

MACHINE TOOL TECHNICIAN



PROGRAM OUTCOMES

Employers will expect you, as a Machine Tool Technician graduate, to be able to:

- Demonstrate the ability to work safely and cooperatively as individuals and in teams in a classroom/industrial setting
- Using various manual machine tools, construct parts to required specifications following instructions and interpreting blueprints
- Analyze the various programming methods, software, and equipment to machine parts to specifications using CNC machines
- Demonstrate proper machine care while producing precision parts within time estimates
- Use terminology associated with machine tool technology to communicate effectively with co-workers, supervisors, customers, and vendors
- Analyze prints to create parts to specifications using computational skills, proper process planning, and equipment

Program Code 32-420-1

Estimated Program Costs: \$11,400

Median Annual Salary: \$33,000

OVERVIEW

At the heart of many industrial processes is machine tool technology. This program trains you for various positions relating to machining in industrial production and maintenance environments. Additional training and experience often lead to supervisory, quality assurance, and tool maker positions. You will learn to shape various materials into intricate, precise, usable parts. You will also learn to work from blueprints and written specifications and to select the proper machinery, materials, and tools to accomplish the task.

This program emphasizes precision measurement with micrometers, dial indicators, optical comparators, and gauges. Machine tools, such as lathes, mills, grinders, computers, and computer-controlled machines (CNC), will be used to produce parts.

The Machine Tool Technician program is offered at the Wisconsin Rapids campus.

CAREER OPTIONS

Advanced Machine Operator
CNC Operator
Engineering Prototype Machinist
Job Shop Machinist
Machine Assembler
Machine Maintenance
Machine Operator
Machine Tool Supplies Salesperson
Machinist
Machinist Apprentice
Tool and Die Apprentice
Tool and Die Repairer
Tool Room Machinist

POTENTIAL FOR ADVANCEMENT

CNC Programmer
Journeyman Machinist
Journeyman Mold Maker
Journeyman Tool and Die Maker
Lead Person
Machine Set-Up Person
Manufacturing Engineer
Quality Control Manager
Supervisor
Tool Designer
Tool Engineer

Potential advancement generally requires further education.

ADMISSIONS PROCEDURES

To apply to the Machine Tool 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 34
 - ACT equivalents for above scores are acceptable.

You may take the Accuplacer again if you did not meet the required scores. Additional options, including coursework and tutoring, are also available to assist you. Contact the Student Affairs Office on your local campus to learn about your options. To schedule an Accuplacer test, contact your local Campus Office.

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

10462116 // 3 credits

Metal Fabrication

An introduction to structural steel and plate fabrication, sheet metal fabrication, and basic electric arc and oxyacetylene welding. Fabrication techniques, metal selection, layout, cutting, bending, drilling, threading, and joining will be presented. Information will be presented to the student followed by lab activities to provide a hands-on experience.

Emphasis will be placed on developing an understanding of tools, techniques, safe work habits, and the application of metal fabrication skills.

Prerequisite: Admission to Automotive Technician 324042, Diesel & Heavy Equipment Technician 324121, Industrial Mechanical Technician 104621, Instrumentation & Control Engineering Technology 106054, Welding 314421, or Machine Tool Technician 324201 programs

10606109 // 2 credits

Geometric Dimensioning & Tolerancing

Provides fundamentals of geometric dimensioning and tolerancing (GD&T) per the ASME Y14.5M standard. The development of the technical knowledge and skills required for application and interpretation of GD&T is the focus of the course. Design requirements for functional gages and other methods used to verify GD&T specifications are also presented.

10623104 // 3 credits

Mechanical Drafting Concepts

Drafting media, drafting standards, reproduction processes, geometric construction, isometric and oblique pictorial drawings, dimensioning, tolerancing, parts drawing, and part identification are included in this course.

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 are recommended.

10623112 // 3 credits

Manufacturing Practices

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 manufacturer's watchwords are productivity, efficiency, and quality. In this course, students will 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's, value stream mapping, set-up reduction and quick changeover, cellular flow, building a lean culture, total productive maintenance, and Statistical Process Control (SPC).

32420301 // 4 credits

Intro to Machine Tool

Students learn old and new concepts, terms, and basic information relevant and common to all facets of Machine Tool Technology. Emphasis will be placed on safety and safe work habits while expanding the learners' knowledge of precision and non-precision measuring tools, limits, tolerance, and hand tools used in the machine shop. The learner will be introduced to more common manual machine tools, lathe, drill press, and band saw while completing projects and exercises.

CURRICULUM

Term (14 credits)

10623104	Mechanical Drafting Concepts	3
10804107	College Mathematics	3
32420301	Intro to Machine Tool	4
32420302	Layout, Drill Presses, & Saws	4

Term (17 credits)

10606109	Geometric Dimensioning & Tolerancing	2
10623106	Intro to AutoCAD	2
32420303	Manual Lathe & Cutting Fluids	5
32420304	Threads & Mills	5
32420312	Metals Science	2
32420320	Machine Tool Math	1

Term (16 credits)

31801351	Occupational Communication	2
32420305	Advanced Lathes	4
32420306	Advanced Mills	4
32420362	CNC Lathes/Manual Programming	2
32420364	CNC Mills/Manual Programming	2
32806351	Applied Science	2

Term (17 credits)

10462116	Metal Fabrication	3
10623112	Manufacturing Practices	3
31809351	Applied Human Relations	2
32420307	Non-Traditional Machine Operations	3
32420366	CNC Controls	3
32420368	CAD/CAM	3

Total Credits 64

Please Note:

- The Machine Tool 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.

MACHINE TOOL TECHNICIAN

32420302 // 4 credits

Layout, Drill Presses, & Saws

Learners explore new concepts, terms, and operations of machine tools while reviewing and further developing skills from previous covered operations. Safety must be practiced continually. Safety and the development of safe work habits are emphasized. Learners' working skills on the individual machine tools through exercises and projects will be expanded. Classroom instruction focuses on non-precision and precision layouts, drill presses, drill press accessories, band saws, and cutoff saws.

Prerequisite: Intro to Machine Tool 32420301

32420303 // 5 credits

Manual Lathe & Cutting Fluids

The learners' understanding of new concepts, terms, and operations of machine tools is developed while reviewing and further developing skills from previous covered operations. Safety must be practiced continually. Safety and the development of safe work habits are emphasized. The learners' working skills on the individual machine tools through exercises and projects are expanded. Classroom instruction places emphasis on the parts and accessories of the engine lathe, the use and benefit of cutting fluids, and the different operations performed on the lathe. The operations which will be covered in this nine-week period include setting up and turning work between centers, facing, knurling, and cutting tapers; setting up and using 3 jaw and 4 jaw chucks; and using a follow rest and steady rest.

Prerequisite: Intro to Machine Tool 32420301

32420304 // 5 credits

Threads & Mills

Learners are presented with new concepts, terms, and operations of machine tools while reviewing and further developing skills from previous covered operations. Safety must be practiced continually. Safety and the development of safe work habits are emphasized. The learner's working skills on the individual machine tools through exercises and projects are expanded. Classroom instruction places emphasis on threads, thread terminology, thread measuring, thread cutting, and the vertical milling machine.

Prerequisite: Intro to Machine Tool 32420301

32420305 // 4 credits

Advanced Lathes

Instruction will give the student further insight in lathe concepts. Safety will be reviewed and advanced cutting tool materials such as carbides, ceramics, cubic boron nitride (CBN), and polycrystalline diamonds (PCD) will be covered. Tooling, speeds and feeds, cutting tool selection, and advanced machine practices such as multi-operations and process planning will be covered.

Prerequisite: Threads & Mills 32420304

32420306 // 4 credits

Advanced Mills

Instruction will give the student greater insight in milling machine concepts. Major emphasis will be placed on milling machine terminology, work holding methods, location principles, tooling, and cutting tool selection along with operations and process planning. Rotary tables and indexing methods such as direct, simple, and angular are also taught.

Prerequisite: Threads & Mills 32420304

32420307 // 3 credits

Non-Traditional Machine Operations

Students will explore a variety non-traditional machining operations. Students will gain knowledge of the theory and operation of electrical discharge machining (EDM) and coordinate measuring machine. The focus of this course will be on the cutting edge processes that are becoming the mainstream of modern machining.

Prerequisites: Advanced Lathes 32420305 and Advanced Mills 32420306

32420312 // 2 credits

Metals Science

Students are introduced to the field of metallurgy. Includes the following topics: sources of common metals including both ferrous and non-ferrous methods of ore extraction and refining and classification of these metals and the alloy systems. The heat treatment of various metals and properties of metals are studied including lab work on shear, compression, tensile strength, and corrosion.

32420320 // 1 credit

Machine Tool Math

This course includes the study of machine tool problems involving calculations with fractions, decimals, and percentage. Includes work with the metric system, measurement conversion, geometry, trigonometry of right triangles, and use of a scientific calculator. Formulas with application to the trades are also studied.

Prerequisite: College Mathematics 10804107 or appropriate placement score

32420362 // 2 credits

CNC Lathes/Manual Programming

NC/CNC terminology including introduction to computers and components of NC/CNC lathes will be covered. All programming is manual word address (G + M Code) basics. Basic CNC lathe operation is included.

Corequisite: Advanced Lathes 32420305

32420364 // 2 credits

CNC Mills/Manual Programming

NC/CNC terminology including introduction to computers and components of NC/CNC mills will be covered. All programming is manual word address (G + M code) basics. Basic CNC mill operation is included.

Prerequisite: Mechanical Drafting

Concepts 10623104

Corequisite: Advanced Lathes 32420305

32420366 // 3 credits

CNC Controls

This course will provide students with the skills needed to navigate common CNC machine control panels. Students will learn common methods to set tool offsets, work offsets, and common part set up practices. Focus of this course will be on accuracy, repeatability, and efficiency in the operations of CNC machine tools.

Prerequisites: CNC Lathes/Manual

Programming 32420362 and CNC Mills/

Manual Programming 32420364

32420368 // 3 credits

CAD/CAM

This course introduces students to Computer-Aided Drafting/Design (CAD) and computer-Aided Machining/Manufacturing (CAM). This course consists of demonstrations and hands-on use of CAD/CAM software and hardware. Major emphasis is placed on geometry creation and editing functions, process planning, proper cutter selection, feed and speed selection, and tool path generation along with post processing to specific CNC machines. Some basic machine set-up and operation are included to verify program operation. Students should have knowledge of drafting/design, machining processes and procedures, and computer operating systems (MS Windows).

Prerequisites: CNC Lathes/Manual

Programming 32420362 and CNC Mills/

Manual Programming 32420364