FACULTY OF ENGINEERING & TECHNOLOGY Somester I					G	ANPAT	'UNI	VERSITY						
Programme			FA	CULT					HNOLC)GY				
Semester									gy)					
Teaching scheme Teaching scheme Examination scheme (Markey Cere week) Lecture (PCP) Practical (Lab.) Total Ce SEE Total				I						<i></i>				
Teaching scheme	Effective	from Acad	lemic	Year	2	025-2026		Effective for the	batch Adn	nitted in	July	2025		
Credit L TU P TW								Grid Integration	of Renewa	able Energy				
Credit			Те	aching sch	eme			Exa	mination s	cheme (Mar	ks)			
Credit	(Per v	week)	Lectu	ure(DT)	Practi	cal(Lab.)	Total		CE	SEE	To	tal		
Pre-requisites: Sample S					1									
Pre-requisites: Course Outcomes: On successful completion of the course, the students will be able to: CO1 Understand the need, challenges, and concepts related to integrating renewable energy sources into the grid CO2 Analyze the operation and integration of synchronous and induction generators with grid-connected systems. CO3 Evaluate power quality issues and apply grid management techniques for reliable operation. Theory syllabus CO4 Apply principles of wind and solar energy systems for efficient energy extraction and integration. Theory syllabus Introduction: Various techniques of utilizing power from renewable energy sources, Concept of nano/micro/mini grid, Need of integrating large renewable energy sources, Susues related to integration of large renewable energy sources, Sonotop plants. Concept of VPP. Power System Equipment's for Grid Integration: Synchronous generator: Synchronous depraction, Stability due to variable speed and counter measures Power Electronies: Need of power electronic equipment's in grid integration, Converter, Inverter, Chopper, AC regulator and cyclo converters for AC/DC conversion Power Quality and Management: THD, voltage sag, Voltage swell, Frequency change and its effects, Network voltage management, Frequency management, System protection, Grid codes Wind Energy System: Principles of wind energy extraction, Grid Integration Challenges, Electromechanical energy conversion, Characteristics of wind turbines, Voltage regulation in wind systems Solar Energy Systems: Solar Energy Systems: The photovoltaic (PV) cells, Energy conversion principles, Electrical modelling, Optimal power extraction, Effects of shading, Solar thermal systems, Operating principles Storage capability. Integration of Alternate Sources of Energy; Introduction, Principles of power injection, Converting technologies, power flow, Instantaneous integration, AC link integration, HFAC link integration instance and unterview and reactive and reactive and reactive appreach, Integrating multiple re								•						
Course Outcomes: On successful completion of the course, the students will be able to: CO1		• •,	3	0	2	0	5	Practical	30	20	5	0		
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On successful completion of the course, the students will be able to: CO1	Course	Outcomos												
CO1			letion	of the cou	irse the	ctudente wi	ll be able	to:						
CO2									ewable en	ergy sources	s into the	e orid		
CO3														
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2.	Analysis of demand response and wind integration in Germany's electricity market, M. Klobasa, IET								
	Renew. Power Generation., Vol. 4, No.1, pp. 55–63 55, 2010.								
3.	Comparative analyses of seven technologies to facilitate the integration of fluctuating renewable energy								
	sources, B.V. Mathiesen H. Lund, IET Renew. Power Generation., Vol. 3, NO. 2, pp. 190–204, 2009.								
ICT/MOOCS									
1.	https://www.youtube.com/watch?v=MocCm-3mA7c								
2.	https://onlinecourses.nptel.ac.in/noc23_ee60/preview								
3.	https://archive.nptel.ac.in/noc/courses/noc18/SEM2/noc18-ee42/								

	Mapping of CO with PO and PSO:														
	PO1	PO2	PO3	PO4	PO5	P06	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	0	1	3	2	1	1	1	2	2	1	3	1	3
CO2	3	2	0	0	2	2	1	1	0	0	2	0	1	1	0
CO3	1	1	1	0	2	1	2	2	0	0	0	0	3	3	0
CO4	1	1	2	2	1	0	1	2	3	3	1	1	1	1	2