



Western Technical College

10623228 Principles of Lean Manufacturing (CBE)

Course Outcome Summary

Course Information

Description	Requires the learner to identify types of waste, develop a means of eliminating the wastes, and use a 5S approach to identify process improvement opportunities.
Career Cluster	Manufacturing
Instructional Level	Technical Diploma Courses
Total Credits	1
Total Hours	36

Textbooks

No textbook required.

Learner Supplies

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor:** Campus Shop. Required.

Proper footwear - \$35.00-75.00. **Vendor:** To be discussed in class. Required.

Scientific calculator (recommend T1-36x Solar). **Vendor:** Campus Shop. Required.

Three-ring binder. **Vendor:** Campus Shop. Required.

Clipboard. **Vendor:** Campus Shop. Required.

Pens/Pencils/Black Sharpie Marker. **Vendor:** Campus Shop. Required.

Minimum 4GB USB Flash Drive. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Increase Self-Awareness
2. Live Responsibly: Embrace Sustainability
3. Refine Professionalism: Act Ethically
4. Refine Professionalism: Practice Effective Communication

Program Outcomes

1. Apply basic safety practices in the machine shop.
2. Perform basic machine tool equipment set-up and operation.
3. Perform programming, set-up and operation of CNC Machine Tools.

Course Competencies

1. Define Lean Manufacturing.

Assessment Strategies

- 1.1. Written Product

Criteria

You will know you are successful when

- 1.1. you explain the roots of lean manufacturing.
- 1.2. you develop a working definition of lean.
- 1.3. you summarize the five Lean Principles.

Learning Objectives

- 1.a. Identify the roots of Lean.
- 1.b. Examine the five Lean Principles
- 1.c. Develop a working definition of Lean.
- 1.d. Investigate approaches to continuous improvement.
- 1.e. Define the customer requirements using the KANO model.

2. Identify types of waste in a process.

Assessment Strategies

- 2.1. Written Product

Criteria

You will know you are successful when

- 2.1. you summarize each type of the seven (7) wastes.
- 2.2. you explain muda (waste), muri (overburden), and mura (unevenness) in a selected process.
- 2.3. you categorize each of the non-value added process activities into waste category.
- 2.4. you justify categorization of non-value added process steps into appropriate waste category.
- 2.5. you provide specific and realistic recommendations that would improve the selected process.

Learning Objectives

- 2.a. Observe sources of waste in a simulation activity.
- 2.b. Define the sources of waste (at least seven).
- 2.c. Investigate the interrelationship of muda (waste), muri (overburden), and mura (unevenness).
- 2.d. Examine sources of waste in a process.

3. Differentiate between value added and non-value added actions.

Assessment Strategies

- 3.1. Written Product

Criteria

You will know you are successful when

- 3.1. you select an appropriate process to evaluate.
- 3.2. you detail the steps of a process.
- 3.3. you identify which of the five Lean Principles appear to be absent.
- 3.4. you determine value added and non-value added activities of the process.
- 3.5. you justify each activity of a process as value added or non-value added.

Learning Objectives

- 3.a. Define a process.

- 3.b. Develop an appreciation for systems thinking.
- 3.c. Define value from the perspective of the customer.
- 3.d. Distinguish between value-added and non value-added steps of a process.
- 3.e. Appreciate the percentage of non value-added time in a typical process.

4. Identify Lean problem solving tools.

Assessment Strategies

- 4.1. Written Product
- 4.2. 5S Project

Criteria

You will know you are successful when

- 4.1. you propose how 5S might improve the observed process.
- 4.2. you implement the 5S approach to a process.
- 4.3. you describe specific benefits that might be gained from use of 5S in observed process.
- 4.4. you propose other visual control methods that might improve observed process.
- 4.5. you summarize specific benefits that might be gained from use of other visual controls.
- 4.6. you identify how POUS, and/or Poka-Yoke, and/or Jidoka might be incorporated into observed process.
- 4.7. you summarize specific benefits that might be gained from use of POUS, and/or Poka-Yoke, and/or Jidoka.
- 4.8. you categorize (and justify categorization) observed process as primarily push or pull.
- 4.9. you recommend how to make process pull if it is currently push.

Learning Objectives

- 4.a. Identify possible improvements to a simulated process.
- 4.b. Identify and implement the 5S steps.
- 4.c. Provide examples of visual controls applied to a process.
- 4.d. Differentiate between a push system and a pull system.
- 4.e. Define POUS (point of use storage).
- 4.f. Define poka-yoke (mistake proofing).
- 4.g. Differentiate between the DMAIC, 5, and 7-step problem solving models.

5. Calculate the benefits of applying Lean concepts and tools to improve processes.

Assessment Strategies

- 5.1. Written Product

Criteria

You will know you are successful when

- 5.1. you identify the takt time of a selected process.
- 5.2. you describe adequacy of process cycle time to meet required takt time of selected process.
- 5.3. you recommend specific, logical improvements to process balance and/or cycle time.

Learning Objectives

- 5.a. Compare old paradigm versus new paradigm thinking in relation to cost and price.
- 5.b. Calculate takt time for a process.
- 5.c. Differentiate between cycle time and takt time.
- 5.d. Investigate VSM (value stream mapping) as a tool to identify improvement opportunities.