



WESTERN LAKE ERIE CHAPTER

2021-2022

NTMA Western Lake Erie Apprenticeship School

Curriculum

The Curriculum of the Western Lake Erie Chapter School is in accordance with State of Ohio Apprenticeship Training Bureau Standards. This school is maintained to provide classroom training for the sponsored apprenticeship training programs.

Mission

To provide the necessary educational instruction in order to complete the related instruction requirements of the state of a state registered apprenticeship program.



Program Course Descriptions

Course: NTMA220 AutoCAD

Text Book: Computer Lab / A+CAD Software

Contact Hours: 72

Course Description:

AutoCAD is one of the most widely used CAD software packages in today's marketplace. Upon completion, students should become familiar with AutoCAD commands and be able to complete accurate clean drawings. The basic fundamentals of 2D drawing will be covered such as lines, circles, points, dimensioning, layers, modifiers, and editing. This is a lab-based class that requires students to complete all work in-class.

Course: NTMA410 CAD/CAM I & II

Text Book: Lab Based Class – Mastercam Lab

Contact Hours: 144

Course Description:

This course prepares students with implementing modern tool path strategies to CNC machines. Students are shown how to work off of realistic prints and apply this information into a cam system to place G code into the machine. Students work with a variety of formats for importing and exporting data that is required knowledge in industrial manufacturer's workplace. In addition, students are required to calculate speeds and feeds, work with 2D and 3D wireframe, and also with surfaces and solid models. This course is designed for beginners and intermediate cnc machinist.



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Course: NTMA300 Theory I, II, & III

Text Book: Machine Tool and Manufacturing Technology

Contact Hours: 36

Course Description:

Machine shop is the basis of all manufacturing and is a very important technical subject. The main purpose of the text is to interest the student in machine trades and manufacturing technologies. The objective of this class is to introduce basic metal removal and machining speeds and feeds. Along with the basics of machining, new manufacturing technologies will be discussed.

Course: NTMA400 CNC

Text Book: CNC Programming Principals and Applications 1st edition

Contact Hours: 36

Course Description:

The computer numerical control (CNC) course is for beginning students to learn the fundamentals of G & M code programming. Experience machinist will utilize this class to transition from manual machining to cnc machine tools. Students will be responsible for the cnc programming process, cnc tooling and machining process, tool and work piece setups and codes for positioning. The cnc text is an interactive resource to support project/problem-based learning.

Course: NTMA120 & 130 Trigonometry

Text Book: Introductory Technical Mathematics 5th edition

Contact Hours: 72

Course Description:

Fundamentals of trigonometry involve mathematics that is used to compute unknown angles and sides of triangles. This class is based on the principals



of geometry which is a prerequisite to this course. Problem solving is achieved using algebra, geometry, and trigonometry elements. Student must be able to analyze and then apply knowledge of trigonometry principals. More complex shop applications are introduced near the completion of this course.

Course: NTMA310 Manufacturing Processes

Text Book:

Contact Hours: 72

Course Description:

The Manufacturing Processes course covers a wide range of industrial activity. Its main goal is to introduce the student to areas of manufacturing that work in conjunction with their trade. For example, all machining companies process steel in one way or another, so it is important to have knowledge of materials, how their produced, and understand the heat treat process. Although the course is mainly lecture, emphasis is placed on field trips to businesses such as heat treat, stamping, precision machining, die casting, molding, and occasionally metal foundries. The text used for this course contains more content that can be covered in a semester class and is written so chapters can be taught as separate entities. This allows the instructor to skip areas in which the students are already proficient and experienced. Manufacturing Processes core chapters include: properties and production of metals, casting, welding, hot and cold working of metals, stamping, heat treating, plastics, and robots and process automation.

Course: NTMA200 Blueprint

Text Book: Blueprint Interpreting Engineering drawings 2007

Contact Hours: 36

Course Description:

Blueprint reading for machine trades is a complete guide to learning how to interpret industrial prints. The class introduces the alphabet of lines, an



emphasis on orthographic projection and applications of dimensions and tolerances. Students will be required to complete assignments that include the interpretation of basic to difficult prints.

Course: NTMA100 Algebra

Text Book: Introductory Technical Mathematics 5th edition

Contact Hours: 36

Course Description:

Algebra is one of the main building blocks of mathematics that uses letters to represent numbers. The knowledge of algebra fundamentals is necessary in a wide range of occupations. It is also used in other mathematics such as geometry and trigonometry. Concepts introduced in this course will include algebraic expressions and operations, simple and complex equations, Cartesian co-ordinates and graphing, and finishing with systems and quadratic equations. Emphasis is placed on the knowledge of properly using and re-arranging formulas.

Course: NTMA210 GD&T

Text Book: Fundamentals of Geometric Dimensioning and Tolerancing 2nd edition

Contact Hours: 36

Course Description:

The course is designed to introduce the student to Geometric Dimensioning and Tolerancing (GD&T) as use in the Tool and Die Industry. The student will be required to comprehend symbols, terms and rules of GD&T along with the interpretation of form, orientation, concentricity, symmetry, and profile controls. In addition, emphasis will be placed on the understanding of datum's and their use of implied, planer, and datum targets. Discussion will include how to properly set-up and inspect to the implied GD&T controls.



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Course: NTMA110 Geometry

Text Book: Introductory Technical Mathematics 5th edition

Contact Hours: 36

Course Description:

The knowledge of geometry and the ability to apply it is a valuable tool in many industries such as carpentry, plumbing, drafting and machining. It is also used regularly in everyday living to estimate paint, wallpaper, flooring and lumber for building projects. The class will focus on plane geometry and will require the students to use axioms and postulates that apply as such. Items that will be introduced are angles, triangles, similar and congruent figures, polygons, circles, areas, and volumes. Course will focus on practical applications and solutions rather than theoretical solutions to problems.



Curriculum Summary

<u>MATHEMATICS</u>		<u>Contact hours</u>
NTMA100	Algebra	36
NTMA110	Geometry	36
NTMA120	Trigonometry	36
NTMA130	Advanced Trigonometry	36
<u>DRAFTING / BLUEPRINT</u>		
NTMA200	Blueprint	36
NTMA210	GD&T	36
NTMA220	AutoCAD	72
<u>MANUFACTURING</u>		
NTMA300	Theory I, II, & III	36
NTMA310	Manufacturing Processes	72
<u>CNC / CAD CAM</u>		
NTMA400	CNC Programming	36
NTMA410	Mastercam CAD CAM	144
		Total 576 hours



Class Schedule

First Year

Algebra

Geometry

Blueprint

Theory

Second Year

Trigonometry

Manufacturing Processes

GD&T

Third Year

CNC

Advanced Trigonometry

AutoCAD

Fourth Year

Mastercam