

## *Design your Destiny!*



### Who we are?

**Mission:** Imparting Practical Domain knowledge to Mechanical Engineering Graduates and Automotive enthusiasts by our seasoned industry experts. Empowering our students to become an expert in the domain of their choice.

3,00,000 mechanical engineers graduate every year in India and only a few get into core companies. Mechanical engineers find it difficult to get employed in the industry due to their sole focus on learning the design software, without proper domain knowledge. We Disenosys, are working to bridge this skill gap between students and the industry requirements. We

have a team of industry experts, with over a decade of experience who empower our students to land their dream jobs. We connect to our students from all the corners of the world through live, interactive and virtual classrooms.

Disenosys is bootstrapped by Praveen Kumar, who has worked with many multinational OEMs like Ford, Daimler, Ashok Leyland. Together as a team, we are constantly working to provide Automotive industrial domain training to young and aspiring design engineers around the globe.

***Our students are our Hope. We are dedicated to making their dreams into reality.***



# Automotive Product Design Masters BODY

## What is Automotive Masters in Body Design?

The Masters in Automotive Body design includes learning both Automotive Body in White product design, Automotive plastic trims interiors and Exteriors along with hands on knowledge with CATIA and Geometrica dimensioning and Tolerancing. This curriculum ensures you become a full fledged body designer and makes you more employable for any automotive OEM positions in the field of BIW or interior/exterior trims as well as a myriad of other career options.

### What is Plastic Trims?

The design of Automotive Interior and Exterior plastic components is called Trims. It is done in Catia GSD workbench. The plastic components that you see inside the car are Interior. Ex: Dashboard, Instrument Panel, Doors, seating and pillars.

Plastic components that you see outside of a car are Exterior. ex: bumper, light assy, hoods.

Many major automotive design companies have separate interior and exterior design studios lacking interaction and communication. This divide has created dispersion between the two departments, leading to a design theme that does not follow throughout the whole vehicle. OEMs have recently recognised this issue and are currently making efforts to create a new design strategy, attempting to generate a more substantial connection between exterior and interior design.

The styling and design teams at an automotive OEM always walk an extra mile to make the best looking interior and exterior automotive trims. But, when it comes



to engineering for a feasibility study, various constraints are not well thought and analyzed due to time constraints. As a result, the best-looking styling gets compromised in the production vehicle.

Through this program, Disenosys equips our students both in interior and exterior trims to fill this gap and prepare them for the upcoming automotive trends. Our projects, Pillar design process and Bumper design process are designed by our industry experts to give our students industrial exposure.

### **What is Body in White?**

Body in white or BIW refers to the stage in automotive design or automobile manufacturing in which a car body's sheet metal components are welded together. In a factory, the sheet metal undergoes several operations to become automotive body parts as well as chassis parts. Once all the sheet metal is shaped, and formed parts are integrated or welded, it partially looks like a car body, which will not be painted. Body in white is called because of the metallic appearance of the car body. The automotive body-in-white component market has experienced a significant growth rate in the past few years owing to increasing vehicle production worldwide. The BIW components account for 20 – 33 % of curb weight of the vehicle and therefore represents high revenue potential for component suppliers across the automotive value chain. Despite disruptions in the automotive sector such as the evolution of electric / hybrid vehicle, development of driverless and connected vehicles, BIW components is invariable segment of the automotive sector and therefore associated as the major business segment in the overall automotive industry.

## Who can take this course?

- 3rd and Final year B.E/BTech students in Mechanical/Automobile and Aerospace discipline
- MTech students in Mechanical/Automobile and Aerospace discipline.
- Working professionals who are looking for better job opportunities in CAD, CAM, CAE, Auto Cad, Autodesk Domain.
- Automotive enthusiasts.

## Why should I take the Automotive Masters program with Disenosys?

**Top benefits of Automotive Masters program in Body Design:**

- *One year internship program with paid internships and experience letter at the end of the program.*
- *Placement guarantee in the domain of your choice after completing all the assigned projects*
- *Hands-on experience with real-time industry projects.*
- *You will learn about various materials and manufacturing process involved in the design of the car body.*

- *you should be able to design BIW and plastic trims components of a car independently after successful completion of the course program.*
- *Get trained by seasoned industry **experts** working in top automotive OEMs.*
- *We help in **building your resume** after completion of the course.*
- ***Mock interviews** will be conducted after completion of the course, to clear Industrial Technical rounds for placement.*
- *Excellent performers will be **referred to top OEMs** through our internal contacts.*
- *Stand out among your peers in getting selected as **BIW Designer/Engineer** or interior/exterior trims designer/engineer.*
- ***Industry-oriented projects** at the end of the course which will add value in your interviews.*
- *You will learn about various plastic materials used to build components of the car.*
- *You will learn about various Interior and Exterior components, their design and development process.*

## OUR TRAINERS



Our team comprises of design experts, working in top OEMs around the globe. We stand apart from others with the quality we deliver to our students. Our seasoned industry experts impart their knowledge for the betterment of the future generation.

## Course Duration

- One Year Live, Online and Interactive Sessions.
- 9 Months Training – 3 Month Paid Internship

## Certification

- A digital Masters certificate will be provided by Disenosys after successful completion of the course.
- An internship/Experience Letter is provided to the students after successful completion.



## Course Curriculum

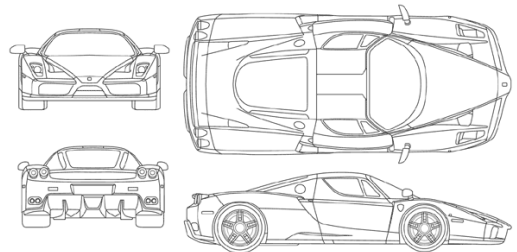
### INTRODUCTION TO CATIA

- User Interface
- Managing Files
- Visualizing Models
- Specification Tree
- Managing Geometry
- Reference Features



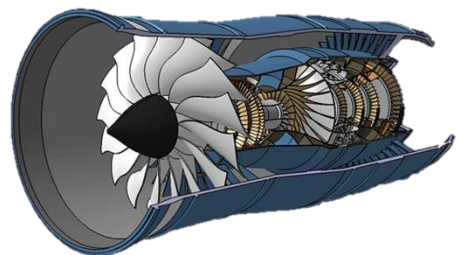
### SKETCHER

- Sketch Geometry Creation
- Sketch Operations
- Sketch Constraints and Dimensions
- Using Sketches Effectively

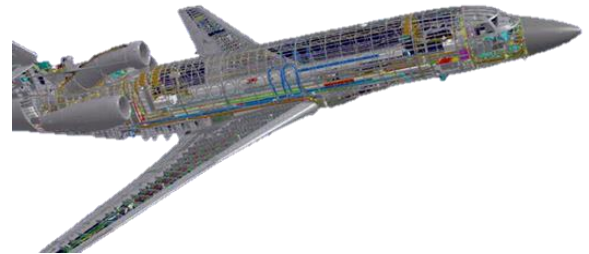


### PART DESIGN

- Introduction to Part Design
- Basic Sketch-Based Features
- Dress-Up Features
- Patterns

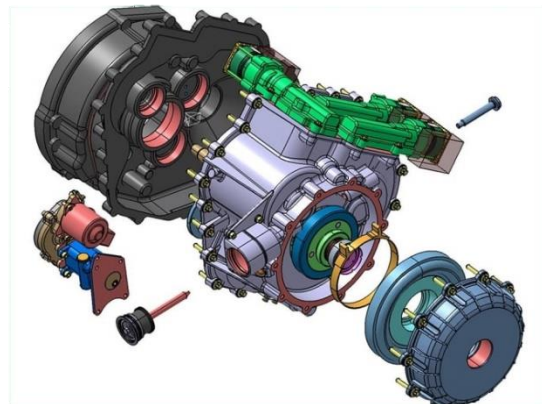


- Additional Dress up Feature
- More Sketch-Based Features
- Advanced Sketch-Based Feature
- Surface-Based Features
- Catalogues
- Parameters Formulas and Interpart Links
- Evaluating the Model
- Boolean Operations
- Managing Features
- Managing Tree
- Transformations



## **ASSEMBLY DESIGN**

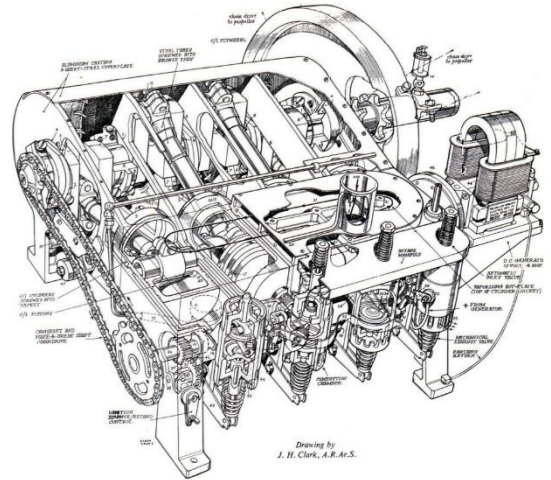
- Basic Assemblies
- Assembly Constraints
- Assembly Analysis
- Advanced Assembly Operations and Tools
- Assembly Drawings
- Assembly Features



## **DRAFTING**

- Drafting Introduction
- Geometry Creation

- Geometry Modification
- Dress Ups
- View Creation
- Secondary Views
- Editing Drawings
- Dimensioning
- Annotations
- Draft Tools
- Bordering Creation and Balloons with BOM
- Filtering Assembly Drawing Views



## GENERATIVE SHAPE DESIGN

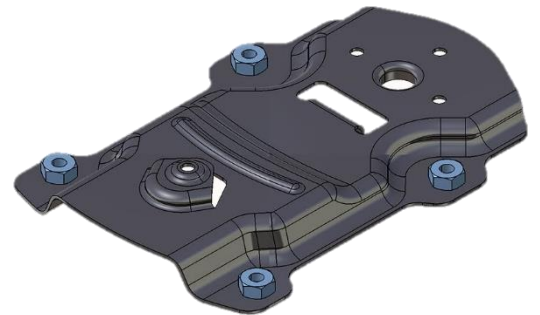
- Basic Surfaces
- Geometrical Sets
- Assembly Information
- Assembly Operations and Tools
- Assembly Management
- Spline Creation and Editing
- Surface and Wireframe Transformations
- Surface and Wireframe Operations
- Surface-Based Features & Multi Section Surfaces
- Surface and Wireframe Operations 2
- Face and Shape Fillets
- Historical Graph



- Surfacing Best Practices
- Surfacing Operations and Multi-document Links
- Advanced Wireframe Geometry 1
- Advanced Wireframe Geometry 2
- Analyzing Surfaces and Curves
- Swept Surfaces
- Geometry Modification Management
- Power Copies
- Surfacing Projects

#### **GENERATIVE SHEETMETAL DESIGN**

- Generative Sheetmetal Design Introduction
- Generative Sheetmetal Parameters
- Generative Sheetmetal Walls
- Generative Sheetmetal Bends
- Generative Sheetmetal Features
- Generative Sheetmetal Stampings

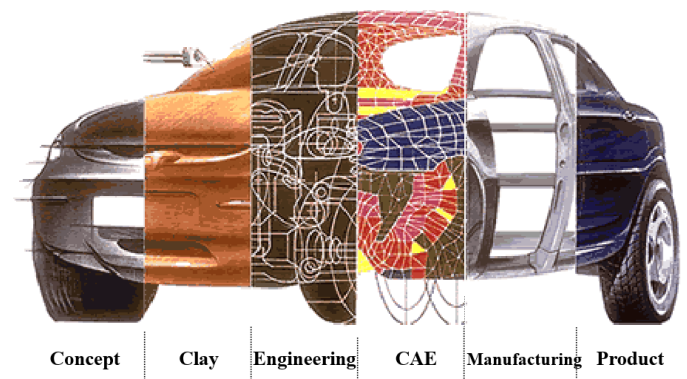




## PLASTIC TRIMS DESIGN

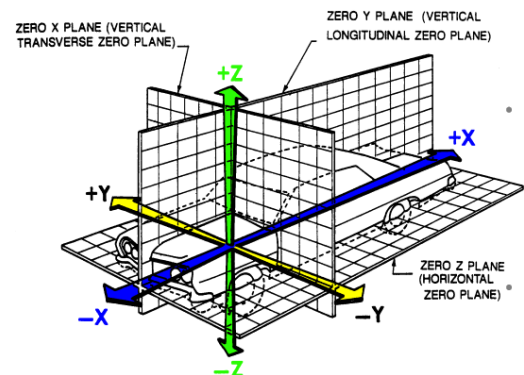
### Introduction to Automotive Interior and Exterior

- Basics of Plastics?
- Commodity of Plastics and Applications
- Product Design and Development
- Mold Design Fundamentals
- Plastic Product Design and Guide Lines
- Plastic Defects and remedies
- Plastic Fixations
- Examples of Master sections
- General Terminologies in Automotive
- Joining Technologies in Plastic
- Heat staking
- Vibration Welding
- Laser Scoring
- Basic Automotive interior and Exterior Regulations



### Steps Involved in Plastic Product Design

- Target setting
- Benchmarking
- Concept themes & Packaging
- Style development
- Ergonomic & packaging
- A class surfacing



- CFD analysis
- System packaging
- Plastic Product design
- CAE analysis
- Prototype manufacturing
- Testing and validation

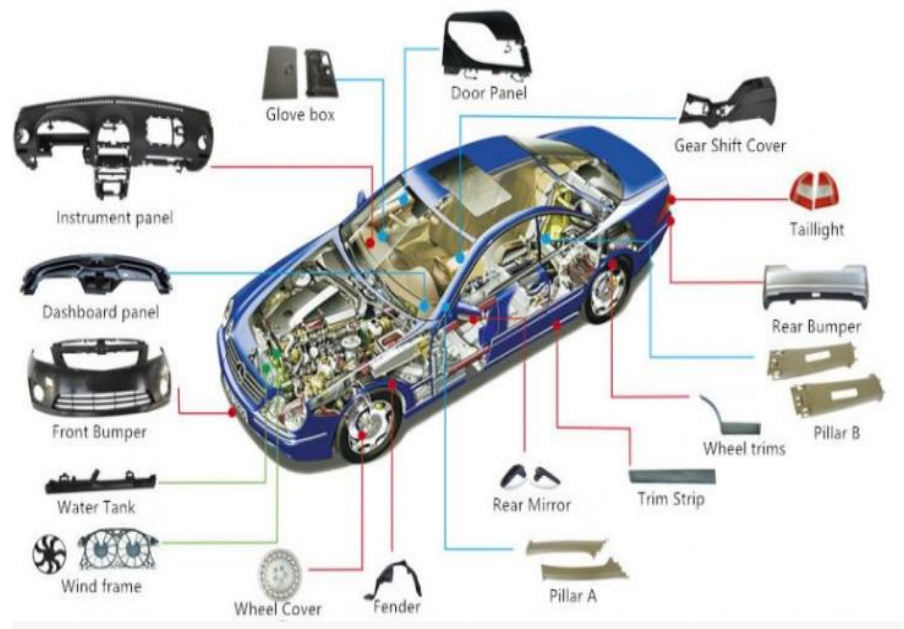
## Introduction to Plastic Trims

### Hard Trims

- IP,
- Console,
- Door,
- Pillars
- Bumper etc.

### Soft Trims

- Head Liner
- Carpet
- NVH parts etc



## Introduction to Automotive Interior and Exterior

### INTERIOR

- Instrumentation Panel (IP)
- Glove Box
- Fuse Box
- Cluster Bezel etc.
- Cross Car Beam (CCB)
- Door Trim
- Door Carrier
- Map Pocket
- Switch Bezel etc
- Many more parts and their Assembly Process



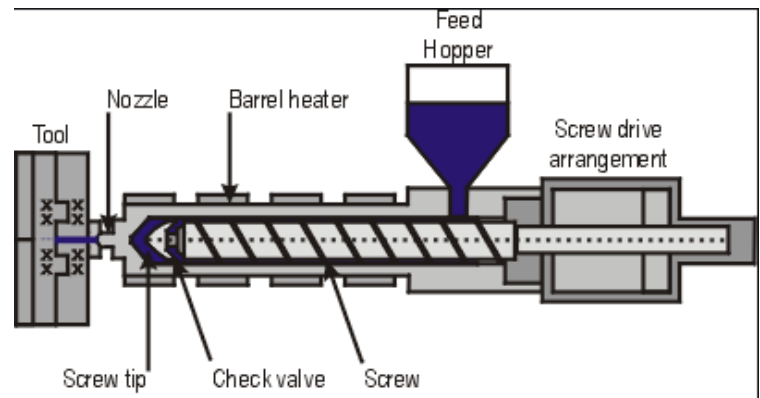
### EXTERIOR

- Bumpers (Front and Rear)
- Fenders
- Bumper Grills
- Scuff Plates
- Roof Rails
- Other Supportive Structures



## Introduction to Plastic Materials

- Polypropylene (PP)
- Acrylonitrile butadiene styrene (ABS)
- Polycarbonate (PC)

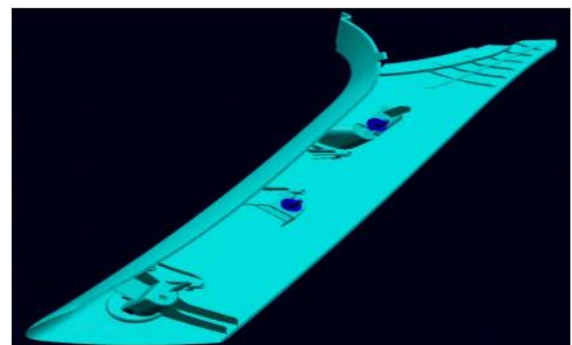


## Introduction to Injection moulding and Types of Molding

- Injection Molding
- Blow Molding
- Rotational molding

## Project 01: Pillar Design Process

- Class A Surface analysis.
- Product Design
- Creation of Attachment features
- Draft analysis
- Master section study and development





## **Project 02: Bumper Design Process**

- Class A Surface analysis.
- Product Design
- Creation of Attachment features
- Draft analysis
- Master section study and development



## **AUTOMOTIVE BODY IN WHITE**

### **Introduction to Automotive BIW**

This introductory module helps you understand the basics of BIW, different terminologies you are going to use and the various steps involved in BIW design.

- What is BIW?
- History of BIW
- Types of CAB
- According to Style
- According to Chassis Type
- What is carline?
- Importance of carline
- How to take sections
- Vehicle co-ordinate System (VCS)



- Examples of sections at specific planes
- General Terminologies in Automotive
  - Inboard/outboard
  - To & Fro
  - Up/Down
  - Formability of sheet metal
  - Joining Technologies in BIW
    - RSW
    - SPR
    - Projection Welding
    - Studs
    - Bonding Adhesive

## **Steps Involved in BIW Design (various steps)**

- Target setting
- Benchmarking
- Concept themes & Packaging
- Style development
- Ergonomic & packaging
- A-class surfacing
- CFD analysis
- System packaging



- BIW design
- CAE analysis
- Prototype manufacturing
- Testing and validation

## **Introduction to Body Structure**

Know the structure of the body (monocoque body)

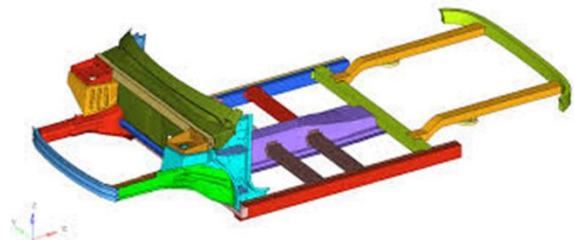
We are going to study the body structure of a car in 5 different components:

- Underbody
- Upper Body
- Roof Structure
- Closures
- Bolt-on Parts

### **Underbody**

In this module, you will understand the different automotive components that form the underbody of the automotive body in white. You will be able to understand the position and the design of the following components in the vehicle.

- Front End
- Floor Assembly
- Underbody Rear



- Assembly Sequence for each
- Design part for seat cross member for seat mounting
- Master section

## Upper Body

The upper body mainly consists of the passenger compartment and the rear compartment of the vehicle. In this module, you learn about the following topics.

- Body side outer Assembly
- The inner Ring reinforcement assembly
- Rear Quarter assembly
- D-pillar assembly
- Shot-Gun assembly.
- Assembly Sequence
- Design brackets in upper body.
- Master sections



## Roof Structure

In this module, you will understand the different automotive components that form the roof structure of the automotive body in white.

- Front, Middle, Rear Roof Bow
- Roof Panel



- Master section  $Y=0$  for Roof Bows
- Design of Roof structure component

## Closures

**Closures** are all components that are not part of the inherent body structure, i.e., those parts welded together. These include not only highly style-sensitive components such as doors, trunks, tailgates and hoods, but also a variety of crash management parts like door impact beams and structural parts like roofs ed or bolted on to the underlying structure of the vehicle.

### • Front & Rear door

- Inner panel
- Outer panel
- Hinge reinforcement ( Upper hinge and Lower hinge)
- Window slot reinforcement
- Latch reinforcement
- Intrusion Beam
- Frame part
- Glass guide channel

### • Hood & Deck/ Trunk lid door

- Inner panel
- Outer panel
- Hinge reinforcement ( Upper hinge & Lower hinge)
- Latch reinforcement



## Project 01: Door Design Process

- Class A Surface analysis.
- Hinge axis Determination
- Seal surface creation
- Master section
  - Upper hinge
  - Lower hinge
  - Latch area
  - Hemming Requirement
  - Cantrail section
- Packaging study
  - Glass drop study
  - WW mechanism packaging
  - Seals study



## Project 02: Hood Design Process

- Class A Surface analysis.
- Hinge axis Determination
- Seal surface creation
- Master section
  - Upper hinge
  - Lower hinge
  - Latch area
  - Hemming Requirement
  - Cantrail section
- Packaging study
  - Glass drop study
  - Latch mechanism packaging
  - Seals study.
- Pedestrian Safety regulation Study



# **GEOMETRICAL DIMENSIONING AND TOLERANCING FOR INDUSTRIAL DESIGNERS**

## **Interpretation Of Engineering Drawing**

- Introduction to Engineering Drawing
- View Projections (First angle and third angle)
- Different types of views

## **Introduction To Geometric Dimensioning And Tolerancing**

- What is GD&T?
- When, why and how we use GD&T?
- Types of dimensions and tolerances
- Part features, non-size features and Features of size
- Symbols, terms and rules

## **Datum**

- Application of Datums
- Datum Features
- Datum feature identification and selection
- Datum targets



## **Form Control**

- Straightness
- Flatness
- Circularity
- Cylindricity

## **Orientation Control**

- Parallelism
- Perpendicularity
- Angularity

## **Position Control**

- Positional tolerance
- RFS
- MMC
- LMC

## **Profile Control And Runout**

- Profile specification
- Circular runout
- Total runout

## CONTACT US

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