



Lean Production Training Program

Lean production or lean manufacturing is a philosophy that focuses on waste elimination within a system. In 1990s, it was part of the Toyota Production System and then became very common in manufacturing industries. There are four principles of lean manufacturing: reducing unnecessary waste, improve quality, reduce time, and reduce the overall manufacturing costs.

Course Outline

The Business Department at University of Minnesota Crookston will develop, teach, facilitate, lead and implement 40 hours of a lean production training program. The program covers basic, intermediate and advanced knowledge and experience in lean manufacturing. Participants will learn to work as a team player, motivator, public speaker and a true lean champion within their organizations. Below is the program outline:

Module 1 – Introduction to lean & continuous improvement

- Lean Philosophy and Continuous Improvement
- Team Building, Lean Tools and Introduction
- Project charter
- Seven types of wastes
- 3 M's (Mura, Muri, Muda)

Module 2 – Work place visualization

- Visual factory
- 5S (Sort, Set In Order, Shine, Standardize, Sustain)
- Kanban

Module 3 – Capacity analysis

- Process flow analysis
- Flow interruption
- Takt Time
- Total Productive Maintenance (TPM)
- Value Stream Mapping
- Quick Changeover

Module 4 – Continuous improvement

- Kaizen Events
- 5 Why Analysis
- Fishbone Diagram
- Mistake Proofing
- Lean and six sigma

Materials Provided and Teaching Tools

- **Lean simulation game:** we will use lean simulation games heavily in this training program. After covering the theoretical part of each lean tool, a simulation game will be used to implement it. There are many lean simulation kits available in the market. For example, the LeanMan simulation kit includes a kit for building a small car factory. The kit provides the opportunity to build toy cars under two main scenarios: the first one is performing production without implementing lean tools, while the second one is with implementing lean tools. Participants get to experience the advantages of lean tools in saving time and reducing waste.
- **Team work:** participants will get to work as a team while conducting the simulation experiments.
- **Handout:** the materials of the training program including PowerPoint slides and case studies will be provided to the participants.
- **Experiential Learning:** After completing each module, participants will be encouraged to implement at least one of the lean tools at their company. Then, a presentation will be made at the beginning of each module on what he/she implements at the home company.

Training Instructor

This training will be developed by Dr. Abdulaziz Ahmed, who works as an Assistant Professor and director of Manufacturing Management and Quality Management program in the Business Department at University of Minnesota Crookston. Abdulaziz earned his B.S. and M.S. in Industrial Engineering from Jordan University of Science and Technology in 2009 and 2012, respectively and the Ph.D. in Industrial and Systems Engineering from the State University of New York at Binghamton in 2016. His research focuses on modeling and optimization of systems including manufacturing and healthcare systems. He has published several journal and conference articles in highly reputed and internationally recognized journals and conferences. Abdulaziz is a Lean Six Sigma Green Belt and Black Belt certified. He is also a member of the Institute of Industrial and Systems Engineers, Industrial and Operations Management Society, and Alpha Pi Mu; the primary honor society for industrial engineers.

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