

5 th Semester	RAU5D004	Automotive Fuels, Emissions and Lubrications	L-T-P 3-0-0	3 CREDITS
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MODULE I**(6 HOURS)****Introduction**

Estimation of petroleum reserve – need for alternate fuels – availability and properties of alternate fuels, ASTM standards

MODULE-II**(9 HOURS)****Types of Alternative Fuels for automobile applications**

Alcohols: general use of alcohols – properties as engine fuel – gasoline and alcohol blends – performance in SI engine – methanol and gasoline blend – combustion characteristics in engine – emission characteristics

Vegetable oils: soya been oil, Jatropha, Pongamia, Rice Bran, Mahuaetc as alternate fuel and their properties, esterification of oils

Natural gas, LPG: availability of CNG, properties, modification required to use in engines – performance and emission characteristics of CNG using LPG in SI & CI engines.

Hydrogen: hydrogen production, hydrogen as an alternative fuel, fuel cell

Biogas

Electric and solar powered vehicles: layout of an electric vehicle – advantage and limitations- specifications –system component – electronic control system – high energy and power density batteries – hybrid vehicle – solar powered vehicles

MODULE-III**(8 HOURS)****Automobile emissions & its control**

need for emission control -classification/ categories of emissions -major pollutants - control of emissions – evaluating vehicle emissions – euro I, II, III, IV, VI standards – Indian standards

MODULE –IV**(9 HOURS)****Theory of lubrication**

Engine friction: introduction, total engine friction, effect of engine variables on friction,hydrodynamic lubrication, elasto hydrodynamic lubrication, boundary lubrication, bearing lubrication, functions of the lubrication system, introduction to design of a lubricating system.

MODULE –V

(8 HOURS)

Lubricants and its properties

Specific requirements for automotive lubricants, oxidation deterioration and degradation of lubricants, additives and additive mechanism, synthetic lubricants, classification of lubricating oils, properties of lubricating oils, tests on lubricants. Grease, classification, properties, test used in grease.

Books:

- [1] Maxwell, Timothy. T, and Jesseco Jones, “Alternate Fuels: Emissions, Economics, and Performance”, Society of Automotive Engineers, 1995
- [2] Norbeck, Joseph M., “Hydrogen fuel for surface transportation”, Society of Automotive Engineers, 1996
- [3] Wakefield, Earnest Henry, “History of the electric automobiles: hybrid electric vehicles”,
- [4] Norbepundir B. R., “Engine Emissions: Pollutant Formation and Advances in Control Technology”, Narosa Publishing House
- [5] S. C. Bhatia, “Air Pollution and its Control”, Atlantic Publications, 2007