLIED SCIENCE (AAS)

### CIVIL ENGINEERING TECHNOLOGY-HIGHWAY TECHNICIAN

Associate in Applied Science (AAS) • 67-68 Credits

#### Start Your Career

- AutoCAD Specialist
- Civil Engineering Technician
- Inspection/Quality Control Technician

## BACHELOR'S DEGREE

### BACHELOR'S DEGREE OPTIONS

Arizona State University, Bellevue University, Colorado State University Global, Concordia University, Franklin University, Grand Canyon University (GCU), Lakeland University, Milwaukee School of Engineering (MSOE), Mount Mary University (MMU), University of Maryland Global, University of Phoenix, UW-Green Bay, UW-Oshkosh, UW-Platteville, UW-Stevens Point, UW-Stevens Point at Marshfield, UW-Stout, UW-Whitewater, Western Governors University, and Wisconsin Private-Nonprofit Universities/Colleges.

For more information and additional opportunities, visit [mstc.edu/transfer](https://mstc.edu/transfer).

## OTHER OPTIONS

### RELATED PROGRAMS

- Automation & Instrumentation Technology
- Mechanical Design Technology



## SAMPLE FULL-TIME CURRICULUM OPTION

Term		16 credits
10607106	Excel for Engineering	1
10607108	Intro to Civil 3D ☑	1
10607145	Soils	3
10607155	Intro to Surveying ☑	2
10623106	Intro to AutoCAD	1
10623115	Intro to Engineering	1
10801136	English Composition 1 ☑	3
10804118	Intermediate Algebra with Applications ☑	4

Term		16 credits
10487101	Drones and Remote Sensing	1
10607110	Cemented Aggregate Mixtures	4
10607150	Civil Engineering Drafting I ☑	3
10607156	Surveying - Total Station	3
10607167	Inspection	2
10804196	Trigonometry with Applications	3

Term		18-19 credits
10607117	GIS Fundamentals	2
10607118	Land Records	1
10607160	Civil Engineering Drafting II	2
10607170	Storm Water Management	3
10607171	Highway Surveying	2
10607174	GPS for Surveyors	2
10806143	College Physics 1	3
<b>-or-</b>		
10806154	General Physics 1	4
10809166	Intro to Ethics: Theory & Application ☑ <b>-or-</b>	
10809195	Economics ☑	3

Term		17 credits
10607149	Highway Bridges, Medians, & Barriers	3
10607166	Construction Estimating & Management	3
10607180	Civil Engineering Capstone	2
10801196	Oral/Interpersonal Communication ☑ <b>-or-</b>	
10801198	Speech ☑	3
10804195	College Algebra with Applications ☑	3
10809198	Intro to Psychology ☑ <b>-or-</b>	
10809188	Developmental Psychology ☑	3

**Total credits 67-68**

☑ This course has options available to receive credit for prior learning (CPL) or work experience. Visit the website at [mstc.edu/cpl](http://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](http://mstc.edu/schedule).

## SAMPLE PART-TIME CURRICULUM OPTION

Term		9 credits
10607108	Intro to Civil 3D ☑	1
10607155	Intro to Surveying ☑	2
10623106	Intro to AutoCAD	1
10623115	Intro to Engineering	1
10804118	Intermediate Algebra with Applications ☑	4

Term		11 credit
10607150	Civil Engineering Drafting I ☑	3
10607156	Surveying - Total Station	3
10607167	Inspection	2
10804196	Trigonometry with Applications	3

Term		7 credits
10607106	Excel for Engineering	1
10607145	Soils	3
10801136	English Composition 1 ☑	3

Term		7-8 credits
10487101	Drones and Remote Sensing	1
10806143	College Physics 1	3
<b>-or-</b>		
10806154	General Physics 1 ☑	4
10809166	Intro to Ethics: Theory & Application ☑ <b>-or-</b>	
10809195	Economics ☑	3

Term		7 credits
10607160	Civil Engineering Drafting II	2
10607170	Storm Water Management	3
10607171	Highway Surveying	2

Term		10 credits
10607110	Cemented Aggregate Mixtures	4
10607166	Construction Estimating & Management	3
10804195	College Algebra with Applications ☑	3

Term		8 credits
10607117	GIS Fundamentals	2
10607118	Land Records	1
10607174	GPS for Surveyors	2
10801196	Oral/Interpersonal Communication ☑ <b>-or-</b>	
10801198	Speech ☑	3

Term		8 credits
10607149	Highway Bridges, Medians, & Barriers	3
10607180	Civil Engineering Capstone	2
10809198	Intro to Psychology ☑ <b>-or-</b>	
10809188	Developmental Psychology ☑	3

**Total credits 67-68**

### 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

## Cemented Aggregate Mixtures

**10607110 ..... 4 credits**

WisDOT standard tests and procedures are performed on aggregates, hot mix asphalt, and concrete in a lab environment. The behavior that results from material selection and mixture proportioning is evaluated through test results. Learners will design hot mix asphalt and concrete mixtures within WisDOT design parameters. HTCP certification is encouraged after completion of the course.  
*Corequisite: Intermediate Algebra with Applications 10804118*

## Civil Engineering Capstone

**10607180 .....2 credits**

This capstone class is a project-based learning experience that allows students to integrate and demonstrate their civil engineering drafting, design, and survey skills by applying them to a specific engineering problem. Students collaborate in teams to apply their problem-solving and technology skills to a design experience. Working in collaboration with a faculty member, students plan, produce, document and present quality engineering designs. Students should be in their last semester of the Civil Engineering Technology program to enroll in this class.  
*Prerequisites: Civil Engineering Drafting II 10607160, Storm Water Management 10607170, and Highway Surveying 10607171*

## Civil Engineering Drafting I

**10607150 .....3 credits**

Students will use survey data to create and analyze existing ground surface models in Civil 3D. Students will also learn basic and advanced corridor modeling methods, create cross sections, analyze earthwork volumes, and apply dynamic annotation in order to produce construction drawings.

*Prerequisite: Intro to Civil 3D 10607108*

## Civil Engineering Drafting II

**10607160 .....2 credits**

Expands on topics learned in Civil Engineering Drafting I. Topics covered include site layout and modeling, as well as sanitary sewer, water main, and dry utility layout and modeling.

*Prerequisite: Civil Engineering Drafting I 10607150*

## College Algebra with Applications

**10804195 .....3 credits**

Covers the skills needed for success in calculus and many application areas on a baccalaureate level. Topics include the real and complex number systems, polynomials, exponents, radicals, solving equations and inequalities (linear and nonlinear), relations and functions, systems of equations and inequalities (linear and nonlinear), matrices, graphing, conic sections, sequences and series, combinatorics, and the binomial theorem.

*Prerequisite: ACT Math score of 22 or Trigonometry with Applications 10804196 or Intermediate Algebra with Applications 10804118 with a "C" or better*

## 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*

## Construction Estimating & Management

**10607166 .....3 credits**

Presents goals and performance of quantity takeoff, cost estimation, and contract interpretation. Project bidding, construction techniques, and equipment capabilities are evaluated.

*Prerequisites: Excel for Engineering 10607106, Intermediate Algebra with Applications 10804118, and Intro to AutoCAD 10623106*

## 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*

## Drones and Remote Sensing

**10487101 ..... 1 credit**

This course will explore topics included in the Section 107 Drone Pilot License exam, as well as drone and remote sensing applications in the civil engineering industry. Students will have the opportunity to fly drones in order to capture data for use in engineering design.

*Corequisite: Civil Engineering Drafting I 10607150*

## 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*

# COURSE DESCRIPTIONS

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

## Excel for Engineering

**10607106 .....1 credit**

Students learn to create, modify, and format spreadsheets and workbooks for readability and functionality in the engineering industry. Students will practice constructing workbooks to perform calculations and generate results in tabular and graphic form.

## General Physics 1 ☑

**10806157 .....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*

## GIS Fundamentals

**10607117 .....2 credits**

An introduction to geographic information systems (GIS) and how they are used to document and convey information that has a spatial component. Students use GIS software to create, manipulate, and present geographic information.

## GPS for Surveyors

**10607174 .....2 credits**

A GNSS surveying instrument and data collector are operated to collect field data and perform construction staking. Learners will explain the GNSS system and diagnose problems with data collection and use the data collector to analyze field data and create linework for stakeout.

*Prerequisites: Intro to Surveying 10607155, Intro to Civil 3D 10607108.*

## Highway Bridges, Medians, & Barriers

**10607149 .....3 credits**

Studies the processes, considerations, and safety aspects of constructing and maintaining highway bridges, medians, and barriers. Includes investigation of structural loads, stress factors, and valid design procedures for these critical components of today's modern roads and highways.

*Prerequisite: Highway Surveying 10607171; Corequisite: Inspection 10607167*

## Highway Surveying

**10607171 .....2 credits**

Learners will explain the geometry of horizontal curves, vertical curves and super elevation with consideration of WISDOT design requirements. Civil 3D and spreadsheet software are used to model basic curves and produce reports from the software that could be used for construction staking. Learners will also perform calculations manually in preparation for the NSPS-CST exam.

*Prerequisites: Intro to Surveying 10607155, Civil Engineering Drafting I 10607150; Corequisite: Trigonometry with Applications 10804196*

## Inspection

**10607167 .....2 credits**

Concerns construction inspection and its importance, the role of the inspector, requirements for a good inspector, and general duties of the inspector. Emphasizes concrete and asphalt inspection.

*Prerequisite: Intro to Surveying 10607155*

## 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 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.

## Intro to Civil 3D ☑

**10607108 .....1 credit**

This introductory course in Civil 3D covers basic two-dimensional drafting concepts, including the layout of roads and parcels in a subdivision. Alignments, parcels, and dynamic labels will be created and explored using Civil 3D software.

*Corequisite: Intro to AutoCAD 10623106*

## Intro to Engineering

**10623115 .....1 credit**

Mathematical solutions are arranged through dimensional analysis, and this process is applied to a variety of engineering situations. Life cycle cost is evaluated to determine the cost effectiveness in decision making. Practical applications will enhance these fundamentals.

# COURSE DESCRIPTIONS

## **Intro to Ethics: Theory & Application** ☑

**10809166 .....3 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 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*

## **Intro to Surveying** ☑

**10607155 .....2 credits**

Learners will use basic surveying instruments to measure/estimate horizontal lengths, an automatic level to determine elevation, and research survey data online. Resolve measurement errors and report results in appropriate formats. Create cross section and profile views from survey data.

*Corequisite: Intermediate Algebra with Applications 10804118*

## **Land Records**

**10607118 .....1 credit**

Interpret land documents, including various types of property descriptions, Certified Survey Maps, and USGS maps. Interconvert azimuth, bearing, and turned angles. Assess evidence for corner restoration and research a local survey document.

*Prerequisite: Civil Engineering Drafting I 10607150, Survey-Total Station 10607156*

## **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*

## **Soils**

**10607145 .....3 credits**

Studies the general classification and properties of soil and subsurface materials. Includes subsurface exploration soil tests and hydraulic principles as used in the field of civil engineering. Laboratory techniques are developed for testing and classifying soil and aggregate.

*Corequisite: Intermediate Algebra with Applications 10804118*

## **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*

## **Storm Water Management**

**10607170 .....3 credits**

Emphasizes storm water management, calculations, planning, and design. Topics include open channel and pressure flow, storage and treatment facility design concepts, and regulation, permitting, and enforcement of sanitary and storm water ordinances.

*Prerequisite: Civil Engineering Drafting I 10607150; Corequisite: Trigonometry with Applications 10804196*

## **Surveying - Total Station**

**10607156 .....3 credits**

Learners will operate a robotic total station and data collector to collect field data and perform construction staking. Civil 3D software is used to interpret field data, solve survey calculations, and convey plat information. Learners will manually perform calculations to confirm data collector solutions and to prepare for the written NSPS-CST exam. Learners will perform a traverse and adjust the results.

*Prerequisites: Intro to Surveying 10607155, Intro to Civil 3D 10607108. Corequisite: Trigonometry with Applications 10804196 and Civil Engineering Drafting I 10607150*

## **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*