

# ALTAIR HYPER MESH AND OPTISTRUCT

## PRE-REQUISITES

- Knowledge about Computer Aided Design 3D modelling
- Basic knowledge about Finite Element Analysis

## OBJECTIVES

The course is designed to impart knowledge and skills related to create a 3D Model and Analyse the model to develop products for serving the Industry community.

## LEARNING OUTCOMES

After completion of this course, the students will be able to:

- Develop CAD models for hypermesh.
- Import and Export CAD data and generate .hm file.
- Attain accurate and high quality meshes in 1D, 2D and 3D element meshes
- Linear Static Analysis (Structural analysis)
- Modal Analysis
- Dynamic Analysis (Thermal analysis)

## DETAIL CONTENTS

### LEVEL : 1 (HYPER MESH)

- **Basic Interaction with HyperMesh** (2 Hours)  
Introduction, Process, Classification, Advantages, Interacting With HyperMesh Desktop, Applications.
- **Geometry** (6 Hours)  
Loading and Repairing CAD Geometry, Simplifying CAD Tools, Generating a Midsurface, Midsurfacing with Advanced extraction options.
- **2D Meshing** (10 Hours)  
2D Shell Meshing and Topology Refinement, Refining Topology to Achieve a Quality Mesh, Checking and Editing Mesh, Mesh component using feature based mesh controls
- **Solids and 3D Meshing** (8 Hours)  
Tetra Meshing, 3D Solid Meshing with Hexas and Pentas, Shrink Wrap Meshing
- **1D Meshing and Connectors** (4 Hours)  
1D Meshing and Connectors

**TOTAL : 30 hours**

### LEVEL : 2 (OPTISTRUCT)

- **Linear Static Analysis** (6 Hours)  
Static Analysis of a Solid Bracket, Static Analysis of a Simply Supported Beam
- **Inertia Relief Analysis** (6 Hours)

## Satellite Inertia Relief Analysis

- Modal Analysis**

**(4 Hours)**

Compressor Bracket Modal Analysis, Simply Supported Beam Modal Analysis

- Linear Buckling Analysis**

**(6 Hours)**

Wing Linear Buckling Analysis

- Thermal Stress Steady State Analysis**

**(6 Hours)**

Thermal Stress Analysis of a Beam

- Optimization in Linear Analysis**

**(2 Hours)**

Size Optimization of a Rail Joint, Size Optimization of a Shredder

**TOTAL : 30 hours**

### LIST OF PRACTICALS:

#### LEVEL : 1 (HYPER MESH)

- Loading and Repairing CAD Geometry
- Generating a Midsurface.
- 2D Meshing
- 2D Mesh Refining Topology
- 3D Solid Meshing with Tetra
- 3D Solid Meshing with Hexas and Pentas
- 1D Meshing and Connectors

#### LEVEL : 2 (OPTISTRUCT)

- Static Analysis of a Solid Bracket
- Satellite Inertia Relief Analysis
- Compressor Bracket Modal Analysis
- Wing Linear Buckling Analysis
- Thermal Stress Analysis of a Beam
- Size Optimization of a Rail Joint

### STUDENTS PROJECT:

#### Capstone Assemble

This project covers the following topics:

- Importing a Model
- Geometry Cleanup
- 1D Meshing
- 2D Meshing
- 3D Meshing

- Analysis Setup
- Model Loading
- Analysis
- Post Processing

