



St. Louis NTMA-U Portal

Module Descriptions and Textbooks

Shop Safety (Note: this course is *not* a required apprenticeship course. See below for apprenticeship required modules.) **Shop Safety Course content includes:** Intro to safety: drill press safety, machine guarding. These topics introduce machining operations with a focus on the safe application of the most common machining procedures and machines used by multi-skilled technicians. The Lock out tag out with Fact Sheet/Procedure Form / Graded Control Methods / Energy Source Form covers basic safety procedure which is used in industry to ensure that dangerous machines are properly shut off and not able to be started up again prior to the completion of maintenance or servicing work. The MSDS-SDS, Hazards Communications Standards Safety Data sheets, OSHA Fact sheet, describes the properties and potential hazards of the material, how to use it safely, and what to do in an emergency. The purpose of this section is to assist employees in understanding and interpreting this type of information. The Safe lifting section is designed to help employees perform proper lifting in order to prevent back injuries associated with lifting heavy materials and objects. The Blood Borne Pathogens section is designed to provide an awareness or basic understanding of bloodborne pathogens, common modes of their transmission, methods of prevention and other pertinent information. The course also offers Basic First Aid awareness.

Apprenticeship Training (total of 704 contact hours)

Series 1

NTMA-U 1: 1100-1A - Basic Blueprint (38 contact hours)

Textbook: The Technology of Manufacturing Blueprint Reading for Machinist Training

Basic Blueprint: This course teaches the proper terminology, symbols, and guidelines associated with reading and sketching blueprints, and how these are applied in a manufacturing environment. It focuses on reading as well as interpreting blueprints through the different views of an object, including dimensioning techniques, tolerancing, fraction to decimal conversion, drafting lines using geometric equations, line types, orthographic views, isometric views, offset sections, auxiliary sections, symbols and broken sections.

NTMA-U 1: 1120-1A - Basic Math (42 contact hours)

Textbook: New Practical Mathematics for Metalworking Trainees

Basic Math: This course introduces math skills and concepts that are necessary in shop activities, including use of fractions, fraction to decimal conversion and calculating angles.

NTMA-U 1: 1200-1A - Precision Machining Technology (42 contact hours)

Textbook: Precision Machining Technology - NIMS

Machine Tools: This course has a strong focus on safety in the machine shop. It introduces the metallurgy of steel and iron and the fundamentals of metal cutting operations to produce manufacturing parts. It includes the operation of machinery, terminology, safety, measurement, layouts, print reading, machine set-ups, hand tools, quality measurement devices (e.g., rules, calipers, micrometers) and cutting tools. It highlights the use of typical equipment found in conventional machine shops.



Series 2

NTMA-U 2: 1200-2A - Precision Machine Technology 2 (42 contact hours)

Textbook: Precision Machining Technology - NIMS

Machine Technology 2: This course offers continued emphasis on shop safety and quality measurement devices. It focuses on the metal removal processes on typical equipment found in the machine shop, with emphasis on the drill press, engine lathe, milling machine and surface grinder. It covers the use of workholding devices, as well as how to properly support and locate workpieces. It also reviews the applications of the Coordinate measuring machine (CMM), the optical comparator and the electro-discharge machine (EDM).

NTMA-U 2: 1100-2 - Intermediate Blueprint Module 2 (38 contact hours)

Textbook: The Technology of Manufacturing Blueprint Reading for Machinist Training

Intermediate Blueprint: This course is designed to increase your efficiencies in blueprint reading. This course emphasizes the relationship of blueprint drawings and how they apply to manufacturing parts including lines, views, dimensioning and machining processes. It includes fraction to decimal conversion, drafting lines using geometric equations, line types, orthographic views, isometric views, offset sections, auxiliary sections, symbols and broken sections.

NTMA-U 2: 1120-2A - Applied Mathematics (42 contact hours)

Textbook: New Practical Mathematics for Metalworking Trainees

Applied Mathematics: This course is designed to increase your efficiencies in math skills and concepts that are necessary in shop activities. Emphasis on the relationship of math required for manufacturing of parts as viewed on blueprint drawings and how the concepts apply to manufacturing parts and machining processes.

Series 3

NTMA-U 3: 2300-3 - CNC-With Simulator (38 contact hours)

No Textbook

CNC: This course introduces the tools and technology involved in computer numeric control (CNC) machining. It teaches G&M Codes and explains the principles of the Cartesian Coordinate System and how they apply to CNC. It also reviews the use of various metal cutting tools as they relate to CNC programming. This course will cover the process planning involved in creating CNC programs, including safety precautions, proper machine set up and operational skills, creating programs and controlling part sizes with wear offsets.

NTMA-U 3: 2500-3 - Intermediate Applied Math (42 contact hours)

Textbook: New Practical Mathematics for Metalworking Trainees

Intermediate Applied Math: This course is the 3rd in a series, and is designed to increase your efficiencies in math skills and concepts that are necessary in shop activities. It explains how to properly use the Pythagorean theory and explains the use of trigonometric functions and their applications. It focuses on solving right triangle trigonometry problems, and also relates these trig functions to the use of sine bars and gage blocks for use in setting up angles to be machined.



Series 3 (continued)

NTMA-U 3: 1500-3 - Intermediate Blue Print Reading with Basic Essentials for GDT (38 contact hours)

Textbook: Intro to Geometric Tolerancing and Dimensioning (note: this book is also used in Semester 5)

Intermediate Blue Print Reading with Basic Essentials for GDT: This course introduces the symbols and concepts of geometric dimensioning and tolerancing as they relate to engineering drawings.

Series 4

NTMA-U 4: 2720-4 - Metallurgy (38 contact hours)

Textbook: Material Science (author Ken McCreight)

Metallurgy: This course introduces the nature and properties of materials. It presents a history of metals- providing background on the origins of various metals and provides an explanation of physical characteristics of metals. Students will study the chemical reactions and thermodynamics related to the production of steel as well as the key processes of iron making from the raw materials through to the final product. It stresses how metals are alloyed and formed to achieve desired mechanical properties-including comparisons between various forming processes including casting, forging, extrusion, and rolling.

NTMA-U 4: 2800-4 - Advanced Math (38 contact hours)

handouts that begin with 272-14

Advanced Math: This course is the 4th in a series, and is designed to increase your efficiencies in math skills and concepts that are necessary in shop activities. It includes more complex applications, such as the use of the law of sines and the law of cosines.

NTMA-U 4: 2900-4 - Quality Control / SPC / Inspection (38 contact hours)

No Textbook

Quality Control / SPC / Inspection: This course introduces the area of quality control of mechanical parts in the industry. You will learn the skills necessary to properly inspect parts by using the skills you have obtained through blueprint reading of geometric dimensioning and tolerancing, as well as inspection tools and equipment. You will learn why these skills are necessary in the industry and how to properly apply them on the job. This course familiarizes students with the applications of statistics in process and quality control function. Upon completion, the student will be able to verify part dimensions, location, and orientation of finished products and parts.

Series 5

NTMA-U 5: 2420-5 - Manufacturing Technology (38 contact hours)

No Textbook

Manufacturing Technology: This course focuses on the machining of various metals. It will review the variations of speeds and feed rates for different types of material, as well as the use of various cutting tools.



Series 5 (continued)

NTMA-U 5: 2500-5 - GDT (38 contact hours)

Textbook: Intro to Geometric Tolerancing and Dimensioning (same textbook as Series 3 NTMA-U 1500)

GD&T: This course focuses on how to interpret and apply the concepts of geometric dimensioning and tolerancing to engineering drawings. Topics covered include fundamentals of symbols, terms used in application, positional tolerance applications, data frame and conversion tables.

NTMA-U 5: 2800-5 - Advanced Applied Math (38 contact hours)

Handouts begin with Problem 297-74

Advanced Applied Math: This course is the 5th in a series, it covers applied mathematics that are required to solve for unknown surfaces found on advanced blueprints

Series 6 (select 3 courses for Apprenticeship Training requirements)

NTMA-U 6: 2420 - 6 Jig and Fixture (38 contact hours)

Textbook: Basic Jig & Fixture

Jig and Fixture: This course covers the necessary information for the designs of jigs, fixtures and dies. It includes the use and application of bushings, locating devices and work holding devices used in jigs, fixtures and dies.

NTMA-U 6: 2410-6 – Moldmaking (38 contact hours)

Textbook – Moldmaking

Moldmaking: This course covers the principles of injection molding, including the molding press and how it works, the basics of an injection mold, and mold components. It explains the heating of cooling of molds and the runners, gates, venting and hot runner systems. It also describes the various methods of producing cavities, cores and various mold components.

NTMA-U 6: 2800-6 - Advanced Math (38 contact hours)

Handouts begin with Problem 275-22

Advanced Math: This course is the 6th in a series, it covers applied mathematics that are required to solve for unknown surfaces found on advanced blueprints.

NTMA-U 6: 1300-6 – Diemaking (38 contact hours)

Textbook: Basic Diemaking

Diemaking: This course provides specialized instruction in die construction, processes and types related to automated manufacturing technology. This is an introduction to the basic types and construction of metal stamping dies. Topics include types of stamping dies and how they process sheet metal, standard die components, concepts of die clearances, die making terminology and materials used in stamping die construction.

NTMA-U courses are offered to all St. Louis NTMA Members, St. Louis Associate Members and Educational Members *FREE* as part of their NTMA membership. For more details on NTMA-U or to enroll in a course contact St. Louis NTMA ▪ www.stlouis-ntma.org ▪ ntmastl@aol.com ▪ (314) 378-1293