Machine Tool Technician

Technical Diploma

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.

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
- Construct parts to required specifications following instructions and interpreting blueprints, using various manual machine tools
- 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

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
Journeyperson Machinist
Journeyperson Mold Maker
Journeyperson 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 to MSTC Student Affairs Admissions Office:

1. WTCS application form and $30 non-refundable application fee
2. Completed Accuplacer test. (Other test scores may be acceptable alternatives.) Entrance exam requirements for the Machine Tool Technician program are:
   - Reading–Accuplacer score of 55 or equivalent
   - Language–Accuplacer score of 60 or equivalent
   - Math–Accuplacer score of 34 or equivalent

   If a student does not meet the required scores in these academic areas, they may remediate and retest or complete an identified structured remediation course(s) in the Academic Support Center.
3. High school transcript or GED/HSED scores

Mid-State Technical College
Admissions
500 32nd Street North
Wisconsin Rapids, WI 54494
mstc.edu
888.575.MSTC

Program Course Descriptions

10606142
Mechanical Drafting Concepts **3 credits**
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.

32404330
Applied Fluid Power **2 credits**
Covers basic principles and application of pumps, compressors, motors, valves, seals, packing and conductors. Students learn the advantage of hydraulic and pneumatic systems, as well as the physical properties of liquids and air. The intent is to identify various parts of a circuit and to illustrate standard liquid power components through laboratory experiments. Prerequisite: Admission to Automotive Technician 324042, Diesel & Heavy Equipment Technician 324121 or Machine Tool Technician 324201

32420301
Intro to Machine Tool **5 credits**
Students learn the concepts, old and new, 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.

32420302
Layout, Drill Presses & Saws **5 credits**
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
Manual Lathe & Cutting Fluids **5 credits**
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, cutting tapers; setting up and using 3-jaw and 4-jaw chucks; using a follow rest and a steady rest. Prerequisite: Intro to Machine Tool 32420301

32420304
Threads & Mills **5 credits**
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
Advanced Lathes **4 credits**
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
Advanced Mills **4 credits**
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
Advanced Machine Operations **4 credits**
Theory and operation of plunge type electrical discharge machining (EDM) and wire cut EDM theory are covered. Students learn to machine parts to very close tolerances using all processes. Students also learn to inspect parts on a manual coordinate measuring machine (CMM). Jig grinding and a brief overview of statistical process control (SPC) are covered in this course as well. Corequisite: Abrasives & Precision Grinding 32420370

Curriculum

First Semester		**(18 Credits)**
10606142	Mechanical Drafting Concepts	3
10804106	Intro to College Math	3
32420301	Intro to Machine Tool	5
32420302	Layout, Drill Presses & Saws	5
32801351	Occupational Communication	2

Second Semester		**(16 Credits)**
32404330	Applied Fluid Power	2
32420303	Manual Lathe & Cutting Fluids	5
32420304	Threads & Mills	5
32420312	Metals Science	2
32421387	GD&T and Machine Tool Calculations	2

Third Semester		**(17 Credits)**
32420305	Advanced Lathes	4
32420306	Advanced Mills	4
32420362	CNC Lathes/Manual Programming	2
32420364	CNC Mills/Manual Programming	2
32442303	Related Welding I	3
32806351	Applied Science	2

Fourth Semester		**(16 Credits)**
32420307	Advanced Machine Operations	4
32420366	CNC/Conversational Controls	3
32420368	CAD/CAM	3
32420370	Abrasives & Precision Grinding	4
32809351	Applied Human Relations	2
	Total Credits:	**67**

Please Note:

- The Machine Tool Technician program has an August preferred starting date. However, we advise you to meet with a counselor to successfully plan your academic schedule.
- For General Education course descriptions (800 level courses), see section marked under Course Descriptions.

32420312
Metals Science **2 credits**
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.

32420362
CNC Lathes/Manual Programming **2 credits**
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
CNC Mills/Manual Programming **2 credits**
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 10606142; Corequisite: Advanced Lathes 32420305

32420366
CNC/Conversational Controls **3 credits**
Students are introduced to CNC conversational programming using specific machine controls. Programming will include Bridgeport SPS (Simplified Programming System) and FAPT (Fanuc Automatically Programmed Tools) for turning centers. Prerequisites: CNC Lathes/ Manual Programming 32420362; CNC Mills/ Manual Programming 32420364

32420368
CAD/CAM **3 credits**
Students are introduced to computer-aided drafting (CAD) and computer-aided manufacturing (CAM). Demonstrations and hands-on usage of CAD-CAM software and hardware will be presented. Major emphasis is placed on the operation of equipment, geometry creation and editing functions, process planning and tool path generation along with post processing to a specific CNC machine. Note: Students should have knowledge of drafting, machining and computer concepts. Prerequisites: CNC Lathes/ Manual Prog 32420362; CNC Mills/Manual Prog 32420364

32420370
Abrasives & Precision Grinding **4 credits**
Students learn abrasive machining technology including super abrasives. Precision surface grinding, cylindrical grinding and tool and cutter grinding are covered. Advanced grinding operations such as radius dressing and special shapes and techniques are also taught. Prerequisites: Advanced Mills 32420306; Mechanical Drafting Concepts 10606142

32421387
GD&T and Machine Tool Calculations **2 credits**
Expands students' understanding of the concepts, terms and basic information related to Geometric Dimensioning and Tolerancing. The intent of this course is to relate Geometric Dimensioning and Tolerancing to blueprints, the inspection of parts and setting up of parts on the different machines in the machine shop. Part of this course is devoted to math concepts and math problems related to machine tool. Learners' math skills with problems that are associated with the machining trades are expanded. Co-requisite: Intro to College Mathematics 10804106; Prerequisite: Mechanical Drafting Concepts 10606142

32442303
Related Welding I **3 credits**
A basic beginning course to develop entry skills in the fundamentals of SMAW (arc), GMAW (wire), oxyacetylene welding and brazing. Typical operations include lap, tee and butt joints in the flat and horizontal positions. Oxyfuel cutting and general information essential to safe welding practices are discussed via lecture, demonstration, films and hands-on exercises.