	le: Wind, biomass, and other renew			-			
			redits: 3	L-T-P: 45-0-0	Learning hours: 45		
_	site course code and title (if any):	NA					
	nt: Sustainable Engineering		Course inst	muston(a), Drof Nogu	A	/	
Course co	ordinator: Prof. Naqui Anwer		Dr Sapan Th	ructor(s): Prof. Naqui napar	Anwer		
	etails: naqui.anwer@terisas.ac.in			•			
Course ty			Course offe	red in: Semester 2			
Course de	scription						
Wind tech thermal en technologi principles	e is designed to make the student nologies. Other RE technologies, su nergy conversion will also be co es (both thermo-chemical and bio- of the technologies, experience ga ing with conventional energy/power iectives	uch as geo overed. T -chemical ained on t	thermal energy he main topi methods of co he ground, le	y, tidal energy, wave e cs covered are: bior onversion) and liquid	nergy an nass co bio fue	nd ocea nversio ls. Basi	n n ic
Course on	jeenves						
	velop understanding the various r	oute to ge	enerate energy	from biomass and o	ther rea	newable	e
resour	ces culate energy production potential;	energy of	ntent in vorio	is resources			
	entify challenges and strength of var						
Course co				6			
Module	Торіс				L	Т	P
1.	Wind technologies				16	0	0
	Different types of wind turbine Trends in development of wind principles, trends in evolution	d turbines					
	Offshore wind turbines, onsho turbines, floating wind turbine	re vs offs		pinent			
	Wind turbine manufacturing	3					
	Transport, logistics, assembly a	and instal	lation of win	d			
	turbines						
	connection of power produced	to grid tr	ansport				
2.	Biomass Technology:						
	Thermo-chemical conversibility biomass, biomass processific combustion, biomass stoves biomass, biomass gasification, draft), downdraft (Open core, gasifier thermal applications, and 100% gas mode operation, grid interactive).	ng, bric s, bioma , gasifiers throat ty gasifier f	uetting, pe ss carboniz [updraft (fo pe & modul for engine ap	ation, pyrolysis o orced draft & Natura ar)], Gasifier stoves oplications: dual fue	s 8 f 8 1	0	0
	<i>o</i>				8		
	Bio-chemical conversion: A sludge process, plug flow reareactor, anaerobic fluidized la anaerobic digestion system designs of biogas plants for an	ctors, an bed react for MS	aerobic fixed or, estimatio W, Vermi-o	d film reactor, UAS on of methane yiel composting, differe	B d, nt		
	Liquid Bio Fuels: Liquid bi preprocessing, transesterificat fuels, production of syngas fr syngas, production of ethanol fuel applications	ofuels, n tion, bio rom biom	on-edible oi diesel, chara ass, product	lseeds, oil extractio acterization of liqu ion of methanol fro	6 n, id m		

	Other Renewable Energy Technologies			
3.	Geothermal technology, wave energy, tidal energy, ocean thermal energy, Considerations for power and heat generation, Status of commercialization Examples of operational projects and challenges Challenges of integrating renewable energy with conventiona energy/power system	7	0	0
		45	0	0
Evaluatio	n criteria			
AssigMinoMinoMajo	nments: 20% (after Module 1 and 3 and 5) r test 1: 15% (after Module 1) r test 2: 15% (after Module 2)			
Learning	outcomes			
On succes	sful completion of this course the students will be able to:			
 Ident Quan Trans Pedagogi A combin Materials 	ended readings			
(TERI Pre		endium	", ed.	
Reference	Books			
USA) Godfrey B Thomas R Energy Fo	lass, "Biomass for Renewable Energy, Fuels, and Chemicals", (Entech Intervole, "Renewable Energy", (Atlantic Publishing Company, 2008) ead & Agua Das, "Handbook of biomass downdraft gasifier engine systems" (bundation Press, 1988) Mitzlaff, "Engines for Biogas – Theory, Modification, Economic O peration" (aft fur Entwicklungstechnologien GATE, 1988) d information (if any):NA	The Bio	mass	
Addition				
Addition	esponsibilities			

Course Reviewers

- 1. Prof. S. Maji, Department of Mechanical Engineering, SOET, IGNOU, New Delhi
- 2. Dr Oruganty Prasada Rao, Scientist, CSIR (Retired)