

BIOMASS ENERGY SYSTEMS

Subject Code	: 10ME843	IA Marks	: 25
Hours/Week	: 04	Exam Hours	: 03
Total Hours	: 52	Exam Marks	: 100

PART - A

UNIT - 1

Introduction: Biomass energy sources, energy content of various Bio – fuels, Energy plantation, origin of Biomass photo synthesis process, Biomass Characteristics, sustainability of Biomass.

06 Hours

UNIT - 2

Biomass Conversion Methods: Agrochemical, Thermochemical, Biochemical (flowchart) & Explanation.

06 Hours

UNIT - 3

Physical & Agrochemical Conversion: Briquetting, Pelletization, Agrochemical, fuel Extraction, Thermo chemical Conversion: Direct combustion for heat, Domestic cooking & heating.

07 Hours

UNIT - 4

Biomass Gasification: Chemical reaction in gasification, Producer gas & the constituents, Types of gasifiers. Fixed bed gasifiers, Fluidized bed gasifiers. Liquefaction: Liquefaction through pyrolysis & Methanol synthesis, application of producer gas in I C Engines.

07 Hours

PART – B

UNIT - 5

Bio-Methanization: Anaerobic digestion, Basic principles, factors influencing Biogas yield, classification of Biogas digester, floating gasholder & fixed dome type. (Working Principle with diagram), Calculations for sizing the Biogas plant.

06 Hours

UNIT - 6

Biogas For Power Generation: Ethanol as an automobile fuel, Ethanol production & its use in engines.

06 Hours

UNIT - 7

Bio - Diesel: Bio Diesel from edible & non-edible oils, Production of Bio diesel from Honge & Jatropha seeds, use of bio diesel in I C engines, Engine power using Bio diesel, Blending of Bio diesel, Performance analysis of diesel engines using bio diesel. Effect of use of bio diesel in I C engines.

07 Hours

UNIT - 8

Bio Power Plants: Bio Power generation routes, Basic Thermodynamic cycles in Bio power generation; Brayton cycle, Sterling cycle, Rankine cycle, Co-generation cycle. Biomass based steam power plant.

07 Hours

TEXT BOOKS:

1. **Bio Gas Technology**, B.T. Nijaguna. New Age International- New Delhi.2001-02
2. **Energy Technology**, S. Rao & B. B. Parulekar – Khanna Publishers, Delhi-1999.
3. **Non Conventional Energy Sources**, G. D. Rai - Khanna Publishers. Delhi.

REFERENCE BOOKS:

1. **Greenhouse Technology for Controlled Environment**, G.N. Tiwari, Alpha Science International Ltd., Pangbourne.England.
2. **Renewable Energy Resources**, John.W.Twidell, Anthony. D. Weir, EC BG-2001.
3. **BioMass, Deglisc. X and P. Magne**, Millennium Enterprise, New Delhi.