Machine Tooling Technics
32-420-5 Technical Diploma

Program Overview
The Machine Tooling Technics program emphasizes mold and toolmaking for the plastic injection molding industry including using computerized machining equipment. Basic machining skills are covered along with math and print reading. The student will gain skills in precision measurement, metallurgical processes, in-depth programming, operation of CNC milling machines and lathes, shop and theory courses in toolmaking, and CAD/CAM operation.

Career Pathway Options
A career pathway is a series of connected education and training strategies and support services that enable individuals to secure stackable industry relevant credentials and obtain employment within an occupational area and advance to higher levels of future education and employment in that area. The Machine Tooling Technics two-year technical diploma includes two embedded technical diploma options as documented below:
- 31-420-6 Entry Level Machining
- 30-420-3 Multi Axis CNC Milling

Admission Requirements
Students in this program must:
- Complete application form and submit with fee (fee waiver may apply if previously submitted)
- Complete Accuplacer entrance assessment to determine placement (waiver may apply with acceptable alternative test scores and/or postsecondary degree completion)
- Complete admissions interview with a WITC counselor (above requirements should be completed prior to interview)

Student Profile
Machine Tooling Technics students should be able to:
- Solve math problems
- Visualize shapes and forms
- Concentrate
- Be detail oriented and take criticism
- Enjoy doing mechanical work
- Lift 75 pounds
- Assume responsibility
- Follow procedures carefully
- Manage their time
- Work well with others and under supervision

Preparation for Admission
Students should strive to reach a comfort level in the following courses or skills:
- Communications
- General Metals/Welding/Woodworking
- Machine Shop
- Print Reading
- Algebra/Trigonometry
- Geometry
- Keyboarding

Program Outcomes
Employers will expect the Machine Tooling Technics graduate to be able to:
- Apply basic safety practices in the machine shop
- Interpret industrial/engineering drawings
- Apply precision measurement methods to part inspection
- Perform basic machine tool equipment set up and operation
- Perform programming, set up, and operation of CNC machine tools
- Perform advanced tool, die, and mold operations

Collegewide outcomes and indicators will also be addressed to develop personal awareness, career effectiveness, and professionalism. See page 5 of the college catalog for a list of collegewide outcomes and indicators.

Career Outlook
Typical careers available after graduation include:
- Tool and Die Mold Maker
- Machinist Apprentice
- Machine Operator
- CNC Machinist
- Setup Person
- Programmer
- Maintenance Machinist

Curriculum

<table>
<thead>
<tr>
<th>Number</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>32420306</td>
<td>Machine Shop Theory 1</td>
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<tr>
<td>32420307</td>
<td>Machine Shop Theory 2 ▲</td>
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<tr>
<td>32420308</td>
<td>Applied Machine Tooling 1</td>
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<td>32420321</td>
<td>Print Reading for Machine Trades</td>
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<td>32420334</td>
<td>CAD/CAM Demo ▲</td>
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<td>32420336</td>
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<td>32420337</td>
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<tr>
<td>32420338</td>
<td>CAD Basics ▲</td>
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<tr>
<td>32420339</td>
<td>Mastercam ▲</td>
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<td>32420357</td>
<td>Advanced Machining Concepts</td>
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<tr>
<td>32420370</td>
<td>Machine Tooling Technics 1 ▲</td>
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<td>32420371</td>
<td>Machine Tooling Technics 2 ▲</td>
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<td>32420372</td>
<td>Machine Tooling Technics 3 (WBL) ▲</td>
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<tr>
<td>32420391</td>
<td>Toolmaking Theory ▲</td>
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Collegewide outcomes and indicators will also be addressed to develop personal awareness, career effectiveness, and professionalism. See page 5 of the college catalog for a list of collegewide outcomes and indicators.

Financial Aid Eligible

Campus: New Richmond

Wisconsin Indianhead Technical College

120 800.243.9482  witc.edu  2015-2016
<p>ISO standards. Strongly recommend a basic understanding of and the reading of prints in specialized areas including ANSI and reading procedures, drawing changes, machining specifications, single- and multiple-view working drawings. Topics include print paths to the designs they have created. Surface creation and machining exercises will be demonstrated by each individual. Each learner will design and detail a plastic part including a plotted final drawing to the correct scale. PREREQUISITES: 32420321 Print Reading for Machine Trades and 32420339 Mastercam.

32420336 Applied Machine Tooling 3 - Credits: 4
This lab-based course further develops students’ skills in CNC vertical mill and CNC lathe setup, operation, and programming. Students will set up increasingly complex projects on both the CNC lathe and CNC vertical mill. Students will learn how to troubleshoot CNC setups, programs, and tooling variations. Students will also troubleshoot and run their own programs created in Machine Shop Theory 2 and Mastercam. Finally, students will complete surface grinding projects. COREQUISITES: 32420307 Machine Shop Theory 2 and 32420336 Applied Machine Tooling 3.

32420338 CAD Basics - Credits: 1
This course offers instruction on individual computer workstations in a computer lab. This computer-aided drafting (CAD) instruction uses SolidWorks software that is capable of creating 3D drawings. In this course you will spend a majority of the time creating 3D models and exploring the concepts of working in 3D space. Students will create complete and fully dimensioned 3-view part prints ready to be transferred to paper. COREQUISITE: 32420321 Print Reading for Machine Trades.

32420339 Mastercam - Credits: 2
This introductory course prepares students for using Computer-Aided Machining (CAM) software to create CNC machining programs. This CAM instruction utilizes Mastercam software that is capable of creating 2D and 3D drawings, from which toolpaths to machine part features can be generated. Students will complete a variety of exercises before working on 2D machining projects. Students will create complete CNC process projects including drawings, toolpaths, CNC code, and all setup sheets and diagrams. These projects will be shop ready for machining. PREREQUISITE: 32420338 CAD Basics.

32420357 Advanced Manufacturing Concepts - Credits: 1
In this course students will learn about advanced CNC programming and setup techniques, electrical discharge machining, and advanced inspection techniques.

32420370 Machine Tooling Technics 1 - Credits: 4
In this course learners will learn to set up, program, and run CNC mills, lathes, and EDM equipment. Learners will continue to build competencies in surface grinding, tool and cutter grinding, and manual milling. PREREQUISITE: 32420337 Applied Machine Tooling 4.

32420371 Machine Tooling Technics 2 - Credits: 4
In this course learners will build upon their machining skills using CNC mills, lathes, and EDM equipment. Learners will continue to build competencies in surface grinding, tool and cutter grinding, and manual milling. Learners will create, program, and run CNC programs with helical interpolation, subroutines, cutter compensation, and multiple fixture offsets. Learners will practice final grinding and fitting operations. COREQUISITE: 32420370 Machine Tooling Technics 1.

32420372 Machine Tooling Technics 3 (WBL) - Credits: 5
In this course, the learner will build and polish one plastic injection mold. Learners will do several projects to gain competency, which will include electrical discharge machining, tool and cutter grinding, and a project that requires problem solving set-up problems. A work-based learning component will be completed by each individual, you will contact a manufacturer to get a job that you will bring back to the campus lab and complete the work as directed by the manufacturer and your instructor. Learners will gain additional skills in the operation of basic and advanced machine tools in the areas of milling, drilling, boring, reaming, grinding, CNC milling, and EDMing operations. PREREQUISITES: 32420321 Print Reading for Machine Trades, 32420371 Machine Tooling Technics 2, and COREQUISITE: 32420391 Toolmaking Theory.

32420391 Toolmaking Theory - Credits: 2
This course provides the classroom instruction that supports shop activities in semester four of the Machine Tooling Technics program. It is a lecture course that addresses the technology of various types of plastic injection mold dies. Major emphasis will be placed on the theory, design, and building of plastic injection molds. Small group activities will be utilized to enhance student learning.

Gainful employment information is available at this link: http://www.witc.edu/gmpages/machtooltech/career.htm. This information is provided as a federal requirement in an effort to help students make informed decisions related to the costs and potential employment in a chosen field.

Graduate Employment Information
(WITC Graduate Survey Responses 2012-2013; for most recent data, go to witc.edu)

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<thead>
<tr>
<th>Number of graduates</th>
<th>Number employed</th>
<th>% employed in WITC district</th>
<th>Range of yearly salary</th>
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<tbody>
<tr>
<td>14</td>
<td>12</td>
<td>75%</td>
<td>$33,277-$51,376</td>
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<tr>
<td>12</td>
<td>100%</td>
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<tr>
<td>12</td>
<td>Employed in related field</td>
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