Microgrid
Centre of Excellence

Activities Before Compliance

The Microgrid-COE is utilised by our Students by conducting experiments and analysing the performance of the Renewable energy sources like Standalone Solar Kit,Grid Tied Solar Kit and the Wind Turbine Kit which has been included in the Curriculum.Faculties have published papers and books.

Curriculum of

B.Tech -EEE

1. Simulation Laboratory for Renewable Energy Systems - 2013 Regulation

Dr.M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
UNIVERSITY
(Decl. U/S 3 of UGC Act 1956)
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VII SEMESTER						
S.No	**Sub.Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	BEE13025	Power Distribution System	3	2	0	4
2	BEE13026	Power System Operation And Control	3	2	0	4
3	BEE13027	High Voltage Engineering	3	0	0	3
4	BMG13008	Principles Of Management	3	0	0	3
5	BEE13XXX	Elective-II	3	0	0	3
6	BEE13XXX	Elective-III	3	0	0	3
7	BEE13L06	Industrial Automation Laboratory	0	0	2	1
8	BEE13L07	Simulation Laboratory For Renewable Energy Systems	0	0	2	1
9	BEE13L08	Project Phase-I	0	0	6	3
		Total	**18**	**4**	**10**	**25**

2. Microgrid Laboratory - 2017 and 2018 Regulation

Dr.M.G.R Educational & Research Institute University

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Practical:

BEE17ESX	Elective (Special - Based On Current Technology) *	3	1	0/2	1/1	ETL
BEE17L12	Industrial Automation Laboratory	1	0	0/1	1/1	Lb
BEE17L13	Microgrid Laboratory	1	0	0/0	2/1	Lb
BEE17L14	Project Phase – 1	2	0	0/1	0/1	Lb
BFL17001	Foreign Language (Evaluation)	2	1	0/1	0/0	Ty

Credits Sub Total: 26

Dr.M.G.R Educational & Research Institute (Deemed to be University)
Department of Electrical & Electronics Engineering
Regulation 2018 (Based on AICTE Model Curriculum 2018)

Practical:

Course Code	AICTE Category	Course Title	C	L	T/SLr	P/R	T/L/ ETL
BEE18ET4	PCC	Industrial Drives and Automation*	3	1	0/2	1/1	ETL
BEE18L10	PCC	Microgrid Laboratory	1	0	0/0	3/0	L
BEE18L11	PCC	Power Electronics & Drives Laboratory	1	0	0/0	3/0	L
BEE18L12	PROJ	Project Phase – 1	2	0	0/0	1/1	L
BFL18XXX	HSS	Foreign Language (Evaluation)	1	1	0/0	0/0	L
	BSS	Open Lab	1	0	0/0	3/0	L

Credits Sub Total :22

M.Tech-Power Systems

1. Renewable Energy Lab - 2020 Regulation

M.Tech –Power System (Full Time)
Curriculum and Syllabus
2020 Regulation

I SEMESTER						
S.No	**Subject Code**	**Title of Subject**	**L**	**T**	**P**	**C**
1	MEE20P001	Power System Modelling & Analysis	3	0	0	3
2	MEE20P002	Power System Dynamics -I	3	0	0	3
3	MEE20PE01	Elective – I, Renewable Energy System	3	0	0	3
4	MEE20PE08	Elective – II, Electric and Hybrid Vehicles	3	0	0	3
5	MXX20XXXX	Research Methodology and IPR	2	0	0	2
6	MEE20PL01	Power System Steady State Analysis Lab	0	0	4	2
7	MEE20PL02	Renewable Energy lab	0	0	4	2
8	MXX20XXXX	Audit – I, English For Research Writing	2	0	0	0
		TOTAL	**16**	**0**	**8**	**18**

M.Tech-Power Electronics & Drives

1.Renewable Energy Technology Laboratory- 2016,2018 Regulation

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
UNIVERSITY
(Declared as Deemed to be University u/s.3 of UGC Act 1956)
Maduravoyal, Chennai 600 095.
(An ISO 9001 : 2008 Certified Institution)

M.Tech –Power Electronics & Drives (Full Time)
Curriculum and Syllabus
2016 Regulation

I SEMESTER						
S.No	Subject Code	Title of Subject	L	T	P	C
1	MMA16016	Random Process and Optimization Techniques	3	1	0	4
2	MEE16PD001	Advanced Power Semiconductor Devices and Applications	3	1	0	4
3	MEE16PD002	Design and Analysis of Inverters	3	1	0	4
4	MEE16PD003	Design and Analysis of Power Converters	3	1	0	4
5	MEE16XXXX	Elective – I	3	0	0	3
6	MEE16XXXX	Elective – II	3	0	0	3
7	MEE16PDL01	Electrical Drives Laboratory	0	0	2	1
8	MEE16PL02	Renewable Energy Technology Laboratory	0	0	2	1
		TOTAL	18	4	4	24

Dr. M.G.R.
EDUCATIONAL AND RESEARCH INSTITUTE
(Deemed to be University)
University with Graded Autonomy Status
Periyar E.V.R. Salai, Maduravoyal, Chennai – 95

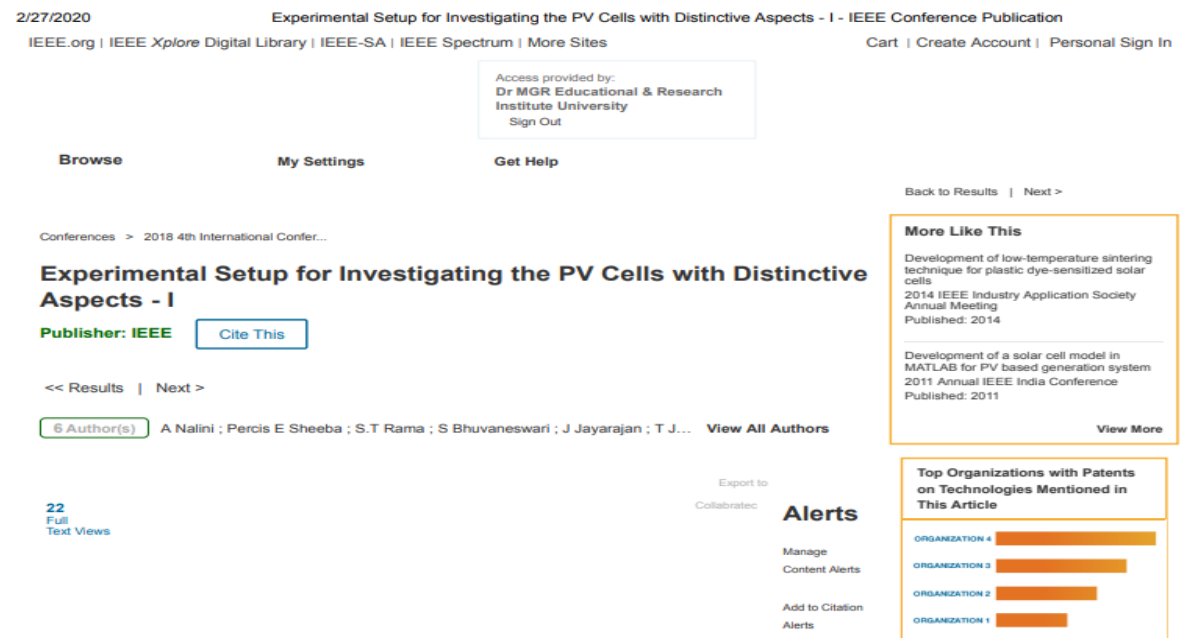
M.Tech –Power Electronics & Drives (Full Time)
Curriculum and Syllabus
2018 Regulation

I SEMESTER						
S.No	Subject Code	Title of Subject	L	T	P	C
1	MMA18016	Random Process and Optimization Techniques	3	1	0	4
2	MEE18PD001	Advanced Power Semiconductor Devices and Applications	3	1	0	4
3	MEE18PD002	Design and Analysis of Inverters	3	1	0	4
4	MEE18PD003	Design and Analysis of Power Converters	3	1	0	4
5	MEE18XXXX	Elective – I	3	0	0	3
6	MEE18XXXX	Elective – II	3	0	0	3
7	MEE18PDL01	Electrical Drives Laboratory	0	0	2	1
8	MEE18PL02	Renewable Energy Technology Laboratory	0	0	2	1
		TOTAL	18	4	4	24

PAPERS PUBLISHED:

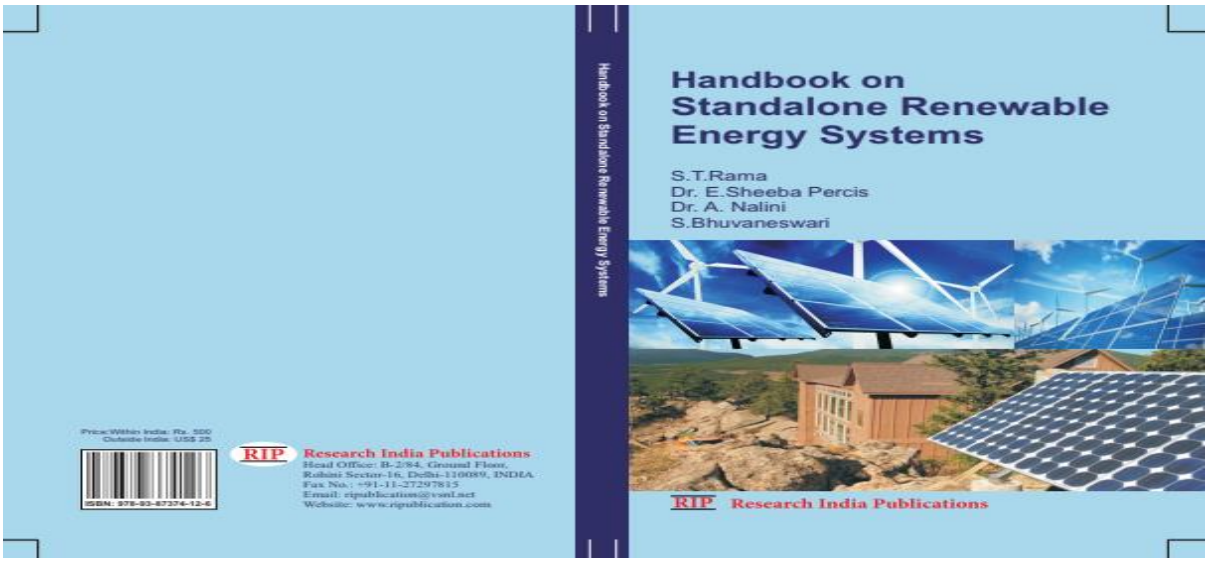
Dr.A.Nalini, Dr.E.Sheeba Percis, Er.S.T.Rama, Dr.S.Bhuvaneswari, Mr.J.Jayarajan, Mr.T.Jenish published a paper titled "**Experimental Setup for Investigating the PV Cells with Distinctive Aspects - I** " in IEEE Xplore in 2018.

https://ieeexplore.ieee.org/document/8443192



BOOKS PUBLISHED:

1. Er. S.T. Rama , Dr. E. Sheeba Percis , Dr. A. Nalini , Dr. S. Bhuvaneswari have authored a book entitled "**Handbook on Standalone Renewable Energy Systems**" with ISBN: 978-93-87374-12-6 in Research India Publications in the year 2017.



2. Dr. K. Sujatha and a final student Mr. T. Muthuraja, authored a Book entitled "Applications of ANN in Renewable Energy Technology" with ISBN: 9786202197366, LAMBERT Publishing services, 2017.

https://www.amazon.com/Applications-ANN-Renewable-Energy-Technology/dp/6202197366

This book entitled "Applications of ANN in Renewable Energy Technology – An Innovation in Learning Practice" promotes a real time work bench for the students, researchers and teachers to induce hands on training for the theoretical courses taught during the entire tenure of Engineering. On the other hand Renewable Energy and Artificial Intelligence plays an important role for Electrical Engineers as it would be a challenging field today. The effect of green house gases and its contribution to global warming can be drastically reduced by using renewable energy. So this field is of prime importance if we would be able to enhance the power output either from solar or wind energy. Hence this initiative is taken to expose the Electrical Engineers for ANN based Renewable Energy Technology. Text reading alone doesn't help the students to become a good Engineer. It is this kind of value added hands on session using advanced techniques like ANN will kindle the thought process of the budding engineers to fair well in this field.

K. Sujatha
K. Senthil Kumar
T. Muthuraja

Applications of ANN in Renewable Energy Technology

An Innovation in Learning Practice

Dr. K. Sujatha and Dr.K.SenthilKumar are presently working as Professors in EEE/ECE, Department at Dr. M.G.R Educational and Research Institute, Chennai, Tamil Nadu, India and heading 'Center for Electronics, Automation and Industrial Research (CEAIR). She/He has 18 years of teaching experience and published/won papers and awards worldwide.

978-620-2-19736-6

LAP LAMBERT Academic Publishing

CoE Activities after Compliance

Nearly 9 research scholars have used the facilities available in the CoE on microgrid with 18 publications in reputed scopus indexed and WoS journals. List of publications are enclosed in the table below.

Research Scholar Publications

List of Publications for the year –June 2022 – May 2023

S.No.	Authors	PUBLICATION TITLE	Journal	Year
1.	Mythreyee Madhavan;Nalini Anandan	Genetic Algorithm Based Smart Grid System for Distributed Renewable Energy Sources	Computer Systems Science and Engineering	2022
2.	Kumaresan Mathivanan;Vijayaprabhu A	PMSG Wind Turbine Based Current Fed Three Phase Inverter with Model Predictive Control	International Journal of Electrical and Electronics Research	2022
3.	Nalini Anandan;Mythreyee Madhavan	Unified power quality control based microgrid for power quality enhancement using various controlling techniques	Indonesian Journal of Electrical Engineering and Computer Science	2022
4.	V Devaraj; Kumaresan Mathivanan	An Elite LOA-TFWO Approach for Load-Frequency Control of Islanded Micro-Grids Incorporating Renewable Sources	International Journal of Engineering Trends and Technology	2022
5.	Boddu Tejaswini;Edwin Sheeba Percis	Supremacy of Power Electronic Technologies and their Applications in Modern Operating Converters in Smart Grid	2022 6th International Conference on Electronics, Communication and Aerospace Technology	2023
6.	Ramesh L;Sravan Kumar B	Coordination of Wind Turbines and Battery Energy Storage Systems in Microgrid	Lecture Notes in Electrical Engineering	2023

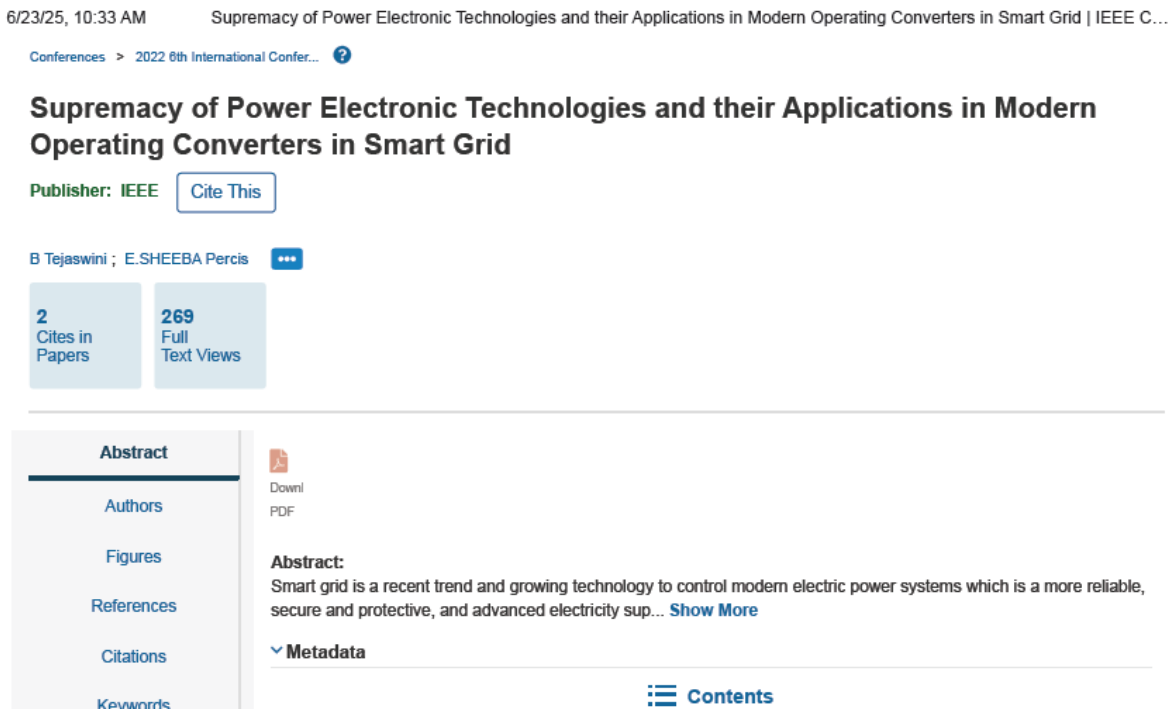
List of Publications for the year –June 2023 – May 2024

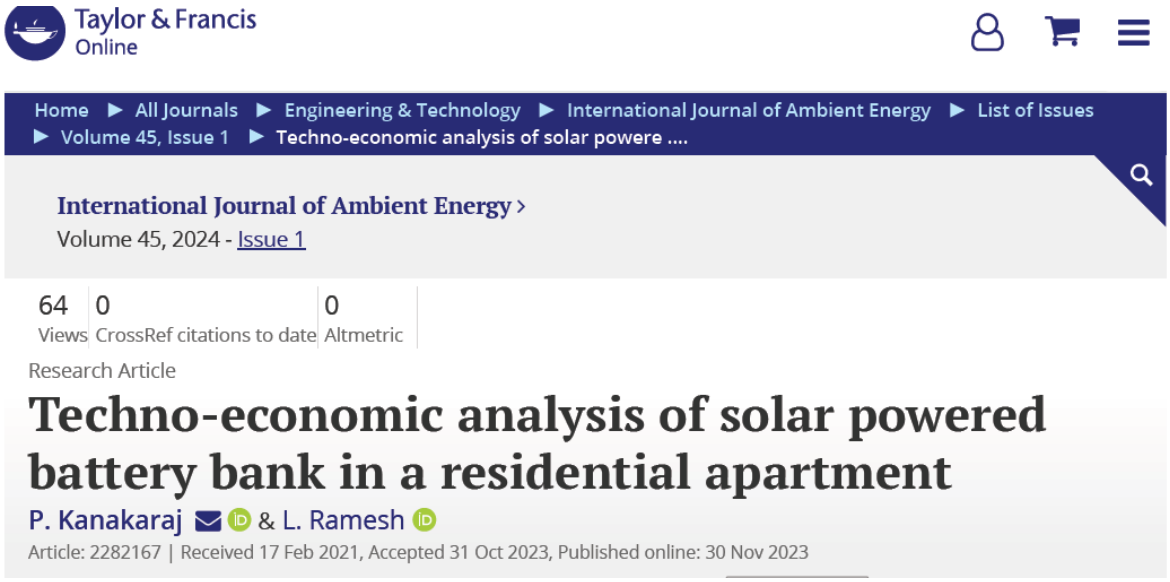
S.No	Authors	Title	Journal	Year
1.	Chelladurai Chandarahasan;Edwin Sheeba Percis	The accessible large-scale renewable energy potential and its projected influence on Tamil Nadu's grid stability	Indonesian Journal of Electrical Engineering and Computer Science	2023
2.	Ranjit Singh;Ramesh L	Impact of Fuzzy PID and PSO-PID Controllers on the Load Frequency Control of Interconnected Microgrids	SSRG International Journal of Electronics and Communication Engineering	2023

3.	Devaraj V;Kumaresan Mathivanan	Isolated and Grid-Connected Hybrid Microgrid Model Frequency Stabilization by Novel Salp-Swarm Optimization Algorithm	SSRG International Journal of Electronics and Communication Engineering	2023
4.	Ramesh L;Kanakaraj Parangusam	Techno-Economic Analysis of Solar Powered Battery Bank in Residential Apartment	International Journal of Ambient Energy	2023
5.	Ramesh L;Ranjit Singh	Comparison between PID and PSO-PID controllers in analysing the load frequency control in interconnected microgrids in a deregulated environment	International Journal of Global Energy Issues	2023
6.	Kanakaraj Parangusam;Ramesh L	The Impact of Nature-Inspired Optimization Techniques on Peak and Electricity Cost in Distribution Systems	SSRG International Journal of Electrical and Electronics Engineering	2023
7.	Anandhan Nalini;Ramani R	IoT Based Real Time Monitoring of PV Sourced Battery with High Gain Boost Integrated Zeta Converter for EV	SSRG International Journal of Electrical and Electronics Engineering	2023

List of Publications for the year –June 2024 – May 2025

S.No	Authors	Title	Journal	Year
1	Nalini Anandan;Ramani R	Enhanced EV Battery Monitoring Using IoT with Improved SEPIC - ZETA Converter and Modified Lion Optimization for Photovoltaic Systems	Journal of Electrical Systems	2024
2	Chelladurai Chandarahasan;Edwin Sheeba Percis	Optimizing resilience in large-scale integration of renewable energy sources: Exploring the role of STATCOM device	International Journal of Power Electronics and Drive Systems	2024
3	Ramani R;Nalini Anandan	Optimizing Electric Vehicle Charging Infrastructure with EVGridNet by Internet of Things and Machine Learning Strategies	Scalable Computing: Practice and Experience	2025
4	Ramesh L;P S Mahitha	Electric vehicle and charging station: A literature review, impact and prospects for future growth	AIP Conference Proceedings	2025
5	B Sravan Kumar;Ramesh L	Multiple roles of battery energy storage systems in plug-in electric vehicles	AIP Conference Proceedings	2025





Patents

S.No	Name of the Patenter	Patent Number/ Application number	Title of the patent	Year of Award of patent
1.	K. Sujatha	409055-001	Machine learning based electricity consumption monitoring device	Granted on 23/04/2024 Filed: 28.2.2024
2.	V.Arumugam Dr.E.Sheeba Percis Dr.A.Nalini Mr.J.Jayarajan	201741038869	Low Cost Petrol-Solar Based Hybrid Electric Bi-Cycle	Granted 6.12.23 Filed: 1.11.2017

3.	E. SHEEBA PERCIS	201741038411	GENERATION OF POWER USING PELTON WHEEL - AN IOT APPLICATION	GRANTED 13/6/2024 Filed: 30.10.2017
4.	Dr.R.Sivanand	437115-001	HYBRID SOLAR DRYER	Granted on 27/12/2024 Filed: 12.11.2024

Initiatives are taken by the faculty to secure funding from various funding agencies and are capable to undertake consultancy work in the field of renewable energy and micro-grid

Funded projects - Details after Compliance

Dr. K. Saravanan	Design Development of Main Electrical Power generating systems for future UAV/Aircraft-VSCF generating system	Research	Aeronautical Development Establishment	Rs. 1.2 crores	24 months	Ongoing

Consultancy - Details after Compliance

Name of the Faculty	**Project Title**	**Project Type (Research/Consultancy)**	**Funding Agency**	**Amount**	**Duration**	**Outcome**
Dr. L.Ramesh	Electrical Smart Remodel	Consultancy	Reliance Projects and Property management services	Rs.3,35,000/-	3 months	10.4.24
Dr. L.Ramesh	Electrical Smart Remodel	Consultancy	Reliance Projects and Property management services	Rs.79,000/-	3 months	21.5.24