Mold Making Course
Curriculum and Schedule

DAY 1 - MORNING SESSION

8AM - 12PM Classroom Theory + Hands-On DEMOS

Welcome!

- Orientation
- Introductions
- Breakfast (provided)

Introduction to Molds

- Review of composite materials
- Molds basics
- Mold terminology

Mold Construction Methods

- “Off-the-shelf” molds: flat plates & extrusions
- Single-use molds
- “Moldless” construction
- Molds made using existing parts (“splash” molds)
- CNC machined molds (direct-to-mold)
- CNC machined mold patterns
- 3D printed mold patterns and molds
- Closed molding
- Large Scale Additive Manufacturing (LSAM)

DEMO Session - “Moldless” & “Off-the-Shelf” Mold Construction (HANDS-ON)

- Mold surface preparation
- Mold release application
- Template construction
- Hot-wire cutting foam using machined templates

12PM - 1PM LUNCH (provided)

DAY 1 - AFTERNOON SESSION

1PM - 5PM Classroom Theory + Hands-On DEMOS

Overview of Mold Materials

- Foam board and tooling board
- Casting foam and tooling paste
- Plastics and 3D printed materials
- MDF and engineered wood
- Gel coat
- Composites
- Aluminum and Steel

DEMO Session - “Moldless” & “Off-the-Shelf” Mold Construction (HANDS-ON)

- Dispensing and mixing gel coat
- Application of gel coat layers
- Foam core surface prep process
- Wet layup of composite skin on foam core

DEMO Session - Mold Design in CAD

- CAD basics
- Best practices for mold design in CAD
- CAD modeling a mold from an existing part model
- Important mold features to include and how to model them in CAD

DEMO Session - “Off-the-Shelf” Mold Construction (HANDS-ON)

- Wet-layup construction of composite mold structure
- Curing best practices

5PM - ADJOURN

DAY 2 - MORNING SESSION

8AM - 12PM Classroom Theory + Hands-On DEMOS

DEMO Session - Demolding and Mold Inspection

- Demold while demonstrating proper demolding techniques
- Quality inspection
- Repair techniques
- Non Destructive Testing (NDT) techniques
- Trimming, sanding, and finishing techniques
- Mold release application

How to Navigate Key Factors When Designing and Constructing a Mold

- Producing parts with simple and complex geometries
- Producing one part or many parts
- Molds matched to specific manufacturing processes
- Composite layups (to avoid bad parts)
- Lead time from design to part creation (understanding what is fastest)
- Material and labor costs
- When to use female, male, and closed mold geometries
- Ensuring consistent and proper part demolding
- Draft angles and trim features

How to Create CNC Machined Molds and Mold Patterns

- CNC machining overview
- What is CAM software?
- Creating roughing tool paths in CAM
- Creating finishing tool paths in CAM
- Understanding cutting tool types, flutes, and feeds & speeds
- Techniques for workholding the stock material
- How to the create stock material for a mold
- Creating mold from multi-material and multi-section stock
- Final mold finishing work
- Mold release agents and how to apply them

12PM - 1PM LUNCH (Provided)

DAY 2 - AFTERNOON SESSION

1PM - 4:30PM Classroom Theory + Hands-On DEMOS

DEMO Session - CNC Machined Mold Construction

- Personal Protective Equipment (PPE) and safety
- Process equipment and tools
- CNC machine setup
- CAM software walkthrough
- Workholding setup
- Overview of machining end mills and tool changes
- Demonstration of roughing passes
- Demonstration of finishing passes
- Cleanup of machined mold

Advanced Molds, Multi-section Mold Patterns, and Mold Design

- Design of mold support structures
- High temperature mold design and mold making materials
- Design of multi-section molds
- Design of multi-section mold patterns

4:30 PM - ADJOURN