

# Course Content of Racing Car Formula

## SESSION 1

- INTRODUCTION TO CONCEPT OF DESIGN AND DYNAMICS.
- WHAT IS THE NEED OF DESIGN IN INDUSTRY.
- HOW TO ANALYZE THE PROBLEM IN THE R&D DEPARTMENT.
- HOW TO SOLVE THE PROBLEM.
- NEED OF DESIGN IN AUTOMOBILE INDUSTRY
- ONGOING RESEARCH IN AUTOMOBILE INDUSTRY

## SESSION 2

- WHAT IS THE CONCEPT OF DYNAMICS.
- ROLE OF DYNAMICS IN SOLVING THE PROBLEMS.
- CONCEPT OF VEHICLE DYNAMICS.

## SESSION 3

- DYNAMICS OF CHASSIS OF VEHICLE
- HOW TO CALCULATE CENTRE OF GRAVITY OF A VEHICLE
- HOW TO BALANCE THE DEAD LOAD ON THE CHASSIS
- CONCEPT OF DESIGNING OF COMMERCIAL CAR CHASSIS
- CONCEPT OF DESIGNING OF RACING CAR CHASSIS
- FINDING THE PROBLEM IN DESIGNING OF CHASSIS
- OPTIMIZATION OF STRENGTH TO WEIGHT RATIO.

## SESSION 4

- DYNAMICS OF BRAKING SYSTEM
- HOW TO FIND PROBLEMS IN BRAKING DESIGN
- PARAMETERS OF BRAKING DYNAMICS
- MARKET SURVEY FOR THE BRAKE DESIGN
- CALCULATION OF THE BRAKING EFFORT

## SESSION 5

- CALCULATION OF THE STOPPING DISTANCE
- CALCULATION OF DEACCELERATION
- CALCULATION OF THE WEIGHT DISTRIBUTION DURING DEACCELERATION
- BRAKING TORQUE
- FINALLY PREPARATION OF BRAKE DESIGN REPORT.

## SESSION 6

- STEERING DYNAMICS AND DESIGNING
- STEERING PRINCIPLE
- STEERING GEOMETRY
- STEERING DYNAMICS PARAMETERS

## **SESSION 7**

- SLIP ANGLE
- TURNING RADIUS
- OVER STEER
- UNDER STEER
- STEERING RATIO CALCULATION
- STEERING EFFORT CALCULATION
- FINALLY PREPRATION OF DESIGN REPORT OF STEERING

## **SESSION 8**

- SUSPENSION DYNAMICS
- SUSPENSION REQUIREMENT FOR THE RACING CAR
- SUSPENSION REQUIREMENT FOR THE COMMERCIAL CAR
- SELECTION OF SUSPENSION FOR THE CAR
- PROBLEMS IN SUSPENSION DESIGN

## **SESSION 9**

- CALCULATION OF ROLL CENTRE
- DESIGNING OF SPRING OF THE SUSPENSION SYSTEM
- DESIGNING OF SHOCK ABSORBER FOR THE SUSPENSION SYSTEM
- DESIGNING OF HUB
- DESIGNING OF KNUCKLE
- DESIGNING OF WISHBONES

## **SESSION 10**

- CALCULATING THE LENGTH OF THE WISHBONE
- GRID SHEET DESIGNING OF WISHBONE
- CONCEPT OF DIVE AND SQUAD
- CALCULATION OF ANTI-DIVE& SQUAD FOR THE RACING CAR
- DESIGNING OF WISHBONES FOR THE ANTI-DIVE & SQUAD
- FINALLY A COMPLETE DESIGN REPORT OF SUSPENSION

## **SESSION 11**

- INTRODUCTION TO SKETCHING
- BASIC TOOLS AND COMMONDS FOR THE SKETCHING
- DIMENSIONING

- DRAFTING
- INTRODUCTION TO 3D MODELING
- TOOLS FOR THE 3D

## **SESSION 12**

- MODELING OF SOME BASIC STRUCTURE
- MODELING OF COMPONENT OF AUTOMOBILE
- STEERING
- HUB
- KNUCKLE
- STEERING WHEEL
- TIRE
- RIM
- WISHBONES

## **SESSION 13**

- CONCEPT OF 3D SKETCHING
- 3D SKETCH MODEL
- SKETCHING OF FRAME OF RACING CAR
- CONCEPT OF WELDMENTS
- PROVIDING THE PROPERTY TO THE SKETCH (MATERIAL)
- CHECKING OF ALL THE JOINTS OF WELDING
- FINAL DESIGN

## **SESSION 14**

- CONCEPT OF FEA (FINITE ELEMENT ANALYSIS)
- FEA OF THE CHASSIS
- STRESS ANALYSIS OF THE CHASSIS
- TORSIONAL ANALYSIS OF THE CHASSIS
- PROVIDE THE RIGIDITY
- PROVIDE THE FACTOR OF SAFETY

## **SESSION 15**

- SURFACING CONCEPT
- SURFACING OF THE CHASSIS
- ASSEMBLY OF THE COMPONENT WITH THE CHASSIS
- RENDERING CONCEPT
- RENDERING OF THE FINAL DESIGN

## **SESSION 16**

- AERODYNAMICS DESIGN OF THE VEHICLE
- CONCEPT OF FLUID DYNAMICS
- AERODYNAMICS PROBLEM DURING THE MOTION
- AERODYNAMICS DEVICES

- AERODYNAMIC ANALYSIS OF AERODYNAMIC COMPONENTS