Build4 Scale
U.S. Department of Energy

Design for Manufacturing, Assembly, and Reliability

Module 3 Crosscutting Introduction

Motivation

Why is this module is important?

- Now that you have a detailed design that comprises a bill of materials (BOM) and a bill of process (BOP), it is time to refine your plan
- Decisions made at this point in the process will determine the overall cost and quality of your product

You don't want to get this wrong!

Module 3 Outline

- What this module covers
- Why this is important

The Right Design Decisions

Materials and cost

- Businesses that get the cost equation wrong will fail
  - **Module 3A** provides tools to help you determine the investment and product cost implications of alternative decisions
  - It is important to understand the cost implications of the alternative decisions you are making as you scale your product
- Poor materials-selection decisions can break your product
  - **Module 3B** gives an overview of materials and their associated properties
  - It is critical that you understand the different kinds of materials that are available and the properties that will help you determine if these materials will meet your design requirements
  - This module also covers the interaction between the design, materials, and manufacturing processes (if you do this wrong, you derail your development efforts)

The Right Design Decisions

Manufacturing

- The manufacturing process will determine the quality and cost of your product
  - **Module 3C** provides the capabilities, costs, and investments necessary for alternative manufacturing processes
  - While the market, design, and materials will determine which manufacturing process you use, the selection of that process will also affect some aspects of the design and cost
- Product designs must be tailored to the proposed production process to ensure that products are made at high quality and low cost
  - **Module 3D** provides tools to help you improve your design for **manufacturing and assembly** (DFMA)
  - **Design for manufacturing** (DFM) can ensure that you don't have to make costly changes in your design at later stages
  - **Design for assembly** (DFA) guidelines help you reduce the number of parts, and decrease assembly time and cost

The Right Design Decisions

Reliability and performance

- Ensuring that your design decisions translate into long-lasting products is critical for business success
  - **Module 3E** covers tools you'll need to ensure that constituent components and the overall product are reliable and meet customer needs and requirements
  - **Module 3F** introduces how to design and fabricate electronic components that meet customer needs and provide robust performance

No customer wants the product they have purchased to fail, ever, much less, prematurely