

<b>Course No: CAF (EOES) -472</b>	<b>Semester: VII</b>
<b>Course title: Renewable Energy Technologies</b>	<b>Credits: 3 (2+1)</b>

**Syllabus:**

Design and operational parameters, performance evaluation and maintenance aspects of different renewable technologies like gasifiers, biogas plants, solar passive heating devices, photovoltaic cells and arrays, briquetting machines and balers; bio-diesel utilization in CI engines.

**Practical:** Performance evaluation of solar water heater; performance evaluation of solar cooker; Characteristics of solar photovoltaic panel; evaluation of solar air heater/dryer; Performance evaluation of a rice husk throatless gasifier engine system; Performance evaluation of down draft gasifier with throat for thermal application; Performance evaluation of a fixed dome type biogas plant; Performance evaluation of floating drum type biogas plant; Estimation of calorific value of producer gas; Testing of diesel engine operation using biodiesel; Evaluation of briquetting machine using biomass material; evaluation of rice straw briquette.

<b>Lec. No</b>	<b>Topic</b>	<b>Text Book No</b>	<b>Chapter No.</b>	<b>Article No.</b>	<b>Page No.</b>
	Design and operational parameters, performance evaluation and maintenance aspects of				
1-2	Gasifiers	1	Chapt.4		73-97
3-4	Biogas plants	2 2 1 2	Chapt.8 Chapt.6 Chapt.5 Chapt.7	8.1-8.6 6.1-6.8 7.1-7.5	51-58 39-45 103-130 45-50
5	<b>Solar Passive heating devices</b>  Solar water heater	4  3	Chapt.3 Chapt.5  Chapt.6	3.3(A), 3.5 5.2 6.7	76-81 91-94 147-151 128-134
6	Solar Air heater	4	Chapt.3	3.3 (B)	81-86
7	Solar still	3	Chapt.6	6.6 6.6.1-6.6.4	123-128 229
8-9	<b>Solar Dryers</b>	3 6	Chapt.6 Chapt.6	6.5 6.3	119-123 294-296 117- 120,299
10	Solar Cookers	3	Chapt.6	6.4	112-119

				6.4.1-6.4.4	259
11-12	Photovoltaic cells and arrays	3	Chapt.7	7.1-7.9	136-152 267-268
13-14	Briquetting machines and balers	3	Chapt.4	4.1-4.6.2	69-83
15-16	Bio-diesel utilization in CI engines.	5	Tech. Session IV 1,2,3		139-170

### List of practical

1. Performance evaluation of solar water heater/ solar cooker.
2. Determination of characteristic of solar photovoltaic panel.
3. Evaluation of solar air heater/ dryer.
4. Performance evaluation of rice husk throatless gasifier engine system.
5. Performance evaluation of downdraft gasifier for thermal application.
6. Performance evaluation of fire dome biogas plant.
7. Performance evaluation of floating drum type biogas plant.
8. Estimation of calorific value of producer gas.
9. Testing of diesel engine operations using biodiesel.
10. Evaluation of briquetting machine using biomass material.
11. Evaluation of (rice straw) agro residual waste briquette.

### List of textbooks:

1. Biotechnology and other Alternative Technologies for utilization of biomass/ Agricultural wastes, A. Chakerverty.
2. Biotechnology, A. Practical hand book, K. C. Khandalwal and S. S. Mahdi 1986.
3. Renewable Energy, theory and practice, N. S. Rathore, N.C. Panwar, A. K. Kurchania, 2008.
4. Non- conventional sources of energy, G. D. Rai, Forth Edition.
5. National conference on, Biodiesel for Ic engine-Technologies and strategies for rural application. CIAE, Bhopal
6. Principle of Renewable Energy – Twidell and Weir

### Reference Book:

- 1) Culp A. W. (1991). Principal of Energy conversion, Mcgraw Hill pub. Co, Inc.
- 2) Garg H. P, and odum, E. C. (1976) Energy basis for man and nature, Mcgraw Hill pub. Co, Inc.
- 3) Dufee, J.A. and Beckman, W.A.(1986), Renewable Energy sources, E and FN Spon Ltd London.