

MACHINE TOOL TECHNOLOGY

DIPLOMA PROGRAM

The Machine Tool Technology program develops academic and technical knowledge and the manipulative skills necessary for employment in the metal working industry. Students learn to operate computer numerical control machines, milling machines, lathes, grinders, boring machines, metal saws, and drill presses. Graduates construct and create machines and equipment from the raw materials to the finished products required for all industrial manufacturing processes. Program graduates receive a diploma.

ASSOCIATE DEGREE OPTION

Individuals who are graduates of, or eligible to graduate from, this diploma program and who meet general admission requirements for associate-degree level work may pursue an associate of applied science degree in Technical Studies by completing an additional 50 quarter credit hours of coursework. Interested students should see their advisors to obtain assistance in completing processes associated with readmission and/or change of major.

CAREER OPPORTUNITIES

Machinists are skilled workers who make precision parts for industrial machinery, instruments, aircraft, and other goods. They can set up and operate most types of machine tools. They also know the working properties of metals such as steel, cast iron, aluminum, and brass. Some operators perform varied and complex machining operations. Skilled machine operators plan and set up the correct sequence of operations according to blueprints, layouts, or other instructions. They adjust speed, feed, and other controls and select the proper instruments or tools for each operation. Using micrometers, gauges, and other precision measuring instruments, they compare the completed work with the tolerance limits given in the specifications.

Graduates qualify for positions as general machine tool technicians. This program provides the foundation to pursue further education in order to become advanced machine tool technicians, CNC specialists, tool and die technicians, and mold-making technicians.

PROGRAM EXPENSES

The recent reauthorization of the Higher Education Act requires all colleges and universities to notify students and prospective students of all program costs for which they will be responsible. Students will be responsible for the following expenses:

- Quarterly tuition (\$45 per credit hour)
- Quarterly student activity fees (\$16)
- Quarterly registration fee (\$26)
- Quarterly accident insurance fee (\$4)
- Quarterly instructional and technology supply fee (\$35)
- Program supply fee (Varies – See course descriptions for exact costs)
- Textbooks (Approximately \$905 for the Machine Tool Technology diploma program, \$160 for the CNC specialist program, \$255 for the Lathe Operator program, and \$250 for the Mill Operator program)
- Tools (Approximately \$675 for the Machine Tool Technology program)

The expenses are based on costs in effect at the time this catalog was published. Prices are subject to change.

ADMISSION REQUIREMENTS

Applicants must submit the following information to the Admissions Office:

- a. Completed and signed application for admission and a \$20 nonrefundable application fee;
- b. Official high school or GED transcripts and/or official college transcripts from all colleges attended in the past (see *General Admission Requirements*); and
- c. Valid COMPASS, ASSET, SAT, or ACT test scores (see *ASSET and COMPASS Placement Tests*).

MACHINE TOOL TECHNOLOGY CURRICULUM OUTLINE

Diploma Program (Major Code: MT02)

Credit Required for Graduation: 85 quarter credit hours

General Core

EMP	1000	Interpersonal Relations and Professional Development
ENG	1010	Fundamentals of English I
MAT	1012	Foundations of Mathematics

Credits

13
3
5
5

Technical Core			28
MCH	101	Introduction to Machine Tool	6
MCH	102	Blueprint Reading I	5
MCH	104	Machine Tool Math I	
	OR		5
MAT	1013	Algebraic Concepts	
MCH	105	Machine Tool Math II	
	OR		5
MAT	1015	Geometry and Trigonometry	
MCH	107	Characteristics of Metals/Heat Treatment I	4
SCT	100	Introduction to Microcomputers	3
Technical Major			39
MCA	211	CNC Fundamentals	7
MCH	109	Lathe Operations I	6
MCH	110	Lathe Operations II	6
MCH	112	Surface Grinding Operations	3
MCH	114	Blueprint Reading II	5
MCH	115	Mill Operations I	6
MCH	116	Mill Operations II	6
Elective			5

CNC MACHINE ATTENDANT CURRICULUM OUTLINE
Technical Certificate of Credit (Major Code: CNI1)
Credit Required for Completion: 19 quarter credit hours

Technical Certificate			Credit
			19
MCA	211	CNC Fundamentals	
	OR		7
MCA	XXX	CNC Elective	
MCH	101	Introduction to Machine Tool	6
MCH	109	Lathe Operations I	
	OR		6
MCH	115	Mill Operations I	

CNC SPECIALIST CURRICULUM OUTLINE
Technical Certificate of Credit (Major Code: CNC1)
Credit Required for Completion: 36 quarter credit hours

Technical Certificate			Credits
			36
MCA	211	CNC Fundamentals	7
MCA	213	CNC Milling Manual Programming	7
MCA	215	CNC Lathe Manual Programming	7
MCA	217	CNC Practical Applications	4
MCA	219	CAD/CAM Programming	6
		Elective	5

LATHE OPERATOR CURRICULUM OUTLINE
Technical Certificate of Credit (Major Code: 5AJ1)
Credit Required for Completion: 28 quarter credit hours

Technical Certificate			Credits
MCH 101	Introduction to Machine Tool		28
MCH 102	Blueprint Reading I		6
MCH 109	Lathe Operations I		5
MCH 110	Lathe Operations II		6
	Elective		6
			5

MILL OPERATOR CURRICULUM OUTLINE
Technical Certificate of Credit (5AH1)
Credit Required for Completion: 28 quarter credit hours

Technical Certificate			Credits
MCH 101	Introduction to Machine Tool		28
MCH 102	Blueprint Reading I		6
MCH 115	Mill Operations I		5
MCH 116	Mill Operations II		6
	Elective		6
			5

EMPLOYABILITY SKILLS

Department Code: EMP

EMP 1000

Interpersonal Relations and Professional Development (3-0-3)

Banner Title: Interpersonal Relations

Students study human relations and professional development in today's changing world in order to prepare themselves for living and working in a complex society. Topics include human relations skills, job acquisition skills and communications, job retention skills, job advancement skills, and professional image skills.

Prerequisite: Provisional admission

Offered quarterly

ENGLISH

Department Code: ENG

ENG 1010

Fundamentals of English I (5-0-5)

Banner Title: Fundamentals of English I

This course emphasizes the development and improvement of written and oral communication abilities. Topics include analysis of writing techniques, applied grammar and writing skills, editing and proofreading skills, research skills, and oral presentation skills.

Prerequisites: ENG 097 with a grade of C or better and RDG 097 with a grade of C* or better or placement by diagnostic testing*

Offered quarterly

MATHEMATICS

Department Code: MAT

MAT 1012

Foundations of Mathematics

(5-0-5)

Banner Title: Foundations of Mathematics

This course emphasizes the mathematical skills that can be applied to the solution of occupational and technical problems. Topics include properties of numbers, fractions, decimals, percents, ratios and proportions, measurement and conversions, formula manipulation, technical applications, and basic statistics.

Prerequisite: MAT 097 with a grade of C or better or placement by diagnostic testing*

Offered quarterly

MAT 1013

Algebraic Concepts

(5-0-5)

Banner Title: Algebraic Concepts

Instructors introduce concepts and operations which can be applied to the study of algebra. Course content emphasizes basic mathematical concepts and both basic and intermediate algebraic concepts. Class includes lecture, applications, and homework to reinforce learning.

Prerequisite: MAT 098 with a grade of C or better or placement by diagnostic testing*

Offered quarterly

MAT 1015

Geometry and Trigonometry (5-0-5)

Banner Title: Geometry and Trigonometry

This course introduces basic geometric and trigonometric concepts. The course content emphasizes geometric and trigonometric concepts.

Prerequisite: MAT 1013 with a grade of C or better

Offered Winter term

CNC SPECIALIST

Department Code: MCA

MCA 211

CNC Fundamentals

(4-6-7)

Banner Title: CNC Fundamentals

Instructors provide a comprehensive introduction to computer numerical controlled (CNC) machining processes. Topics include safety, computer numerical control, setup and operation, programming, and CAD/CAM training. Students must pay a \$20 supply fee when registering for this course.

Prerequisite: Program admission

Offered quarterly

MCA 213

CNC Mill Manual Programming

(4-6-7)

Banner Title: CNC Mill Manual

Programming

Students learn to safely operate and manu-

ally program computer numerical controlled (CNC) milling machines. Topics include machine safety, programming calculations, program codes and structure, and program run and editing. Students must pay a \$20 supply fee when registering for this course.

Prerequisite: MCA 211

Offered quarterly

**MCA 215
CNC Lathe Manual
Programming (4-6-7)**

*Banner Title: CNC Lathe Manual
Programming*

Students learn to safely operate and manually program computer numerical controlled (CNC) lathes. Topics include machine safety, program codes and structure, and program run and editing. Students must pay a \$20 supply fee when registering for this course.

Prerequisite: MCA 211

Offered quarterly

**MCA 217
CNC Practical Applications (1-9-4)**

Banner Title: CNC Practical Applications
This course provides instruction in specialty tooling and multi-axis machining. Students will also gain experience in process control. Topics include safety, fixture design and manufacturing, practical applications, and laboratory practice.

Prerequisites: MCA 213, MCA 215

Offered quarterly

**MCA 219
CAD/CAM Programming (2-8-6)**

Banner Title: CAD/CAM Programming
Students develop their skills in computer-aided design (CAD) and computer-aided manufacturing (CAM). Students will design and program parts on computer numerical controlled machines. Topics include hardware and software, drawing manipulations, tool path generation, and program posting and running. Students must pay a \$20 supply fee when registering for this course.

Prerequisite: MCA 211

Offered quarterly

MACHINE TOOL TECHNOLOGY

Department Code: MCH

**MCH 101
Introduction to
Machine Tool (2-8-6)**

*Banner Title: Introduction to Machine
Tool*

This course introduces the fundamental concepts and procedures necessary for the safe and efficient use of basic machine tools. Topics include safety and terminol-

ogy, hand and bench tools usage, precision layout and measurements, bandsaw setup and operation, drilling setup and operation, and quality control processes.

Prerequisite: Provisional admission

Offered quarterly

**MCH 102
Blueprint Reading I (5-0-5)**

Banner Title: Blueprint Reading I

Students learn the fundamental concepts needed to interpret drawings and produce sketches for machine tool applications. Topics include interpretation of blueprints and sketching.

Prerequisite: Provisional admission

Offered quarterly

**MCH 104
Machine Tool Math I (5-0-5)**

Banner Title: Machine Tool Math I

Students develop mathematical competencies as applied to machine tool technology. This course emphasizes the manipulation and use of machining formulas and the discussion of machining geometry. Topics include machining algebra and machining geometry.

Prerequisite/Corequisite: MAT 1012

Offered quarterly

**MCH 105
Machine Tool Math II (5-0-5)**

Banner Title: Machine Tool Math II

Students continue to develop mathematical competencies as applied to machine tool technology. Students learn the geometric and trigonometric principles in machining. Topics include advanced applied geometry and applied trigonometry.

Prerequisite: MCH 104 or MAT 1013

Offered quarterly

**MCH 107
Characteristics of Metals/
Heat Treatment I (3-2-4)**

Banner Title: Metals/Heat Treatment I

This course introduces the properties of various metals, production methods, and ferrous and nonferrous metals identification. Topics include basic metallurgy, heat treatment, and safety.

Prerequisite: Provisional admission

Offered quarterly

**MCH 109
Lathe Operations I (2-8-6)**

Banner Title: Lathe Operations I

Students develop their skills in using lathes. Topics include lathes, lathe calculations, lathe setup and operations, late tooling, and safety. Students must pay a \$20 supply fee when registering for this course.

Prerequisite: Provisional admission

Offered quarterly

**MCH 110
Lathe Operations II (2-8-6)**

Banner Title: Lathe Operations II

Students further develop their skills in using lathes. Topics include safety, advanced lathe setup, internal lathe cutting operations, mating parts manufacturing, and advanced cutting tools. Students must pay a \$20 supply fee when registering for this course.

Prerequisite: MCH 109

Offered quarterly

**MCH 112
Surface Grinder Operations (1-4-3)**

*Banner Title: Surface Grinder
Operations*

This course provides instruction in the setup, operations, maintenance, and assembly operations of surface grinders. Topics include safety and surface grinders maintenance, setup, and operations.

Prerequisite: Provisional admission

Offered quarterly

**MCH 114
Blueprint Reading II (5-0-5)**

Banner Title: Blueprint Reading II

Students continue to develop blueprint reading competencies as applied to machine tool technology. Topics include advanced sectioning, geometric dimensioning and tolerancing, and assembly drawings.

Prerequisite/Corequisite: MCH 104

Offered quarterly

**MCH 115
Mill Operations I (2-8-6)**

Banner Title: Mill Operations I

Students obtain instruction in the setup and use of milling machines. Topics include safety and milling machines setup and operations. Students must pay a \$20 supply fee when registering for this course.

Prerequisite: Provisional admission

Offered quarterly

**MCH 116
Mill Operations II (2-8-6)**

Banner Title: Mill Operations II

Students further develop their skills in using milling machines. Topics include advanced mill calculations, setup, operations, and safety. Students must pay a \$20 supply fee when registering for this course.

Prerequisite: MCH 115

Offered quarterly

**MCH 152
Industrial Machine
Applications (2-8-6)**

Banner Title: Industrial Machine

Application

Students perform creative and critical thinking skills needed to fabricate, modify, and maintain complex machine

assemblies. Course content emphasizes bench work, lathe, mill, and grinder operations; tool selection; and sequencing fabrication operations. Topics include job planning, machining operations preparations, and machining operations.

Prerequisites: MCH 110, MCH 112, MCH 116

Offered quarterly

SCIENCE AND TECHNOLOGY

Department Code: SCT

SCT 100

Introduction to

Microcomputers

(1-4-3)

Banner Title: Intro to Microcomputers

This course introduces the fundamental concepts and operations necessary to use microcomputers. Course content emphasizes basic functions and familiarity with computer use. Topics include computer terminology and an introduction to the Windows environment, networking, word processing, spreadsheets, presentation graphics, and databases.

Prerequisite: Provisional admission

Offered quarterly