



Experiential Learning Portfolio for 32420326 Machine Tool Operation 2

Student Contact Information:

Name: _____ Student ID#: _____

Email: _____ Phone: _____

*It is **required** that you speak with the Academic Dean or instructor who teaches this course prior to completing a portfolio.*

Before attempting to complete this portfolio, the following prerequisites and/or corequisites must be met: COREQUISITE: 32420325 Machine Tool Operation 1

Directions

Consider your prior work, military, volunteer, education, training and/or other life experiences as they relate to each competency and its learning objectives. Courses with competencies that include speeches, oral presentations, or skill demonstrations may require scheduling face-to-face sessions. You can complete all of your work within this document using the same font, following the template format.

1. Complete the Student Contact Information at the top of this page.
2. Write an Introduction to the portfolio. Briefly introduce yourself to the reviewer summarizing your experiences related to this course and your future goals.
3. Complete each "Describe your learning and experience with this competency" section in the space below each competency and its criteria and learning objectives. Focus on the following:
 - What did you learn?
 - How did you learn through your experience?
 - How has that learning impacted your work and/or life?
4. Compile all required and any suggested artifacts (documents and other products that demonstrate learning).
 - Label artifacts as noted in the competency
 - Scan paper artifacts
 - Provide links to video artifacts
 - Attach all artifacts to the end of the portfolio
5. Write a conclusion for your portfolio. Briefly summarize how you have met the competencies.
6. Proofread. Overall appearance, organization, spelling, and grammar will be considered in the review of the portfolio.
7. Complete the Learning Source Table. Provide additional information on the business and industry, military, and/or volunteer experiences, training, and/or education or other prior learning you mentioned in your narrative for each competency on the Learning Source Table at the end of the portfolio. Complete this table as completely and accurately as possible.

The portfolio review process will begin when your completed portfolio and Credit for Prior Learning Form are submitted and nonrefundable processing fees are paid to your local Credit for Prior Learning contact. Contact Student Services for additional information.

Your portfolio will usually be evaluated within two weeks during the academic year; summer months may be an exception. You will receive an e-mail notification regarding the outcome of the portfolio review from the Credit for Prior Learning contact. NOTE: Submission of a portfolio does not guarantee that credit will be awarded.

You have 6 weeks to appeal any academic decision. See your student handbook for the complete process to appeal.

To receive credit for this course, you must receive “Met” on 4 of the 5 competencies.

32420326 Machine Tool Operation 2, 4 Associate Degree Credits

Course Description: Students will be assigned basic, specifically designed projects that will be machined using the engine lathe, milling machine, drill press, and various saws. Students will also machine parts on conversationally-programmed CNC lathes and vertical mills. Students will be in a job-like setting. The capability and safe use of machine tools will be stressed.

COREQUISITE: 32420325 Machine Tool Operation 1.

If you receive credit for prior learning for this portfolio, you will also receive a “Met” score for the following **Technical Skills Attainment Program Outcomes** that are assessed in this specific course:

Introduction: Briefly introduce yourself to the reviewer summarizing your experiences related to this course and your future goals.

Competency 1: Analyze different manufacturing materials and processes

Criteria: Performance will be satisfactory when:

- learner identifies the machining process
- learner identifies materials and desired properties

Learning Objectives:

- a. Discuss standard machine tools
- b. Discuss computer numerical control machines (CNC)
- c. Analyze the classification system for metals
- d. Analyze the manufacturing systems
- e. Recognize the flexible manufacturing systems
- f. Recognize manufacturing cells
- g. Analyze dedicated manufacturing systems
- h. Analyze high-velocity manufacturing

Required Artifacts: Description of your experience with Competency 1.

Discussion with Instructor:

- **Manual Machine Tools**
- **CNC Machine Tools**
- **Metal Classification**
- **Manufacturing Systems**

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 2: Perform layout procedures

Criteria: Performance will be satisfactory when:

- learner prepares work for layout
- learner uses and cares for various types of surface plates
- learner identifies and uses the main basic layout tools and accessories
- learner will hold an accuracy of .007 inch

Learning Objectives:

- a. Analyze the layout of hole locations, slots, and radii
- b. Analyze the layout of a keyway on a shaft
- c. Identify a vernier height gage
- d. Analyze the layout of a casting having a cored hole
- e. Measure a layout using a vernier height gage
- f. Identify a surface gage
- g. Layout centerline and parallel lines
- h. Identify a hand scribe
- i. Analyze the use of a sine bar
- j. Analyze the use of precision gage blocks
- k. Demonstrate the layout of equally-spaced holes on a given diameter

Required Artifacts:

- **Example of manufactured parts that utilized basic layout processes. (Examples can be a hard part, picture of parts or a written description of the parts and the process used.)**
- **Discussion with the Instructor on the layout process used.**

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 3: Analyze hand tools and bench work

Criteria: Performance will be satisfactory when:

- learner selects various tools for holding, assembling, or dismantling workpieces
- learner properly uses these tools for holding, assembling, or dismantling workpieces
- learner selects and uses the proper hacksaw blade for sawing a variety of materials
- learner selects and uses a variety of files to perform various filing operations
- learner cuts internal and external threads using a variety of taps
- learner identifies, explains, and uses several types of hand reamers

Learning Objectives:

- a. Identify the machinist vise, with hard and soft jaws
- b. Use the common ball-peen hammer safely
- c. Use screwdrivers of a variety of shapes safely
- d. Use wrenches of various types and sizes safely
- e. Identify the hand hacksaw
- f. Analyze the use of the hacksaw
- g. Compare the pitch of hacksaw blades and their use
- h. Identify hand files and their use
- i. Analyze the degree of coarseness of the file
- j. Analyze drawn filing
- k. Identify the need for special files
- l. Identify rotary files and burrs
- m. Identify hand taps
- n. Measure the tap drill size
- o. Demonstrate tapping a hole with the use of a hand tap
- p. Analyze removing a broken tap
- q. Identify threading dies
- r. Differentiate a solid die from an adjustable split die
- s. Demonstrate threading with a hand die

Required Artifacts: Discussion with Instructor:

- **Identification of bench work tools.**
- **Demonstration of bench work processes.**

Suggested Artifacts: None

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 4: Analyze metal cutting technology

Criteria: Performance will be satisfactory when:

- learner defines the various terms that apply to metal cutting
- learner recognizes the three types of chips produced from various metals
- learner explains the factors that affect the machinability of metals
- learner identifies the applications of various types of cutting-tool materials
- learner describes the effect of cutting conditions on cutting-tool life
- learner selects the proper grade of carbide for various workpiece materials
- learner states the importance and function of cutting fluids

Learning Objectives:

- a. Analyze metal cutting terminology
- b. Identify the discontinuous (segmented) chip
- c. Identify plastic flow of metal
- d. Identify the continuous chip
- e. Identify the continuous chip with a built-up edge
- f. Analyze the grain structure of low-carbon machine steel
- g. Characterize the grain structure of high-carbon tool steel
- h. Analyze the grain structure of alloy steel
- i. Characterize the grain structure of cast iron
- j. Classify the grain structure of aluminum and copper-based alloys
- k. Analyze the effects of temperature and friction in the process of cutting metals
- l. Characterize cutting tool materials
- m. Characterize high-speed tool bits
- n. Characterize cast alloy toolbits
- o. Compare cemented carbide toolbits to carbide toolbits
- p. Analyze cutting tool nomenclature
- q. Describe tool life
- r. Analyze operating conditions
- s. Analyze depth of cut, feed rate, and cutting speeds
- t. Analyze general operating condition rules
- u. Utilize machining cost analyses
- v. Differentiate the various grades of carbide inserts
- w. Analyze coded carbide inserts
- x. Analyze the characteristics of a good cutting fluid
- y. Describe the functions of a cutting fluid
- z. Characterize the application of cutting fluids

Required Artifacts:

Discussion with instructor:

- **Chip formation**
- **Material composition**
- **Tool Theory**
- **Machining calculations**

Suggested Artifacts: None

Competency 4: Analyze metal cutting technology

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

Competency 5: Perform basic conventional machining operations

Criteria: Performance will be satisfactory when:

- learner performs basic conventional machining operations
- learner operates drill presses
- learner operates vertical milling machines
- learner operates metal turning lathe

Learning Objectives:

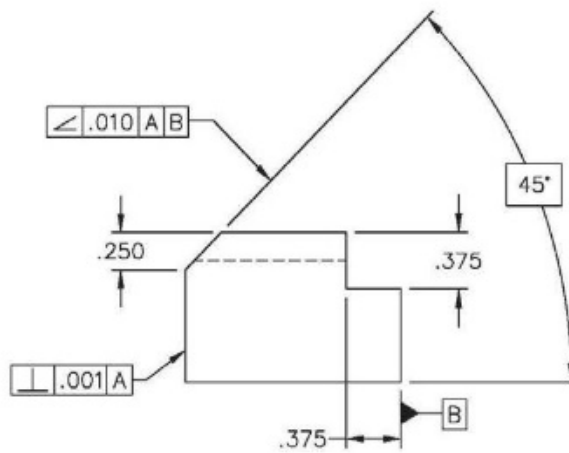
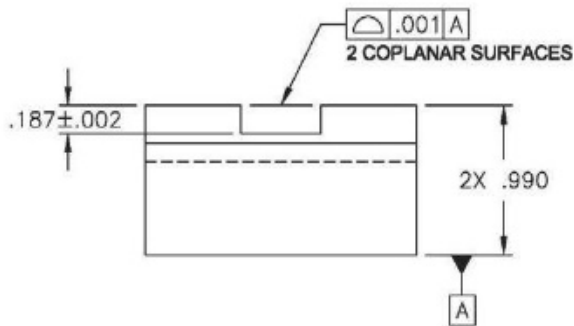
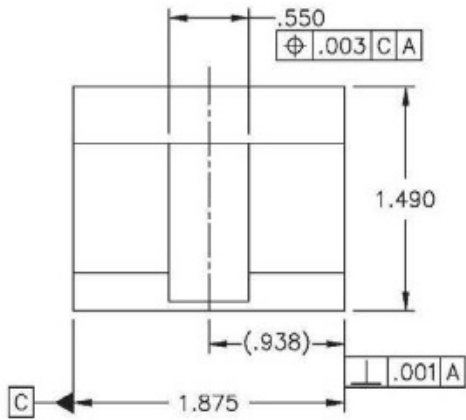
- a. Plan machining operations
- b. Analyze machinability and chip formation
- c. Calculate speeds and feeds and depth of cut for various machine operations
- d. Select necessary work-holding devices and hand tools as needed
- e. Use reciprocating and horizontal band saws
- f. Demonstrate the use of all controls on the vertical mill
- g. Demonstrate the use of all controls on the engine lathe
- h. Use high-speed tooling for cutting
- i. Use carbide tooling for cutting

Required Artifacts: Examples of parts.

- **Parts machined using a vertical mill, engine lathe (single point threading), drill press, horizontal saw, and surface grinder. Examples can be a hard part, pictures of parts.**
- **If examples of parts cannot be obtained, the completion of the following test parts is required.**

Suggested Artifacts: None

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	UPDATED DRAWING AND TITLE BLOCK	3/7/05	LW



Notes:

1. GRIND ALL OVER 32 MICROINCH
2. BREAK ALL SHARP EDGES .015 MAX
3. FILLET AND RADII .015 MAX

DO NOT SCALE DRAWING

<p>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994</p> <p>TOLERANCES .X ±.032 .XXX ±.001 .XX ±.015 ANGLES ± 1 DEG. FRACTIONS ± 1/64</p>	MACHINING SKILLS LEVEL I			MATERIAL COLD ROLL STEEL OR MILD STEEL
	Job Duty 2.7b Surface Grinding Operation			
	DESIGNER	DK	11/11/01	
DWG CHK				
DWG APPD				
SCALE	FULL	DWG.#98501 I	SHEET 1 OF 1	

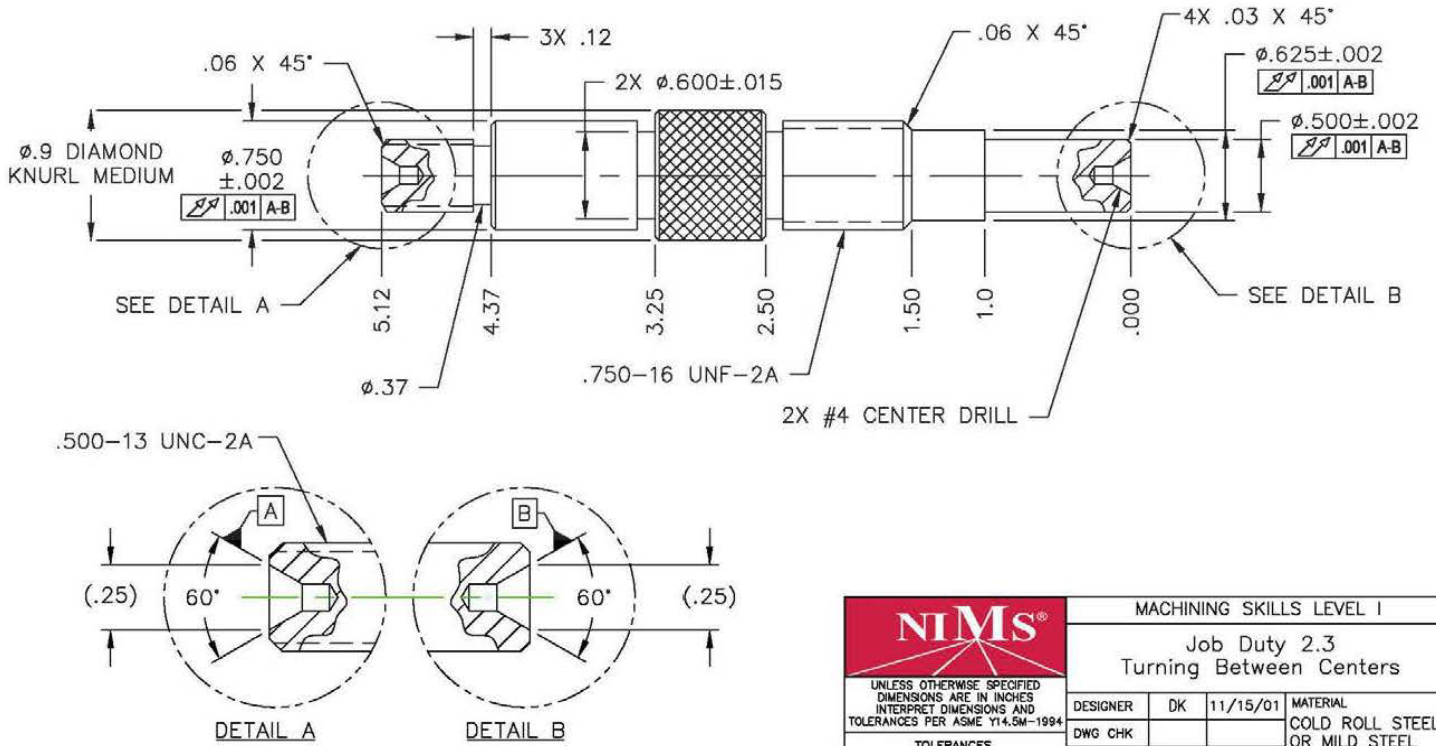
NIMS PROCEDURAL REQUIREMENTS

1. SUBMIT THIS PRINT AND WORKPIECE ALONG WITH THE PERFORMANCE AFFIDAVIT FOR EVALUATION

NOTES:

1. FINISH ALL OVER TO $125 \sqrt{\text{ }}$
2. BREAK ALL SHARP EDGES .015 MAX
3. UNLESS OTHERWISE SPECIFIED,
ALL COAXIAL DIAMETERS $\sqrt{\text{ }}$.010 A-B

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	UPDATED DRAWING AND TITLE BLOCK	3/7/05	LW



	MACHINING SKILLS LEVEL I		
	Job Duty 2.3 Turning Between Centers		
	DESIGNER	DK	11/15/01
	DWG CHK		
	DWG APPD		
TOLERANCES .X ± .032 .XXX ± .005 .XX ± .015 ANGLES ± 1 DEG. FRACTIONS ± 1/64		SCALE FULL	DWG.#98601 I SHEET 1 OF 1

DO NOT SCALE DRAWING

NIMS PROCEDURAL REQUIREMENTS

1. SUBMIT THIS PRINT AND WORKPIECE ALONG WITH THE PERFORMANCE AFFIDAVIT FOR EVALUATION

Competency 5: Perform basic conventional machining operations

Describe your learning and experience with this competency:

Met/ Not Met Evaluator Feedback:

