

Tool and Die

67-credit Technical Diploma

About the Program

Build the skills that journeyworker tool and die makers use in industry through instruction in complex and conventional machining, CNC machining, and grinding operations. Students will also have the opportunity to make molds and dies, and develop skills in precision work. Successful graduation from the Tool & Die program will satisfy state of Wisconsin Tool and Die apprentice-related instruction.

Potential Job Titles

- Machinist
- Tool Room Machinist
- Tool & Die Maker
- CNC Operator
- Apprentice

Credit Transfer

Credits earned in the Tool and Die program may be transferable to institutions offering baccalaureate degrees. Visit www.wctc.edu/transfer for specific information. Since the details of credit transfers change from time to time, be sure to contact the intended college or university to verify credit transferability.

Admission Process

- Fill out a WCTC application
- Send \$30 non-refundable application fee
- Send high school transcript or GED/HSED
- Send any previous college transcripts
- Complete Skills Assessment test (COMPASS)
- Begin pursuing Financial Aid options

For more information, call 262.691.5200.

| Required Courses | | Credits |
|---|-----------------------------------|-----------|
| First Semester | | |
| 420-316 | CNC Machining Center Operation | 2 |
| 420-320 | Machine Tool Operation I | 4 |
| 420-321 | Machine Tool Operation II | 4 |
| 420-326 | Machine Tool Theory I | 1 |
| 420-330 | Industrial Blueprint Reading I | 2 |
| 420-386 | CNC Machining Center | 2 |
| 804-304 | Industrial Math I | 2+ |
| 809-345 | Basic Workplace Psychology | 1 |
| Total semester credits | | 18 |
| Second Semester | | |
| 420-317 | CNC Turning Center Operation | 2 |
| 420-323 | Machine Tool Operation III | 4 |
| 420-324 | Machine Tool Operation IV | 4 |
| 420-328 | Machine Tool Theory II | 1 |
| 420-331 | Industrial Blueprint Reading II | 2 |
| 420-387 | CNC Turning Center | 2 |
| 804-305 | Industrial Math II | 2+ |
| Total semester credits | | 17 |
| Third Semester | | |
| 420-388 | Computer Assisted Programming/CNC | 2 |
| 420-399 | Wire EDM Fundamentals | 1 |
| 422-302 | Metals Technology | 1 |
| 439-314 | Mold Design | 1 |
| 439-331 | Tool and Die Moldmaking I | 5 |
| 439-332 | Tool and Die Moldmaking II | 5 |
| 804-306 | Industrial Math III | 2+ |
| Total semester credits | | 17 |
| Fourth Semester | | |
| 420-315 | Contemporary Manufacturing | 1 |
| 439-324 | Die Design | 1 |
| 439-341 | Tool and Die - Stamping I | 5 |
| 439-342 | Tool and Die - Stamping II | 5 |
| 801-311 | Communication in the Workplace | 2+ |
| 809-321 | Basic Applied Economics | 1 |
| Total semester credits | | 15 |
| + Proficiency exam available | | |
| <i>Curriculum is current as of catalog printing. The most current curriculum requirements for graduation will be provided upon admission to program, or review at www.wctc.edu.</i> | | |

Tool and Die Required Courses

420-315 Contemporary Manufacturing 1
Explore current and future manufacturing processes, and apply the discussion topics to specific manufacturing applications.

420-316 CNC Machining Center Operation 2
Learn the fundamentals of CNC. Develop the skills necessary to set up and operate a CNC vertical machining center. Topics that will be covered include: introduction to CNC, G and M codes, basic programming format, speeds and feeds, tool offsets, and the basic features of CNC control panels. Blueprint interpretation and math skills will be used to correctly select tooling, and determine workholding method.

420-317 CNC Turning Center Operation 2

Learn the fundamentals of CNC. Develop the skills necessary to set up and operate a CNC turning center. Topics that will be covered include: introduction to CNC, G and M codes, basic programming format, speeds and feeds, tool offsets, and the basic features of CNC control panels. Blueprint interpretation and math skills will be used to correctly select tooling, and determine workholding method.

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| <p>420-320 Machine Tool Operation I 4 Learn entry-level skills on basic machine tools, including lathes, drill presses, grinders, and milling machines. Produce parts from engineering drawings, and make measurements using inspection tools such as micrometers, height gages, verniers, thread gages, and the optical comparator. Develop the machine operating skills needed to produce parts to the tolerances commonly found in industrial situations.</p> | <p>420-386 CNC Machining Center 2 Develop the skills needed to program, set up, and operate a CNC vertical machining center. Use blueprint interpretation and math skills to select tooling, determine a workholding method, and write a CNC program to completely machine a part. Learn to alter, insert, and delete portions of existing programs in order to maintain control of parts produced.</p> | <p>420-332 Tool /Die Moldmaking II 5 Develop the skills needed for an entry-level position in a moldmaking tool and die shop, by enhancing knowledge of blueprint reading and machine tool operation. Study the construction of a two-cavity family mold. Use numerous conventional and computerized machine tools throughout the moldmaking process. Trial run the completed mold. Create a plan, and implement mold corrections. Take part in various shop projects such as analyzing an existing mold or participating as a member of a team on a larger mold project. Learn various molding processes, including plastic injection molding. Prerequisites: 439-331 Tool and Die Moldmaking I (or concurrent)</p> |
| <p>420-321 Machine Tool Operation II 4 Enhance ability to use basic machine tools, including lathes, drill presses, grinders, and milling machines. Produce parts from engineering drawings, and make measurements using inspection tools such as micrometers, height gages, verniers, thread gages, and the optical comparator. Develop the machine operating skills needed to produce parts to the tolerances commonly found in industrial situations. Prerequisites: 420-320 Machine Tool Operation I (or concurrent)</p> | <p>420-387 CNC Turning Center 2 Develop the skills needed to program, set up, and operate a CNC turning center. Use blueprint and math skills to select tooling, determine a method of workholding, and write a CNC program to completely machine a part. Learn to modify existing programs and offsets to maintain dimensional control.</p> | <p>420-334 Tool/Die - Stamping I 5 Develop skills and knowledge through critical thinking and practical application in the construction of progressive dies. Construct two progressive pierce and blank dies that will produce the parts for a non-twist clamp. Make the necessary hardware that turns the stamped pieces into five separate working clamps. Perform the various machining tasks necessary for entry-level employment in various areas of the machining industry. Develop self-reliance while building machining skills. Prerequisites: 420-324 Machine Tool Operation IV and 420-386 CNC Machining Center</p> |
| <p>420-323 Machine Tool Operation III 4 Hone the skills related to using basic machine tools, including lathes, drill presses, grinders, and milling machines. Produce parts from engineering drawings, and make measurements using inspection tools such as micrometers, height gages, verniers, thread gages, and the optical comparator. Develop the machine operating skills needed to produce parts to the tolerances commonly found in industrial situations. Prerequisites: 420-321 Machine Tool Operation II</p> | <p>420-388 Computer Assist Prog/CNC 2 Learn to harness an off-line computer-assisted CNC programming system to create geometry, post process, and download to the machine tool. It is recommended that students have a good understanding of math and blueprint interpretation.</p> | <p>420-336 Tool/Die - Stamping II 5 Hone skills and knowledge through critical thinking and practical application in the construction of progressive dies. Construct two progressive pierce and blank dies that will produce the parts for a non-twist clamp. Make the necessary hardware to turn the stamped pieces into five separate working clamps. Learn how to perform the various machining tasks necessary for entry-level employment in various areas of the machining industry. Develop self-reliance while building machining skills.</p> |
| <p>420-324 Machine Tool Operation IV 4 Master the entry-level skills needed to use basic machine tools, including lathes, drill presses, grinders, and milling machines. Produce parts from engineering drawings, and make measurements using inspection tools such as micrometers, height gages, verniers, thread gages, and the optical comparator. Develop the machine operating skills needed to produce parts to tolerances commonly found in industrial situations. Prerequisites: 420-323 Machine Tool Operation III (or concurrent)</p> | <p>420-399 Wire EDM Fundamentals 1 Learn to use manual CNC programming to operate a wire electrical discharge machine (EDM). Study the basic programming related to the operation and set-up of a Mitsubishi Wire EDM.</p> | <p>801-311 Communication in the Workplace 2 Expand level of awareness and skill in interpersonal communications, both oral and written, while focusing on securing and maintaining a job. Develop competencies in the area of listening, sending, and employability skills.</p> |
| <p>420-326 Machine Tool Theory I 1 Become familiar with basic theory related to machine tools including lathes, drill presses, grinders and milling machines. Learn the theory of using measuring tools such as micrometers, height gages, verniers, thread gages, and the optical comparator.</p> | <p>422-302 Metals Technology 1 Examine the elementary principles governing the behavior of ferrous and non-ferrous metals. Review the composition, production, properties, applications, and possible heat treatments of various materials.</p> | <p>804-304 Industrial Math I 2 Explore the topics of applied arithmetic and algebra during this individualized course. Study concepts related to measurement, fractions, decimals, percents, ratio and proportion, signed numbers, formula substitution, solutions to equations, tapers and gears.</p> |
| <p>420-328 Machine Tool Theory II 1 Increase knowledge of the theory related to machine tools including lathes, drill presses, grinders and milling machines. Learn the theory of using measuring tools such as micrometers, height gages, verniers, thread gages, and the optical comparator. Prerequisites: 420-326 Machine Tool Theory I</p> | <p>439-314 Mold Design 1 Mold design concentrates on injection mold design. Instruction builds on the student's knowledge of blueprint reading and machine tool theory. Receive instruction in the development of a complete mold design and through the construction process of the assembled molds. Receive instruction in various design concepts, as well as, the molding process and its relationship to mold design, mold making, and mold repair. Prerequisites: 439-331 Tool and Die Moldmaking I (or concurrent)</p> | <p>804-305 Industrial Math II 2 Examine topics in geometry and trigonometry that are related to the metalworking trades. Practice applying geometric theorems and solving both right and oblique triangle problems. Prerequisites: 804-304 Industrial Math I</p> |
| <p>420-330 Industrial Blueprint Reading I 2 Learn universally applicable techniques for interpreting all mechanical and industrial drawings through the study of drawing standards, abbreviations, basic rules for dimensioning, and various types of sectional views. Become familiar with geometric dimensioning and tolerancing.</p> | <p>439-324 Die Design 1 Geared to further knowledge of die making by creating the cross-sectional views of the projects that made in the tool and die making course. Design and make a working retractable disappearing stop for a long-leg die project. Draw the working details and an assembly view for a disappearing stop. Prerequisites: 439-341 Tool/Die - Stamping I (or concurrent)</p> | <p>804-306 Industrial Math III 2 Learn the problem-solution techniques of advanced applied trigonometry, and become familiar with solving compound angle problems. Prerequisites: 804-305 Industrial Math II</p> |
| <p>420-331 Indust Blueprint Rd II 2 Explore advanced concepts related to accessing information relative to manufacturing. Use several computer applications to access drawing information and to create drawings. Complete worksheets with questions covering molds, dies, fixtures, and other workholding applications. Prerequisites: 420-330 Industrial Blueprint Reading I or 421-350 Machine Blueprint Reading I</p> | <p>439-331 Tool and Die Moldmaking I 5 Prepare for an entry-level position in a moldmaking tool and die shop by enhancing knowledge of blueprint reading and machine tool operation. Explore the construction of a two-cavity family mold. Use numerous conventional and computerized machine tools throughout the molding process. Trial run the completed mold. Develop a plan and implement mold corrections. Take part in projects such as analyzing an existing mold or participating as a member of a team on a larger mold project. Learn various molding processes, including plastic injection molding. Prerequisites: 420-324 Machine Tool Operation IV and 420-386 CNC Machining Center</p> | <p>809-321 Basic Applied Economics 1 Understand business operations by studying topics such as the appreciation of profit and loss, return on investment, business expenses, daily operations, and other vital elements. This course is for students in vocational occupational programs.</p> |
| | | <p>809-345 Basic Workplace Psychology 1 Develop the skills needed for building positive relationships with others by taking part in unique workplace scenarios and exploring psychological concepts.</p> |