Vehicle Dynamics - Video course

COURSE OUTLINE

- ***Introduction to Vehicle Dynamics***
- ***Longitudinal Dynamics***

Vehicle Load Distribution – Acceleration and Braking - Brake Force Distribution, Braking Efficiency and Braking Distance - Longitudinal dynamics of a Tractor-Semi Trailer

- ***Tire Mechanics – An Introduction***

Mechanical Properties of Rubber - Slip, Grip and Rolling Resistance - Tire Construction and Force Development - Contact Patch and Contact Pressure Distribution

- ***A Simple Tire Model***

Lateral Force Generation - Ply Steer and Conicity - Tire Models – Magic Formula - Classification of Tire Models and Combined Slip

- ***Lateral Dynamics***

Bicycle Model - Stability and Steering Conditions - Understeer Gradient and State space Approach - Handling Response of a Vehicle - Mimuro Plot for Lateral Transient Response - Parameters affecting vehicle handling characteristics
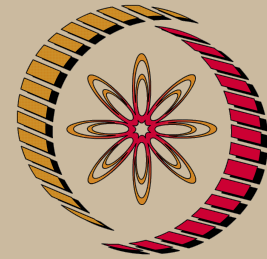
- ***Subjective and Objective Evaluation of Vehicle Handling***
- ***Vertical Dynamics***

Rollover Prevention - Half Car Model - Quarter Car Model

- ***Noise, Vibration and Harshness – Random Processes***

COURSE DETAIL

S.no	Topic	No. of hours
1	Introduction to Vehicle Dynamics	1

NPTEL

http://nptel.ac.in

Engineering Design

Pre-requisites:

Engineering Mechanics

Coordinators:

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4	A Simple Tire Model	6
5	Lateral Dynamics	5
6	Mimuro plot for lateral transient response	2
7	Subjective and Objective Evaluation of Vehicle Handling	3
8	Vertical Dynamics	3
9	Noise, Vibration and Harshness – Random Processes +	1

References:

- Pacejka, Hans. *Tire and vehicle dynamics*. Elsevier, 2005.
- Wong, Jo Yung. *Theory of ground vehicles*. John Wiley & Sons, 2001.
- Moore, Desmond F. "The friction of pneumatic tyres." (1975).
- Jazar, Reza N. *Vehicle dynamics: theory and application*. Springer, 2008
- Gillespie, Thomas D. *Fundamentals of vehicle dynamics*, 1992.