

Automobile

Session 1: Automobile & Designing Session

(Expected Session Duration: 1.5- 2.0 hours with Presentations, Demonstrations etc)

1. Introduction to Automobile Mechanics
2. Locomotive Vehicles
3. Chassis design

Brief terminology

1. Multipoint Strut Bar
2. Fenderbar
3. Anti Roll Bar
4. Monocoque
5. Tubular Space
6. Longerons RH, LH

Types of chassis

1. Ladder Frame Chassis
2. Tubular Space Frame Chassis
3. Monocoque Frame Chassis
4. Ulsab Monocoque
5. Backbone Frame Chassis
6. Aluminium Space Frame
7. Carbon Fibre Monocoque

Session 2: Suspension Session

(Expected Session Duration: 1.5- 2.5 hours with Presentations, Demonstrations etc)

Suspension Unit

Brief terminology

1. Weight transfer sprung and unsprung)
2. Jacking forces
3. Camber and caster angle
4. Anti dive & anti squat
5. Spring Rate
6. Travel

Types of suspensions

1. Dependent suspension
2. Independent suspension

Front Independent Suspensions

1. McPherson Strut
2. Double wishbone
3. Coil Spring type1
4. Coil spring type2
5. Multi link type
6. Trailing arm suspension
7. I beam suspension

Rear suspension - dependant systems

1. Solid-axle, leaf-spring
 2. Solid-axle, coil-spring
 3. Beam Axle
- Hydragas Suspension
Hydropneumatic Suspension
Progressively wound springs
Torsion bars

Session 3: Braking Unit Session

(Expected Session Duration: 1- 1.5 hours with Presentations, Demonstrations etc)

Braking Unit

Disc brakes

1. Self adjusting nature
2. Disc damage modes
3. Servicing your disc

Drum brakes

Anti-lock braking system

1. Four-channel, four-sensor ABS
2. Three-channel, three-sensor ABS
3. One-channel, one-sensor ABS

Brake Actuators

1. Cable-operated
2. Solid bar connection
3. Single-circuit hydraulic
4. Dual-circuit hydraulic
5. Brake-by-wire

Session 4: Transmission Session

(Expected Session Duration: 2- 2.5 hours with Presentations, Demonstrations etc)

Transmission system

Manual transmission

1. Gear ratio
2. Different types of gear
3. Clutch & its components
4. Reverse & its working

Automatic transmission

1. Planetary gearsets
2. DSG / DCT Gearboxes

Torque Converters

1. Semi automatic Transmission
2. Continuously variable transmission

Session 5: Differential & Traction Session

(Expected Session Duration: 2- 2.5 hours with Presentations, Demonstrations etc)

Differentials

Differentials

Open Differentials

Limited-slip differentials

Locking differentials

2WD, 4WD, AWD

Tyres and Traction Control

Tyre size notations

Tyre types for passenger cars

Tyre constructions

- Cross-ply construction
- Radial construction

Tyre tread

Traction & its control

Demonstration on

Bike Engine Dis-Assembling / Re assembling

Session 6: IC Engine Session

(Expected Session Duration: 3- 3.5 hours with Presentations, Demonstrations etc)

IC Engines

Types

- Compression ignition
- Spark ignition

Layout

Engine balancing

Spark plug

Carburettor

Fuel injector

Valves & valve timing

Valve trains

Engine cooling

Turbochargers

Superchargers

Air/Fuel ratios

Wankel Engine (6 stroke)

Session 7: Electronics & Safety Session

(Expected Session Duration: 1 – 1.5 hours)

Engine Sensors

Microcontrollers and applicable sensors

Electronics Usage and Feedbacking for vehicle analysis and control

Airbag System

Seat Belt System