

# MACHINE SHOP (420)

## 420-116. CNC Machining Center Operation. (2 Credits)

Gain an introduction to CNC fundamentals while developing the skills necessary to set up and operate a CNC vertical machining center. Explore G and M codes, basic programming format, speeds and feeds, tool offsets and the basic features of CNC control panels. Use blueprint interpretation and math skills to correctly select tooling and determine workholding method.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=116>)

## 420-120. Machine Tool/Fabrication. (2 Credits)

This course is designed to provide fabrication students with knowledge and applications of machine tool safety, processes, operation, and cutting conditions. The student will be required to produce a number of acceptable piece parts from standard blueprints.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=120>)

## 420-126. Machine Tool Theory. (1 Credit)

Gain an introduction to the practical theory related to machining processes and machine tools including lathes, vertical milling machines and drill presses. Explore shop safety, cutting tools, cutting conditions, part layout, hand tools, hardware, and precision and semi-precision measurement.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=126>)

## 420-127. Machine Tool Theory 2. (1 Credit)

Building on Machine Tool Theory, explore the practical theory related to machining processes and machine tools, including grinders, saws and cutoff machines. Learn about shop safety, cutting tools, cutting conditions, metal composition, heat treatment, maintenance, lubrication, cutting fluids, inspection, fixturing and an introduction to contemporary manufacturing.

Prerequisites: 420-126 (may be taken concurrently) with a minimum grade of C or 420-326 (may be taken concurrently) with a minimum grade of C

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=127>)

## 420-128. Fixturing for Machining. (1 Credit)

This course is designed to introduce the student to the practical concepts of work holding methods for machining operations. Production fixtures and other work holding methods for various manufacturing operations including manual drilling, turning, milling and grinding along with CNC machining will be addressed. Locating, supporting and clamping principles in addition to Geometric Dimensioning & Tolerancing (GD&T) will be emphasized.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=128>)

## 420-130. Industrial Blueprint Reading 1. (2 Credits)

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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=130>)

## 420-160. Manufacturing Processes - Cold. (2 Credits)

The student will be introduced to manufacturing methods and the progression a part follows from a piece of raw stock to its finish dimensions utilizing provided drawings. Strong emphasis will be placed on strategies in standard machining practices, methods, and procedures to safely machine work pieces using standard manufacturing equipment including drill presses, manual mills and manual lathes.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=160>)

## 420-186. CNC Machining Ctr Programming. (2 Credits)

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 per print. Learn to alter, insert and delete portions of existing programs in order to maintain control of part integrity. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=186>)

## 420-315. Contemporary Manufacturing. (1 Credit)

Explore current and future manufacturing processes, and apply the discussion topics to specific manufacturing applications.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=315>)

## 420-316. CNC Machining Center Operation. (2 Credits)

This course will introduce students to the fundamentals of CNC. Students will 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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=316>)

## 420-316A. CNC Machining Center Oprtn. A. (1 Credit)

Gain an introduction to the fundamentals of CNC. Develop skills to set up and operate a CNC vertical machining center. Explore G and M codes, basic programming format, speeds and feeds, tool offsets and the basic features of CNC control panels. Use blueprint interpretation and math skills to correctly select tooling and determine the workholding method. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=316A>)

## 420-316B. CNC Machining Center Oprtn. B. (1 Credit)

Gain an introduction to the fundamentals of CNC. Develop skills to set up and operate a CNC vertical machining center. Explore G and M codes, basic programming format, speeds and feeds, tool offsets and the basic features of CNC control panels. Use blueprint interpretation and math skills to correctly select tooling and determine the workholding method. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=316B>)

## 420-317. CNC Turning Center Operation. (2 Credits)

This course will introduce students to the fundamentals of CNC. Students will 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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=317>)

**420-320. Machine Tool Operation 1. (4 Credits)**

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.

Prerequisites: (420-326 (may be taken concurrently) with a minimum grade of C or 420-126 (may be taken concurrently) with a minimum grade of C)

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=320>)

**420-321. Machine Tool Operation 2. (4 Credits)**

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 (may be taken concurrently) with a minimum grade of C and (420-126 (may be taken concurrently) with a minimum grade of C or 420-326 (may be taken concurrently) with a minimum grade of C)

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=321>)

**420-323. Machine Tool Operation 3. (4 Credits)**

Hone 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 (may be taken concurrently) with a minimum grade of C and 420-320 (may be taken concurrently) with a minimum grade of C and (420-127 (may be taken concurrently) with a minimum grade of C or 420-128 with a minimum grade of C)

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=323>)

**420-324. Machine Tool Operation 4. (4 Credits)**

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 (may be taken concurrently) with a minimum grade of C)

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=324>)

**420-326. Machine Tool Theory I. (1 Credit)**

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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=326>)

**420-330. Industrial Blueprint Reading I. (2 Credits)**

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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=330>)

**420-336. CNC Machining Center Operation. (2 Credits)**

This course will introduce students to the fundamentals of CNC. Students will 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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=336>)

**420-337. CNC Turning Center Operation. (2 Credits)**

This course will introduce students to the fundamentals of CNC. Students will 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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=337>)

**420-386. CNC Machining Center. (2 Credits)**

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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=386>)

**420-387. CNC Turning Center Programming. (2 Credits)**

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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=387>)

**420-388. Computer Assist Prog/CNC. (2 Credits)**

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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=388>)

**420-399. Wire EDM Fundamentals. (1 Credit)**

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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=399>)

**420-410. Introduction to Casting. (0.8 Credits)**

This course will introduce students to the fundamentals of casting. Topics that will be covered include: introduction to casting processes, components of a casting and common foundry terms. Blueprint interpretation and math skills will also be discussed. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=410>)

**420-421. Industrial Blueprint Reading. (1.6 Credits)**

Learn the theoretical concepts of Industrial Blueprint Reading. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=421>)

**420-430A. Industrial Blueprint Reading. (1.2 Credits)**

Learn the theoretical concepts of Industrial Blueprint Reading. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=430A>)

**420-430C. Geometric Dim & Toler (GD&T). (1 Credit)**

Learn theoretical concepts of GD&T and the knowledge required to interpret GD&T feature control frames relative to current industry standards. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=430C>)

**420-437. Machining. (0.8 Credits)**

Participants will gain and develop the skills needed for the safe, efficient operation of machines located on a shop floor. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=437>)

**420-451. Applied Math Industrial Appl. (1.6 Credits)**

Learn entry-level skills by exploring the topics of applied math in an industrial setting. Study concepts related to measurement, fractions, decimals, percents, ratio and proportion. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=451>)

**420-451A. Industrial Math. (0.4 Credits)**

Learn fundamentals of applied math related to measurements, fractions, decimals, percents, ratio and proportion in an industrial setting. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=451A>)

**420-455. Geometric Dimension & Toleran. (1.2 Credits)**

Learn theoretical concepts of GD&T and how to interpret GD&T feature control frames relative to current industry standards. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=455>)

**420-456. Advanced GD&T. (0.4 Credits)**

Learn advanced concepts of GD&T and how to interpret GD&T feature control frames relative to current industry standards. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=456>)

**420-471A. Industrial Blueprint Reading. (0.8 Credits)**

Learn the theoretical concepts of Industrial Blueprint Reading. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=471A>)

**420-471B. Industrial Blueprint Reading. (0.4 Credits)**

Learn the theoretical concepts of Industrial Blueprint Reading. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=471B>)

**420-486. Manufacturing Bootcamp. (8 Credits)**

This course is designed to give the student exposure to Manufacturing operations in an accelerated format. Topics covered will included CNC turning, blueprint reading, and math skills for manufacturing operations. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=486>)

**420-486A. CNC Turning Ctr Operatns-35Hrs. (3.5 Credits)**

In this course students will develop the skills necessary to set up and operate a CNC turning center. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=486A>)

**420-486B. Lathe Operations. (0.6 Credits)**

This course covers the major types of lathes and their attachments, safety, maintenance, job preparation, and basic lathe operations. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=486B>)

**420-487B. CNC Machining Operations-35Hrs. (3.5 Credits)**

In this course students will learn the fundamentals of CNC. Students will develop the skills necessary to set up and operate a CNC vertical machining center. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=487B>)

**420-492. Manufacturing Bootcamp. (0.6 Credits)**

Gain an overview of manufacturing operations and best practices in an accelerated format. Explore fabrication, welding, CNC machining, blueprint reading, and math skills for manufacturing. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=492>)

**420-493. Coil Winding. (8 Credits)**

Learn to identify and utilize safe practices and documentation associated with coil winding equipment and procedures, identify and describe the components of different coil winding processes, and properly and safely set up and operate coil winding machinery.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=493>)

**420-495. Manufacturing Orientation. (1.2 Credits)**

Gain an overview of industrial math, blueprint reading, use of precision gauges and safety essentials. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=495>)

**420-496. Manual Machining. (0.6 Credits)**

Explore the components, set-up practices, depth control and demonstration of lathe and mill machining. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=496>)

**420-497. Blueprint Reading. (2.4 Credits)**

Learn the theoretical concepts of Industrial Blueprint Reading. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=497>)

**420-504. Safety Machine Tool Apprentice. (0.5 Credits)**

Examine safe work practices for machinists, tool and die makers and related trades. Apprentices will explore industrial safety standards; personal protective equipment; machine guards and protective devices; and chemical safety, and more. Course relates 5S concepts to safe work practices and trade work processes. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=504>)



**420-505. OSHA Machine Trade Apprentices. (0.5 Credits)**

Learn about industrial safety concepts and ensuring safe work practices. Topics include OSHA, Lock out/Tag out, Personal Protective Equipment, Hazardous Communication, Electrical Safety, Industrial Hygiene, Machine Guarding, Fall Protection and Permit-Required Confined Spaces. See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=505>)

**420-514. Mathematics for Machine Trades. (1 Credit)**

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. U.S. and metric measurement systems will be introduced. The course is recommended for first semester.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=514>)

**420-515. Communications for Apprentices. (1 Credit)**

The course 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.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=515>)

**420-516. Safety for IMT Apprentices. (1 Credit)**

Explore customer needs, team building, decision making, safety within an organization, personal protective equipment, fire and electrical safety, and hazardous material safety. The content in this course aligns with OSHA 10 training.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=516>)

**420-551. Engineering Drawings Appr. (1 Credit)**

Learn universally applicable techniques for interpreting mechanical and industrial drawings through the study of drawing standards, abbreviations, basic rules for dimensioning and various views.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=551>)

**420-552. Machine Process 1 Apprentices. (1 Credit)**

Learn the proper use of sawing, drilling and milling machines; grinders and lathes. Learn to work safely and efficiently while acquiring the skills needed to identify proper machine shop practices and choosing the correct tool for the job.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=552>)

**420-553. Machine Tool Theory 1 Appr. (1 Credit)**

Learn about shop safety and the selection and application of hand tools, measuring instruments and layout procedures. Explore the process of determining the proper tools needed to perform specific machining tasks. Practice working safely and efficiently while acquiring the skills needed to identify proper machine shop practices and choosing the correct tool for the job.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=553>)

**420-554. GD&T Apprentices. (1 Credit)**

Gain an introduction to geometric dimensioning and tolerancing (GD&T), including symbols, featuring control frames, maximum material condition (MMC) and least material condition (LMC). Create models and drawings with the correct GD&T placement.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=554>)

**420-555. Machine Process 2 Appr. (1 Credit)**

Explore metal composition and metallurgy techniques through both lecture and hands-on learning.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=555>)

**420-556. Machine Tool Theory 2 Appr. (1 Credit)**

Explore fixturing and workholding techniques and applications through both lectures and hands-on learning.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=556>)

**420-561. Solidworks Machinist Appr. (1.75 Credits)**

Learn to use the 3D modeling software SolidWorks to create and design parts including single- and multiple-configuration solid models. Create assemblies and assembly drawings using configuration part models, and model advanced part features.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=561>)

**420-562. CNC Machining Ctr Appr. (1.75 Credits)**

Become competent in "G" and "M" code programming and basic operation of a Haas CNC machining center. Learn basic word address codes and proper CNC program structure to communicate with the machine. Explore programming techniques, proper safety and operation of the machining center.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=562>)

**420-563. Comp Assist Prog Machinist App. (1.75 Credits)**

Gain exposure to lathe and 2 1/2 axis CAD programming software. Explore part geometry creation and editing. Build a solid foundation of geometric relationships, then tool-path several parts to acceptable machining practices.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=563>)

**420-564. CNC Turning Ctr Appr. (1.75 Credits)**

Gain the skills needed to set up and manually program a Computer Numerical Control (CNC) Turning Center. Explore the fundamentals of CNC Turning Center setup practices and procedures, and establish work coordinate systems. Learn to mount cutting tools; load, edit and troubleshoot programs; and archive final program revisions.

See sections of this course (<http://www.wctc.edu/academics/programs-courses/course-search/course-search-listing.php?code=420&num=564>)