

Manufacturing and Machine Technologies

The student will demonstrate safe workplace practices

- 1 Pass all machine safety tests
- 2 Demonstrate personal safety practices
- 3 Demonstrate lockout / tagout procedure
- 4 Demonstrate proper cleaning, storage, use and disposal of shop liquids
- 5 Demonstrate cleaning & maintaining of assigned equipment and work area

The student will demonstrate Mathematics skills

- 6 Add and subtract fractions
- 7 Convert fractions to decimals
- 8 Identify basic geometric outlines
- 9 Demonstrate knowledge of trig tables
- 10 Solve trig problems
- 11 Demonstrate use of hand held calculator
- 12 Solve problems from drawings
- 13 Demonstrate use of Machinery's Handbook

The student will demonstrate the use and care of measuring instruments

- 14 Read a scale to within 1/64 inch
- 15 Read a vernier scale to within .002 inch
- 16 Read micrometers to within .001 inch
- 17 Read a caliper to within .001 inch
- 18 Read a protractor to within one degree
- 19 Demonstrate use of a dial indicator
- 20 Demonstrate use of a test indicator
- 21 Demonstrate use and Assembly of Gage blocks
- 22 Demonstrate use of a sine bar
- 23 Demonstrate use of three wire method
- 24 Recognize surface finishes
- 25 Demonstrate use of a Coordinate Measurement Machine
- 26 Demonstrate use of a Optical Comparator

The student will be able to interpret blueprints

- 27 Produce a three view print of an object
- 28 Interpret drawing dimensions
- 29 Define symbols, notes and specifications
- 30 Establish tolerances
- 31 Interpret sectional and auxiliary views
- 32 Interpret Geometric Positioning & Tolerancing

The student will develop a complete project work plan

- 33 Prepare a bill of materials
- 34 Prepare a plan (or process) sheet including time and cost
- 35 Demonstrate basic understanding of Statistical Process Control

Student will layout a complete part per NIMS print

- 36 Demonstrate use of layout tools
- 37 Produce layout part per NIMS print

Demonstrate use of bench tools to produce part per NIMS print

- 39 Identify Machine Shop Hand tools
- 40 Demonstrate proper use of Hand tools
- 41 Demonstrate proper use of Tap & Die
- 42 Demonstrate proper use of Files

- 43 Demonstrate proper use of Hacksaw
- 44 Demonstrate proper use of Hand Reamers
- 45 Demonstrate proper use of V-blocks
- 46 Demonstrate proper use of Lay-Out tools
- 47 Select proper Finishing Techniques
- 48 Produce bench work part per NIMS print

The student will demonstrate the operation of horizontal & vertical band saws

- 49 Demonstrate proper feeds, speeds and blades
- 50 Adjust Guides
- 51 Install Blades
- 52 Weld Blades
- 53 Demonstrate proper clamping techniques
- 54 Saw to 1/32 of layout lines

The student will demonstrate the operation of a drill press

- 55 Perform a drilling operation
- 56 Perform a reaming operation
- 57 Perform a tapping operation
- 58 Perform a C'Boring, C'sinking, & Spot Facing operation
- 59 Demonstrate proper use of feeds and speeds
- 60 Sharpen a drill properly
- 61 Perform a set up and clamp work properly
- 62 Produce a conforming part per print

The student will demonstrate the operation of a lathe

- 63 Identify functions of various lathes
- 64 Face and C'drill stock
- 65 Perform facing, turning and boring operations
- 66 Perform a C'drilling, drilling, reaming, and tapping operation
- 67 Perform a grooving operation
- 68 Produce angles using the compound
- 69 Demonstrate setup & use of taper attachment
- 70 Demonstrate correct use of insert tooling
- 71 Demonstrate correct use of work holding devices
- 72 Produce a standard 60 degree internal & external thread (chasing)
- 73 Indicate round stock within .001 inch
- 74 Indicate square stock within .001 inch
- 75 Produce three basic lathe tools
- 76 Demonstrate proper use of feeds and speeds
- 77 Produce a diameter mounted between centers
- 78 Produce an eccentric turned diameter
- 79 Demonstrate proper lubrication and care of equipment
- 80 Demonstrate use of various tools and holders
- 81 Produce chucking part per NIMS print

The student will demonstrate the operation of milling machines

- 82 Demonstrate proper use of feeds and speeds
- 83 Demonstrate trimming for a vertical head w/n .002"
- 84 Demonstrate indicating a vise w/n .001"
- 85 Demonstrate proper use of HHS & carbide cutting tools
- 86 Demonstrate use of an edge finder
- 87 Produce square block
- 88 Perform slotting operation
- 89 Perform a drilling & C'boring operation
- 90 Perform a boring operation within .001 inch

- 91 Exhibit proper use of digital readout within .001 inch
- 92 Produce a drilled bolt hole circle
- 93 Exhibit proper use of a index fixture
- 94 Perform an angle cutting operation
- 95 Complete a pocket milling operation
- 96 Produce a keyway
- 97 Perform a sawing or slitting operation
- 98 Product milling part per NIMS print

The student will demonstrate the operation of a grinder

- 99 Demonstrate procedure to dress wheel (ped)
- 100 Demonstrate ring testing
- 101 Perform selection and mounting of wheels(surface)
- 102 Demonstrate grinding carbide tools(ped)
- 103 Demonstrate procedure to dress wheel(surface)
- 104 Produce a part ground flat w/n .001"
- 105 Demonstrate proper feed and speeds selection
- 106 Demonstrate proper clamping procedures

The student will demonstrate the basics of CNC machining

- 107 Write point to point program
- 108 Write circular program
- 109 Write canned cycle program
- 110 Write complete approved program from print
- 111 Edit program
- 112 Set up and operate machining center
- 113 Set up and operate CNC lathe
- 114 Produce completed part on CNC

The student will demonstrate Metallurgy processes

- 115 Demonstrate the case hardening process
- 116 Demonstrate the tempering process
- 117 Demonstrate the annealing process
- 118 Demonstrate physics of metal cutting
- 119 Exhibit need for different compositions of materials

The student will be familiar with occupations in the machining industry

- 120 Recognize classified ads for employment
- 121 Demonstrate knowledge of needs of industry
- 122 Perform an internet employment search
- 123 Complete Portfolio
- 124 Complete Mock Job Interview

PERSONAL QUALITIES

- 125 Work Effort
- 126 Safety Habits
- 127 Work Area Organization
- 128 On Task Behavior
- 129 Responsibility
- 130 Initiative
- 131 Team Work
- 132 Respect
- 133 Interpersonal Skills