KARUNYA INSTITUTE OF TECHNOLOGY AND SCIENCES
(Declared as Deemed to be University under Sec. 3 of the UGC Act 1956)
A CHRISTIAN MINORITY RESIDENTIAL INSTITUTION
AICTE Approved & NAAC Accredited
Karunya Nagar, Coimbatore - 641 114, Tamil Nadu, India

DEPARTMENT OF MECHANICAL ENGINEERING

Centre for Research in Renewable Energy (CRRE)

The purpose of this laboratory is to familiarize students with thermo-chemical conversion and bio-chemical conversion methods of biomass. The lab facilities available are pyrolysis reactor, anaerobic digester, biomass gasifier, gas chromatography and multi fuel engine test rig. In this laboratory, the biomass waste is converted into useful energy. Liquid fuel, gaseous fuel is obtained from biomass. Thermal and electric power can be generated from biomass waste.

Course Objectives:

To impart knowledge on

- The thermochemical conversion method of biomass
- The anaerobic digestion process of biomass waste
- The working principle of alternative fuel in IC engines

Course Outcomes:

At the end of the course, the student will be able to

- Analyze the yield of bio-oil from biomass waste
- Evaluate the composition of bio-oil
- Apply the thermo chemical conversion method of biomass
- Design a lab scale pyrolysis reactor
- Understand the production of bio gas from animal waste
- Analyze the composition of exhaust gases

Facilities available for regular class work, project, research and consultancy

- ✓ Pyrolysis Reactor
- ✓ Biomass Gasifier
- ✓ Anaerobic Digester
- ✓ Biogas Plant
- ✓ Multifuel Engine Test Rig
- ✓ Exhaust Gas Analyzer
- ✓ Biogas Flow Meter
- ✓ Gas Chromatography
- ✓ Ball Mill Grinder
- ✓ Sieve Shaker
- ✓ Biomass Crusher

Major Equipment's:

Fig. 1 Fixed Bed Pyrolysis Reactor

Fig. 2 Biomass Gasifier

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Fig. 3 Biogas Plant

Fig. 4 Gas Chromatography

Fig. 5 Fluidized Bed Pyrolysis Reactor

Fig. 6 Sieve Shaker

Fig. 7 Ball Mill

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Fig. 8 Multifuel Engine Test Rig

Fig. 9 Biomass Crusher

List of Experiments:

1. Bio oil production from non-edible oil cake using fixed bed pyrolysis reactor.
2. Wood gas production using biomass gasifier.
3. Biogas production from animal waste using biogas plant.
4. Production of pyrolysis oil from saw dust using fluidized bed pyrolysis reactor.
5. Performance of bio diesel in multi-fuel engine test rig.
6. Performance of biogas in multi-fuel engine test rig.

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