

## Design for Manufacturability (DFM)

### Course Description

This course is intended to familiarize engineers with analytical tools and processes required for successful introduction of electronic components into manufacturing. The sub-discipline known as DFM (Design For Manufacturability) is a vital component in the toolkit of most modern design teams. Achieving a product's cost and reliability goals requires both, proper application of available design tools and understanding of product development processes. The course covers the design activities that have to take place at the prototype design level to ensure that the end product can be efficiently manufactured, as well as activities related to selection and qualification of contractors and suppliers.

This two-day short course covers the basics of design for manufacturability theory and implementation for the design, manufacturing and quality control. The course covers most of the aspects of the back-end process (packaging, assembly, and testing) and provides guidelines for the selection of the assembly house. Most of the principles and processes describes are also applicable to the wafer manufacturing process.

### Overview

Imagine if a company could discover that 60 percent manufacturing costs are unnecessary. If it could act on it, would there be any need to outsource the jobs? Imagine further that lean manufacturing does not have to be mean. This course is about becoming very lean without being mean.

The participants will learn:

- How to recognize critical product features for ultrahigh quality
- How to translate critical design features into manufacturing requirements
- How to recognize wasteful practices
- How to replace wasteful practices into high impact best practices
- How to reduce wrong lean practices and do more of right practices

### Intended Audience

All the engineers and managers in manufacturing engineering, production, and maintenance.

### Prerequisites

No prior experience is required. This is a basic sound thinking course on how to discover your real needs.

### Course Outline

What is manufacturing reliability?  
Goals of manufacturing reliability  
New paradigms for manufacturing systems  
Identifying product features for ultrahigh quality  
Identifying key process characteristics to assure product features  
Why inspection is rarely effective?  
Process Failure mode and effects analysis (PFMEA)  
Developing sound manufacturing controls  
Why maintainability is important for zero unscheduled down time?  
Techniques for developing reliability centered maintenance  
Reliability improvement techniques  
Maintainability improvement techniques  
Total predictive maintenance  
Elegant problem solving techniques for high return on investment  
Fault tree analysis for solving difficult problems  
Change analysis for sudden problems  
Principles of lean ultrahigh quality  
How to be the best lean producer

## About the Instructor

**Dev Raheja**, the author of *Zen and the Art of Breakthrough Quality* has over 30 years of hands-on and consulting experience in manufacturing. He served as Manufacturing Engineering Manager at General Electric, Quality Control Manager at Cooper Power Systems, and Senior Reliability and Maintainability consultant at Booz-Allen & Hamilton. He has been a consultant to automotive, medical, and aerospace companies such as GM, Ford, Boeing, Intel, Johnson & Johnson, Mattel, Lockheed, and IBM.