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COURSE BROCHURE

Design for Manufacturing and Assembly (DFMA) Training Course

jupiterprime.uk

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

Design for Manufacturing and Assembly (DFMA) Training Course

Design for Manufacturing and Assembly DFMA is a 1-week training course for product designers, manufacturing engineers and cost engineers who shape what a product costs before tooling is ordered, and it ends with a DFMA redesign case for one product. Most of a product's lifetime cost is fixed at the drawing stage, so late changes are slow and expensive. Jupiter Prime Training runs this course for engineering and cost teams.

Why Design for Manufacturing and Assembly Matters Now

Three pressures make DFMA a board-level topic. Buyers and retailers push for lower unit prices while material and energy costs move unpredictably. Shorter launch cycles leave little time for redesign after pilot builds. Sustainability targets reward fewer parts, fewer materials and easier disassembly. Firms that apply DFMA early cut part counts, fastener use and assembly labour, and they negotiate with suppliers from a credible should-cost figure. Firms that skip it discover tolerance clashes, fixturing problems and hidden handling costs only when the line is already running.

Who Gains Most from Design for Manufacturing and Assembly

- Product designers responsible for part geometry, material choice and fastening methods
- Manufacturing engineers responsible for process routing, fixtures and assembly sequence
- Cost engineers responsible for should-cost models and supplier quotation challenges
- Quality engineers responsible for tolerance allocation and defect prevention at launch
- Sourcing specialists responsible for make-or-buy and supplier process capability

Cross-functional product teams that send a designer, a manufacturing engineer and a cost engineer together gain most.

Design for Manufacturing and Assembly Capabilities

The capabilities below turn drawing decisions into measurable effects on part count, assembly time and unit cost.

- Apply minimum part count criteria to challenge every separate component — design review boards
- Calculate an assembly efficiency index from handling and insertion times — line balancing engineers
- Specify process-specific rules for moulding, casting, sheet metal and machining — tooling suppliers
- Test tolerance stack-ups by worst-case and statistical methods — quality and inspection planning
- Build a should-cost estimate from material, process and overhead drivers — sourcing negotiations
- Communicate a redesign business case with cost, quality and risk trade-offs — product line sponsors

Key Design for Manufacturing and Assembly Terms

- DFMA — A structured method that simplifies a product for easy assembly first, then optimises each remaining part for its manufacturing process.
- Theoretical minimum part count — The number of parts left after removing every part that need not move, differ in material or be separate for access.
- Assembly efficiency index — The ratio of ideal assembly time for the minimum part count to the estimated actual assembly time.
- Tolerance stack-up — The combined effect of individual part tolerances on a critical dimension or fit in an assembly.
- Should-cost — An engineering estimate of what a part ought to cost, built from material, process time, tooling and overhead.
- Design for disassembly — Choosing joints and materials so a product can be separated for repair, reuse or recycling.

Design for Manufacturing and Assembly Day by Day

Day 1: Cost Commitment and Product Simplification

- Cost Commitment Curve — When Drawing Decisions Lock In Unit Cost
- Product Teardown and Bill of Materials Mapping — Redesign Target Selection
- Minimum Part Count Criteria — Merging and Eliminating Components
- Fastener Reduction and Snap-Fit Options — Joining Method Choice
- Design for Disassembly — Repair, Reuse and Recycling Requirements

Day 2: Assembly Efficiency Scoring

- Handling Time Factors — Size, Symmetry and Part Orientation
- Insertion Time Factors — Alignment, Access and Holding Down
- Assembly Efficiency Index Calculation — Benchmarking Design Alternatives
- Manual Versus Automated Assembly Choice — Volume and Variant Mix
- Error-Proofing Features in Part Design — Defect Prevention on the Line

Day 3: Process-Specific Design Rules

- Injection Moulding Rules — Wall Thickness, Draft and Gate Position
- Die Casting and Forging Guidelines — Parting Lines and Section Change
- Sheet Metal Bending and Punching Rules — Hole Spacing and Bend Relief
- Machining Rules for Turned and Milled Parts — Setups and Tool Access
- Additive Manufacturing Fit Assessment — Low-Volume and Complex Geometry Parts

Day 4: Tolerances and Should-Cost Estimation

- Worst-Case Tolerance Stack-Up — Critical Fit Assurance
- Root Sum Square Statistical Stack-Up — Wider Tolerances at Lower Cost
- Process Capability Matching — Tolerance Allocation by Supplier Process
- Should-Cost Model Building — Material, Cycle Time, Tooling and Overhead
- Supplier Quotation Challenge — Fact-Based Cost Negotiation

Day 5: Practising the DFMA Redesign Case

- Baseline Teardown Scoring — Applying Day 1 and Day 2 Methods to a Case Product
- Concept Redesign Options — Applying Day 3 Process Rules
- Tolerance and Cost Verification — Applying Day 4 Stack-Up and Should-Cost
- Risk Review of Redesign — Tooling, Validation and Launch Timing
- DFMA Redesign Case — Savings, Trade-Offs and Approval Request

Applying Design for Manufacturing and Assembly After the Course

- Lead a teardown of one current product, score its assembly efficiency index and list parts that fail the minimum part count criteria.
- Build a should-cost estimate for the highest-spend bought-in part and use it in the next supplier quotation review.

Design for Manufacturing and Assembly Questions FAQ

What is design for manufacturing and assembly and why does it matter now?

Design for manufacturing and assembly is a method for simplifying products and tailoring parts to their processes before tooling is committed. It matters now because price pressure, short launch cycles and sustainability targets all reward fewer parts and lower assembly effort.

Which roles gain most from design for manufacturing and assembly training?

Product designers, manufacturing engineers and cost engineers gain most, with quality engineers and sourcing specialists.

How does design for manufacturing and assembly differ from lean manufacturing training?

Design for manufacturing and assembly changes the product itself at the drawing stage. Lean manufacturing training improves flow, waste and work methods on an existing production line without redesigning the parts.

What do you bring back from design for manufacturing and assembly training?

You bring back a scored redesign of one real product, with part count, assembly efficiency, tolerance checks and should-cost savings ready to present.

Design for Manufacturing and Assembly: The Way Forward

The DFMA redesign case first informs whether the product's next engineering change or model refresh adopts the simplified design. Design, manufacturing, cost and sourcing leads use it to agree targets with suppliers and the product sponsor. After the first redesign reaches production, revisit the assembly time and should-cost estimates against actual line and invoice figures to sharpen future scoring.