



## “Web-based module training”

Modules are self-paced and interactive.

- Each module takes approximately 30-40 hours to complete.
- Instruction includes quizzes to progressively test the user’s understanding.
- Certificates with the accumulated grade are downloadable upon successfully completing the module.
- Content introduces basic concepts, sound manufacturing practices, practical uses, key topics that are required to become successful in the manufacturing trade.
- The new modules introduce a select training format for users, from the basics of manufacturing technology courses, to Advanced Manufacturing Procedures

Two options are available

- 1) Select “Individual modules” that are identified by the company to fulfill individual workforce development needs.
- 2) The precision Machine Trades Apprenticeship program that fulfills the 600 contact hours of Technical Related Training requirements ( please note that: 8,000 hours of shop time is also required which equals 2,000 hours per year for four years) for the “National Tooling and Machining Association Journeyman’s Credentials that are also tracked towards NIMS credentials, and/or the Federal Bureau of Apprenticeship / DOL - Certified Journeyman’s Status,– (Participants can also earn 21 articulated education credits with the completion of all 18 modules).

For more information please contact NTMA- Vice President – Ken McCreight at 216-264-2834 or E-mail: [kmccreight@ntma.org](mailto:kmccreight@ntma.org)

### Module training

**NTMA 900 - Dimensional Metrology: Applications and Techniques** - This course presents the science of measurement. It is intended for anyone who wishes to learn the basic tools and techniques required for Metrology. The course covers a variety of related topics that apply to measurement principles with “best practices” and presents fundamental considerations for the proper selection, application, and care of typical precision measurement systems.

Course objective - This on-line course will provide opportunities that demonstrate the proper use of common hand-held measuring tools, it will help students to develop awareness and understanding of shop safety, gain knowledge and the basic skills that are necessary for manufacturing measurement applications. Technical manufacturing terms and principles will be covered in depth. Measurement applications for Geometric Dimensioning and Tolerancing (GD&T) and assessment of measurement quality, and quality control will be introduced. This course will cover the basic uses and interpretation of geometric dimensions and tolerances as specified for machine trade blueprint.

This course also includes introductory to probability, universal unknown errors and random variables, basic SPC, and basic statistics.

**NTMA 7300 Advanced Diemaking** – This course is a study of Die to Press relationship / Automatic Feed systems / Inverted Die / Compound Dies / Progressive Dies using the Blank-through principle / Progressive Dies using the Chop-off system / Progressive Dies using the Parting Principle / Secondary Operation's / Drawing Operations – Draw dies / Drawing Operations – Redraw Dies- Combination Dies // Drawing Operations – Computation Processes.

### **Modules tracked towards workforce development / apprenticeship**

**NTMA 1000 Basic Math** – Addition and Subtraction of fractions / Fraction to Decimal Conversions / Intro to Geometry / Calculating cutting planes.

**NTMA 1100 Basic Blueprint** – A study that stresses the relationship of engineering drawings as related to the manufacture of a working part. Topics of study include lines, views, dimensioning, constructing a sketch of a workable engineering drawing, auxiliary sections, symbols, and broken lines.

**NTMA 1110 Basic Shop Technology** – Safety / Cutting Tools / Provides skills in layout techniques / Into to Inspection and Quality Control / Abrasives – Grinding / Clamping / requires student to understand Shop Safety practices / Included are all work necessary to layout an actual part.

**NTMA 2110 Manufacturing Applied Intermediate Math** – Bolt hole circles/ location of surfaces related by non-right angle triangles / and points of tangency.

**Intermediate Blueprint Reading** - Overview and understanding actual shop prints with GDT feature control frames.

**NTMA 2200 Intermediate Shop Technology** - Presents a foundation for study of manufacturing methods, processes, related equipment, and tools of industry, , job planning, feeds and speeds, layout tools and procedures, hand tools and bench work, metal cutting saws, drilling machines, lathes, milling machines, jig bore and jig grinder, surface grinder, E.D.M, and abrasives.

**NTMA 3500 Manufacturing Technology Skills** - The advanced study of the relationship of engineering drawings to applications of machine shop production of precise parts, dies, and mold components to provide students with theory on use of Coordinate Measuring Machine (CMM) for machine tool trades. Understanding the use of machine shop engineering drawing mathematics as used in development and production of a piece part from a print in machine shop will be stressed. Application of engineering drawing skills on projects made in shop. Emphasis will be placed on geometric dimensioning. Students will learn to read and comprehend advanced engineering drawings from various industries.

**NTMA 3600 Master CAM** - An introduction to computer systems and computer-aided drafting software as tools used to produce engineering drawings. Keyboarding and computer operating skills are overlaid with software commands. Command topics include line coordinate systems, circles and arcs, geometry creation, text styles, editing geometry and text, controlling drawing display, drawing aids, layers, blocks, hatching, and dimensioning.

**NTMA 3700 - Manufacturing Technology** - The advanced study of the relationship of engineering drawings to applications of machine shop production of precision parts, dies, and mold components to provide students with theory on use of Coordinate Measuring Machine (CMM) for machine tool trades. Understanding the use of machine shop engineering drawing mathematics as used in development and production of a piece part from a print in machine shop will be stressed. Application of engineering drawing skills on projects made in shop on CNC's. Emphasis will be placed on geometric dimensioning. Students will learn to read and comprehend advanced engineering drawings from various industries.

**NTMA 4420 Specialty Materials** - Advanced study of relationship of materials, fixtures, and special machining operations as they are related to applications of machine shop production of precise parts, dies, and mold components. Provides theory on use of machining exotic materials, hard turning, machining of plastics, 4th and 5th axis programming, coolants and specialty inserts. Included are practical applications and machine shop mathematics formulas used in fixture and holding device design. Provides knowledge of castings, weldments, tool coatings and manufacturing methods that are becoming part of today's technology such as "waterjets and lasers". Student will learn advanced metallurgy processes, and standard procedures for trouble shooting all types of manufacturing projects.

**NTMA 4600 CNC- Programming Operations-** Instruction in tool path generation, local CNC programming and 2D simulation calculation of speeds; feeds and tool offset; establishment of work zero and tool home positions. Manual programming of computer numerical control (CNC) machines using G-codes; tooling and set-up of CNC lathes and milling machines for machining operations; verification of toolpaths by simulation; operating CNC machines to produce mechanical parts.

**NTMA 4800 Quality Control – SPC / Inspection**

A comprehensive coverage of modern quality control technique in inspection that helps to control the quality of manufacturing products by helping to fix the sources of defects immediately, methods to improve productivity, reduce defect rates, and reduce re-work and waste, this study will include the design of statistical process control systems, acceptance sampling, and process improvement.

**NTMA 5500 GDT** Study of relationship of engineering drawings to applications of manufacturing part for CNC machines, screw machines, mold, and die components. Topics include dimension and tolerance; form tolerances; calculation of tolerance using equations; calculation of tolerances using standard shop formula's; profile and run out tolerances; location

tolerances; geometric dimensioning; geometric applications; transferring engineering drawing using computer graphics and development of engineering drawing with computer.

**NTMA 5210 Advanced Applied Math** This course is an advanced study of math that would be required to solve for unknowns typically found on working drawings. This math requires the use of Law of Sines and Law of Co-Sines

**NTMA 5720 Advanced Manufacturing Technology** - Advanced study of manufacturing methods, processes, related equipment, and tools of industry. Topics include practices of manufacturing hard milling products, machining of Aluminum, Smart Tool, Tool Balancing, Dimensional Tool Compensation, Get Rid of Rust, Innovative Fixturing.

**NTMA 5901 – Advanced Manufacturing Processes** - This course will enable students to develop short and long-range plans to effectively accomplish organizational goals. Through the use of terminology, exercises and case studies, students will be able to give a critical appraisal of real life situations involving manufacturing organization, staffing and motivating others. The student will also learn tools to aid in problem solving, teamwork, valuing diversity and coping with change. The principals learned in this course will allow the student to effectively work with and through others in an organization. The principals are relevant to any type of manufacturing organization or group, empowering the student to lead others, negotiate, embrace change and better understand the role of business in society.

**NTMA 6300 Diemaking** - Principles of blanking and/or piercing dies; bending; screw and dowel holes; die life; punches; pilots; die block construction; strippers and stock guides; shredders and knockouts; nest gages; pushers; die stops; stock material utilization; strip layouts; and die sets. Study includes techniques and theory of building stamping dies with topics including cutting and forming operations; primary die components; internal parts of complete die.

**NTMA 6410 Moldmaking** - The study of fundamentals of mold construction, processes and construction of plastic molds such as compression, transfer, pressure molding of non-ferrous alloys, rubber molds, dies cast molds, and injection molds. This study includes foundations of mold construction, depending on design of part, material used, equipment available, and ingenuity of moldmaker.

**NTMA 6500 Jig and Fixture / Workholding Vice / Locating Devices / Clamping and Ejectors / Bushings**

**NTMA 6800 Advanced Math II** - This course is only for those experienced at applied shop math. The course focuses on dimension unknowns found on shop prints that require the use of advanced applied mathematics.