



Fast Track Machine Tool

Organization Washburn Institute of Technology

Program Number 48.0501

Instructional Level Cert A (23 Credit Hours)

Target Population Post-Secondary

Description

The program will cover the basics of the trade and expand the student's knowledge and skills in the use of machine tools. Students will be instructed in blue print reading, shop theory, set-up and operation of conventional machine tools including lathes, mills, drill presses, and surface grinders. Basic operations and set-up of CNC machines will be introduced.

Entry Requirements

WorkKeys® Applied Math Level 4 or equivalent

WorkKeys® Reading for Information Level 4 or equivalent

Required textbooks:

Hoffman, Edward G. & McCauley, Christopher J. Shop Reference for Students and Apprentices; Industrial Press; 2000; 2nd edition. ISBN: 978-0-831-13079-4.

Hoffman, Peter; Hopewell, Eric; Janes, Brian and Sharp, Kent. Precision Machining Technology; Delmar Cengage; 2015, 2nd edition. ISBN: 978-1-285- 44454-3.

Barsamian, Michael & Gizelbach, Richard. Machine Trades Blueprint Reading; Goodheart – Wilcox; 2013; 5th edition. ISBN: 978-1-619-60195-6

Assessment Plan

Assessment is an integral part of the educational process at Washburn Tech and accurate feedback is an important tool in continuously improving the institution's technical programs. Students can expect to participate in assessment activities prior to entry into programs, within a specific courses and following program completion for specific fields of study.

Student Learning Outcomes

- A. Communicate effectively.
- B. Integrate technology.
- C. Learn Effectively – use academics effectively
- D. Demonstrate cooperative/teamwork skills.
- E. Apply safety
- F. Think critically and creatively
- G. Demonstrate responsible work ethics

Program Outcomes

- A. Students will learn and apply safe work habits in the classroom and while working with the machinery.
- B. Students will learn and apply basic knowledge of the use and care of hand and power tools related to this field.
- C. Students will demonstrate professional and quality workmanship in the classroom and lab assignments
- D. Students will apply essential math skills for all areas to become a machinist
- E. All students will have an Understanding of Work Place Ethics.

Course #	Course Title	Credit Hours	Required
MTT106	Safety OSHA 10	1	YES
MTT112	Print Reading	3	YES
MTT114	Machining 1	3	YES
MTT116	Machine Tool Processes	1	YES
MTT118	Lathe/Mill/Grind 1	4	YES
MTT123	Machining II	3	YES
MTT131	Quality Control & Inspection	1	YES
MTT151	Workplace Ethics	2	YES
MTT218	Metallurgy	1	YES
MTT221	Bench Work	1	YES
MTT241	CNC Operations	3	YES

Program Course Descriptions

MTT 106 Safety/Osha 10

Students will learn how to explain job/site safety and precautions for job/site hazards; determine the uses of personal protective equipment (PPE); identify the safety equipment and procedures related to safe work practices and environment; identify fire prevention and protecting techniques; explore Hazardous Communication (HazCom) including Material Safety Data Sheets (MSDS)

MTT112 Print Reading

Students will learn to identify basic lines, views and abbreviations used in blueprints, interpret basic 3D sketches using orthographic projections and blueprints, determine dimensions of features of simple parts, sketch simple parts with dimensional measurements, determine dimensions of a multi-feature part, interpret GDT symbols, frames and datums.

MTT114 Machining 1

Students will learn to conduct job hazard analysis for conventional mills and lathes, develop math skills for machine tool operations, perform preventive maintenance and housekeeping on conventional mills and lathes, select work holding devices for mills, lathes and other machine tools, calculate feeds and speeds, remove material using milling and turning processes, align milling head, use a vertical mill to center drill, drill and ream holes, change tools and tool holders on milling machines, and maintain saws and grinders. Prerequisite: OSHA 10 or 30 Safety Course.

MTT116 Machine Tool Process

Students will learn to conduct a job hazard analysis for a machine tool group, analyze blueprints to layout parts and materials, select hand tools and common machine shop mechanical hardware for specific applications, prescribe cutting tools for assigned operations, calculate stock size to minimize drop, machine parts to specifications outlined in machine handbooks, summarize preparations for machining operations, and apply precautions to minimize hazards for work with lathes, mills, drills and grinders. Prerequisite OSHA 10 or 30 Safety Course

MTT118 Lathe/Mill/Grind 1

Instruction will be given in the form of lectures, hand-outs, videos, shop demonstrations, shop assignments and text book assignments. Students will perform required setups and operations of lathes, milling machines, and grinders in a timely manner. Students are required to practice all shop safety rules. Calculate feeds and speeds using the math formulas taught. Math will also be used to calculate whole pattern layouts, gear cutting, threading information, inspecting and quality control, and programming. Students will be required to perform machine operations to the satisfaction of the instructor. Students may be required to work in two or three person teams, but all students will be given the opportunity to demonstrate their competency level and ability by means of written tests, verbal communications, and demonstrating hands-on abilities.

MTT123 Machining II

Students will learn to perform basic trigonometric functions and perform other procedures such as I.D. boring and facing operations, planning a sequence for machining operations, aligning work pieces, use work holding devices, jigs and fixtures, performing threading operation on lathes, machining key ways on a vertical mill, inspection and dressing grinding wheels, performing O.D. and I.D. threading operations, performing O.D. and I.D. tapering operations, machining parts using milling cutters and milling machines.

MTT131 Quality Control & Inspection

Students are introduced to the science of dimensional metrology and its applications to ensure form and function of machined parts and assemblies using semi-precision and precision measuring instruments.

MTT151 Workplace Ethics

Students study human relations and professional development that exists in today's rapidly changing world so that they become better prepared for living and working in a complex society. Topics include human relations, job acquisition, job retention, job advancement and professional image skills.

MTT218 Metallurgy

Students will learn the metallurgical terms and definitions in an effort to understand the behavior and service of metals in industry. Characteristics during heating, cooling, shaping, forming, and the stress related to their mechanical properties are covered, as well as the theory behind alloys, heat treatment processes and wear resistance.

MTT221 Bench Work

Students will be provided the opportunity to learn and practice bench work skills such as filing, drilling, tapping, deburring and layout for projects. They will gain valuable practical experience in the use of various hand tools by producing basic bench work projects. Topics will include safety, print reading, job planning, and quality control.

MTT241 CNC Operations

Students will become acquainted with the history of Numerical Control (NC) and Computer Numerical Control (CNC) machines and will be introduced to a CNC machine used in the precision machining trades. They will gain practical experience in the application of "G" codes and "M" codes, writing CNC machine programs, and machine setup and operation.

Prerequisites: OSHA 10 or 30 Safety Course; Machining I; Machining II

Disability

The Special Support Services (SSS) Office is responsible for assisting in arranging accommodations and for identifying resources at Washburn Institute of Technology for persons with disabilities. Qualified students with disabilities **MUST** register and provide documentation with the office to be eligible for services. New requests for accommodations should be submitted two months or more prior to the date services should begin; however, contact the SSS Office as soon as a need may arise. Depending on the accommodation request, four to eight week lead time may be needed for timely and effective provision of services. SSS coordinates and assist in arranging services it deems appropriate of eligible students on a case-by-case basis. If you are a student with a disability that may substantially limit your ability to participate in this class and believe you will need accommodations, it is your responsibility to contact:

Special Support Services Coordinator

Phone: 785-228-6356

E-Mail: gloria.christian@washburn.edu

Washburn University [prohibits discrimination](#) on the basis of race, color, religion, age, national origin, ancestry, disability, sex, sexual orientation, gender identity, genetic information, veteran status, or marital or parental status. The following person has been designated to handle inquiries regarding the non-discrimination policies: Dr. Pamela Foster, Equal Opportunity Director/Title IX Coordinator, Washburn University, 1700 SW College Ave, Topeka, Kansas 66621, 785.670.1509, codirector@washburn.edu

