CIVIL ENGINEERING TECHNOLOGY-HIGHWAY TECHNICIAN

Associate in Applied Science (AAS)
Program Code: 10-607-4
Total Credits: 68-69

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.

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.**

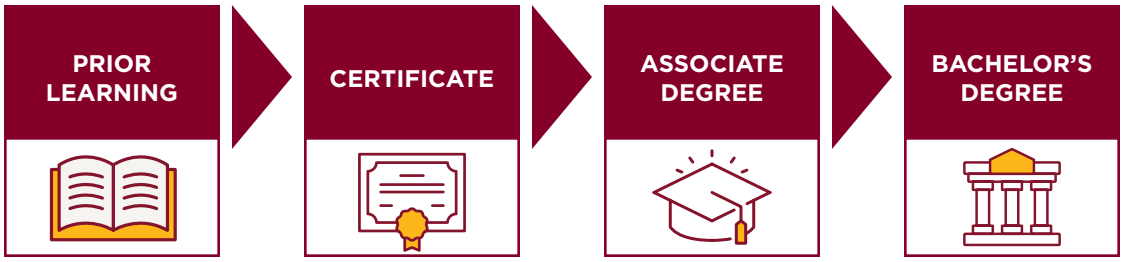
NEW STUDENT CHECKLIST

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**.

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**.

Certificate

- Civil Drafting (7 Credits)

Associate Degree

- Civil Engineering Technology-Highway Technician (68-69 Credits)
  Start Your Career: AutoCAD Specialist, Civil Engineering Technician, Inspection/Quality Control Technician, Land Survey Technician, Material Testing 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**.

Other Options

Related Programs: Automation & Instrumentation Technology, Mechanical Design Technology

OUTCOMES

Employers will expect you, as a Civil Engineering Technology-Highway Technician graduate, to be able to:

- Utilize graphic techniques to produce engineering drawings.
- Conduct standardized field and laboratory testing on civil engineering materials.
- Utilize modern surveying methods for land measurements and/or construction layout.
- Estimate material quantities and costs for civil engineering projects.
- Utilize geometric elements to develop corridors.
- Design storm systems to meet given design requirements.
- Determine forces and stresses in elementary structural systems.
- Employ productivity software to solve technical problems.

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

Civil Engineering Technology-Highway Technician • 68-69 Total Credits

Term 17 Credits

Course Number	Course Name	CPL	Credits
10607106	Excel for Engineering	No	1
10607108	Intro to Civil 3D	Yes	1
10607145	Soils	No	3
10607155	Intro to Surveying	Yes	2
10623106	Introduction to AutoCAD	Yes	1
10623115	Intro to Engineering	No	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
10487101	Drones and Remote Sensing	No	1
10607110	Cemented Aggregate Mixtures	No	4
10607150	Civil Engineering Drafting I	Yes	3
10607156	Surveying - Total Station	No	3
10607167	Inspection	No	2
10804196	Trigonometry with Applications	No	3

Term 18-19 Credits

Course Number	Course Name	CPL	Credits
10607117	GIS Fundamentals	No	2
10607118	Land Records	No	1
10607160	Civil Engineering Drafting II	No	2
10607170	Storm Water Management	No	3
10607171	Highway Surveying	No	2
10607174	GPS for Surveyors	No	2
10806143 or 10806154	College Physics 1 or General Physics 1	No	3 or 4
10809166 or 10809195	Introduction to Ethics: Theory & Application or Economics	Yes	3

Term 17 Credits

Course Number	Course Name	CPL	Credits
10607149	Highway Bridges, Medians, & Barriers	No	3
10607166	Construction Estimating & Management	No	3
10607180	Civil Engineering Capstone	No	2
10801198 or 10801196	Speech or Oral/Interpersonal Communication	Yes	3
10804195	College Algebra with Applications	Yes	3
10809198 or 10809188	Introduction to Psychology or Developmental Psychology	Yes	3

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

Civil Engineering Technology-Highway Technician • 68-69 Total Credits

Term 10 Credits

Course Number	Course Name	CPL	Credits
10607108	Intro to Civil 3D	Yes	1
10607155	Intro to Surveying	Yes	2
10623106	Introduction to AutoCAD	Yes	1
10623115	Intro to Engineering	No	1
10804118	Intermediate Algebra with Applications	Yes	4
10890102	GPS for Student Success	Yes	1

Term 11 Credits

Course Number	Course Name	CPL	Credits
10607150	Civil Engineering Drafting I	Yes	3
10607156	Surveying - Total Station	No	3
10607167	Inspection	No	2
10804196	Trigonometry with Applications	No	3

Term 7 Credits

Course Number	Course Name	CPL	Credits
10607106	Excel for Engineering	No	1
10607145	Soils	No	3
10801136	English Composition 1	Yes	3

Term 7-8 Credits

Course Number	Course Name	CPL	Credits
10487101	Drones and Remote Sensing	No	1
10806143 or 10806154	College Physics 1 or General Physics 1	No	3 or 4
10809166 or 10809195	Introduction to Ethics: Theory & Application or Economics	Yes	3

Term 7 Credits

Course Number	Course Name	CPL	Credits
10607160	Civil Engineering Drafting II	No	2
10607170	Storm Water Management	No	3
10607171	Highway Surveying	No	2

Term 10 Credits

Course Number	Course Name	CPL	Credits
10607110	Cemented Aggregate Mixtures	No	4
10607166	Construction Estimating & Management	No	3
10804195	College Algebra with Applications	Yes	3

Term 8 Credits

Course Number	Course Name	CPL	Credits
10607117	GIS Fundamentals	No	2
10607118	Land Records	No	1
10607174	GPS for Surveyors	No	2
10801198 or 10801196	Speech or Oral/Interpersonal Communication	Yes	3

Term 8 Credits

Course Number	Course Name	CPL	Credits
10607149	Highway Bridges, Medians, & Barriers	No	3
10607180	Civil Engineering Capstone	No	2
10809198 or 10809188	Introduction to Psychology or Developmental Psychology	Yes	3

Cemented Aggregate Mixture
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
10607160
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
10607150
3 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 Introduction 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

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

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
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

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.

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.

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: Introduction 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.

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

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

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 or College Reading and Writing with a C or better

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