Vehicle Dynamics & Designing

Learning Goals: - The participants will get the knowledge and concept of Vehicle dynamics and designing. Designing parameters and process of designing of all the components for example Brake Calculation, Steering Calculation design , Suspension Designing and Frame designing & Analysis.

Course content:-

- 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

WHAT IS THE CONCEPT OF DYNAMICS.

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

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

• STEERING DYNAMICS AND DESIGNING

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

• SUSPENSION DYNAMICS

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

• 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

• 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

• INTRODUCTION TO SKETCHING

- BASIC TOOLS AND COMMONDS FOR THE SKETCHING
- DIMENSIONING
- DRAFTING
- INTRODUCTION TO 3D MODELING
- TOOLS FOR THE 3D MODELING

• MODELING OF SOME BASIC STRUCTURE

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

• CONCEPT OF 3D SKECHING

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

• CONCEPT OF FEA (FINITE ELEMENT ANALYSIS)

- FEA OF THE CHASSIS
- STRESS ANALYSIS OF THE CHESSIS
- TORSIONAL ANALYSIS OF THE CHASSIS
- PROVIDE THE RIGIDITY
- PROVIDE THE FACTOR OF SAFETY

• SURFACING CONCEPT

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

• AERODYNAMICS DESIGN OF THE VEHICLE

CONCEPT OF FLUID DYNAMICS

AERODYNAMICS PROBLEM DURING THE MOTION

AERODYNAMICS DEVICES

AERODYNAMIC ANALYSIS OF AERODYNAMIC COMPONENTS

Duration:- 3 Days

Fees:- 1250INR + Service Tax (per participants)