RACING VEHICLE DESIGN & DEVELOPMENT **F1 STYLE**

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Summary:
A course in racing vehicle design & development makes you understand the basics and advanced of mechanical and structural system's engineering and design. The principles and practices discussed here also helps you in Aerodynamic systems, structural systems, and systems' design in general.

Topics:

- **Physics of Racing:** Laws of motion applied to Ground Vehicles, Tire data, Tire-engine optimisation, Acceleration, Breaking, and Cornering.
- **Basic Vehicle Structure**: Tire-Body-and Suspension.
- **Vehicle Dynamics**: Forces on a vehicle, Ride & Roll, Ground vehicle aerodynamics, Yaw, Vehicle stability, Speed-stability optimisation.
- **Vehicle Suspension system design**: Shock absorbers, Suspension methods, Wheel alignment and components,Ride handling, Double Wishbone suspension, Degrees of Freedom, Load analysis on wheel and suspension components.
- **Suspension Computation:** Vibrational computation & Solution, Modern computation for suspension system design.
- **Automatic Suspension**
- **Powertrain:** IC Engines - Diesel vs Petrol, Petrol engines, IC Engine tuning - Intake-Exhaust tuning, Fueling, Power modelling, Performance modelling, Electric Engines vs IC engines, Tuning in Electric engines, Powertrain Electronics.
- **Drivetrain:** IC Engine Drivetrain design, Gears, Axels, Differential, Automatic systems,Electric vehicle's drivetrain.
- **Driving Systems**: Acceleration system, Breaking Systems, Steering System, Automated driving systems.
- **Vehicle Structure**: Load analysis, Weight optimisation, Structural design methods, Use of modelling softwares, Computer Aided Engineering, Aerodynamic Analysis, Ergonomics.
- **Vehicle Body:** Aerodynamic Analysis, Aerodynamic modelling, Shape design, Computational Fluid Dynamics.
- **Vehicle Electrical, Electronics, and Safety.**