

# MANUFACTURING TECHNOLOGIES (MFG)

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## **MFG 0500 Skill up for Manufacturing (0 Credits)**

The Introduction to Manufacturing course is designed to teach the foundational concepts within precision manufacturing and the supportive knowledge required for an entry level position. The course provides theoretical concepts as well as the hands-on skills components in the state-of-the-art manufacturing laboratory. Methods in: • Mathematics o Arithmetic, Tolerance Calculations, Applied Manufacturing Word Problems • Blueprint Reading o Orthographic Projection, Title Blocks, Alphabet of Lines, Dimensioning and Tolerances Comprehension • Semi-Precision and Precision Measurement o Scales, Calipers, Micrometers, Height Gage, Surface Gage, Gage Blocks, Go/No-Go • Safety o Safe Machine Operation, Material Safety Data Sheets (MSDS), Personal Protective Equipment (PPE), Lockout Tagout Procedures • Machine Technology o Machine Operation, Trimming a Vise, Digital Read-Outs, Tool Selection, Squaring a Block, Drilling, Turning, Facing, • CNC Technology o Powering On/Off, Short-Run Production, Wear Offsets • Measurement, Material and Safety NIMs o Applied Mathematics, Filing, Fits, GD&T, Inspection, Machine Maintenance, Machine Safety, Machining Applications, Materials, Measurements, Print Reading, Shop Safety *Additional fees may apply*

## **MFG 0501 Manufacturing Processes (0 Credits)**

The Manufacturing Processes program was specifically designed to address manufactures with employees you may not be familiar with machining or the associated processes. It will provide foundational knowledge of common shop floor operations for those who work in manufacturing in non-machining roles.

## **MFG 0503 Skill up Manufacturing with Plastics (0 Credits)**

Enhance manufacturing skills with a focus on plastic materials, covering processing, molding, and fabrication techniques.

## **MFG 0504 MTC Introduction to Software Applications (0 Credits)**

Explore the fundamentals of software applications used in manufacturing, gaining proficiency in tools essential for the industry.

## **MFG 0505 MTC Manufacturing Shop Safety (0 Credits)**

Prioritize safety in a manufacturing environment, covering shop safety protocols and practices to ensure a secure workplace.

## **MFG 0506 MTC Manufacturing Processes (0 Credits)**

Gain insight into various manufacturing processes, from raw materials to the final product, understanding the intricacies of production.

## **MFG 0507 MTC Electrical Engineering Technology (0 Credits)**

Dive into electrical engineering technology within the manufacturing context, covering principles and applications relevant to the field.

## **MFG 0508 MTC Basic Blueprint (0 Credits)**

Develop a foundational understanding of blueprint reading in the manufacturing industry, a crucial skill for interpreting design specifications.

## **MFG 0509 MTC Workplace Skills (0 Credits)**

Enhance essential workplace skills tailored for the manufacturing sector, covering communication, teamwork, and problem-solving.

## **MFG 0510 MTC Material Science (0 Credits)**

Explore the science of materials used in manufacturing, gaining knowledge about material properties, selection, and applications.

## **MFG 0511 MTC Hydraulics & Pneumatics (0 Credits)**

Delve into the principles of hydraulics and pneumatics, crucial components in manufacturing systems, and machinery.

## **MFG 0512 MTC Lean Manufacturing (0 Credits)**

Learn about Lean Manufacturing principles, focusing on efficiency, waste reduction, and continuous improvement in the production process.

## **MFG 0513 MTC Environmental Regulations (0 Credits)**

Understand and comply with environmental regulations relevant to the manufacturing industry, ensuring sustainable and responsible practices.

## **MFG 0514 MTC Personal Finance (0 Credits)**

Equip individuals in the manufacturing sector with personal finance management skills, covering budgeting, savings, and investment.

## **MFG 0515 MPI Outside Machinist (0 Credits)**

Of all the installation trades used aboard ship, none is more important than the outside machinist (OSM). The OSM is basically a machinist who works outside or away from the shop. Not only must they perform machinist's jobs (using portable power and machinist tools), but they must also fabricate, install, and repair ship machinery and components aboard ship. Since most OSM jobs are performed aboard ship, the mechanic's knowledge must extend beyond the normal scope of most trades. They must be thoroughly familiar with all areas of a submarine and with submarine terminology. Training hours will transfer to Electric Boat Apprenticeship program. Curriculum for this course covers topics such as: • Blueprint Reading • Lines of the Ship • Shop Math • Precision Measurement • Hand Tools • Benchwork and layout • Grinding/Surface Prep • Safety (includes OSHA 10) • Drilling and Tapping • Dial Indicators & Shaft Alignment

## **MFG 0516 MPI Design Engineering (0 Credits)**

This course will give you the basic skills to design and build in the 3-dimensional environment of NX, the 3D software utilized in many defense manufacturing companies. It will provide you with all the tools necessary to become an entry level designer and could easily be applied to other software programs like SolidWorks. Along with supporting topics like blueprint reading, manufacturing math and technical writing, a graduate of this program will qualify as an entry level designer in any manufacturing company in the area. Curriculum for this course covers topics such as: • Blueprint Reading & Drafting • Manufacturing Math • 3D Design Software (NX) • Technical Writing • Workplace Skills • Lean Manufacturing • Precision Measurement

## **MFG 0517 MPI Introduction to Planning & Logistics (0 Credits)**

This course will familiarize you with the basics of the Planning trade, incorporating logistics and all necessary core skills to help you become the best entry level Planner at any Manufacturing facility or related field. The course will convey basic trade knowledge, production scheduling, work package development, material control, and change orders. Other foundational workplace skills and production readiness will prepare the new Planner for a successful start in this trade. Curriculum for this course covers topics such as: • Blueprint Reading & Lines of the Ship • Safety • Intro to Software Applications • Composition & Tech Writing • Public Speaking • Operations Management • Statistics • Operational Management Capstone

## **MFG 0518 MPI Introduction to Plastics (0 Credits)**

Gain an introduction to the world of plastics in manufacturing, covering properties, processing, and applications.

**MFG 0519 MPI Shipfitting (0 Credits)**

Shipfitting is a trade that is specific to shipbuilding, i.e. Electric Boat, but has many transferable skills to other trades in the metal or fabrication fields. In this trade you will assemble and install various equipment on and off the submarine, similar to a carpenter working with wood. It requires being able to read and interpret blueprints, as this is one of the most important skills. You will determine locations and mark them for future installation of equipment as well as completing the install. You work with other trades, sometimes prepping things for them to be completed by them. It can sometimes be a physically demanding job. Curriculum for this course covers topics such as: • Blueprint Reading & Lines of the Ship • Weld Symbols & Joint Design • Measurement • Shop Math • Hand Tools • Layout • Thermal Cutting (Oxyfuel, Plasma-Arc) • Grinding/Surface Prep • Safety

**MFG 0520 MPI Welding (0 Credits)**

Welding is a very skilled trade that requires a steady hand and strong discipline. A dedication to work procedures and acceptance criteria are needed to maintain a strong weld that is critical to the strength of the piece being welded, sometimes as critical as life or death. Certified welders are respected as a key trade and an important part of the manufacturing process. This trade is suffering from a large turn over from an aging population as well and is looking for people that are dedicated to learning the fine art of welding. Curriculum for this course covers topics such as: • Weld Symbols & Joint Design • Grinding/Surface Prep • Thermal Cutting (Oxyfuel, Plasma-Arc) • GMAW (MIG) • SMAW (Stick) • Welder workmanship • Measurement • Hand Tools • Layout & fit up (for non-EB classes) • Blueprint Reading • Lines of the Ship • Safety

**MFG 0521 MPI Introduction to Manufacturing (0 Credits)**

Introduce individuals to the broader field of manufacturing, covering basic concepts and processes.

**MFG 0522 MPI Introduction to Machine Operator (0 Credits)**

This course will introduce you to the manufacturing trade as an entry level employee in production, fabrication, machine operator, or similar areas. You will learn the basics of mechanics, precision measurement, material preparation including cutting, deburring, drill/tap, and assembly. Procedural compliance is heavily stressed to make your understanding of the manufacturing process complete. Lathes and Mills will also be utilized to acquaint you with precision machining and assembly. Curriculum for this course covers topics such as: • Blueprint Reading • Semi precision & Precision Measurement • Introduction to Mills/Lathes • Manufacturing Hand Tools • Layout • Metal Cutting • Sheet Metal Bending • Safety (Includes OSHA 10) • Drilling & Tapping • Riveting • Procedure Compliance • Employability

**MFG 0523 MPI Inside Machinist (0 Credits)**

Explore the role of an inside machinist in manufacturing, covering machining techniques and equipment operation.

*Additional fees may apply*

**MFG 0524 MTC Manufacturing Math (0 Credits)**

Develop mathematical skills tailored for manufacturing applications, covering calculations and problem-solving specific to the industry

**MFG 0526 MTC Alg and Trig (0 Credits)**

Build a foundation in algebra and trigonometry relevant to manufacturing, applying mathematical concepts to practical scenarios.

**MFG 0527 MTC Labor History (0 Credits)**

Explore the history of labor in manufacturing, understanding the evolution of work, rights, and conditions in the industry.

**MFG 0528 MTC Strength of Materials (0 Credits)**

Gain an understanding of the strength and properties of materials used in manufacturing, crucial for designing and testing components.

**MFG 0529 MTC Lathe I (0 Credits)**

Learn the basics of operating a lathe machine, a fundamental skill in precision machining.

**MFG 0530 MTC DC Circuits Lecture MTC DC Circuits Lecture MTC DC Circuits Lecture (0 Credits)**

Understand the principles of direct current (DC) circuits, essential knowledge for roles involving electrical systems in manufacturing.

**MFG 0531 MTC DC Circuits Lab (0 Credits)**

Apply theoretical knowledge in a hands-on laboratory setting, gaining practical experience in working with DC circuits.

**MFG 0532 Plastics I (0 Credits)**

This course provides students with a solid foundation in the field of plastics, covering essential topics ranging from basic chemistry to the practical aspects of working with plastics in manufacturing processes. Participants will gain a comprehensive understanding of the properties, behavior, and applications of various plastic families. Learning Outcomes: • Review safety topics. • Gain an understanding of polymers: chemistry of plastics, Thermoplastics, and Plastic Families. • Review the components of a molding machine and how it works. • Understand the process of injection molds and material handling. • Review Extrusion, Foam, and Compression processes.

*Additional fees may apply*

**MFG 0533 Plastics II (0 Credits)**

This course is designed to provide students with a comprehensive understanding of plastics processing with a focus on injection molding and the practical skills necessary for successful plastics manufacturing. The course combines theoretical knowledge with hands-on experience and general exposure to different manufacturing processes including extrusion, compression molding, and foam packaging production. By the end of this course, students will have gained a fundamental understanding of the various processes as well as a more detailed understanding of the injection molding process, from mold setting to process development. They will possess the necessary skills to troubleshoot defects and optimize the molding process. This course equips students with valuable hands-on experience and theoretical knowledge to excel in the field of plastics manufacturing. Learning Outcomes: • Review safety topics. • Review Injection Mold Processes: Mold Setting. • Understand the basics of scientific molding: Viscosity Curve, Cavity Balance, and Gate Freeze. • Learn the features of complex parts including design considerations, shrink, defects, and troubleshooting. • Participate in hands-on learning experiences and field trips to include disassembling, assembling, hanging, starting a machine, and developing a process.

*Additional fees may apply*

**MFG 0534 MPI Advanced Inside Machinist (0 Credits)**

Advance your skills as an inside machinist, covering complex machining techniques and advanced equipment operation.

**MFG 0535 Uniquely Able (0 Credits)**

Create an inclusive environment in the manufacturing sector by addressing the unique abilities and talents of individuals with diverse needs.

**MFG 0536 Advanced Manufacturing Systems Certificate (0 Credits)**

Certificate training for incumbent workers at CT Manufacturing Company.  
*Additional fees may apply*

**MFG 0537 Optics Fabrication & Metrology (0 Credits)**

This six-month non-credit certificate program trains participants in the fabrication, testing, and maintenance of optical components and optical systems for entry-level optics technician roles. It suits both newcomers and those already working in related fields, like optical coating or metrology technicians, seeking to enhance their skills.

*Additional fees may apply*