

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN AUTOMOBILE ENGINEERING
SEMESTER: V

Subject Name: **Vehicle Dynamics**

Sr. No.	Course Content
1	Balancing: Balancing of rotating mass. Balancing of single rotating mass Balancing of several rotating masses. Primary and secondary unbalanced forces of reciprocating masses. Partial balancing of unbalance primary force in reciprocating engines. Variation of tractive force. Swaying couple. Hammer blow. Balancing of primary forces of multicylinder in-line engine. Balancing of secondary forces of multicylinder in-line engine
2	Vehicle Vibration: Definition. Vehicle vibration with single degree of freedom. Free Vibration. Forced Vibration
3	Steering Mechanism: Condition for true rolling. Ackerman steering gear. Turning circle radius.
4	Suspension System: Vehicle suspension. Theory of chassis spring. Mechanism of independent. Suspension system. Roll axis and effect of side forces
5	Propeller Shafts and Axles: Propeller shaft. Universal joint and Hook's joint. Front axle. Bearing load on front axle. Bearing load on rear axle. Axle shafts. Axle mechanism
6	Vehicle Performance: Various resistances to vehicle. Power for propulsion. Traction and tractive effort. Relation between engine speed and vehicle speed. Acceleration, drawbar pull and gradeability. Distribution of weight. Calculation of Equivalent weight. Stability of vehicle on slope and while taking turn. Calculation of maximum acceleration, maximum tractive effort and relation for different drive. Factors affecting braking efficiency. Calculation of stopping distance. Braking of vehicle on curved path.
7	Ergonomics: Vehicle Vibration and human comfort. Factors affecting human comfort

Note: Every formulas/ equations, numerical problems must be in S.I Units only.

List of Tutorials:

1. Exercise on balancing
2. Report writing on Vibration
3. Exercise on steering mechanism
4. Exercise on suspension system
5. Exercise on propeller shaft and axles
6. Exercise on vehicle performance
7. Report writing on ergonomics

Reference Books:

1. Problems in Automobile Engg, K.M.Agrawal.
2. Theory of machine, by R. S. Khurmi, W. steeds.
3. The motor vehicle, I C Newton.
4. Mechanics of road vehicle, W. steeds.
5. Automobile Technology, Dr.N.K.Giri.
6. Auto Design, R.B.Gupta.