NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY, SCHOOL OF ENGINEERING

Mechanical Engineering Department
Open Electives (except Dept. of Mechanical Eng.)

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Course Code	**2MEOE52**
Course Title	**Introduction to Automobile Engineering**

Course Outcomes (CO):

After successful completion of the course, student will be able to-

1. demonstrate the various forces acting on vehicles
2. explain the application, working and construction details of various automobile systems
3. apply the knowledge of automobile systems/subsystems for troubleshooting
4. explain various air pollution control techniques used in automobiles

Syllabus **Teaching hours: 30**

UNIT I **Vehicle Performance** **04 hours**

Forces acting on vehicle, tractive force with uniform speed and with acceleration.

Chassis and body

Engine location, arrangement of clutch assembly, gear box, propeller shaft, front and rear axles, front or rear wheel drive, Types and construction of frames, sub-frames

UNIT II **Propulsion** **10 hours**

Overview of Internal Combustion Engines, Electric vehicle propulsion

Clutch

Constructional features, types of clutches, single and multiple plate clutch.

Gearbox

Synchromesh type of gearbox, automatic gear transmission, fluid coupling, torque converter, Continuous Variable Transmission.

Propeller shaft

Universal, slip and constant velocity joints, overview of shaft and drives.

Final drive and axles

Types of final drive, differential, rear axle

UNIT III	**Suspension** Types, front and rear suspension, its arrangement and components, Independent suspension, Fluid and Air Suspension, Types of Springs, Dampers. **Steering** Layout, types of steering gears, linkages and mechanism, power assisted steering, four wheel steering **Brakes** Types, braking distance, self-energizing effect, Hydraulic and pneumatic braking, Power brake Antilock Braking System, Regenerative braking. **Tyres and Wheels** Introduction to wheels, Types of wheels, classification and construction of tyres, Tread patterns, Cross ply, Radial & tubeless tyres	**08 hours**
UNIT IV	**Electrical & Electronic Systems:** Battery: Construction, working, charging methods, tests for battery, construction and working of generator, current, voltage and cut out regulator, alternators, types and construction of starting motors, fuel and temperature gauge, speedometer and odometer, horn wipers, Head lamp, signaling system, ECM.	**03 hours**
UNIT V	**Air Pollution and Control:** Treatment of exhaust gas, catalytic converter, control of NOX and total emission control package, standards for emissions **Automobile Law:** Motor Vehicle Act, registration of motor vehicles, driving license, control of traffic, insurance against third party, claims for compensation.	**03 hours**
UNIT VI	**Advances in Automobile:** Electrical vehicle, hybrid vehicle, Driverless Cars, Automated Manual Transmission, V2V communication, Advance Safety Systems.	**02 hours**
Self - Study	The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.	

Laboratory Work:

Laboratory work will be based on above syllabus with minimum 10 experiments/exercise to be incorporated.