



Course: **Machine Shop 101 - A Practical Approach**

Contact Hours: **30**

Pre-requisite: **Basic understanding of mechanical principles**

Abstract

Machine Shop 101 - A Practical Approach is an introductory training program designed to provide participants with fundamental knowledge and practical skills, essential for working in a machine shop environment.

This course covers basic concepts, safety protocols, and hands-on training in operating common machine shop equipment.

Target Audience

- Student pursuing education or careers in machining and manufacturing
- Persons employed in manufacturing / factories seeking to enhance their skills or transition into machine shop roles
- Person interested in working in a machine shop environment
- Individuals new to machine shop environments

Learning Outcomes

On completion of this course, learners will be able to:

1. Understand the principles of machine shop operations
2. Identify and demonstrate safe working practices in a machine shop environment
3. Learn the basic functions and applications of common machine shop equipment
4. Develop hands-on skills in operating machinery such as lathes, milling machines, use of hand tools, bench fitting and drilling operations
5. Interpret engineering drawings and blueprints relevant to machining tasks
6. Acquire knowledge of material properties and appropriate machining techniques
7. Practice precision measurement techniques using various tools and instruments
8. Troubleshoot common issues encountered during machining processes

Course Content

- 1. Module 1: Introduction to Machine Shop Operations**
 - a. Overview of machine shop environment
 - b. Importance of safety in machine shops
 - c. Introduction to basic machine shop terminology
- 2. Module 2: Safety in the Machine Shop**
 - a. Understanding safety protocols and procedures
 - b. Personal protective equipment (PPE) requirements
 - c. Hazard identification and risk mitigation strategies
- 3. Module 3: Machine Shop Equipment and Tools**
 - a. Overview of common machine shop equipment (lathe, milling machine, Drill press, etc.)
 - b. Functions and applications of each machine
 - c. Introduction to cutting tools, fixtures, and work holding devices
- 4. Module 4: Machining Fundamentals**
 - a. Reading and interpreting engineering drawings and blueprints
 - b. Introduction to machining processes (turning, milling, grinding etc.)
 - c. Basics of cutting speeds, feeds, and cutting parameters
- 5. Module 5: Material Properties and Machining Techniques**
 - a. Understanding different types of materials used in machining
 - b. Selection of appropriate cutting tools and techniques for specific materials
 - c. Heat treatment and its effects on machinability
- 6. Module 6: Precision Measurement**
 - a. Overview of measurement tools and instruments (Vernier callipers, micrometres, gauges, etc.)
 - b. Techniques for accurate measurement and verification of dimensions
 - c. Importance of tolerances in machining processes
- 7. Module 7: Hands-On Training**
 - a. Practical exercises on operating lathe, milling machine, bench fitting and drilling operations
 - b. Application of machining techniques learned in previous modules
 - c. Troubleshooting common machining issues
- 8. Module 8: Final Assessment and Review**
 - a. Evaluation of knowledge and skills acquired during the course
 - b. Review of key concepts and techniques
 - c. Feedback and recommendations for further development