Workshop on Automobile Mechanics & IC Engine Design

Content of the workshop:

DAY 1
Session-1: Introduction (1 Hr)
- What is an automobile?
- Brief history
- Changes over the years
- Indian automobile industry
- Sigma ratings

Session-2: Chassis design (1 Hr)
- Brief terminology
1. Multi point strut bar
2. Fender bar
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

*All these will be explained with their current applications and the **advantages & disadvantages in various applications.***

Session 3: Suspension Unit (1 Hr 30 Min)
- 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
3. Front Independent Suspensions
4. McPherson Strut

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5. Double wishbone

6. Coil Spring type1

7. Coil spring type2

8. Multi-link type

9. Trailing arm suspension

10. I beam suspension

- Rear suspension - dependant systems

11. Solid-axle, leaf-spring

12. Solid-axle, coil-spring

13. Beam Axle

- Hydra gas Suspension
- Hydro pneumatic Suspension
- Progressively wound springs
- Torsion bars

Session 4: Braking Unit (1Hr)

- Disc brakes

1. Self adjusting nature

2. Disc damage modes

3. Servicing your disc

- Drum brakes
- Magnetic brakes
- Vaccum 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

- Power Brakes and master cylinders
- Brake fluids

Query Session (30 Min)
Session 5: Designing Using Software- Basics of AutoCAD & CATIA V5 (2 Hr)

- Drawing, modifying & dimensions in AutoCAD
- Sketching & Part modelling in CATIA.

On the basis of the commands taught one component of engine will be made to illustrate the use of commands in a better way.

Query and Competition (1 Hr)

DAY 2
Session 5: Designing Using Software- Basics of AutoCAD & CATIA V5 (1 Hr Continue...)

Session 6: Transmission system (2Hr)
- Types of Transmission system
1. Manual transmission
    - Gear ratio
    - Different types of gear
    - Clutch & its components
    - Reverse & it's working
2. Automatic transmission
3. Semi-Automatic Transmission
4. Continuously variable transmission
    - Differentials
1. Open Differentials
2. Limited-slip differentials
3. Locking differentials
    - 2WD, 4WD, AWD
    - **Tyres and Traction Control**
1. Tyre size notations
2. Tyre types for passenger cars
3. Tyre constructions
4. Cross-ply construction
5. Radial construction
6. Tyre tread
7. Traction & its control

Session 7: IC Engines (2 Hr)
- Types
- Compression ignition
- Spark ignition
- Layout
- Engine balancing
- Spark plug
- Carburetor
- Fuel injector
- Valves & valve timing
- Valve trains
- Engine cooling
- Turbochargers
- Superchargers

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- Air/Fuel ratios
- Wankel Engine (6 stroke)
- Latest technologies
- PGMFi
- DTS-Fi
- MPFI
- CRDI
- RTR
- VVTi

Session 8: Air Bags & Steering System (1 hr 30 Min)

- Apart from this a deep insight (how it works, how to make one, where to participate, how to go about the competition, various technical and financial aspects) of various student car projects like

a) Formula student car project
b) Solar vehicle
c) Mini Baja
d) Super Mileage Vehicle
e) Hybrid vehicle

1. Live Engine Demonstration - Honda 110 CC (45 Min) Query and Competition (1 Hr)
Hands-On:

- Basics of designing software i.e. CATIA V5 or Solidworks
- Learning of whole Automobile unit live Engine and car (if possible) through demonstration.

Eligibility: Any B-tech student who wants to pursue his career in Automobile industry
Duration: 2 days (8 hours per day)
Fees: `1250 /- per participant

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