

CIVIL ENGINEERING TECHNOLOGY-HIGHWAY TECHNICIAN



PROGRAM OUTCOMES

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

- Design civil engineering layouts
- Understand safety requirements for the civil engineering field
- Acquire civil engineering technology knowledge to aid in obtaining appropriate certifications
- Exhibit CAD skills
- Apply theoretical and practical concepts to surveying practices
- Work cooperatively in groups
- Acquire working knowledge of instruments used in the civil engineering field
- Understand quantities and materials used in the civil engineering technology area

CAREER OPTIONS

CAD Specialist
Construction Grade Supervisor
Draftsperson
Engineering Specialist
Engineering Technician
Environmental/Water Quality Technician
Estimator
Inspector
Materials Technician
Right-of-Way Technician
Sales-Construction (Equipment-Supplies)

Program Code 10-607-4

Expected Program Costs: \$10,200

Median Annual Salary: \$32,000

OVERVIEW

The challenging field of engineering is constantly changing and in need of skilled technicians. In this program, you will be trained to work in street and highway construction; sewer and water systems; and railroad, pipeline, powerline, dam, canal and airport construction. You will work in support of civil engineers, designers, surveyors and city planners. Comprehensive training in surveying, soils and construction material testing will be provided. You will also learn about drafting, computer drafting, estimating, system design, mapping and inspection procedures. The Civil Engineering Technology-Highway Technician program prepares you for a variety of positions in the municipal and construction field.

The Civil Engineering Technology-Highway Technician program is offered at the Wisconsin Rapids campus.

Soils Tester
Solid Waster/Landfill Technician
Structural Technician
Surveyor (Construction-Land)
Treatment Plant Technician
Utility Technician

POTENTIAL FOR ADVANCEMENT

Certified Soil Tester
Civil Project Engineer
Construction Supervisor
Crew Chief (Construction)
Designer
Engineering Specification Writer
Head Estimator
Land Surveyor
Lead Inspector
Senior Draftsperson
Treatment Land Operator

Potential advancement generally requires further education.

ADMISSIONS PROCEDURES

To apply to the Civil Engineering Technology-Highway Technician program, please submit the following documents to the MSTC Admissions Office:

1. Complete an MSTC application form and return it with the \$30 non-refundable application fee.
2. Complete the Accuplacer or ACT test. Minimum scores required:
 - Reading-Accuplacer score of 55
 - Sentence Skills-Accuplacer score of 60
 - Math-Accuplacer score of 65
 - ACT equivalents for above scores are acceptable.

If a student does not meet the required test scores, they may retest or complete an identified structured course(s) in the Academic Support Center.

- Written Communication, courses in mathematics and some science courses have placement requirements. Please refer to the course description section in the back of the catalog, listed under General Education, for course specific information.
3. Submit an official copy of all academic transcripts, including high school, college or university and HSED/GED.

**Mid-State Technical College
Admissions**

**500 32nd Street North
Wisconsin Rapids, WI 54494**

PROGRAM COURSE DESCRIPTIONS

10103106 // 3 credits

Microsoft Office-Introduction

Develops introductory skills in the Microsoft Office Suite (Word, Excel, Access, PowerPoint, and Outlook) while reinforcing the students' knowledge of computer concepts, Windows Explorer and Internet usage through demonstrations and lab exercises. Students should possess basic keyboarding, mouse and Windows XP skills. Students may develop these skills in Academic Support Center computer training prior to enrolling or while concurrently enrolled in the Microsoft Office-Introduction course.

10607138 // 3 credits

Highway Construction Materials

Covers properties of materials and methods and techniques of field testing as background information for design and construction. Includes types of gradation, distribution, and testing of aggregates, proportions, mixtures, placing, curing, and testing of Portland cement concrete, asphaltic concrete and other bituminous surfacings and use of metallic materials, such as wire bars, mesh, and others.

Prerequisite: Intermediate Algebra w/ Apps 10804118

10607145 // 3 credits

Soils

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

10607149 // 3 credits

Structural Design & Detailing

Students are acquainted with drafting procedures and methods used in graphical presentation of steel structures. Emphasis is on designing and detailing structural connections and investigating valid design procedures. Includes investigating loads, stress analysis, and selection of elements of the structure.

Prerequisite: Trigonometry w/ Apps 10804196; Civil Engineering Drafting I 10607150

10607150 // 3 credits

Civil Engineering Drafting I

Provides fundamentals necessary for using Civil Engineering software to create subdivision, property, traverse, topographic and contour drawings. Information collected in Surveying - Total Station is downloaded onto the computer to create drawings.

Prerequisite: Intro to AutoCAD 10623106 Corequisites: Intermediate Algebra w/Applications 10804118; Intro to Surveying 10607155

10607155 // 2 credits

Intro to Surveying

Covers fundamental principles of surveying and the use of surveying instruments in the application of these principles. Topics include measurement of horizontal distances, care and use of survey equipment, note keeping, differential leveling, angular measurement, and surveying field procedures. Actual field problems supplement classroom instruction.

Corequisite: Intermediate Algebra w/ Apps 10804118; Intro to AutoCAD 10623106

CURRICULUM

Term		(18 credits)
10103106	Microsoft Office-Introduction	3
10607145	Soils	3
10607155	Intro to Surveying	2
10623100	Problem Solving & Critical Thinking	1
10623106	Intro to AutoCAD	2
10801195	Written Communication	3
10804118	Intermediate Algebra with Applications	4

Term		(16 credits)
10607138	Highway Construction Materials	3
10607150	Civil Engineering Drafting I	3
10607156	Surveying-Total Station	3
10804196	Trigonometry with Applications	3
10806154	General Physics 1	4

Term		(18 credits)
10607160	Civil Engineering Drafting II	2
10607166	Construction Estimating & Management	3
10607170	Storm Water Management	3
10607171	Highway Surveying	2
10607174	GPS for Surveyors	2
10804195	College Algebra with Applications	3
10809143	Microeconomics -or-	
10809144	Macroeconomics	3

Term		(16 credits)
10607149	Structural Design & Detailing	3
10607167	Inspection	2
10607180	Civil Engineering Capstone	2
10623135	Strength of Materials	3
10801196	Oral/Interpersonal Communication -or-	
10801198	Speech	
10809198	Intro to Psychology	3

Total Credits 68

Please Note:

- The Civil Engineering Technology-Highway Technician program has an August start date. We advise you to meet with an academic advisor or counselor to successfully plan your academic schedule.
- This curriculum sequence is only for student planning. Actual student schedules will vary depending on course availability.
- Degree completion time may vary based on student scheduling and course availability.
- For General Education course descriptions (800 level), see section marked under Course Descriptions.

CIVIL ENGINEERING TECHNOLOGY-HIGHWAY TECHNICIAN

10607156 // 3 credits

Surveying-Total Station

Advanced principles of surveying and use of surveying instruments are covered. Topics include land surveying, calculation and layout of vertical and horizontal curves, and topographic surveys using transits and Total Stations. The data collected will be downloaded onto computers for use in Civil Engineering Drafting I. Actual field problems supplement classroom instruction.

Prerequisites: Intro to Surveying 10607155; Intro to AutoCAD 10623106

10607160 // 2 credits

Civil Engineering Drafting II

Expands on topics learned in Civil Engineering Drafting I. Covers fundamentals necessary for creating a set of highway plans. Drawings include the development and design of alignments, profiles, cross-sections and earthwork calculations. In addition, design information is downloaded from the computer to the Total Station to be used for staking.

Prerequisites: Civil Engineering Drafting I 10607150; Intro to Surveying 10607155

10607166 // 3 credits

Construction Estimating & Management

Goals and performance of quantity takeoff, cost estimation, resource leveling, estimating labor, and contract interpretation are presented. Project bidding, construction techniques, and equipment capabilities are evaluated.

Prerequisites: Microsoft Office - Introduction 10103106; Problem Solving and Critical Thinking 10623100; Intro to AutoCAD 10623106

10607167 // 2 credits

Inspection

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

10607170 // 3 credits

Storm Water Management

Emphasis is on stormwater management, calculations, planning and design. Topics include: open channel and pressure flow, storage and treatment facility design concepts, and regulation, permitting and enforcement for sanitary and stormwater ordinances.

Prerequisites: Soils 10607145; Microsoft Office - Introduction 10103106

10607171 // 2 credits

Highway Surveying

Principles of geometric design of highways, including horizontal curves, vertical curves, superelevation, and using station/offset orientation. Also includes basic design principles of airports, railways, and pipeline design. Evaluation of existing traffic and designing for future needs are included.

Prerequisites: Trigonometry w/ Apps 10804196; Civil Engineering Drafting I 10607150; Intro to Surveying 10607155

10607174 // 2 credits

GPS for Surveyors

Basic operation of survey-grade GPS equipment and equipment limitations are explored. Emphasis is on data collection, stakeout, and performing calculations with a hand-held data collector. Interaction of design team and surveyors is discussed.

Prerequisite: Intro to Surveying 10607155

10607180 // 2 credits

Civil Engineering Capstone

The civil engineering capstone class is a project based learning experience which allows students to integrate and demonstrate their civil engineering drafting, design and survey skills by applying them to a specific engineering problem. Students will collaborate in teams to apply their problem solving and technology skills to a design experience. Working in collaboration with a faculty member students will 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; Highway Surveying 10607171; Intro to Surveying 10607155

10623100 // 1 credit

Problem Solving & Critical Thinking

Introductory course in problem setup, organization, and solution. Identification of given and unknown values, equation setup, unit conversions and use of significant figures. Introduction to physical science; working with units of force, area, volume, time, and distance in metric and imperial systems. This course is designed to help you be successful in technical and engineering classes and should be taken during your first semester of enrollment.

10623106 // 2 credits

Intro to AutoCAD

This is an introductory course in computer aided drafting (CAD) using AutoCAD software. It will provide foundation skills in using CAD software to create and print two dimensional technical drawings. This course is available to students in any program. Computer skills and prior knowledge of drawing/drafting techniques is recommended.

10623135 // 3 credits

Strength of Materials

A study of stress and strain experienced by machine parts and structural members in service. Includes statics and vector analysis as applied to structures, properties of materials, beam theory, beam design, theory of columns and design formulas. Emphasis is on application of theory and problem solving.

Prerequisite: General Physics I 10806154