Massachusetts Department of Elementary & Secondary Education
Career/Vocational Technical Education

Learning that works for America CTE

Vocational Technical Education Framework

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Manufacturing, Engineering & Technology Services Occupational Cluster

Machine Tool Technology (VMACH)

CIP Code 480501

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Massachusetts Department of Elementary and Secondary Education
Office of Career/Vocational Technical Education
75 Pleasant Street, Malden, MA 02148-4906
781-338-3910
www.doe.mass.edu/cte/

This document was prepared by the
Massachusetts Department of Elementary and Secondary Education
Mitchell D. Chester, Ed.D. Commissioner

Massachusetts Department of Elementary and Secondary Education
75 Pleasant Street, Malden, MA 02148-4906
Phone 781-338-3000 TTY: N.E.T. Relay 800-439-2370
www.doe.mass.edu

Industry Recognized Credentials (Licenses and Certifications/Specialty Programs)

Manufacturing Advancement Center Workforce Innovation Collaborative (MACWIC) Certification

All students will be eligible for level 1&2 testing, at what time students are tested will be decided by their teachers. MACWIC is presently revising/developing exams for Level 1 & Level 2 certificate testing, the exams are aligned with the new CVTE core frameworks and a post-secondary pathway. The exams will be proctored by a local industry representative (i.e. Program Advisory Committee (PAC) member or other local MACWIC representative). MACWIC is planning to provide the exam and issue certifications to students beginning in School Year 2012-2013.

Applied Manufacturing Technology Certification Pathway

Level 1

Shop Math: Students will be able to understand basic math concepts and terms as well as recognize the symbols that represent them. They will be able to solve basic problems with and without the use of a calculator. Students will be able to compute basic mathematical equations required to perform related tasks on the shop floor.

Blueprint Reading: Students learn how to read and interpret technical drawings (blueprints). They gain a fundamental understanding of the critical role the technical drawing plays with respect to work process, quality control and a product's critical features.

Metrology: Attain a basic level of competency in the use of precision measurement tools that will allow them to monitor and validate the production outputs related to the precision parts making process. Students gain a solid foundation of knowledge and skill in performing measurements and calculations. The student learns to use precision measurement tools, such as steel rule, tape measure, protractor, micrometer, height gage, calipers and dial indicators. Students gain proficiency selecting the proper tools for inspecting parts and in preparing quality control inspection reports.

Team Involvement Problem Solving: An accelerated skill building workshop that trains participants how to effectively use a structured team-based approach to find and eliminate the root cause of costly performance problems.

Work Readiness: Skills including world-of-work awareness, labor market knowledge, occupational information, values, clarification and personal understanding, career planning and decision making, and job search techniques (resumes, interviews, applications, and follow-up letters). They also include positive work habits, attitudes, and behaviors such as punctuality, regular attendance, presenting a neat appearance, getting along and working well with others, exhibiting good conduct, following instructions and completing tasks, accepting constructive criticism from supervisors and co-workers, showing initiative and reliability, and assuming the responsibilities involved in maintaining a job.

Level 2

(MassMEP's Level 2 training has the following additional credentials: MA Division of Apprentice Training pre-apprentice certificate, 3 elective credits in Quinsigamond Community College's Manufacturing Technology A.S. degree program)

Safety: Students learn the fundamentals of machine shop safety. Students learn the importance of recognizing critical safety features related to the equipment they will ultimately work with. They will be oriented to location of exits, fire extinguishers, fire blankets, eye wash stations, emergency stops and panic buttons. The training covers the importance of ear and eye protection. Students are oriented to the requirements of injury and accident reporting. A safety test is used to assure that the student has successfully absorbed the material and training.

CNC Milling: CNC milling technology introduces students to fundamentals of CNC (Computer Numerical Control) milling. Students work on a variety of machining applications learning fundamentals by working with industrial based equipment to machine complex parts. Students gain hands on experience in machine set-up, cutting tool function, tool path simulation and machining center operation.

CNC Turning: CNC turning technology introduces students to the fundamentals of CNC turning working with industrial based equipment to machine parts. The modules and related activities challenge students to develop a basic program. Ultimately the students will be machining complex precision parts.

CNC Programming: CNC programming compliments the CNC turning and CNC milling modules. Students learn new G&M code commands, enabling them to write and understand basic NC programs. The students use software that provides them an animated simulation of the machining process.

GD&T: Present an overview of Geometric Dimensioning and Tolerancing to familiarize the student on its use and application on the shop floor. The materials are based on the ASME Y14.5M – 1994 standard.

Other

Reference Materials

- Machine Trade Print Reading: Michael A. Barsamian- Mechanical Drafting, Print Reading Instructor, Gateway Technical College, Richard A. Gizelbach, CNC Instructor, Gateway Technical College
- CNC Programming: Lathe, By: Matthew Manton and Duane Weidinger
- Machine Fundamentals, By: John R. Walker

Bibliography

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Related National, Regional, and State Professional Organizations

- MACWIC – Manufacturing Association Workforce Innovation Collaborative
- NTMA – National Tooling and Manufacturing Association
- BTMA – Boston Tooling and Manufacturing Association
- SME – Society of Manufacturing Engineers

Student Organizations

- Skills USA www.maskillsusa.org

Selected Websites

- http://www.macwic.org/