AUTOMOBILE MECHANICS

Content

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. Longeron 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. Planetry 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

Number of Team Members: 1