



# DURGAPUR INSTITUTE OF ADVANCED TECHNOLOGY & MANAGEMENT

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## Strategic Plan for Learning and Teaching Department of Chemical Engineering

<b>Branch Name:</b>	Chemical Engineering (CHE)	<b>Session :</b>	2018-2019
<b>Subject Name:</b>	Energy Technology	<b>Year:</b>	2 <sup>nd</sup>
<b>Subject Code:</b>	ES-302	<b>Semester :</b>	3 <sup>rd</sup>

<b>Course Objective:</b>	To impart the fundamental knowledge of different types of conventional and non-conventional energy resources.
<b>Course Outcome:</b>	<ul style="list-style-type: none"> <li>Will be able to understand and perform the various characterization techniques</li> <li>Effective utilization of solid, liquid and gaseous fuels and alternate energy sources</li> <li>Acquiring the knowledge of energy demand of world, nation and available resources to fulfill the demand and different modern energy conversion technologies</li> </ul>

### Teaching-Learning Plan:

Lecture Class No.	Reference to the WBUT Syllabus	Subject Topics to be discussed/ covered/ delivered	Text book / Referred book Sl.No.
1	Module 1	Introduction: Conventional (fossil energy) and non-conventional (alternative energy) resources & reserves.	1,2
2		Global Energy production & consumption pattern. Production & consumption pattern in India.	
3		Solid Fuels: Biomass, Wood and Charcoal. Classification & Rank of Coal, Peat, Lignite, Sub-Bituminous coal, Bituminous coal, Anthracite coal, Cannel & Bog head coal.	
4		Physical Properties of coal, Proximate & Ultimate Analysis of Coal	
5		Cleaning, washing & Storage of coal.	
6		Theory of coal Pyrolysis and Carbonization:	
7		Low Temperature Carbonization (LTC), High Temperature Carbonization (HTC),	
8		Horizontal & Vertical Gas Retorts, Coke Ovens-Beehive & By product Slot type.	
9		Recovery of by products.	
10		Details of Structural configuration and operating principles.	
11	Module 2	Liquid Fuels: Constitution of petroleum, theory of formation of crude petroleum oil. Characterization of crude oil & petroleum fuels.	
12		Operation and flow-sheet of crude distillation plant.	
13		Thermal & catalytic cracking and reforming processes, coking, visbreaking, Process of a typical Indian refinery.	
14		Parameters and testing logistics of petroleum products—Octane no.; Cetane no.; Aviation fuel, Power no.	
15		Pour point; Smoke point; Char point; Cloud point;	
16		Flash point; Fire point; Aniline point and Diesel index.	
17		Liquid fuel from coal: Bergius and	
18		Fischer Tropsch process.	

19		Other Synthetic Liquid fuels.(Benzol, shaleoil,	
20		Gashol, power alcohol Colloidal fuel).	
21	Module 3	Gaseous Fuels: Classification of gaseous fuel; Physico-chemical principles, Calorific Value, Wobbes index, and flame speed.	1,4
22		Flow sheet & operation of Producer gas, Water gas,	
23		Carburetted water gas, oil gas,	
24		coke-oven gas,	
25		blast furnace gas,	
26		Natural Gas and LPG.	
27		Coal Bed Methane.	
28		Bio Gas: Principles and Operation of Aerobic & Anaerobic digestors,	
29		Biogas generation and	
30		Management& flowsheet with special reference to waste utilization.	
31		Module 4	
32	Different types of Solar collectors (Flat plate, parabolic, concentric & heliostat)		
33	Utilization of Solar Energy- For room heating, water heating other industrial uses -		
34	solar Pond, Photovoltaic cells, Chemical storage etc		
35	Geothermal Energy & Wind Energy: Utilization of Geo thermal Energy;		
36	Operating principles of different types of Wind Energy Mills.		
37	Energy from Ocean		
38	Nuclear energy: Sources of Nuclear fuels, Indian scenario;		
39	Nuclear reactions and power generation by Nuclear reactors-		
40	Breeder reactor- reaction & operation.		

#### Recommended Text/ Reference Books:

Sl.No.	Name of Text/ Reference Book	Name of Author	Publisher & edition
1	Fuels & Combustion	Dr. Samir Sarkar,	Orient Longmans
2	Elements of Fuels. Furnace and Refractories	O.P .Gupta	
3	Non conventional energy sources	G.D.Rai	Khanna Publishers
4	Fuel and Combustion	Sharma S.P. and Chanra Mohan	
5	Fundamentals of Renewable Energy Systems	D. Mukherjee and S. Chakrabarti,	New Age Intnat. Publishers

#### Course Co-ordinator / Faculty

Sl. No.	Name of the Course Co-ordinator / Faculty	Signature of Course coordinator / Faculty		Signature of HOD	
1	Dr.Pronoy Kumar Sinha				
2	Dr. Ardhendu Sekhar Giri				