



Lakeshore Technical College

10-623-123 Blueprint Reading & Metrology

Course Outcome Summary

Course Information

Description	...explores basic skills needed to interpret blueprints found in the manufacturing segment of industry. Topic include: types of blueprints, terminology, symbology lines dimensioning, geometric tolerancing and basic sketching skills.
Total Credits	3
Total Hours	54

Types of Instruction

Instruction Type

In Person

Credits/Hours

Pre/Corequisites

Prerequisite A basic math understanding is desirable. The student should know how to use fractions and decimals.

Textbooks

Gary Griffith. *The Quality Technician's Handbook*. Prentice Hall. 1996. **Edition:** third. **Pages:** 622. **ISBN:** 0-13-437328-6. **Source:** LTC Bookstore. Required. **Miscellaneous:** This textbook is used as a a basic textbook used throughout the quality technical courses in the program. The book also makes an excellent reference book..

Wilfred B. Pouler. *Blueprint Reading for the Machine Trades*. Delmar Publishers. 1995. **Edition:** second. **Pages:** 395. **ISBN:** 0-8273--6651-5. **Source:** LTC Bookstore. Required. **Miscellaneous:** This book is an excellent book in learning the basics of interpreting prints. It starts out with the student being able to visualize a part in three dimensions and then being able to make a orthographic projection of the part..

Learner Supplies

Blueprint Reading and Geometric Dimensioning and Tolerancing course syllabus. **Manufacturer:** Lakeshore Technical College. **Quantity:** 1. **Source:** John Maxfeldt. **Description:** The course syllabus is necessary so the student understands what the course is about, what the course schedule is, how grades are determined. and any other information the student needs to know in taking the course. Required.

Program Outcomes

1. **Measure the current state of an organization's quality system**
2. **Analyze data and processes to meet organizational goals**

Course Competencies

1. Explain what a blueprint is.

Assessment Strategies

1.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 1.1. learner correctly explains why drawings are so important to production planning.
- 1.2. learner correctly describes the importance of industrial prints to manufacturing companies.
- 1.3. learner correctly explains how different departments within a company use industrial prints
- 1.4. learner correctly lists the type of information displayed on industrial prints.

Learning Objectives

1.a. Describes what a blueprint is.

2. Explain the process of part concept to print stage.

Assessment Strategies

2.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 2.1. learner correctly explains the concept of idea to print
- 2.2. learner correctly identifies a blueprint from a print
- 2.3. learner correctly lists the four basic types of information provided on prints.

Learning Objectives

2.a. Describe the concept of idea to blueprints.

3. Describe what orthographic projection is.

Assessment Strategies

3.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 3.1. learner correctly explains the importance of obtaining a mental image of the object from the print
- 3.2. learner correctly explains what an orthographic projection is
- 3.3. learner correctly identifies the viewing angles for front, top, and side views.
- 3.4. learner correctly explains how the draftsman selects views
- 3.5. learner correctly details the relationships among surfaces, lines, and object lines .
- 3.6. learner correctly identifies the dimensions shown on the front, top, and side views.
- 3.7. learner correctly identifies what incline plans look like in orthographic projection

Learning Objectives

- 3.a. Explains what an orthographic projection is.
- 3.b. Explains the importance of orthographic projection to visualizing the end product.

4. Discuss the importance of pictorial sketching in interpreting blueprints.

Assessment Strategies

4.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 4.1. learner correctly describes what a pictorial sketch is
- 4.2. learner correctly identifies the difference between a isometric and pictorial sketch
- 4.3. learner correctly explains how pictorial sketching can help in the visualization of an object
- 4.4. learner correctly identifies the most common type of pictorial sketch
- 4.5. learner correctly outlines the steps used in isometric sketching

- 4.6. learner correctly sketches isometric circles
- 4.7. learner correctly outlines the steps used in oblique sketching
- 4.8. learner correctly sketches oblique circles

Learning Objectives

- 4.a. Develop a pictorial sketch given a part.

5. Explain the importance of positions of views on a blueprint.

Assessment Strategies

- 5.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 5.1. learner correctly explains the arrangement of views in a orthographic projection
- 5.2. learner correctly identifies the six views of a orthographic projection
- 5.3. learner correctly lists the guidelines in selecting a front view for a print
- 5.4. learner correctly identifies views in a print that are necessary
- 5.5. learner correctly identifies view in a print that are not necessary
- 5.6. learner correctly explains the importance of the relative positions of views on an industrial print
- 5.7. learner correctly discusses why certain views are selected for a drawing.
- 5.8. learner correctly explains why the draftsman selects the top view or the bottom view
- 5.9. learner correctly explains why the draftsman selects the right side view or the left side view

Learning Objectives

- 5.a. Identify the correct view location on a print.

6. Differentiate the different type of lines used on a blueprint.

Assessment Strategies

- 6.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 6.1. learner correctly identifies the different type of drafting lines used on a print
- 6.2. learner correctly explains what each type of line on a print represents
- 6.3. learner correctly explains how each type of line is used on a print
- 6.4. learner correctly lists the basic steps followed by a draftsman in making a drawing
- 6.5. learner correctly identifies auxiliary lines used on prints

Learning Objectives

- 6.a. Identify lines used on a print.

7. Describe what is a title block.

Assessment Strategies

- 7.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 7.1. learner correctly identifies what information is found in a title block
- 7.2. learner correctly discusses the importance of maintaining uniform print sizes
- 7.3. learner correctly lists the standard print sizes
- 7.4. learner correctly identifies the standard locations for auxiliary print information
- 7.5. learner correctly explains the purpose of each type of title block
- 7.6. learner correctly identifies what a revision change block is
- 7.7. learner correctly explains where the revision change block is normally located
- 7.8. learner correctly explains what a print distribution block is
- 7.9. learner correctly explains where a print distribution block is normally located
- 7.10. learner correctly explains what zoning is on a print
- 7.11. learner correctly explains where microfilm alignment arrowheads are located on a print

Learning Objectives

7.a. Elaborate what information can be found in a title block.

8. Explain how dimensions are placed on a blueprint.

Assessment Strategies

8.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 8.1. learner correctly explains the difference between size and location dimensions
- 8.2. learner correctly lists the rules of finding the size and location dimensions
- 8.3. learner correctly explains how to find the object and feature dimensions
- 8.4. learner correctly describes the types of dimensioning systems commonly used on industrial prints
- 8.5. learner correctly describes the ways of displaying fractional, decimal, and angular dimensions
- 8.6. learner correctly identifies the four basic type of drawing dimensioning
- 8.7. learner correctly details how tolerance accumulation affects a print
- 8.8. learner correctly explains what baseline dimensioning is
- 8.9. learner correctly describes what direct dimensioning is

Learning Objectives

8.a. Elaborate on how dimensions are placed on a print.

9. Explain how tolerances and surface finishes are identified on a print

Assessment Strategies

9.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 9.1. learner correctly describes what dimension tolerances are
- 9.2. learner correctly explains the purpose of tolerance dimensions
- 9.3. learner correctly describes the techniques of displaying tolerance dimensions
- 9.4. learner correctly describes what surface finish is
- 9.5. learner correctly describes what the techniques of displaying surface on a print are
- 9.6. learner correctly identifies the notations placed on surface finish symbols

Learning Objectives

- 9.a. describe how dimensional tolerances are placed on a print
- 9.b. describe how surface finishes are identified on a print

10. Discuss what supplementary information can be found on a print.

Assessment Strategies

10.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 10.1. learner correctly lists what supplementary information can be found on a print
- 10.2. learner correctly discusses the scaling of drawings
- 10.3. learner correctly discusses the common machining notations found on a print
- 10.4. learner correctly explains the classification of fits and how fit dimensions are determined
- 10.5. learner correctly describes the purpose and types of engineering specifications
- 10.6. learner correctly differentiates between fillets and rounds
- 10.7. learner correctly explains what a counterbore, countersink and spot faced holes are
- 10.8. learner correctly explains what a chamfer is
- 10.9. learner correctly identifies new machining symbols

Learning Objectives

10.a. Identify what supplemental information can be found on a print.

11. Interpret thread designations as found on prints.

Assessment Strategies

11.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 11.1. learner correctly identifies common methods of representing threads on an industrial print
- 11.2. learner correctly differentiates bolt threads and pipe threads on prints
- 11.3. learner correctly explains the meaning of thread notations on a print
- 11.4. learner correctly describes the common thread forms
- 11.5. learner correctly describes the metric thread notations
- 11.6. learner correctly describes the different types of threaded fasteners
- 11.7. learner correctly describes the different types of nonthreaded fasteners

Learning Objectives

- 11.a. Identify what type of thread is found on a print, given a proper thread designation.

12. Interpret gear and spline information as found on prints.

Assessment Strategies

12.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 12.1. learner correctly explains basic gear theory
- 12.2. learner correctly lists factors that determine which type of gear to use
- 12.3. learner correctly explains the meaning of common gear terms used on prints
- 12.4. learner correctly identifies required print gear data
- 12.5. learner correctly explains basic gear rack and spline theory
- 12.6. learner correctly describes how to calculate additional gear data from handbook tables

Learning Objectives

- 12.a. Correlate gear and spline information found on a print to an actual part.

13. Explain the importance of sectional views.

Assessment Strategies

13.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 13.1. learner correctly explains the purpose of sectional views
- 13.2. learner correctly explains the importance of the cutting plane location
- 13.3. learner correctly explains the viewing direction of section views
- 13.4. learner correctly explains the different types of section views

Learning Objectives

- 13.a. Indicate what a sectional view is on a print.
- 13.b. Characterize the importance of using sectional views on a print.

14. Identify how different part materials are identified on prints.

Assessment Strategies

14.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 14.1. learner correctly identifies material representation on section views to the type of material depicted
- 14.2. learner correctly explains the factors involved in the selection of materials
- 14.3. learner correctly lists the basic types of materials used in industry
- 14.4. learner correctly describes the difference between iron and steel
- 14.5. learner correctly describes the steel classification numbering system
- 14.6. learner correctly lists common types of nonferrous metals
- 14.7. learner correctly lists common types of plastics

14.8. learner correctly describes the various types of material treatments

Learning Objectives

14.a. Compare how different types of material used on parts is shown on a print.

15. Explain what types of drawings are used throughout a manufacturing environment.

Assessment Strategies

15.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 15.1. learner correctly explains why some older industrial prints may be in use for many more years
- 15.2. learner correctly explains why title block information contains most of the print's basic information
- 15.3. learner correctly details the new trend of providing separate prints for each manufacturing department
- 15.4. learner correctly identifies different kinds of hydraulic prints
- 15.5. learner correctly identifies air logic prints
- 15.6. learner correctly identifies electrical control prints
- 15.7. learner correctly identifies basic welding symbols

Learning Objectives

15.a. Identify where prints are used in a manufacturing environment.

16. Explain what geometric dimensioning is.

Assessment Strategies

16.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 16.1. learner correctly explains why geometric dimensioning is needed
- 16.2. learner correctly list the benefits of using geometric symbols
- 16.3. learner correctly defines the common geometric dimensioning terms
- 16.4. learner correctly lists the basic rules of geometric dimensioning
- 16.5. learner correctly describes how feature control frames are displayed on prints

Learning Objectives

- 16.a. Identify geometric symbols used on a print.
- 16.b. Identify tolerance buildup using geometrics.

17. Identify what methods are used to fabricate a print.

Assessment Strategies

17.1. in a classroom setting

Criteria

Criteria - Performance will be satisfactory when:

- 17.1. learner correctly identifies different methods of making a print
- 17.2. learner correctly explains what a CAD system is
- 17.3. learner correctly explains what a CAM system is

Learning Objectives

- 17.a. Explain how prints are drawn.
- 17.b. Explain how prints are manufactured.