MACH A120: MEASUREMENT AND BLUEPRINT READING

Item	Value
Curriculum Committee Approval Date	12/02/2020
Top Code	095630 - Machining and Machine Tools
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

A study of blueprint reading and measuring systems used in manufacturing, including an in-depth study of the basic and advanced measuring tools used by machinists. Common blueprint formats and dimension practices will be explored. Geometric dimensioning and tolerancing will be discussed. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Generate orthographic drawings from isometric drawings.
2. Identify precision tolerances and dimensions from engineering and manufacturing drawings.
3. Evaluate engineering drawing specifications of close manufacturing tolerance work on prints.

Course Objectives

- 1. Recognize the difference and use of the different styles of lines.
- 2. Relate the different views to the actual shape of the part.
- 3. Identify and discuss the key elements found in the title block.
- 4. Identify and define the common symbols found on blueprints.
- 5. Recognize the most frequently used drawing formats.
- 6. Interpret and use both bilateral and unilateral size notations in calculations of part size.
- 7. Define the basic meaning of form notations and tolerances.
- 8. Use and accurately apply common none precision measuring tools.
- 9. Read and apply vernier type measuring tools.
- 10. Demonstrate the accurate use of all inside and outside micrometer type measuring devices.
- 11. Measure threads with the common thread measuring tools.
- 12. Describe the measurement process using the optical comparator.
- 13. Read blueprints used in the welding fabrication industry.
- 14. Identify the different drawing formats used in welding.

Lecture Content

A. INTRODUCTION TO BLUEPRINTS Importance of print reading How prints are made Print reading Standards for engineering drawing B. LINES AND LETTERING Views The alphabet of lines Primary view lines Section lines Dimension lines Standardized lettering C. TITLE BLOCK AND PARTS LIST Sheet size and format Borders and Zoning Block information Title block elements Revision history block Parts list D. MULTIVIEW DRAWINGS Drawing formats Orthographic projections of views Projection explained Selection of views Dimensions of an object Visualization of an object Cylindrical and curved surfaces Third angle projection E. SECTION VIEWS Section view lines and principles Section view types Conventional practice in section views Section in assemble drawings F. AUXILIARY VIEWS Auxiliary view principles Visualizing auxiliary views Auxiliary view types G. SCREW THREADS REPRESENTATION Thread terms Screw thread forms Thread characteristics Metric threads Pipe threads H. DIMENSIONING AND TOLERANCING Dimensioning rules and placement Dimensioning and mechanics Notes and special features Tolerance terms American standard tolerance Tolerancing methods I GEOMETRIC DIMENSIONING AND TOLERANCING Symbols and abbreviations GDT symbols GDT terminology Special feature notations Size tolerancing Form tolerancing J. DETAIL DRAWINGS Casting and forging drawings Purchase part control drawings Modifying drawing Welding drawings K. ASSEMBLY DRAWING Part identification Sections in assembly drawings Application blocks Parts list information Versions in assembly drawings L. PRECISION MEASURING TOOLS GAGING Orientation to gaging Gage standards Non-precision measuring tools Line graduated standards with verniers Precision measuring standards Precision measuring tools Thread measuring tools Dial indicators Optical compactors Gear measurements Hardness tests Surface finish tests Gage lab procedures M. Welding Prints Welding defined Welding drawings Weld symbols Arrow Reference line Tail Supplementary weld symbols N. Placement of appropriate information Depth of preparation Size of weld Length of weld Pitch

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)

Instructional Techniques

Lecture, demonstrations, and exercises using measuring tools

Reading Assignments

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Writing Assignments

Students will write short answer quizzes and exams

Out-of-class Assignments

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Demonstration of Critical Thinking

Quizzes, final exam

Required Writing, Problem Solving, Skills Demonstration

Students will write short answer quizzes and exams

Textbooks Resources

1. Required Brown Walter C.. Blueprint Reading for Industry, latest ed. Chicago: Goodhart Publisher, 2002 Rationale: -