# Gautam Buddha University, Greater Noida

## School of Engineering (Mechanical Engineering)

| Degree | Course Name | Course Code | Marks:100 |
|---|---|---|---|
| M. Tech. in Thermal Engg. | Alternate Fuels | MET 512 | SM+MT+ET 25+25+50 |
| **Semester** | **Credits** | **L-T-P** | **Exam.** |
| II | 3 | 3-0-0 | 3 **Hours** |

### Unit - I

**Introduction:** Working processes in I.C. engine; Fuel efficiency; Fuel requirement; Rating of fuels; Ignition quality; Volatility; Sources of fossil fuels; Scope of availability of fossil fuels; Need for alternative fuels; Calculation of air / fuel ratio; Calorific value; engine efficiency; Engine life. **(07 Hours)**

### Unit - II

**Alcohols:** Sources; Methanol & ethanol; Production methods; Properties of methanol & ethanol as engine fuels; Use of alcohols in S.I. & C.I. engines; Performance of methanol & gasoline blends; Alcohol diesel emulsions; Dual fuel systems; Emission characteristics. **(09 Hours)**

### Unit - III

**Hydrogen:** Properties of hydrogen with respect to its utilization as a renewable forms of energy; Sources of hydrogen; Production; Transportation; Storage; application & economics of hydrogen. **(07 Hours)**

### Unit - IV

**Fuel Cells and Solar Power:** Hydrogen; Methanol fuel cells; Power rating and performance; Heat dissipation; Layout of a fuel cell vehicle; Solar Power; Solar cells for energy collection; Layout of solar powered automobiles. **(07 Hours)**

## Unit - V

**Bio-Diesels and Engine Performance**: Karanji oil; Neem oil; Rice bran oil; Linseed oil; Sunflower oil; Properties; Diesel & vegetable oil blends; Engine performance; Surface ignition; Additives; Hybrid power plants and fuel cells

**(07 Hours)**

## Unit - VI

**Electric Vehicles:** Layout of an electric vehicles; Advantage & limitations; Significations; Systems components; Electronic controlled systems; High energy & power density batteries; Hybrid vehicles. **(08 Hours)**

## Recommended Books:


1. C. I. Engine Performance for Use with Alternative Fuels; Society of Automotive Engineers; 2009.
2. Alternative Fuels: The Future of Hydrogen; Hordeski; M. F.; CRC Press; 2006.
3. Alternative Fuels: Emissions; Economics and Performance; T. T. Maxwell and J. Jones; Society of Automotive Engineers; 2002.
4. Commercial Vehicle Alternative Fuels; Society of Automotive Engineers; 2007.
5. Alternative Fuel: The future of Hydrogen; M. F. Horeski; Tayler and Francis Ltd.; 2008