

National Institute of Technology Meghalaya



Issue: 1

Department of Electrical Engineering





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Prof. Gayadhar Panda Dr. Shaik Affijulla Mr. Madhav Kumar Julene Seka H Thabah

Department Magazine

Academic Year 2023-2024



Department of Electrical Engineering, National Institute of Technology Meghalaya, Shillong, India-793003

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About the Institute



National Institute of Technology Meghalaya is one of the Premiere Institutes of National Importance under MHRD and was established in the year of 2010. NIT Meghalaya has achieved 72nd rank in the NIRF ranking 2023 and it stands 16th amongst the NITs.

It started functioning from its temporary campus in Shillong, Meghalaya from 2012. It has, over these years, strived to become one of the finest learning centers of the country. The Institute has nine teaching departments viz. Civil Engineering, Computer Science & Engineering, Electrical Engineering, Electronics & Communication Engineering, Mechanical Engineering, Physics, Chemistry, Mathematics, and Humanities & Social Science. The Institute has around 1000 students in the campus who are in to the Programmers like B.Tech. M.Tech. M.Sc. and Ph.D. The faculty members, besides teaching, are also very much involved in to Research & Consultancy. The quantity and quality of their publications, the number of sponsored R&D projects, the number of consultancy projects speaks about the engagement of the faculty in these activities. To mention a few, the Institute has been providing consultancy services to some of the reputed organizations and industries such as Indian Air Force, Airport Authority of India, PWD, CPWD, Assam Rifles, NEEPCO, Vedanta Resources, Jindal Stainless Pvt. Ltd., Various departments of Government of Meghalaya etc. Also, a good number of R&D projects are operating under well-known sponsors like DST-SERB, CSIR, and SDMA etc. Members of faculty publishing research papers in various National/International reputed journals and conferences. A few international collaboratives work with countries like Korea, France and Austria have been started in 2018.

Although, very young the Institute has organized quite a number of short-term courses, Faculty Development Programmers, Workshops, Conclaves, Conferences including three International Conferences with the support from Industries and many associated organizations. NIT Meghalaya constantly strives to work on job creation and skill development by imparting knowledge and development of technologies through effective teaching and research programs.

The Centre for Career Development has been consistently doing a commendable job by conducting a good number of placement programmers in the campus for the placement of our graduating students. The Centre has so far, a decent record of providing employment to 80% of the eligible students in reputable companies like Microsoft Corporation, Power Grid Corporation, POSOCO, Bharat Petroleum, Bharat Electronics, Infosys, Vedanta Resources, etc.

About the Department



The Department of Electrical Engineering started since the inception of NIT Meghalaya. Presently the department offers B.Tech, M.Tech and PhD program. The B. Tech program started in 2010 with an intake of 30 students and since 2014 onward M.Tech program has been started with an intake of 20 students offering specialization in Power & Energy Systems. Presently there are full time and part time research scholars, registered for PhD program.

The Department aims to impart high quality education to the students and carry out fundamental and industry-oriented research work. The research interest of faculties encompasses various areas of electrical engineering such as Deregulated power system, Soft computing application in power system control, Voltage stability alleviation under Deregulated Environment, Power Electronics & Drives, Control System and Instrumentation, Mechatronics, Embedded System, Non-conventional Energy system, High Voltage Engineering etc.

The department have well-equipped laboratory facilities to the students such as Electro-Technique Lab, Electrical Machine Lab, Network and Systems lab, Digital Electronics Lab, Power System Simulation Lab, Control & Instrumentation Lab, Power Electronics & Drives Lab, Microprocessor Lab, Microcontroller & Embedded Systems Lab. Specialized simulation software's like Power Factory 14.1 (DIgSILENT), PSIM (Power Simulator), PSSE (Power System Simulator for Engineers) are available with the department to develop the computing efficiency of the students and also to carry out research activities.

Message from the Director

Greetings from NIT Meghalaya!!

It is my privilege to welcome you to the National Institute of Technology Meghalaya, one of the premier autonomous institutes of National Importance established in 2010, under the Act of Parliament 2007. The institute is committed to achieve excellence in quality technical education, research and extension imbibed with professional and ethical values by providing a comprehensive and innovative education through its competent faculty and state-of-the-art infrastructure.



The institute believes in the philosophy of achieving the holistic development of students by adopting its core values like Academic integrity, excellence in teaching-learning through studentcentric pedagogy, interdisciplinary interaction through electives & projects, nourishing the creativity of the students through innovation, skill development and instilling social responsibilities. We are also emphasising on collaboration with industries, innovative industry-based projects, soft skill, personality development, co-curricular and extracurricular activities in order to meet the everincreasing expectations and challenges of the industry and society. In addition to having NBA approval, NIT Meghalaya has secured consistently high NIRF rankings for last few years.

NIT Meghalaya has the mission to produce students with the multi-dimensional approach by providing them with skill-based multifaceted courses through NEP-2020. The Academic Bank of Credit is functional for our students. Dynamic Curriculum development is continuing and already started implementing for the B.Tech programmes in the institute. The institute has an excellent placement record with multiple offers from reputed national and multinational companies. The Alumni of NIT Meghalaya are one of its greatest strengths and brand ambassador of the institute. I feel proud of the alumni for constantly bringing fame and reputation to the institute by excelling in their respective field.

The institute creates an engineering start-up ecosystem by establishing an innovation incubation and entrepreneurship development centre. It promotes innovation, research and entrepreneurial activities in technology-based areas among the students and young faculty members. The institute aims to provide a platform to all budding local talents for start-ups in ethnic food products, spices, bamboomade handicrafts and handlooms to promote the North-Eastern Indian cultural heritage and to convert their innovative and indigenous ideas into commercially viable products by collaborating with various organizations. Promotion of research in the area of renewable energy, food processing, AI and ML, VLSI, rainwater harvesting, structural engineering is given importance. At present NIT Meghalaya is functioning in a temporary campus at Shillong. With the support of the MoE and state govt we are expecting the completion of permanent campus at Village Saitsohpen, Sohra, Meghalaya within the next 1(one) year with best of the facilities for the excellent academic ambience.

Prof. Pinakeswar Mahanta

Message from the Head of the Department



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Greetings from NIT Meghalaya!!

It is my privilege to welcome you to the Department of Electrical Engineering at the National Institute of Technology Meghalaya. As the Head of the Department, I am honoured to extend my warmest greetings to all our esteemed readers, students, faculty, alumni, and supporters.

The academic year 2023-24 holds great promise and excitement as we embark on a journey of learning, discovery, and growth. Our department

is committed to fostering excellence in education, research, and innovation, and I am thrilled to share our aspirations and achievements with you.

The past year has been a remarkable period of growth and innovation for our department. We have witnessed significant advancements in our academic curriculum, research endeavours, and industry collaborations. Our dedicated faculty members have continued to push the boundaries of knowledge, engaging in cutting-edge research that addresses some of the most pressing challenges of our time. Their contributions have not only enriched the academic environment but also brought recognition to our department on both national and international platforms.

Our students have demonstrated exceptional commitment and ingenuity, excelling in their coursework, participating in prestigious competitions, and undertaking impactful projects. Their success is a testament to their hard work, the guidance of our faculty, and the supportive infrastructure provided by the institute. We take immense pride in their achievements and are confident that they will continue to uphold the legacy of excellence that defines NIT Meghalaya.

This year, we have introduced several new initiatives aimed at enhancing the learning experience and preparing our students for the dynamic demands of the electrical engineering field. These include the incorporation of modern teaching methodologies, the establishment of state-of-the-art laboratories, and the promotion of interdisciplinary research. We are also strengthening our ties with industry leaders to ensure that our students gain practical insights and are well-prepared for their professional careers.

As we move forward, our focus remains steadfast on fostering an environment that encourages innovation, critical thinking, and a passion for lifelong learning. We are committed to nurturing the next generation of engineers who will not only excel in their respective fields but also contribute positively to society.

I extend my heartfelt gratitude to all the faculty members, staff, students, and alumni for their unwavering support and dedication. Your collective efforts are the driving force behind our department's success. I also thank our esteemed industry partners and stakeholders for their invaluable contributions.

Thank you for being a part of our journey. I wish you all a productive and fulfilling academic year ahead.

Dr. Shaik Affijulla



DEPARTMENT LABORATORY

Basic Electrical Lab



Power Electronics Lab.



Electrical Machines Lab.



Instrumentation and Control Lab.



Power System Lab.

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Microprocessor and Embedded System Lab.



Department of Electrical Engineering, National Institute of Technology Meghalaya, India 9



Research Laboratory-I





DEPARTMENT DETAILS



TECHNICAL STAFF

SI. No.	Name	Qualification	Designation
1	Mr. Sushanta Nath	M.tech (NIT Meghalaya)	Technical Assistant
2	Mr. Bankitbok Laloo	Diploma in Electrical	Technical Assistant
3	Dr. Ankur Rai	Ph.D (NIT Nagaland)	Technical Assistant
4	Mr. Felix Albert Nongneng	M.Tech (IIT Madras)	Technician
5	Mr. Rishandonborlang Mawrie	B.Tech	Technician
6	Mr. Nangskhem Khongwir	B.Tech	Technician
7	Ms. Julene Seka H Thabah	M.Tech	Technician
8	Mr. Vicky Staryson Wahlang	B.Tech	Lab Attendant

DEPARTMENT FACULTY

Faculty Details					
		Number of Google H		H-	i-10
Faculty	Research Interest	Publications	Citation	Index	Index
Frof. Gayadhar Panda	Distributed Power Generation using Renewable Energy Sources, Power Quality Assessment and Monitoring, Seamless operation of AC/DC microgrid with optimal power management, Power Electronics & Drives	250+	3182+	30	77
Dr. Shaik Affijulla	Power System Protection Technology, Synchrophasor Technology, Signal Processing Applications in Power Systems	40+	301+	9	9
Dr. Sanjoy Debbarma	Power System Operation & Control, Energy Management System, Smart Grid, Electric Vehicles Integration to Grid, Cybersecurity and Transactive Energy Market.	58+	1441+	15	25
Dr. Ksh Milan Singh	Digital Signal Processing, Ultrasonic vibration measurement, Phase-Locked Loop design, Wavelet Transform	35+	118+	7	4
Dr. Piyush Pratap Singh	Control Systems, Nonlinear Dynamics and Chaos, Memristive Chaotic Systems and Circuits, Chaos Applications in Communication and Power Systems, Control of Complex Systems/Networks	73+	586+	13	16
Dr. Rakesh Roy	Electrical Machine Drives, Power Electronics, PMSM motor control, BLDC motor control, Direct torque control of Induction motor	27+	101+	6	4

Full Time Ph.D Scholars



Madhav Kumar NIT Meghalaya, India



Manish Kurre NIT Meghalaya, India



Sumant Kumar Dalai NIT Meghalaya, India



Bodhisatwa Bhattacharya NIT Meghalaya, India



Priyankar Roy NIT Meghalaya, India



Kingsuk Roy NIT Meghalaya, India



Vianny Wahlang NIT Meghalaya, India



Deigratia Sutnga NIT Meghalaya, India



P. V. Rajesh Varma NIT Meghalaya, India



Dip Kumar Biswas NIT Meghalaya, India



Dathewbhalang Tariang NIT Meghalaya, India



Edapha Rhema Jones Chullai NIT Meghalaya, India



Liza Debbarma NIT Meghalaya, India



Ngangoiba Maisnam NIT Meghalaya, India



ACHIEVEMENTS

Listed among the top 2% researchers in the world (Notified by Stanford University)



INVITED FOR EXPERT TALK BY IEEE POWER & ENERGY SOCIETY SINGAPORE CHAPTER



E-Mobility with Green Energy Technology

Webinar

Organized by IEEE PES Singapore Chapter

Date: 7 November 2023 (Tuesday)

Time: 3pm - 4.30pm (SGT)

Webinar link: https://newcastleuniversity.zoom.us/j/88030308972 Meeting ID: 880 3030 8972, Passcode: 586414



Learn more by visiting

https://site.ieee.org/singapore-pes/emobility-with-green-energy-technology/



Prof Gayadhar Panda NITM, India

LIST OF PUBLICATION

Journal's

- S. K. Dalai, K. P. Panda, Y. P. Siwakoti and G. Panda, "Three-Phase Switched-Capacitor Boost Self-Balanced Multilevel Inverter for Photovoltaic Applications," in *IEEE Transactions on Energy Conversion*, doi: 10.1109/TEC.2024.3367733.
- Kumar, Madhav, Kaibalya Prasad Panda, Ramasamy T. Naayagi, Ritula Thakur, and Gayadhar Panda. 2024. "A Critical Analysis of Quadratic Boost Based High-Gain Converters for Electric Vehicle Applications: A Review" *Sensors* 24, no. 7: 2186. https://doi.org/10.3390/s24072186
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- Shadangi, Pushpanjali, Swain, Sushree Diptimayee, Ray, Pravat Kumar, Panda, Gayadhar and Dalai, Sumant. "Experimental validation of non-dual adaptive controller based DSTATCOM for power quality enhancement" *International Journal of Emerging Electric Power Systems*, 2023. <u>https://doi.org/10.1515/ijeeps-2023-0138</u>
- 8. Devi, Nongmaithem Nandini, Panda Gayadhar and Thokchom, Surmila. "Optimal ranking-based charging station selection for electric vehicles" *International Journal of Emerging Electric Power Systems*, 2023. <u>https://doi.org/10.1515/ijeeps-2023-0124</u>
- 9. Choudhury, Anasuya Roy, Nayak, Pravati, Mallick, Ranjan Kumar, Agrawal, Ramachandra, Mishra, Sairam and Panda Gayadhar. "Islanding detection and power quality disturbance classification in multi DG based microgrid using down sampling empirical mode decomposition and multilayer neural network" *International Journal of Emerging Electric Power Systems*, 2023. <u>https://doi.org/10.1515/ijeeps-2023-0135</u>

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- Jagan, Amar, Ray, Pravat Kumar, Behera, Bhanu Pratap and Panda, Gayadhar. "A fuzzy-logic-based smart power management strategy for reliability enhancement of energy storage system in a hybrid AC-DC microgrid with EV charging station" *International Journal of Emerging Electric Power Systems*, 2023. <u>https://doi.org/10.1515/ijeeps-2023-0128</u>
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- J. R. Baral, K. P. Panda and G. Panda, "An Adaptive Variable LMS Technique for Enhanced Power Quality in Solar PV Grid-tied System," 2023 IEEE International Conference on Power Electronics, Smart Grid, and Renewable Energy (PESGRE), Trivandrum, India, 2023, pp. 1-6, doi: 10.1109/PESGRE58662.2023.10405170.
- K. P. Panda, S. Kumar Dalai and G. Panda, "Step-up Switched-Capacitor Common-Grounded Seven-Level Inverter for Transformerless PV System," 2023 IEEE International Conference on Power Electronics, Smart Grid, and Renewable Energy (PESGRE), Trivandrum, India, 2023, pp. 1-6, doi: 10.1109/PESGRE58662.2023.10404851.
- **3.** S. J. Pinto and **G. Panda**, "Cyber-Secured Distributed Control System for Reliable AC Microgrids," *2023 IEEE PES Innovative Smart Grid Technologies Europe (ISGT EUROPE)*, Grenoble, France, 2023, pp. 1-1, doi: 10.1109/ISGTEUROPE56780.2023.10407960.
- 4. S. K. Prince, S. B. Elghali, S. Affijulla and G. Panda, "Robust Fault Detection and Characterisation in AC Microgrids using Ensemble Empirical Mode Decomposition," 2023 IEEE PES Innovative Smart Grid Technologies Europe (ISGT EUROPE), Grenoble, France, 2023, pp. 1-5, doi: 10.1109/ISGTEUROPE56780.2023.10408238.
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- 12. C. J. Jena, P. K. Ray, S. Nandkeolyar and G. Panda, "Model Predictive Control of Islanded DC Microgrid with SOC-based Power Sharing," 2023 5th International Conference on Energy, Power and Environment: Towards Flexible Green Energy Technologies (ICEPE), Shillong, India, 2023, pp. 1-6, doi: 10.1109/ICEPE57949.2023.10201524.
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- 14. P. V. Rajesh Varma and S. Affijulla, "Assessment of Reliability Indices under Generation and Peak Load Constrained Scenarios," 2023 IEEE 3rd International Conference on Sustainable Energy and Future Electric Transportation (SEFET), Bhubaneswar, India, 2023, pp. 1-6, doi: 10.1109/SeFeT57834.2023.10245377.
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- 22. R. Kumar, N. Kumar, A. Rai and P. P. Singh, "Level Control of Coupled Tank System using Fuzzy PI Feedforward Technique," 2023 5th International Conference on Energy, Power and Environment: Towards Flexible Green Energy Technologies (ICEPE), Shillong, India, 2023, pp. 1-6, doi: 10.1109/ICEPE57949.2023.10201596.
- 23. S. Warjri, A. Surong, S. Majumdar, M. M. Langstieh, M. Marbaniang and P. P. Singh, "Radar Communication via Asymmetric and Wideband Chaotic Signal," 2023 5th International Conference on Energy, Power and Environment: Towards Flexible Green Energy Technologies (ICEPE), Shillong, India, 2023, pp. 1-6, doi: 10.1109/ICEPE57949.2023.10201586.

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- **24.** R. Mawrie, L. Swer, A. Chauhan and **K. M. Singh**, "Adaptive Noise Cancellation Technique in Signal Estimation using Particle Swarm Optimization," *2023 5th International Conference on Energy, Power and Environment: Towards Flexible Green Energy Technologies (ICEPE)*, Shillong, India, 2023, pp. 1-5, doi: 10.1109/ICEPE57949.2023.10201528.
- 25. A. Chauhan, I. Jyrwa, S. Wahlang and K. M. Singh, "Ultrasonic Vibration Parameters Estimation using Fuzzy based PID Controller in Digital-PLL," 2023 5th International Conference on Energy, Power and Environment: Towards Flexible Green Energy Technologies (ICEPE), Shillong, India, 2023, pp. 1-6, doi: 10.1109/ICEPE57949.2023.10201501.
- 26. A. Anand, R. Gandhi, D. Bhattacharya and R. Roy, "Dynamic Analysis of Vector Controlled PMSM with Constant Torque Angle Control Strategy Using Artificial Neural Network," 2023 5th International Conference on Energy, Power and Environment: Towards Flexible Green Energy Technologies (ICEPE), Shillong, India, 2023, pp. 1-5, doi: 10.1109/ICEPE57949.2023.10201640.
- **27. R. Roy**, K. K. Prabhakar and P. Kumar, "Equivalent Circuit for Inverter fed Induction Motor," *2023 3rd International Conference on Emerging Frontiers in Electrical and Electronic Technologies (ICEFEET)*, Patna, India, 2023, pp. 01-06, doi: 10.1109/ICEFEET59656.2023.10452168.

Patents

Details of Patents Published/Granted.

SI. No.	Title of Patent	Inventers	Date of Publication/Grant
1	Double Stage Voltage Level Boost Optimized Multilevel Inverter	Prof. Gayadhar panda	14/02/2024
2	High-gain dc-dc converter for solar- assisted electric vehicle	Prof. Gayadhar Panda	15/03/2024
3	Grid- Resilient Solar Photovoltaic Fed Shunt Active Power Filter System and Control Method	Prof. Gayadhar Panda and Dr. Shaik Affijula	19/02/2024
4	High Boost Switched-Capacitor Integrated Grid Following Transformerless Inverter	Prof. Gayadhar Panda	13/10/2023
5	A flux controlled quadratic memductance-based extreme multistable 4D hyperchaotic system	Dr. Piyush Pratap Singh	30/11/2023
6	An electric carrier for transportation	Dr. Rakesh Roy	02/01/2024

CONSULTANCY WORK BY DEPARTMENT FACULTY

Details of Consultancy works Performed.

	SI. No.	Title of Consultancy	Faculty	Client's	Project/ Consultancy Amount (Rs)	Date of Completion
	1	Harmonic study and appropriate remedial measures for industrial distribution system	Prof. Gayadhar Panda & Dr. Shaik Affijula	STAR CEMENT LIMITED	8,96,800.00	15-March-2024
22 1	2	Test of transformer oil	Prof. Gayadhar Panda & Dr. Shaik Affijula	STAR CEMENT LIMITED	37,170.00	24.Feb. 2024
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EVENTS ORGANIZED BY DEPARTMENT

Details of events e.g. Conference/ Seminar etc organized.

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SI. No.	Name of Event	Organized by	Duration of Event
1	5th International Conference on Energy, Power, and Environment (ICEPE-2023)	Prof. Gayadhar Panda & Shaik Affijula	15.06.2023 -17.06.2023
2	Workshop on Advanced Control, Communication & Protection of Sustainable Power & Energy Systems (ACPSPES 2023)	Prof. Gayadhar Panda & Shaik Affijula	26.06.2023 - 30.06.2023
3	Short-Term Course on Microgrid Protection and Control	Prof. Gayadhar Panda	17.04.2023 - 21.04.2023
4	3rd International Symposium on Sustainable Energy and Technological Advancements (ISSETA 2024)	Prof. Gayadhar Panda	23.02.2024 - 24.02.2024
5	One Week Short Term Course (STC) on Advanced Control, and Machine Learning Approaches for Smart Distribution Systems	Prof. Gayadhar Panda	03.02.2024 - 07.02.2024
6	Competition on innovative fleet-oriented business models for E-Vehicles in Northeast India	Dr. Rakesh Roy	04.12.023
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Event Gallery









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DEPARTMENT GROWTH



ALUMNI ACHIEVEMENT



Dr. Siddhartha Deb Roy



Dr. Kaibalya Panda





Dr. Raja Gandhi

"An alumni PhD scholar from our department elevates to Assistant Professor position at NIT Bhopal, marking a remarkable journey of academic excellence."

"An alumni PhD scholar from our department ascends to recognition for being listed among the top 2% researchers worldwide by Stanford University."

"An alumni PhD scholar from our department elevates to Assistant Professor position at Supaul Engineering College (Bihar Govt.), marking a remarkable journey of academic excellence."

Thank You

Commun

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Cred

Science

Technology

Education

 $\overline{2}$ (1-2)+(4-5) X= $\sqrt{A^2+B^2}$

Nedicine

Idea

thinking

Department of Electrical Engineering, National Institute of Technology Meghalaya, Shillong, India-793003