

# Surfacing Using Creo Parametric 4.0

## Overview

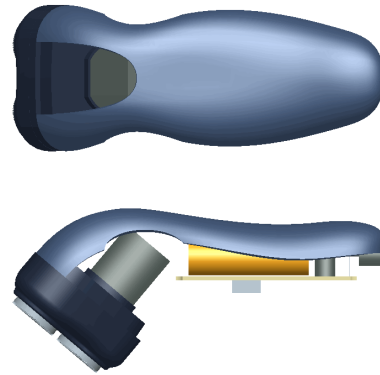
Course Code TRN-5106-T

Course Length 24 Hours

In this course, you will learn how to use various techniques to create complex surfaces with tangent and curvature continuities. You will also learn how to manipulate surfaces using editing tools, and analyze surfaces for quality and desired characteristics. In addition, you will learn how to create solid features using the surfaces as references. After completing this course, you will be well prepared to create complex shaped models using surfaces in Creo Parametric.

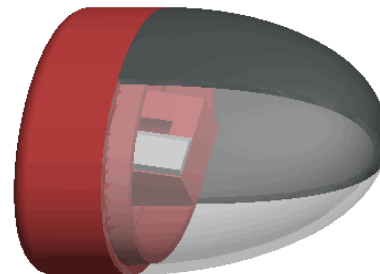
At the end of each module, you will complete a set of review questions to reinforce critical topics from that module. At the end of the course, you will complete a course assessment in Pro/FICIENCY intended to evaluate your understanding of the course as a whole.

This course has been developed using Creo 4.0 U360.



## Course Objectives

- Describe surface modeling and its terminology
- Learn advanced selection techniques
- Create advanced datum features
- Use advanced sketching techniques
- Learn basic surfacing tools
- Create various boundary surfaces
- Create variable section sweep surfaces
- Create helical sweep surfaces
- Create swept blend surfaces
- Utilize surface analysis tools
- Extend and trim surfaces
- Manipulate surfaces
- Create and edit solid models using surface quilts
- Utilize the master model technique



## Prerequisites

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- Introduction to Creo Parametric 4.0

## Audience

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- This course is intended for mechanical designers, design engineers, industrial designers, and related roles
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## Agenda

### Day 1

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Module 1 Surface Modeling Overview

Module 2 Advanced Selection

Module 3 Advanced Datum Features

Module 4 Advanced Sketching

Module 5 Basic Surfacing Tools

Module 6 Boundary Blend Surfaces

### Day 2

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Module 7 Sweep Surfaces with Variable Sections

Module 8 Helical Sweeps

Module 9 Swept Blends

Module 10 Analyzing Surface Curvature

Module 11 Additional Surface Analysis Tools

### Day 3

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Module 12 Extending and Trimming Surfaces

Module 13 Manipulating Surfaces

Module 14 Creating and Editing Solids using Quilts

Module 15 Master Model Technique

Module 16 Project

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## Course Content

### Module 1. Surface Modeling Overview

- i. Introduction to Surfacing
- ii. Surface Modeling Uses
- iii. Surface Modeling Paradigms
- iv. Blending Surface Modeling Paradigms
- v. Surfacing Terms

### Module 2. Advanced Selection

- i. Advanced Chain Selection
- ii. Advanced Surface Selection
- iii. Using the Search Tool

### Module 3. Advanced Datum Features

- i. Creating Datum Graphs
- ii. Creating Datum Coordinate Systems
- iii. Creating Points On or Offset from Entities
- iv. Creating Points at Intersections
- v. Creating Points Using an Offset Coordinate System
- vi. Sketching Geometry Datums
- vii. Creating Curves Through a Point or Vertex
- viii. Creating a Curve Through a Point Array
- ix. Creating a Curve from a Cross-Section
- x. Creating a Curve From Equation
- xi. Creating Composite Curves
- xii. Creating a Curve from Curve Intersections
- xiii. Creating a Curve at Surface Intersection
- xiv. Projecting and Wrapping Curves
- xv. Trimming Curves
- xvi. Creating Offset Curves
- xvii. Creating Cosmetic Sketches

### Module 4. Advanced Sketching

- i. Using Sketched Curves
  - ii. Sketching Ellipses
  - iii. Sketching Elliptical Fillets
  - iv. Sketching Splines
  - v. Modifying Splines — Basic Operations
  - vi. Modifying Splines — Advanced Operations
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- vii. Importing and Exporting Spline Points
- viii. Sketching Conics
- ix. Sketching Text
- x. Thickening Edges
- xi. Analyzing Sketcher Convert Options
- xii. Locking Sketcher Entities
- xiii. Analyzing Sketcher Dimension Options
- xiv. Sketcher Diagnostic Tools

#### **Module 5. Basic Surfacing Tools**

- i. Creating Surface Extrude Features
- ii. Creating Surface Revolve Features
- iii. Creating Fill Surfaces
- iv. Creating Sweep Surfaces with Open Trajectories
- v. Creating Sweep Surfaces with Closed Trajectories
- vi. Creating Blend Surfaces by Selecting Parallel Sections
- vii. Creating Blend Surfaces by Selecting Non-Parallel Sections
- viii. Creating Blend Surfaces by Sketching Sections
- ix. Analyzing Blend Surface Section Tools
- x. Analyzing Blend Surface Options
- xi. Analyzing Blend Surface Tangency
- xii. Creating Rotational Blend Surfaces by Selecting Sections
- xiii. Creating Rotational Blend Surfaces by Sketching Sections
- xiv. Analyzing Rotational Blend Surface Options
- xv. Analyzing Rotational Blend Surface Tangency

#### **Module 6. Boundary Blend Surfaces**

- i. Understanding Boundary Curve Concepts
- ii. Creating Boundary Blends in One Direction
- iii. Creating Boundary Blends in Two Directions
- iv. Analyzing Blended Surface Boundary Conditions
- v. Analyzing Blended Surface Constraint Options
- vi. Analyzing Blended Surface Control Points
- vii. Creating Boundary Blends with Influencing Curves
- viii. Analyzing Approximate Blended Surface Options
- ix. Creating a Blend Tangent to Surfaces

#### **Module 7. Sweep Surfaces with Variable Sections**

- i. Understanding Sweeps with Variable Sections
  - ii. Creating Sweep Surfaces using a Constant Section
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- iii. Creating Sweep Surfaces using Normal to Trajectory
- iv. Creating Sweep Surfaces using Constant Normal Direction
- v. Creating Sweep Surfaces using Normal to Projection
- vi. Analyzing Horizontal and Vertical Control in a Sweep Surface
- vii. Creating Sweep Surfaces Utilizing Multiple Trajectories
- viii. Creating Sweep Surfaces using Tangent Trajectories
- ix. Analyzing Sweep Surface Trajectory Options and Rules
- x. Using Trajpar with Sweep Surface Features
- xi. Using Trajpar and Datum Graphs with Sweep Surface Features

### **Module 8. Helical Sweeps**

- i. Understanding Helical Sweeps Theory
- ii. Utilizing Helical Sweeps for Surfaces
- iii. Analyzing Helical Sweep Surface Profile and Pitch Variations
- iv. Utilizing Variable Sections in Helical Sweep Surfaces

### **Module 9. Swept Blends**

- i. Understanding Swept Blend Theory
- ii. Creating Swept Blend Surfaces by Selecting Sections
- iii. Creating Swept Blend Surfaces by Sketching Sections
- iv. Analyzing Swept Blend Surface Section Options
- v. Analyzing Swept Blend Surface Section Plane Control
- vi. Analyzing Horizontal and Vertical Control in a Swept Blend Surface
- vii. Analyzing Swept Blend Surface Tangency
- viii. Analyzing Swept Blend Surface Options
- ix. Analyzing Swept Blend Rules

### **Module 10. Analyzing Surface Curvature**

- i. Analyzing Surfaces Theory
  - ii. Defining Curvature
  - iii. Defining Curvature Continuity
  - iv. Analyzing Curvature of Curves
  - v. Analyzing Curvature of Surfaces
  - vi. Analyzing Curvature Using Sections
  - vii. Analyzing Curvature using Normals
  - viii. Using Shaded Curvature Analysis for Surfaces
  - ix. Using Shaded Section Curvature Analysis
  - x. Creating Curvature Continuous Surfaces
  - xi. Analyzing Connections
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**Module 11. Additional Surface Analysis Tools**

- i. Using the Point Analysis Option
- ii. Using the Radius Analysis Option
- iii. Using the Dihedral Angle Analysis Option
- iv. Using the Offset Analysis Option
- v. Using the Draft Analysis Option
- vi. Using the Slope Analysis Option
- vii. Using the Reflection Analysis Option
- viii. Using the Shadow Analysis Option

**Module 12. Extending and Trimming Surfaces**

- i. Extending Surfaces
- ii. Extending Surfaces Using Measurements
- iii. Analyzing Extend Surface Options
- iv. Creating a Surface Trim
- v. Trimming Surfaces with Geometry
- vi. Trimming Surfaces with Quilts Options
- vii. Trimming Surfaces with the Silhouette Trim Option
- viii. Trimming Surfaces with the Vertex Round Option

**Module 13. Manipulating Surfaces**

- i. Copying and Pasting Surfaces
- ii. Offsetting Surfaces
- iii. Offsetting Surfaces with the Expand Option
- iv. Offsetting Surfaces with Draft
- v. Moving and Rotating Quilts
- vi. Mirroring Quilts
- vii. Merging Surfaces
- viii. Untrimming Surface Copies
- ix. Flattening Quilts

**Module 14. Creating and Editing Solids using Quilts**

- i. Thickening Surface Quilts
  - ii. Solidifying Quilts to Add Material
  - iii. Solidifying Quilts to Remove Material
  - iv. Solidifying Quilts to Replace Material
  - v. Offsetting Surfaces using the Replace Option
  - vi. Creating Rounds on Surfaces
  - vii. Converting Solid Rounds to Surfaces
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**Module 15. Master Model Technique**

- i. Master Model Technique Theory
- ii. Creating a Master Model
- iii. Creating Framework in the Master Model
- iv. Creating Surfaces in the Master Model
- v. Refining and Completing the Master Model
- vi. Sharing Geometry from the Master Model
- vii. Completing Body Components

**Module 16. Project**

- i. The Shaver
  - ii. Creating the Master Model
  - iii. Creating Framework in the Master Model
  - iv. Creating Surfaces in the Master Model
  - v. Refining and Completing the Master Model
  - vi. Sharing Geometry from the Master Model
  - vii. Creating a Body Component
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