

# Course: SOLIDWORKS Flow Simulation

MFG

## Description

Learn the basics of turbulent fluid and air flow analysis. This introductory hands-on course is designed for users who would like to quickly become productive.

## Training objectives

On completion of this course you will be able to use SOLIDWORKS Flow Simulation software to run fluid or air flow analysis on your designs such as the wing of an airplane, or an exhaust valve. Performance PCB analysis to evaluate the effectiveness of cooling systems and understand the impact of fluid flow on temperature in electrical systems.

## Prerequisites

Mechanical design experience. Experience with Windows Operating System.

Completed the SOLIDWORKS Essentials training course, or equivalent. At least one month using SOLIDWORKS software.

Knowledge and understanding of the fundamentals of Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD).

## Skills you will acquire


Conduct CFD analysis of your Electrical and Mechanical systems. Able to test and optimise your designs. Understand and solve your flow, heating, and cooling design problems.

## Who should attend


Users who would like to quickly become productive in turbulent fluid and air flow analysis.

## Delivery mode

 Face-to-face

 Virtual Classroom

## Duration

 3 days or 19 hours

## Course Outline

### Lesson 1: Creating a SolidWorks Flow Simulation Project

- Case Study: Manifold Assembly
- Problem Description Model
- Preparation
- Post processing

### Lesson 2: Meshing

- Case Study: Chemistry Hood
- Project Description
- Computational Mesh
- Basic Mesh
- Initial Mesh
- Geometry Resolution
- Optimise Thin Wall Resolution
- Result Resolution/Level of Initial Mesh

### Lesson 3: Thermal Analysis

- Case Study: Electronics Enclosure
- Project Description
- Fans
- Perforated plates

### Lesson 4: External Transient Analysis

- Case Study: Flow Around a Cylinder
- Problem Description
- Reynolds number
- External Flow
- Transient Flow
- Turbulence Intensity
- Solution Adaptive Mesh
- Refinement
- Two Dimensional Flow
- Computational Domain
- Calculation Control Options
- Time Animation

### Lesson 5: Conjugate Heat Transfer

- Case Study: Heated Cold Plate
- Project Description
- Conjugate Heat Transfer
- Real Gases

### Lesson 6: EFD Zooming

- Case Study: Electronics Enclosure
- Project Description
- EFD Zooming

### Lesson 7: Porous Media

- Case Study: Catalytic Converter
- Problem Description
- Porous Media
- Design Modification

### Lesson 8: Rotating Reference Frames

- Rotating Reference Frame
- Case Study: Fan Assembly
- Problem Description

### Lesson 9: Parametric Analysis

- Case Study: Piston Valve
- Problem Description
- Parametric Analysis
- Steady State Analysis

### Lesson 10: Cavitation

- Case Study: Cone Valve
- Problem Description
- Cavitation

### Lesson 11: Relative Humidity

- Relative Humidity
- Case Study: Cook House
- Problem Description

### Lesson 12: Particle Trajectory

- Case Study: Hurricane Generator
- Problem Description
- Particle Trajectories – Overview

### Lesson 13: Supersonic Flow

- Supersonic Flow
- Case Study: Conical Bell
- Problem Description

### Lesson 14: FEA Load Transfer

- Case Study: Billboard
- Problem Description