

Automobile Mechanics & IC Engines Technology

- **Session 1: Basic 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. 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

Practical Demonstration on Bike Engine Dis-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:

Bike Engine Hands Dirty Session

(Expected Session Duration: 15 minutes per group with proper hands-on)

1. A group of 7-8 participants will be formed from workshop participants and every group will be called to perform an activity on engine whether its full or partial dis-assembly of the engine.
2. Engine Sub-Systems Identification

Session 8:

Latest Technology Session

(Expected Session Duration: 1 – 1.5 hours)

Latest Technologies

- PGMFi
- DTS-Fi
- MPFI
- CRDI
- RTR
- VVTi
- i-Vtec &TDI

Airbags & steering System