

# Introduction to Manufacturing Course Curriculum

## Skill Up for Manufacturing

**Course Description:** This course will familiarize you with the basic mechanic and manufacturing skills and engineering knowledge required for new hires as an entry level employee in a manufacturing or related field. The course will convey basic trade knowledge, workplace skills and production readiness.

**Course Layout:** Students are taught through a variety of methods including Online Based instructions, Instructor lectures, Hands on Labs, and a variety of video and personal experiences. Grading is broken down into the following categories:

• Tooling U	25%
• Quizzes /Short Test	30%
• Applied Lab Evaluations	30%
• <u>Final Exam</u>	15%
<b>TOTAL</b>	<b>100%</b>

**Course Topics:** The topics include both general shop skills needed for a beginner level helper as well as apprentice level skills needed to start working independently as a semi-skilled manufacturing employee. We cover the 51 objectives listed on the reverse page by incorporating lesson in the following topics.

- Shop Math Fundamentals
- Semi-precise/precise measurement
- Micrometer Applied Skills
- Employability Soft Skills
- Applied Blueprint Reading Fundamentals
- Metal Cutting Fundamentals
- Drilling/Tapping Fundamentals
- Layout Fundamentals
- Shaft Alignment Fundamentals
- Procedural Compliance
- Lock Wire Proficiency

**Online Learning:** The following are topics used as online learning areas that are incorporated into the curriculum. Tooling U/SME is a growing company that highlights apprenticeship and competency based learning for the manufacturing industry.

- Intro Assembly 100
- Intro to Fastener 110
- Understand Torque 210
- Basics of Tolerance 121
- Blueprint Reading 131
- Basics of Measure 101
- Thread Inspection 151
- Math Fund 101
- Math Fractions 111
- Trig 201
- Bench work and layout operations 210
- Thread Inspection - 250

## Objectives:

1. Read and interpret blueprints
2. Describe tools and methods for work piece layout, bluing, measuring, scribing lines, and marking holes
3. Describe tools and methods for hand cutting material with a hack saw, including hacksaw parts, description, blade type, cutting edge alloys, and tooth pitch
4. Describe the different types of files and methods for filing, and drawfile.
5. Describe types of hand reamers, and methods for precision sizing of hole, including the use of hand reams, hand chucks, and drivers.
6. Describe the different types of de-burring tools, and techniques for de-burring of parts with hand tools.
7. Describe the various types of tap and dies, and the proper hand use of taps and dies.
8. Identify common types of micrometers.
9. List the major components of micrometer.
10. Demonstrate how to take accurate reading with an outside micrometer.
11. Explain how to properly read the scale on an English scale micrometer, a metric scale, micrometer, and a Vernier micrometer.
12. Demonstrate how to take an accurate reading with an inside micrometer.
13. Demonstrate how to take an accurate reading with a depth micrometer.
14. Identify and describe the purpose of each of the following types of fixed gauges.  
Go No Go Gauge, Plug gauge, Thickness gauge, Screw pitch gauge, Radius gauge, Small hole gauge
15. List the main components of a dial indicator.
16. Explain how to properly read a dial indicator,
17. Describe how to measure run out
18. Demonstrate how to align rotating components.
19. Describe various types of indicators.
20. List the major components of a vertical band saw.
21. Describe different types of available band saw cutting blades.
22. Explain safety precautions taken when operating a drill press.
23. Describe various drill components and attachments.
24. Identify types of grinding wheels and compare their use.
25. Explain the basic steps for dressing a grinding wheel and profile - shaping a grinding wheel.
26. Describe the two basic techniques for grinding a part.
27. Identify safety equipment and best practices for safe grinder operation.
28. Outline the technique for grinding work piece parallel and to a specific size.
29. Utilize reading skills necessary to follow direction.
30. Apply and practice employability skill.
31. Comply with established safety protocols.
32. Complete work on time
33. Complete work within budgets.
34. Comply with safety regulations
35. Understand different types of torque wrenches (Click, dial dynamometer)
36. Perform practical demonstration of torque wrenches.
37. Lock wiring, Lock Tapping and Safety Cable
38. Terminology & Abbreviations
39. Acronyms
40. Work Packages
41. Math: Fractions, Decimals and Percentages
42. Rules and Measuring Scales
43. Dial Caliper
44. Bevel Protractor
45. MultiMike or Groove Micrometer
46. Micro finish Comparator
47. Telescoping (Snap) Gauges
48. Maintaining Tools and Calibration
49. GD&T: Terms and Concepts
50. GD&T: Symbols, Abbreviations etc.
51. GD&T: General Lesson(s)