ADDITIVE MANUFACTURING FOR PRODUCTION OF PLASTIC PARTS CURRICULUM OUTLINE //

PRACTICAL APPLICATION OF TECHNOLOGIES, MATERIALS, & PROCESSES

FATHOM.

OVERVIEW OF FOUR SESSIONS

This high-level outline is an example of FATHOM's 3-hour additive manufacturing program focused on the production of plastic parts—please note, the additive industry is always changing and the curriculum with it.

1. **Technology Overview & Materials**
2. **Break-Even Point (Direct Part Replacement vs. DFAM)**
3. **Topology Optimization**
4. **Lattice Materials Design**

Session 1 // Technology Overview & Materials

Introduction to additive manufacturing processes—broad survey of the industries most established technologies in polymers.

- Introduction To AM—Basic Explanation of How 3DP Works
- Introduction Polymer AM
    - Fused Deposition Modeling (FDM) (What It Is, How Does It Work, Material Options, Orientation Matters—Anisotropic, Supports & Their Purpose. Self-Supporting Designs, Support Removal—Post Processing, Contours & Infill, Ideal Sizes, Tolerances, Extra Post Processing, Ideal Uses, Limitations, Examples/Brief Use Cases)
    - Powder Bed Fusion (What It Is, How Does It Work, Material Options, More Isotropic Than FDM, No Supports Needed, Ideal Sizes, Tolerances, Extra Post Processing, Ideal Uses, Limitations, Examples/Brief Use Cases)
    - PolyJet/SLA/DLP (What It Is, How Does It Work, Processes & Materials, More Isotropic Than FDM, Tolerances, Ideal Sizes, Ideal Uses, Limitations, Examples/Brief Use Cases)

Session 2 // Break-Even Point

As additive technologies, materials, and processes mature, so does the argument for using additive manufacturing (AM) to make production parts—let go of traditional manufacturing constraints and embrace a new mindset that explores additive manufacturing as a serious means of production.

- Choose From a Wide Range of Production-Grade Materials
- Reduce Total Cost of Ownership & Time-to-Market
- Enable Greater Design Flexibility & Break Free From Traditional Manufacturing Constraints
- Direct Part Replacement—To Fabricate the Final Product and/or Parts Used During Production and Assembly of Finished Goods

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WATCH FEATURED VIDEO GO.STUDIOFATHOM.COM/INTRODUCING-DFAM-CURRICULUM

Session 3 // Topology Optimization

Discussion on Topology Optimization—includes software demonstration.

- Definition, Motivation, & Inspiration—Biomimicry & Architecture
- Theory—Software Methods Behind Topology Optimization
- How-To with Software Tools & Workflow
- Key Process Parameters
- ANSYS Demo—Recorded Screencast with Live Commentary & Review (Optimization Setup, Optimization, Smoothing, Validation)
- Manufacturability Consideration & Limitations
- Three Case Studies

Session 4 // Lattice Materials Design

Discussion on lattice and lightweight design and theory—includes software demonstration.

- Biomimetic Underpinnings—Bulk Material Properties vs. Mesostructured Material Properties
- Classification of Cellular Materials & Applications (Stochastic Space Filling—Light Weighting & Medical, Beam Based Lattice Structures—Structural & Transport Specific to SLS or SLA, Shell Based Lattice Structures—Structural & Transport Specific to FDM)
- Modeling Approaches
- Characterization of Structures & Performance (Unit Cell Topology & Performance + Controlled Buckling of Structures)
- Optimization—Beam Thickness Optimization, Variable Cell Size, Variable Cell Topology
- Manufacturability—Wall Thicknesses, Orientation
- Case Studies

Talk with a FATHOM specialist today to schedule this technical training experience.