

# Dr. Srikanth Mandarapu

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## PROFESSIONAL EXPERIENCE:

Employer	Designation	Department/Experience	Duration
Raghu Engineering College, Visakhapatnam, Andhra Pradesh, India	Associate Professor	Electrical and Electronics Engineering	Aug. 2024 to till date
Science and Engineering Research Board (SERB)	Junior Research Fellow (JRF)	Microgrids Research	Feb. 2021 to Dec. 2021
Raghu Engineering College, Visakhapatnam, Andhra Pradesh, India	Assistant Professor	Electrical and Electronics Engineering	May 2017 to Nov. 2020
Pydah College of Engg. & Tech., Visakhapatnam, Andhra Pradesh, India	Assistant Professor	Electrical and Electronics Engineering	June 2012 to May 2017
			July 2009 to June 2010
Walchand Nagar Industries, Trimex, Srikakulam, Andhra Pradesh, India	Electrical-Engineer	Electrical	Jan. 2007 to April 2009
Jagadamba power Pvt. Ltd., Raipur, Chhattisgarh, India.	Graduate Engineer Trainee (GET)	Electrical	Oct. 2005 to Jan. 2007

## EDUCATIONAL QUALIFICATIONS:

Qualification	Department / Institute	Period
<b>Doctor of Philosophy (Ph.D.)</b> – Fulltime <b>Thesis:</b> Investigation of Microgrid Controllers for Improved Transient Response	School of Electronics Engineering, VIT-AP University, Amaravati, Andhra Pradesh, India	2020-2024
<b>Master of Technology (M.Tech.)</b> – Fulltime <b>Specialization:</b> Power Electronics and Drives	Gandhi Institute of Engineering & Technology University, Gunupur, Odisha, India	2010-2012
<b>Bachelor of Technology (B.Tech.)</b> – Fulltime <b>Specialization:</b> Electrical and Electronics Engg.	Sharada Institute of Science Technology and Management - Srikakulam, Andhra Pradesh, India.	2002-2005
<b>Diploma</b> – Fulltime <b>Specialization:</b> Electrical and Electronics Engg.	Government Polytechnic, Srikakulam, Andhra Pradesh, India. (Aff. State Board of Technical Education)	1999-2002
<b>S.S.C.</b>	St. Joseph's English medium high school, Vizianagaram, Andhra Pradesh, India. (Aff. Board of Secondary Education)	1997-1998

## RESEARCH PROFILE:

### Research Statement:

I am a self-motivated and dedicated researcher holding a Ph.D. degree in Electrical Engineering from the VIT-AP University, Amaravati, Andhra Pradesh, India. Reduced power shortage, lesser installation cost of the generating stations, increased electricity reliability and reduced carbon emissions are the desirable features of the power system. Microgrids which brought a paradigm shift in existing power systems scenario, offer an effective solution to achieve these desirable features. These microgrids receive electrical energy from distributed energy resources (DERs). Uncertainty in generation from renewable energy based DERs, very small or no reserve capacity of DERs, and the inability of the static voltage source inverters (VSI) to provide kinetic energy support, are the key reasons that affect the output of microgrids under any transients during islanded mode of operation. Thus, addressing the issue of transient response has become a major challenge in microgrids operating in islanding mode. Under transient conditions, VSIs with a proper control will help in achieving a) better maintenance of voltage and frequency within limits and b) better power delivering capability. Therefore, there is an urgent need for an effective controller for VSI to enhance the transient response of microgrids. With this motivation, I am currently working on the identification and design of effective control schemes for multiloop control of VSI. One of the primary objectives of my research is to explore novel approaches for effective design of controllers in various loops of the control schemes. In this direction, different state-of-the-art techniques such as fuzzy logic, state machines, and virtual synchronous generator involving hybrid tuning techniques were proposed during my PhD degree. Additionally, several works in this direction are still under progress. Finally, through my research endeavors, I aim to advance the field of microgrids by improving its response under transient conditions by developing innovative control methodologies.

**Topics** : Microgrids, Power delivery, Transient response, VSI control




**Skills** :

**Simulation Tools** : NI Multisim, MATLAB/Simulink

*Simulink Tool Boxes:* Control system toolbox, Curve fitting toolbox, Data Acquisition toolbox, Fuzzy logic toolbox, Model Linearizer, Motor control toolbox, Optimization, Simscape Electrical, Stateflow, Symbolic Math Toolbox.

**Experimental Hardware** : NI DAQ (NI6363 USB)

**Drafting Tools** : LATEX TexStudio, MS Office, MS Visio, Zotero

		
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**Publications** : (Total = 17)

**Journals:**

- [1]. **M. Srikanth** and Y. V. Pavan Kumar, "State Machine and Internal Model Control-based Hybrid Controller for Improved Transient Performance of Microgrids," **Elsevier Energy Reports**, vol. 12, pp. 5300-5319, 2024. (SCIE and Scopus) <https://doi.org/10.1016/j.egy.2024.10.058>
- [2]. **M. Srikanth**, Y. V. Pavan Kumar, P. R. Challa, and M. Rammohan, "Empowered Virtual Synchronous Generator Based Control Scheme for Improved Transient Response and Reduced Nuisance Tripping in Stable Microgrids," **IEEE Access**, vol. 12, pp. 99968-99988, 2024. (SCIE and Scopus) <https://doi.org/10.1109/ACCESS.2024.3429378>
- [3]. **M. Srikanth**, Y. V. Pavan Kumar, P. R. Challa, and M. Rammohan, "Multivariable Control Based dq Decoupling in Voltage and Current Control Loops for Enhanced Transient Response and Power Delivery in Microgrids," **Energies**, vol. 17, no. 15, pp. 3689, 2024. (SCIE and Scopus) <https://doi.org/10.3390/en17153689>
- [4]. **M. Srikanth** and Y. V. Pavan Kumar, "PSO Based Modified Pole-Zero Cancellation Technique for VSI Control to Improve Transient Response in Microgrids," **International Journal of Renewable Energy Research (IJRER)**, 2024. (ESCI and Scopus) (in press)
- [5]. **M. Srikanth** and Y. V. Pavan Kumar, "Fuzzy Logic-Based Adaptive Droop Control Designed with Feasible Range of Droop Coefficients for Enhanced Power Delivery in Microgrids," **Engineering Proceedings**, 2024. (Scopus) (in press)
- [6]. **M. Srikanth** and Y. V. Pavan Kumar, "Advanced Virtual Synchronous Generator Control Scheme for Improved Power Delivery in Renewable Energy Microgrids," **Engineering Proceedings**, 2024. (Scopus) (in press)
- [7]. G. P. Reddy, D. Rohan, Y. V. P. Kumar, **M. Srikanth**, and K. P. Prakash "Artificial Intelligence-Based Effective Detection of Parkinson's Disease Using Voice Measurements," **Engineering Proceedings**, vol. 82, no. 1, pp. 28, 2024. (Scopus) <https://doi.org/10.3390/ecsa-11-20481>
- [8]. **M. Srikanth** and Y. V. Pavan Kumar, "Virtual Synchronous Generator and Multivariable Control Based Hybrid Controller for Improved Power Quality in Microgrids," **Electricity**, 2024. (ESCI and Scopus) (Under Review)
- [9]. S. N. V. B. Rao, Y. V. Pavan Kumar, and **M. Srikanth**, "Power Quality Improvement in PV-FC Microgrid Using Fuzzy Based Current Controlled Voltage Source Inverter," **Electricity**, 2024. (ESCI and Scopus) (Under Review)
- [10]. K. Purna Prakash, Y. V. Pavan Kumar, **M. Srikanth**, M. Naveen, and N. Archana, "Bibliometric analysis on artificial intelligence-based control of renewable energy microgrids: key concepts and research trends," **International Journal of Renewable Energy Research (IJRER)**, 2024. (ESCI and Scopus) (Under Review)

- [11]. **M. Srikanth** and Y. V. Pavan Kumar, "State Machine-Based Droop Control Method Aided with Droop Coefficients Tuning through In-Feasible Range Detection for Improved Transient Performance of Microgrids," **Symmetry**, vol. 15, no. 1, 2023. (SCIE and Scopus) <https://doi.org/10.3390/sym15010001>
- [12]. **M. Srikanth**, Y. V. Pavan Kumar, M. Amir, S. Mishra, and A. Iqbal, "Improvement of Transient Performance in Microgrids: Comprehensive Review on Approaches and Methods for Converter Control and Route of Grid Stability," **IEEE Open Journal of the Industrial Electronics Society**, vol. 4, pp. 534-572, 2023. (SCIE and Scopus) <https://doi.org/10.1109/OJIES.2023.3325440>.
- [13]. **M. Srikanth** and Y. V. Pavan Kumar, "Improved Virtual Synchronous Generator-Based Control Scheme for Enhanced Transient Response in Microgrids," **Engineering Proceedings**, vol. 56, no. 1, 2023. (Scopus) <https://doi.org/10.3390/ASEC2023-15390>
- [14]. **M. Srikanth**, L. Sreedhar, and M. V. S. Kumar, "Digital PI controller using Anti-Windup mechanism for a speed controlled electric drive systems," **International Journal of Multi-disciplinary Educational Research**. vol. 3, no. 1, pp. 239-242, 2013.
- [15]. **M. Srikanth**, L. Sreedhar, and M. V. S. Kumar, "Nonlinear digital PID controller for position controlled electric drive system," **International Journal of Emerging Science and Engineering**. vol. 1, no. 8, 2013.
- [16]. **M. Srikanth**, L. Sreedhar, and P. M. Chandra, "Dynamic Simulation of Robust Sensorless Speed Measurement in IM Using MRAC against Variations in Stator Resistance and Rotor-Time Constant," **International Journal of Multi-disciplinary Educational Research**. vol. 2, no. 5, pp. 52-55, 2013.
- [17]. **M. Srikanth**, P. M. Chandra, G. M. Ali, and A. K. Rath, "Robust MRAS Based Sensorless Rotor Speed Measurement of Induction Motor Against Variations in Stator Resistance Using Combination of Back EMF and Reactive Power Methods," **International Journal of Multi-disciplinary Educational Research**. vol. 1, no. 3, pp. 38-46, 2012.

#### RESEARCH AWARDS AND SUPPORT:

- Open access full funding of INR 3.2 lakhs from VIT-AP University for publishing the paper titled "State Machine and Internal Model Control-based Hybrid Controller for Improved Transient Performance of Microgrids" in Elsevier Energy Reports journal, 2024.
- Research award for Publications from VIT-AP University for the academic year 2023-24, on 24-05-2024.
- Research award for Publications from VIT-AP University for the academic year 2022-23, on 03-06-2023.
- Raman Research Award from VIT-AP University for paper publication titled "Empowered Virtual Synchronous Generator Based Control Scheme for Improved Transient Response and Reduced Nuisance Tripping in Stable Microgrids" in IEEE Access, 2024.
- Raman Research Award from VIT-AP University for paper publication titled "Multivariable Control Based dq Decoupling in Voltage and Current Control Loops for Enhanced Transient Response and

Power Delivery in Microgrids” in Energies, 2024.

- Raman Research Award from VIT-AP University for paper titled “Improvement of Transient Performance in Microgrids: Comprehensive Review on Approaches and Methods for Converter Control and Route of Grid Stability” in IEEE Open Journal of Industrial Electronics Society, 2023.
- Raman Research Award from VIT-AP University for paper publication titled “State Machine-Based Droop Control Method Aided with Droop Coefficients Tuning through In-Feasible Range Detection for Improved Transient Performance of Microgrids” in Symmetry, 2023.
- Open access full funding of INR 1.7 lakhs from VIT-AP University for publishing the paper titled “State Machine-Based Droop Control Method Aided with Droop Coefficients Tuning through In-Feasible Range Detection for Improved Transient Performance of Microgrids” in Symmetry journal, 2023.

#### **SPONSORED RESEARCH PROJECTS (COMPLETED):**

##### **Project 1**

**Project Title** : Investigation of Methods to Improve Transient Response of Microgrids Using Virtual Inertia Mechanisms for Seamless Synchronization with Utility Grids

**Sponsoring Agency** : Science and Engineering Research Board (SERB).  
File No: SRG/2019/000648

**Designation** : Junior Research Fellow

**Duration** : Eleven Months (01-02-2021 to 31-12-2021)

##### **Project 2**

**Project Title** : Virtual Inertia Controller for Voltage Source Inverter Based Microgrids

**Sponsoring Agency** : Research Grant in Engineering, Management and Science (RGEMS), VIT-AP.  
Order No: VIT-AP/SpoRIC/RGEMS/2023-24/002

**Designation** : Investigator

**Duration** : One Year (28-06-2023 to 28-06-2024)

#### **SPONSORED RESEARCH PROJECTS (UNDER REVIEW):**

**Project Title** : Investigation of Methods to Develop Virtual Inertia Controller for Voltage Source Inverter Based Microgrids

**Scheme** : Prime Minister Early Career Research Grant.

**Designation** : Principal Investigator

**Duration** : Three Years

**Amount** : 54 Lakhs

**Institution** : Raghu Engineering College, Dakamarri, Visakhapatnam, A.P.

## TEACHING PROFILE:

### Teaching Statement:

I believe that education is a transformative process that has the power to shape individuals' lives and contribute to the betterment of society. As a teacher, my primary goal is to inspire and empower students to become lifelong learners, critical thinkers, and responsible global citizens. I have a great passion for teaching and it is a very stimulating experience for me. I believe that teaching is a process of mutual learning and I am enthusiastic to take part in all the teaching activities. As I already have 10+ years of rich experience in teaching, my teaching philosophy is rooted in creating a supportive and inclusive learning environment where students can actively engage in the learning process, explore their interests, and develop the necessary skills. I incorporate a variety of instructional methods, such as lectures, group activities, multimedia resources, hands-on experiments, open-book exams, and a learning management system to cater to different learning preferences and promote a deeper understanding of the concepts. I believe that every student has unique strengths and abilities. I encourage students to participate in various events such as technical quizzes, seminars, discussions, etc., that help them to improve technically and personally. I believe that fostering a sense of belonging and creating strong teacher-student relationships are crucial for effective teaching and learning. Finally, I recognize the importance of ongoing professional development to enhance my teaching practice. I am committed to staying updated with the latest educational research, pedagogical strategies, and technological advancements. By continuously refining my teaching methods and incorporating innovative approaches, I strive to provide the best possible education for my students.

### Subjects Taught:

- Electrical Circuit Analysis
- Electromagnetic field theory
- Electrical Machines – I, II, III
- Power Electronics
- Control systems
- Switchgear & Protection
- Power semiconductor drives
- Electrical power quality
- Basic Electrical & Electronics Engineering
- Switchgear & Protection
- Electrical Machine Modelling and Analysis
- Control of DC drives
- Control of AC drives
- Optimization techniques

## ACADEMIC ACHIEVEMENTS:

- Received full financial sponsorship for “Smart Electronics for Connected Communities (SECC-2019)”, a 15-day AICTE sponsored QIP / CEP / Short Term Course conducted by Department of Electronics Engineering, IIT (BHU), Varanasi during Jan. 06 – 18, 2020.
- Ratified as Assistant Professor by JNT University, Kakinada in 2018.
- Qualified in *Graduate Aptitude Test (GATE) 2017* conducted by IIT-Roorkee in Electrical Engineering.
- Secured overall state 2<sup>nd</sup> Rank in PG Entrance Test for admission to M. Tech program conducted by Odisha government in 2010.
- Ratified as Assistant Professor by JNT University, Kakinada in 2009.



## TECHNICAL TRAINING:

1. Trained in *Electrical Switchgear and Protection* from Advanced Training Institute for Electronics and Process Instrumentation (ATI-EPI), Hyderabad.
2. Trained in *Industrial Drives* from Indo-German Institute of Advanced Technology, Visakhapatnam.
3. Trained in *PLC & SCADA* from Indo-German Institute of Advanced Technology, Visakhapatnam.

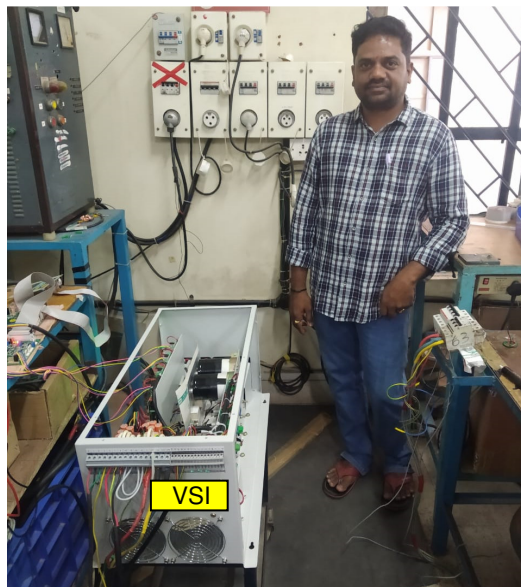
## ADMINISTRATIVE WORKS:

- Member of
  - Department development committee.
  - Department discipline committee.
  - Lab development committee.
  - Class monitoring committee (Class Teacher).
  - Student counseling.
  - College-level NAAC and NBA accreditation work.
- Coordinator for
  - Alumni association.
  - Anti-ragging committee.
  - IEI Student chapter (Electrical Engineering).
  - Students' industrial visits.
  - Website Designing and maintenance.
  - Workshops conducted in the department.
- In charge of Electrical machines, Networks, and Power electronics lab.
- Organized and attended various workshops/training programs.
- Active participation in many departmental/college-level activities.

## GALLERY:



Configuring NIDAQ 6363 USB



Closed loop operation of VSI