Mercedes Engine Designing & Analysis

Introduction

- What is an automobile?
- Brief history.
- Indian automobile industry.

Vehicle Dynamics

- Introduction to Friction and its types.
- Introduction and Calculation of Air drag offered to a car
- Crash Analysis of high speed cars
- How to perform crash analysis using solid works
- Effect of composite materials on vehicle performance

Chassis design: **Introduction to Types of chassis**

Ladder frame chassis.

- Tubular space frame chassis.
- Monocoque frame chassis.
- Backbone frame chassis..
- Carbon fibre Monocoque.

Suspension Unit: Brief terminology

- Weight Transfer
- Camber and Caster angle
- Spring Rate
- Suspension Travel

Types of suspensions

- Dependent suspension
- Independent suspension
- Direct Control Suspension with selective damping in Mercedes Benz

Steering System

- Ackerman Steering Principle
- Steering Mechanisms
  - Rack and Pinion
  - Recirculating Ball Type
  - Worm and Sector
- Under steer, Over steer
- Power Steering

Transmission system

- Flywheel
- Clutch
- Gearbox
  - Constant mesh type
  - Synchromesh type
  - Sliding mesh type
- Types of Transmission
  - Manual
  - Semi-Automatic
  - Automatic
  - CVT
  - 7-G automatic transmission in Mercedes Benz.

- Differential
- 2WD, 4WD, AWD
- Tyres (notations and types)
- Traction Control
- Tire Pressure loss warning system in Mercedes Benz.

Braking Unit

- Disc Brakes
- Drum Brakes
- Magnetic Brakes
- Vacuum Brakes
- Anti-lock braking System
- Brake Actuators
- Power Brakes
- Brake Fluids

Fuel Supply System

- Fuel Filter
- Carburetor
- Fuel Injector
- Spark Plug

Day 2

IC Engine

- Introduction to IC Engine and its components.
- Types of IC Engine
- Engine Layout and working
- Differentiating between Petrol and Diesel Engine
- Introduction to In-line and V arrangements of cylinders and its effect on Engine performance
- Valves and Valve Timing
- Engine Cooling
- Fuel pre-heating
- CRDI, MPFI and Piezo Injectors.
- Turbochargers
- Superchargers
- Introduction to Various sensors in Mercedes Engines.
- Mechatronics in Mercedes Benz for Vehicle performance and Driver□s comfort.

More about Racing Cars

- Introduction to F1 Racing Cars
- Introduction to BAJA and SUPRA
- Interesting facts about F1 Drivers
- Aerodynamics of F1 Cars.
- Difference in Engine of a normal car and a Racing Car.

Edge Features in Mercedes Benz

- Brake drying
- Crash safety
- Adaptive high-beam assist
- ABS and ASR
- Adaptive Brake system with Hold function.
- ESP
- Neck-Pro head restraints
- Parktronic system
- Supplemental Restraint System
- Intelligent Light system
- Concept blue zero.

Project 2:

Live Demonstration

- Mercedes in-line 6 cylinder Engine Parts Showcase
- Measurement of Engine cylinder volume
- Display of various sensors in the Engine.