



Lakeshore Technical College

31-442-385 Welding Print Reading

Course Outcome Summary

Course Information

Description	...prepares the learner to apply orthographic projection principles and AWS welding symbols as they relate to welding fabrications. Students will learn the basics of print reading including alphabet lines, tolerances, bill of materials, title blocks, and revision blocks.
Total Credits	1
Total Hours	36

Types of Instruction

Instruction Type	Credits/Hours
In Person	1/36

Textbooks

Blueprint Reading for Welders, 9th edition, A.E. Bennett and Louis J. Siy, ISBN # 978-1-133-60578-2. Available at the Lakeshore Technical College Bookstore.

Learner Supplies

Scientific Calculator: fx-115MS Plus -SR. **Manufacturer:** Casio.

Pen and #2 Pencil

Graph paper

Core Abilities

1. Apply learning

Criteria

- 1.1. Learner transfers academic knowledge and principles to life and work situations
- 1.2. Learner incorporates prior learning
- 1.3. Learner knows when to ask for help
- 1.4. Learner demonstrates appropriate safety precautions
- 1.5. Learner identifies the need for lifelong learning
- 1.6. Learner develops the ability to research beyond the required work
- 1.7. Learner demonstrates a curiosity for learning about cultures, norms, and practices

2. Apply sustainable practices

Criteria

- 2.1. Learner demonstrates awareness of the ecological impact related to his/her chosen area of study

- 2.2. Learner identifies environmental conservation strategies
- 2.3. Learner can identify how sustainable practices produce a lean work environment
- 2.4. Learner incorporates sustainable practices (environmental, economic, social, and cultural) during the decision making process

3. Communicate effectively

Criteria

- 3.1. Learner comprehends written materials
- 3.2. Learner writes clearly, concisely, and accurately
- 3.3. Learner adjusts communication style in order to meet the needs of others
- 3.4. Learner demonstrates active listening skills
- 3.5. Learner uses culturally appropriate verbal and non-verbal communication methods

4. Demonstrate critical thinking

Criteria

- 4.1. Learner determines issues that merit action
- 4.2. Learner takes initiative in the problem solving processes
- 4.3. Learner makes decisions considering alternatives and consequences
- 4.4. Learner refines action plans based on evaluation of feedback
- 4.5. Learner identifies interdependencies of world issues & events

5. Demonstrate responsible and professional workplace behaviors

Criteria

- 5.1. Learner displays behavior consistent with the ethical standards within a discipline or profession
- 5.2. Learner follows policies and procedures
- 5.3. Learner attends class as mandated by the instructor
- 5.4. Learner completes assignments on time
- 5.5. Learner exhibits academic honesty
- 5.6. Learner accepts responsibility and accountability for his/her actions
- 5.7. Learner demonstrates time management and task prioritization
- 5.8. Learner demonstrates ability to handle ambiguity and unfamiliar situations

6. Integrate technology

Criteria

- 6.1. Learner determines which tasks can be performed more efficiently by using technology
- 6.2. Learner uses technology to perform tasks more efficiently
- 6.3. Learner adapts to changing/emerging technology
- 6.4. Learner selects culturally appropriate technology/tools to communicate with diverse groups

7. Respect and appreciate diversity

Criteria

- 7.1. Learner demonstrates respectful workplace actions for successfully working with a diverse workforce (race, color, creed, national origin, religion, age, sex, sexual orientation, disability, and other differences).
- 7.2. Learner observes business customs/etiquette, time zone differences, and holidays
- 7.3. Learner identifies own bias and can adapt to the customs and practices of others
- 7.4. Learner demonstrates respectful behavior for living/working in a diverse society

8. Use mathematics effectively

Criteria

- 8.1. Learner solves real world problems using mathematics
- 8.2. Learner measures accurately
- 8.3. Learner analyzes graphical information
- 8.4. Learner demonstrates an understanding of world measurements and foreign currency exchange

9. Work cooperatively

Criteria

- 9.1. Learner contributes to a group with ideas, suggestions, and effort
- 9.2. Learner completes his/her share of tasks necessary to complete a project

- 9.3. Learner encourages team members by listening and responding appropriately to their contributions
- 9.4. Learner maintains self control
- 9.5. Learner resolves differences for the benefit of the team
- 9.6. Learner accepts constructive feedback
- 9.7. Learner effectively establishes rapport and builds situationally appropriate relationships

Program Outcomes

1. Demonstrate industry recognized safety practices

Criteria

- 1.1. you demonstrate proper inspection and use of personal protective equipment (PPE)
- 1.2. you demonstrate proper inspection and use of ventilation equipment as required
- 1.3. you demonstrate proper Hot Zone operation as required
- 1.4. you explain proper use of precautionary labeling and SDS information
- 1.5. you demonstrate proper inspection and operation of equipment used for each process
- 1.6. you maintain a safe work environment
- 1.7. you demonstrate proper material handling techniques

Course Competencies

1. Identify the types of lines and views found on prints commonly used in the metal working field

Assessment Strategies

- 1.1. Review Questions
- 1.2. Written Objective Test

Criteria

- 1.1. you identify basic types of lines and views found on a metalworking drawing with minimum grade of 80%.
- 1.2. you satisfactorily complete the written objective test.

Learning Objectives

- 1.a. Identify and describe alphabet lines and how they are used on a metalworking drawing
- 1.b. Identify two different methods in which an object can be represented on a drawing
- 1.c. Identify the proper orientation of views used on an orthographic projection drawing

2. Perform basic sketching techniques

Assessment Strategies

- 2.1. Review Questions
- 2.2. Written Objective Test

Criteria

You will know you are successful when:

- 2.1. you perform basic sketching techniques.
- 2.2. you perform sketching techniques found on a metalworking drawing with minimum grade of 80%.
- 2.3. you satisfactorily complete the written objective test.

Learning Objectives

- 2.a. Discuss the purpose of sketching and how it relates to metalworking drawings
- 2.b. Create an orthographic sketch
- 2.c. Create an oblique pictorial drawing
- 2.d. Create an isometric pictorial drawing

3. Interpret how notes and specifications are used on metalworking drawings

Assessment Strategies

- 3.1. Review Questions
- 3.2. Written Objective Test

Criteria

You will know you are successful when:

- 3.1. you identify how notes and specifications pertain to metalworking drawing with minimum grade of 80%.
- 3.2. you satisfactorily complete the written objective test.

Learning Objectives

- 3.a. Identify the typical information contained within a title block
- 3.b. Describe the difference between a general note and a local note
- 3.c. Identify the proper location for specifications

4. Interpret dimensions and dimensioning systems used on metalworking prints

Assessment Strategies

- 4.1. Review Questions
- 4.2. Written Objective Test

Criteria

- 4.1. you identify dimensions and dimensioning systems used on metalworking drawings with minimum grade of 80%.
- 4.2. you satisfactorily complete the written objective test.

Learning Objectives

- 4.a. Identify and describe the difference between size and location dimensions
- 4.b. Identify common terms used with dimensioning
- 4.c. Describe what a tolerance is and how it relates to fabrication accuracy

5. Interpret a bill of materials for detailed specifications of individual parts that make up weldments

Assessment Strategies

- 5.1. Review Questions
- 5.2. Written Objective Test

Criteria

- 5.1. you interpret a bill of materials for detailed specifications on a metalworking drawing with minimum grade of 80%.
- 5.2. you satisfactorily complete the written objective test.

Learning Objectives

- 5.a. Describe the importance of a bill of materials (BOM)
- 5.b. Identify item number, quantity and description of a particular part by looking at a bill of materials (BOM)

6. Identify common structural shapes that are used in the metal working field

Assessment Strategies

- 6.1. Review Questions
- 6.2. Written Objective Test

Criteria

You will know you are successful when:

- 6.1. you interpret a common structural shapes used in a metalworking drawing with minimum grade of 80%.
- 6.2. you satisfactorily complete the written objective test.

Learning Objectives

- 6.a. Use appropriate terminology to describe structural shapes
- 6.b. Identify common structural shapes used in weldments by shape
- 6.c. Use mill steel book to identify pipe sizes based on the schedule number system

7. Identify detailed, auxiliary, assembly drawings and how they pertain to metalworking drawings

Assessment Strategies

- 7.1. Review Questions
- 7.2. Written Objective Test

Criteria

You will know you are successful when:

- 7.1. you identify detailed, auxillary and assembly drawings and how they pertain to metalworking drawings with minimum grade of 80%.
- 7.2. you satisfactorily complete the written objective test.

Learning Objectives

- 7.a. Determine when a detailed drawing should be used and the proper placement of the detail
- 7.b. List the components that make up a detailed drawing
- 7.c. Identify an auxillary view and describe when it is typically used
- 7.d. Determine the proper location of an enlarged view
- 7.e. List the components that make up an assembly drawing

8. Identify and interpret section views on a metalworking drawing or print

Assessment Strategies

- 8.1. Review Questions
- 8.2. Written Objective Test

Criteria

- 8.1. you identify and interpret section views on metalworking drawings with minimum grade of 80%.
- 8.2. you satisfactorily complete the written objective test.

Learning Objectives

- 8.a. Identify the six major section views used in metalworking drawings
- 8.b. Describe the purpose of using section veivs
- 8.c. Locate where section views can be found on a metalworking drawing

9. Explain the meaning and use of each element of a welding symbol

Assessment Strategies

- 9.1. Review Questions
- 9.2. Written Objective Test

Criteria

You will know you are successful when:

- 9.1. Explain the meaning and location of each elelent of a welding symbol with a minimum grade of 80%
- 9.2. you satisfactorily complete the written objective test.

Learning Objectives

- 9.a. List the basic elemnets of welding symbols
- 9.b. Interpret which side of the welded joint the weld gets placed on
- 9.c. Explain a welding symbol by developing a pattern to follow (Order of Operations)

10. Identify the five basic joints/types used in welding fabrications

Assessment Strategies

- 10.1. Review Questions
- 10.2. Written Objective Test

Criteria

You will know you are successful when:

- 10.1. you identify the five basic joints/types that are used in the metalworking process with minimum grade of 80%.
- 10.2. you satisfactorily complete the written objective test.

Learning Objectives

- 10.a. Identify butt, corner, tee, lap and edge joints
- 10.b. Use standard nomeclature used in joint geometry

11. Interpret welding symbols used for fillet and groove welds

Assessment Strategies

- 11.1. Review Questions
- 11.2. Written Objective Test

Criteria

- 11.1. you identify fillet and groove weld symbols found on a metalworking drawing with minimum grade of 80%.
- 11.2. you satisfactorily complete the written objective test.

Learning Objectives

- 11.a. Identify the fillet weld symbol
- 11.b. Identify the size of a fillet weld
- 11.c. Identify length and pitch of a fillet weld
- 11.d. Identify the characteristics of an offset fillet weld
- 11.e. Identify the two types of intermittent fillet welds (chain and staggered intermittent fillet weld)
- 11.f. Determine the type of groove weld to be prepared and welded
- 11.g. Determine groove weld size
- 11.h. Determine the groove angle and root opening
- 11.i. Determine the contour and finishing for fillet and groove welds

12. Interpret welding symbols used for backing, plug and slot welds

Assessment Strategies

- 12.1. Review Questions
- 12.2. Written Objective Test

Criteria

- 12.1. you identify backing, plug and slot welds and how they pertain to metalworking drawing with minimum grade of 80%.
- 12.2. you satisfactorily complete the written objective test.

Learning Objectives

- 12.a. Discuss the purpose of the "back or backing" and "melt-thru" welds
- 12.b. Determine the size of a backing and melt-thru welds
- 12.c. Distinguish between a plug weld from a slot weld on a drawing
- 12.d. Determine size, weld size, quantity, included angle, length and pitch of plug and slot welds
- 12.e. Determine the contour and finish of a plug, slot, back and melt-thru welds

13. Interpret welding symbols used for edge, spot, projection, seam, surface and stud welds

Assessment Strategies

- 13.1. Review Questions
- 13.2. Written Objective Test

Criteria

You will know you are successful when:

- 13.1. you interpret welding symbols used for edge, spot, projection, seam, surface and stud welds used on a metalworking drawing with minimum grade of 80%.
- 13.2. you satisfactorily complete the written objective test.

Learning Objectives

- 13.a. Distinguish the characteristics of edge, spot, projection, seam, surface and stud welds
- 13.b. Identify typical joints to which edge weld symbols are applied
- 13.c. Identify the size, strength, quantity, pitch and welding processes of a spot weld
- 13.d. Translate dimensions to edge, spot, projection, seam, surface and stud welds and how they are applied
- 13.e. Determine the contour and finish of edge, spot, projection, seam, surface and stud welds
- 13.f. Determine the proper location of stud welds on a metalworking drawing
- 13.g. Determine the diameter, quantity and pitch of a stud welds