

## Wisconsin Technical College System Curriculum Standards Model & Program Design Summary

### 50-420-2 MACHINIST APPRENTICE

#### Program Information

#### Program Description

Machinists are highly skilled individuals who use machine tools, such as lathes, milling machines, and machining centers, to produce precision machined parts. Precision Machinists produce small batches or one-of-a-kind items. They use their knowledge of the working properties of materials and their skill with machine tools to plan and carry out the operation needed to make a variety of products that meet precise specifications. Along with operating machines that use cutting tools to shape work pieces, machinists also utilize machines that cut with lasers, water jets, or electrified wires. While some of the computer controls may be similar, Machinists must understand the unique cutting properties of these different machines. As engineers create new types of machine tools and new materials to machine, machinists must constantly learn new machining properties and techniques. Source: [www.dwd.wisconsin.gov](http://www.dwd.wisconsin.gov).

The related instruction portion of the machinist apprenticeship may cover up to 4 years and 432 hours. The old unit modules were converted to courses in the spring of 2013 and are reflected in this program. A new model and curriculum standards were developed for 2013-2014 in cooperation with WCTC.

#### External Requirements

- 4 year training program
- 7,888 hours on-the-job training
- 432 hours paid related instruction
- Additional hours of unpaid related instruction
- Apprentice must complete the Transition-To-Trainer Course in final year of apprenticeships

#### Entry Requirements

- Entry requirements vary by employer
- High school diploma or equivalent
- Applicants apply directly to participating employers

**Related Outcomes** – Program Outcomes TBD & pending TSA and/or program alignment (NIMS for example)

#### Program Configurations

#### **50-420-2 WTCS Program Configuration for Machinist Apprentice Related Instruction (New Model)**

This program configuration serves as a curriculum standards model for related instruction in the machinist apprenticeship. The program provides for up to 576 hours of related instruction. The program configuration model outlines coursework in machine trades and tool and die theory and application. Courses in industrial



**Term 3**

| Course #   | Course Title           | Credits & Hours | Course Description   |
|------------|------------------------|-----------------|--|
| 50-801-500 | Applied Communications | 0.50<br>18      | Enhance interpersonal communication skills, especially the oral and listening skills needed by those in apprentice programs  |
| 50-420-525 | Machinist Theory I     | 3.50<br>126     | Become knowledgeable about horizontal and vertical turret lathes, screw machines, basic and advanced numerical control machinery, programming, and jig fixture application. Solve numerical control machining problems, draw up the solutions, and present an oral report on the problems. |

**Term 4**

| Course #   | Course Title                 | Credits & Hours | Course Description   |
|------------|------------------------------|-----------------|--|
| 50-809-551 | Human Relations - Apprentice | 0.50<br>18      | Study the psychological principles of human relations that will assist in adaptation to the world of work and adjustment to personal and occupational relationships.   |
| 50-420-527 | Machinist Theory II          | 3.50<br>126     | Increase knowledge of horizontal and vertical turret lathes, screw machines, basic and advanced numerical control machinery, programming, and jig fixture applications. Solve numerical control machining problems, draw up the solutions, and present an oral report on the problems. |

**Additional Term(s)**

| Course #   | Course Title   | Credits & Hours | Course Description  |
|------------|--|-----------------|---|
| 47-455-455 | Transition to Trainer: Your Role as a Journey Worker | 0.00<br>8       | <p>Apprenticeship training is a collaborative partnership: employer and employee associations, government, and educational institutions each play a part. In reality, most learning takes place through the daily interaction between an apprentice and his/her co-workers. Surveys have shown that the apprentices are least satisfied with the on-the-job portion of their training--particularly the ability of journey level workers and supervisors to pass on their knowledge of the trade.</p> <p>You have already learned to use the tools of your chosen trade. In this workshop you will be introduced to a new set of basic tools--the tools of a jobsite trainer. You will explore the skills that are necessary to be an effective trainer, discover how to deliver hands-on training, and examine the process for giving useful feedback. During the workshop you will build a Training Toolkit to take back to your work on the job.</p> |

## 50-420-2 WTCS Machinist Apprentice Program Configuration Related Instruction (Old Course Model)

(1) The old program configuration is shown here for reference purposes and as a guide in transitioning from the old model with 21 course modules to the new mode outlined above.

(2) All of the course modules listed below are addressed in the new model and hour designations for each are left to each college to be responsive to local needs and employer priorities.

### Credits & Hours

1 - Occupation Specific 16.50 (594 Hours at 36 hours/credit)

2 - Occupation Supportive 0.00 (8 hours for Transition to Trainer course)

**Total Credits 16.50 (602 hours of related instruction in 3 years** including Transition to Trainer course)

BAS Training Standard = 432 hours of PRI

### Terms 1 and 2 (Year 1)

| Course #   | Course Title                             | Credits & Hours  | Course Description   |
|------------|--|------------------|--|
| 50-420-711 | Mathematics for the Machine Trades       | 1.00<br>36 hours | This course provides applied mathematics instruction from a review of basic arithmetic; basic algebra; applications, based on geometry; right triangle trigonometry, oblique angle trigonometry and compound angles. This course was formerly module 1 in related instruction.   |
| 50-420-712 | Communications for Apprentices           | 1.00<br>36 hours | Introduces the apprentice to basic communication concepts relating to the workplace. It is designed specifically for the apprentice to acquire the necessary skills of giving instructions, writing a technical memo, and explaining a technical process. Throughout the course the apprentice will brainstorm, write, edit, revise, and use one-on-one communication delivery in a small group. The course combines lecture and hands-on activities utilizing information which the apprentice brings from the workplace. |
| 50-420-713 | Precision Measurement for Machine Trades | 1.00<br>36 hours | This module is designed to acquaint the apprentice with the measurement systems and tools most frequently used in layout and machining processes. Subject matter includes semi-precision through super-precision measuring tools and equipment combined with opportunities to investigate new technologies. This course was formerly module 3 in related instruction.  |
| 50-420-714 | Print Reading for Machine Trades         | 2.00<br>72 hours | This course will acquaint the apprentice with the interpretation of "Prints" (blueprints) and other engineering and manufacturing documentation. The primary focus of the course will be on that part of manufacturing most closely related to machining and tooling. Background information is provided relative to the process used to create and finish the product or piece part on the prints being studied. This course was formerly module 4 in   |

|            |  |  |  |
|------------|--|--|--|
|            |  |  | related instruction.   |
| 50-420-715 | Mechanical Hardware and Handtools for Machine Trades | 0.50<br>18 hours                         | This course provides instruction for the apprentice in recognition, selection, and operation of mechanical hardware and hand tools. Apprentices are taught to use outside sources to select correct component or tool sizes, characteristics, and operating parameters. Apprentices will sharpen drills and single point cutting tools. Course was formerly module 5 in related instruction. |
|            | <b>Year 1 Totals</b>                                 | <b>5.5</b><br><b>198</b><br><b>hours</b> | <b>25 weeks at 8 hours per week</b><br><b>2 terms per year x 18-week/term at 8 hours/week = 288</b>  |

### Term 3 and 4 (Year 2)

| Course #   | Course Title                         | Credits & Hours  | Course Description   |
|------------|--------------------------------------|------------------|--|
| 50-420-716 | Turning Machines for Machine Trades  | 1.00<br>36 hours | This course will acquaint the apprentice with the terminology, methods, and operations for turning machines used in the metal-working industry. Apprentices will learn to perform calculations needed to operate turning machines including speed and feed calculations. Apprentices will make calculations necessary to setup a turning machine for screw threads and taper operations. This course was formerly module 6 in related instruction.   |
| 50-420-717 | Milling Machines for Machine Trades  | 0.50<br>18 hours | <p>This course provides classroom experiences on the basic principles of vertical and horizontal milling machines. Instruction includes safety, basic parts and functions of the machines, work holding devices, tooling requirements, and feeds and speeds. This course was formerly module 7 in related instruction.</p> <p>This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.</p> |
| 50-420-718 | Drilling Machines for Machine Trades | 0.50<br>18 hours | This course focuses on the terminology, construction and operations of drilling machines in the metal-working industry. Be aware that in-depth information regarding cutting tools, hardware and hand tools will be addressed in their own modules. Efforts should be made to reference information found in other modules in order to assist the apprentice in the application and assimilation of information. This course was formerly module 8 in related instruction.   |
| 50-420-719 | Grinding Machines for Machine Trades | 1.00<br>36 hours | This course focuses on the terminology, construction and operations of grinding machines in the metal-working industry. Be aware that in-depth information regarding cutting tools, hardware and hand tools will be addressed in their own courses. Efforts should be made to reference information found in other courses   |

|            |                                     |                           |  |
|------------|-------------------------------------|---------------------------|--|
|            |                                     |                           | in order to assist the apprentice in the application and assimilation of information. This course instructs apprentices in the use of traditional grinding machines and the attachments and accessories frequently encountered in manufacturing operations that use common grinding processes. |
| 50-420-720 | Cut-Off Machines for Machine Trades | 0.25<br>9 hours           | This course will acquaint the apprentice with the basic types of cutoff machines used in industry, cutoff machine applications, cutoff machine tooling, and cutoff machine safety. This course was formerly module 10 in related instruction.  |
|            | <b>Year 2 Totals</b>                | <b>3.25<br/>117 hours</b> | <b>14.6 weeks at 8 hours per week<br/>2 terms per year x 18-week/term at 8 hours/week = 288</b>  |

### Terms 5 and 6 (Year 3)

| Course #   | Course Title  | Credits & Hours   | Course Description  |
|------------|---|-------------------|---|
| 50-420-721 | Metallurgy & Materials for Machine Trades           | 2.00<br>72 hours  | This course provides the opportunity for the apprentice to develop the knowledge, skills, process, and understanding of hardness testing, carbons and low alloy steel, tool steels, stainless steels, cast iron, aluminum and aluminum alloys, die cast alloys, copper and copper alloys, plastics, heat treating and nondestructive testing. This course was formerly module 11 in related instruction.  |
| 50-420-724 | CNC Programming and Planning for Machine Trades     | 3.00<br>108 hours | This course is a classroom introduction to CNC programming for apprentices, with a focus on CNC turning and milling centers. Apprentices will create setup sheets, develop tool lists, calculate speeds and feeds, assign tool offsets and write CNC programs. This course was formerly module 14 in related instruction.   |
| 50-420-725 | Basic CAD/CAM for Machine Trades                    | 1.00<br>36 hours  | This course is designed to provide the apprentice with the concepts and techniques used in computer-aided design (CAD) and computer-aided manufacturing (CAM). This course was formerly Module 15 in related instruction.   |
| 50-420-726 | Jig and Fixture Design for Machine Trades           | 1.00<br>36 hours  | This course introduces the apprentice to the concepts of jig and fixture design. Topics include the basic elements of tool design, jig and fixture application, and the actual design of tooling. This course was formerly module 16 in related instruction.  |
| 50-420-727 | Geometric Design and Tolerancing for Machine Trades | 0.75<br>28 hours  | This course will acquaint the apprentice with the skills to interpret the Geometric Dimensions and Tolerances found on engineering drawings and in other documents. Instruction concentrates on interpreting the symbols, identifying tolerance zones and determining ways to check parts for conformity to the specified geometric controls. Reference is made to ASME Y14.5M - 1994. This course was formerly module 17 in related instruction. |

|            |   |                           |   |
|------------|---|---------------------------|---|
| 47-455-455 | Transition to Trainer:<br>Your Role as a Journey Worker | 0.00<br>8 hours           | <p>Apprenticeship training is a collaborative partnership: employer and employee associations, government, and educational institutions each play a part. In reality, most learning takes place through the daily interaction between an apprentice and his/her co-workers. Surveys have shown that the apprentices are least satisfied with the on-the-job portion of their training--particularly the ability of journey level workers and supervisors to pass on their knowledge of the trade.</p> <p>You have already learned to use the tools of your chosen trade. In this workshop you will be introduced to a new set of basic tools--the tools of a jobsite trainer. You will explore the skills that are necessary to be an effective trainer, discover how to deliver hands-on training, and examine the process for giving useful feedback. During the workshop you will build a Training Toolkit to take back to your work on the job.</p> |
|            | <b>Year 3 Totals</b>                                    | <b>7.75<br/>288 hours</b> | <b>35 weeks at 8 hours per week plus Transition to Trainer<br/>2 terms per year x 18-week/term at 8 hours/week = 288</b>  |



## **Wisconsin Technical College System**

### **50-420-525 Machinist Theory I**

#### **Course Outcome Summary**

##### **Course Information**

**Description** Become knowledgeable about horizontal and vertical turret lathes, screw machines, basic and advanced numerical control machinery, programming, and jig fixture application. Solve numerical control machining problems, draw up the solutions, and present an oral report on the problems.

**Total Credits** 3.50





## **Wisconsin Technical College System**

### **50-420-527 Machinist Theory II**

#### **Course Outcome Summary**

##### **Course Information**

**Description** Increase knowledge of horizontal and vertical turret lathes, screw machines, basic and advanced numerical control machinery, programming, and jig fixture applications. Solve numerical control machining problems, draw up the solutions, and present an oral report on the problems.

**Total Credits** 3.50



## Wisconsin Technical College System

### 50-420-711 Mathematics for the Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course provides applied mathematics instruction from a review of basic arithmetic; basic algebra; applications, based on geometry; right triangle trigonometry, oblique angle trigonometry and compound angles. This course was formerly module 1 in related instruction.

**Total Credits** 1.00

##### Course Competencies

- 1 Perform arithmetic operations on whole numbers and fractions.
- 2 Determine powers and roots.
- 3 Solve percentage, ratio and proportion problems.
- 4 Perform arithmetic operations on signed numbers.
- 5 Evaluate expressions involving order of operations.
- 6 Solve equations.
- 7 Perform basic geometric operations
- 8 Apply the Pythagorean Theorem to right triangles.
- 9 Solve right triangles
- 10 Apply laws of sines and cosines
- 11 Analyze shop applications by constructing triangles .
- 12 Apply geometric formulas to right and oblique triangles.
- 13 Solve compound angle applications.



## Wisconsin Technical College System

### 50-420-712 Communications for Apprentices

#### Course Outcome Summary

##### Course Information

**Description** Introduces the apprentice to basic communication concepts relating to the workplace. It is designed specifically for the apprentice to acquire the necessary skills of giving instructions, writing a technical memo, and explaining a technical process. Throughout the course the apprentice will brainstorm, write, edit, revise, and use one-on-one communication delivery in a small group. The course combines lecture and hands-on activities utilizing information which the apprentice brings from the workplace.

**Total Credits** 1.00

##### Course Competencies

- 1 Deliver orally a set of instructions to another individual
- 2 Write a technical memo
- 3 Explain a technical process to a small group.



## Wisconsin Technical College System

### 50-420-713 Precision Measurement for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This module is designed to acquaint the apprentice with the measurement systems and tools most frequently used in layout and machining processes. Subject matter includes semi-precision through super-precision measuring tools and equipment combined with opportunities to investigate new technologies. This course was formerly module 3 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 1.00

##### Course Competencies

- 1 Differentiate between measurement systems
- 2 Measure with basic measuring tools
- 3 Measure with micrometers
- 4 Use comparison measurement tools
- 5 Perform angular calculations and measurements
- 6 Perform layout and measurements on a surface plate
- 7 Explore current and emerging metrology technology

## Wisconsin Technical College System

### 50-420-714 Print Reading for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course will acquaint the apprentice with the interpretation of "Prints" (blueprints) and other engineering and manufacturing documentation. The primary focus of the course will be on that part of manufacturing most closely related to machining and tooling. Background information is provided relative to the process used to create and finish the product or piece part on the prints being studied. This course was formerly module 4 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 2.00

##### Course Competencies

- 1 Interpret basic print information
- 2 Sketch a simple object
- 3 Analyze part prints
- 4 Interpret metric print information
- 5 Deduce information from non-drawing parts of the print
- 6 Dimension a drawing
- 7 Draw an orthographic projection
- 8 Interpret section views
- 9 Interpret surface texture symbols
- 10 Interpret threaded screw component specifications
- 11 Analyze part prints for surface finish types
- 12 Interpret welding symbology
- 13 Interpret non-threaded component specifications
- 14 Interpret gear specifications
- 15 Deduce information from a die cast part drawing
- 16 Draw simple section views
- 17 Deduce information from an assembly drawing



## Wisconsin Technical College System

### 50-420-715 Mechanical Hardware and Handtools for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course provides instruction for the apprentice in recognition, selection, and operation of mechanical hardware and hand tools. Apprentices are taught to use outside sources to select correct component or tool sizes, characteristics, and operating parameters. Apprentices will sharpen drills and single point cutting tools. Course was formerly module 5 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 0.50

##### Course Competencies

- 1 Select hardware
- 2 Select threaded fasteners
- 3 Select hand tools
- 4 Select hacksaws and files
- 5 Select drills and reamers
- 6 Select counterbores and countersinks
- 7 Select taps and dies
- 8 Select cutting fluids
- 9 Sharpen a drill bit
- 10 Fit parts with an arbor press

## Wisconsin Technical College System

### 50-420-716 Turning Machines for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course will acquaint the apprentice with the terminology, methods, and operations for turning machines used in the metal-working industry. Apprentices will learn to perform calculations needed to operate turning machines including speed and feed calculations. Apprentices will make calculations necessary to setup a turning machine for screw threads and taper operations. This course was formerly module 6 in related instruction

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 1.00

##### Course Competencies

- 1 Analyze turning machine operation
- 2 Classify uses of single point tools
- 3 Sequence lathe operations
- 4 Select work holding devices for turning machines
- 5 Make calculations for taper setup and construction
- 6 Classify thread types
- 7 Assess the use of auxiliary devices

## Wisconsin Technical College System

### 50-420-718 Drilling Machines for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course focuses on the terminology, construction and operations of drilling machines in the metal-working industry. Be aware that in-depth information regarding cutting tools, hardware and hand tools will be addressed in their own modules. Efforts should be made to reference information found in other modules in order to assist the apprentice in the application and assimilation of information. This course was formerly module 8 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 0.50

##### Course Competencies

- 1 Advocate safe drilling machine practices
- 2 Analyze drilling machine capabilities by type and construction
- 3 Select tooling and tool holders for drilling machines
- 4 Select types of work-holding devices for drilling machines
- 5 Assess the application of auxiliary devices for drilling machines
- 6 Apply the concepts of drilling machine tool operations



## Wisconsin Technical College System

### 50-420-719 Grinding Machines for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course focuses on the terminology, construction and operations of grinding machines in the metal-working industry. Be aware that in-depth information regarding cutting tools, hardware and hand tools will be addressed in their own courses. Efforts should be made to reference information found in other courses in order to assist the apprentice in the application and assimilation of information. This course instructs apprentices in the use of traditional grinding machines and the attachments and accessories frequently encountered in manufacturing operations that use common grinding processes.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 1.00

##### Course Competencies

- 1 Analyze grinding tool capabilities by type and construction
- 2 Distinguish properties of abrasives
- 3 Select a grinding wheel
- 4 Select work-holding devices
- 5 Assess applications for a cylindrical grinder
- 6 Create a tool sharpening process guide
- 7 Apply concepts of grinding machine tool operations



## Wisconsin Technical College System

# 50-420-720 Cut-Off Machines for Machine Trades

## Course Outcome Summary

### Course Information

**Description** This course will acquaint the apprentice with the basic types of cutoff machines used in industry, cutoff machine applications, cutoff machine tooling, and cutoff machine safety. This course was formerly module 10 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 0.25

### Course Competencies

- 1 Analyze cut off machine capabilities by design and construction
- 2 Select a saw blade for a given application
- 3 Create a cutting agent matrix
- 4 Write a procedure for welding a saw blade
- 5 Set the feeds and speeds on a vertical band saw

## Wisconsin Technical College System

### 50-420-721 Metallurgy & Materials for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course provides the opportunity for the apprentice to develop the knowledge, skills, process, and understanding of hardness testing, carbons and low alloy steel, tool steels, stainless steels, cast iron, aluminum and aluminum alloys, die cast alloys, copper and copper alloys, plastics, heat treating and nondestructive testing. This course was formerly module 11 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 2.00

##### Course Competencies

- 1 Create a definition table
- 2 Test hardness of materials
- 3 Select machining applications for carbon and low alloy steels
- 4 Select machining applications for tool steels
- 5 Select machining applications for stainless steels
- 6 Select machining applications for cast iron (CI)
- 7 Select machining applications for aluminum and aluminum alloys
- 8 Select machining applications for die cast alloys
- 9 Select machining applications for copper and copper alloys
- 10 Select machining applications for plastics
- 11 Select a heat treating process
- 12 Select a non-destructive testing procedure



## Wisconsin Technical College System

### 50-420-724 CNC Programming and Planning for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course is a classroom introduction to CNC programming for apprentices, with a focus on CNC turning and milling centers. Apprentices will create setup sheets, develop tool lists, calculate speeds and feeds, assign tool offsets and write CNC programs. This course was formerly module 14 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 3.00

##### Course Competencies

- 1 Illustrate the applications of CNC tool systems
- 2 Compute cartesian coordinates
- 3 Sequence CNC operations
- 4 Select tooling for an operation
- 5 Plan set-ups
- 6 Define cutter path
- 7 Write manual programs
- 8 Prove out cutter paths



## Wisconsin Technical College System

### 50-420-725 Basic CAD/CAM for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course is designed to provide the apprentice with the concepts and techniques used in computer-aided design (CAD) and computer-aided manufacturing (CAM). This course was formerly Module 15 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 1.00

##### Course Competencies

- 1 Illustrate the applications of CAD/CAM system
- 2 Create a CAD drawing
- 3 Edit a CAD drawing file
- 4 Transfer a CAD drawing file to CAM software
- 5 Use the CAM software for a machining application
- 6 Create geometry using CAM software
- 7 Post process tool paths for a specific machine tool



## Wisconsin Technical College System

### 50-420-726 Jig and Fixture Design for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course introduces the apprentice to the concepts of jig and fixture design. Topics include the basic elements of tool design, jig and fixture application, and the actual design of tooling. This course was formerly module 16 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 1.00

##### Course Competencies

- 1 Evaluate basic tool design processes
- 2 Summarize the elements of tooling
- 3 Apply jigs to specific applications
- 4 Apply fixtures to specific applications
- 5 Design a jig or a fixture



## Wisconsin Technical College System

### 50-420-727 Geometric Design and Tolerancing for Machine Trades

#### Course Outcome Summary

##### Course Information

**Description** This course will acquaint the apprentice with the skills to interpret the Geometric Dimensions and Tolerances found on engineering drawings and in other documents. Instruction concentrates on interpreting the symbols, identifying tolerance zones and determining ways to check parts for conformity to the specified geometric controls. Reference is made to ASME Y14.5M - 1994. This course was formerly module 17 in related instruction.

This course alone cannot produce the qualified industrial journey level worker. It is but a component of a complete apprenticeship which, when complemented with competent and effective on-the-job training by a qualified journey person can produce a technician capable of dealing with the most industrial work situations.

**Total Credits** 0.75

##### Course Competencies

- 1 Create a matrix showing key GDT terms and symbols
- 2 Create a drawing using datum features
- 3 Interpret "tolerances of form"
- 4 Interpret print controls
- 5 Interpret concentricity and symmetry controls

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## **Wisconsin Technical College System**

### **50-420-520 Metals Trade Theory I**

#### **Course Outcome Summary**

##### **Course Information**

**Description** Become familiar with basic theory related to topics such as in machining, blueprint reading, metallurgy, foundry, measurement, and safety in order to establish a solid foundation on which more specialized units - such as plastic moldmaking, stamping dies, CNC machining, and jig and fixture design - can be built.

**Total Credits** 3.00





## Wisconsin Technical College System

### 50-420-521 Metals Trade Theory II

#### Course Outcome Summary

##### Course Information

**Description** Explore topics including welding, milling machines, mechanical motions, electrical principles, layout, drill press, grinding, boring bar, jig boring, shapers, and planers.

**Total Credits** 3.00



## **Wisconsin Technical College System**

### **50-801-500 Applied Communications**

#### **Course Outcome Summary**

##### **Course Information**

**Description** Enhance interpersonal communication skills, especially the oral and listening skills needed by those in apprentice programs

**Total Credits** 0.50

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## **Wisconsin Technical College System**

### **50-804-504 Industrial Math 1**

#### **Course Outcome Summary**

##### **Course Information**

**Description** Explore the topics of applied arithmetic and algebra. Study concepts related to measurement, fractions, decimals, percent, ratio and proportion, signed numbers, formula substitution, solutions to equations, tapers and gears. Calculate the areas and volumes of common geometric shapes.

**Total Credits** 1.00



## **Wisconsin Technical College System**

### **50-804-505 Industrial Math 2**

### **Course Outcome Summary**

#### **Course Information**

**Description** 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

**Total Credits** 1.00



## **Wisconsin Technical College System**

### **50-809-551 Human Relations - Apprentice**

#### **Course Outcome Summary**

##### **Course Information**

**Description** Study the psychological principles of human relations that will assist in adaptation to the world of work and adjustment to personal and occupational relationships.

**Total Credits** 0.50



## Wisconsin Technical College System

### 47-455-455 Transition to Trainer: Your Role as a Journey Worker

#### Course Outcome Summary

##### Course Information

**Description** Apprenticeship training is a collaborative partnership: employer and employee associations, government, and educational institutions each play a part. In reality, most learning takes place through the daily interaction between an apprentice and his/her co-workers. Surveys have shown that the apprentices are least satisfied with the on-the-job portion of their training--particularly the ability of journey level workers and supervisors to pass on their knowledge of the trade.

You have already learned to use the tools of your chosen trade. In this workshop you will be introduced to a new set of basic tools--the tools of a jobsite trainer. You will explore the skills that are necessary to be an effective trainer, discover how to deliver hands-on training, and examine the process for giving useful feedback. During the workshop you will build a Training Toolkit to take back to your work on the job.

##### Course Competencies

- 1 Value your role as a journey worker trainer
- 2 Serve as a mentor and job coach
- 3 Foster a positive work environment by acting as an ally/advocate
- 4 Provide hands-on skills training
- 5 Provide feedback on apprentice performance