

Engr. Dr. Anzar Mahmood

Senior Member IEEE, Associate Professor,
Mirpur University of Science and Technology (MUST), Pakistan.

Personal Mobile No: 0092-331-5079549,

Email: anzar.ee@must.edu.pk, anzarmahmood@gmail.com,

Web (Researchgate Profile):

https://www.researchgate.net/profile/Anzar_Mahmood.

Google Scholar Citations link:

<https://scholar.google.com.pk/citations?user=gVsXK4gAAAAJ&hl=en>

Scopus Citations Link:

<https://www.mendeley.com/search/?authorFullName=Anzar%20Mahmood&page=1&query=Anzar%20Mahmood&sortBy=relevance>



1. Profile Statement

- Dedicated and accomplished Associate Professor in Electrical Engineering with 17 years of experience with a proven track record of academic excellence, research contributions, administration and mentorship. Committed to promoting interdisciplinary collaboration, enhancing student engagement, and contributing to the growth and reputation of the academic institution.
- 10 Years of university teaching, academics and research experience at graduate and undergraduate level with successful supervision of 02 PhDs, 25 MS and publishing of 87 research contributions. Served as Head of the Department of Electrical Engineering (EE), Blooms' Taxonomy and Outcome Based Education (OBE) trainer, Program Evaluator for Pakistan Engineering Council and resource person for OIC Ministerial Standing Committee on Scientific and Technological Cooperation (COMSTECH).
- 7 Years of serving as Design Engineer in the power industry. Participated in design, installation and commissioning of various electrical power generation plants of 350 MW and 1000 MW.
- Seeking to leverage my expertise and passion for advancing knowledge in electrical engineering to foster a stimulating learning environment, drive innovative research, and cultivate the next generation of engineers while making a lasting impact on the field of electrical engineering.

Core Skills

- Teaching and Academics
- Curriculum Design
- OBE Trainer
- Academic Planning
- Thesis Supervision
- Student Counseling
- Grants Writing
- Lab Establishment
- Student-Centered Approach
- Project Management
- MATLAB
- Python
- Machine Learning
- Predictive Modeling
- MS Office
- Management and Administrative support
- Superior Communication and Leadership

2. Work Experience

18 Years of professional experience in academia, research and industry.

A. Most Recent Position

Associate Professor in electrical engineering since 6th May 2016 at Mirpur University of Science and Technology (MUST), Mirpur, AJ&K Pakistan.

Roles: Teaching and Academics, **Director** Advanced Studies and Research Board (AS&RB), **HoD** Department of Electrical Engineering, Research, Student Counselling, Curriculum Development, Member Academic Council, **Member Senate** (the highest statutory body) MUST.

Management and Administration

- Serving as Director Advanced Studies & Research Board (AS&RB) MUST since 7th of March 2024
- Served as Head of the Department of Electrical Engineering for a tenure of three years, 2019-22
- Experience of Administration as PROVOST for One Year
- Served as Member of Senate MUST, the highest statutory body of the University for governing academic and administrative matters (2021-2024)

Achievements

- Successfully transformed the non-OBE-based syllabi to an OBE-based curriculum and achieved three years of accreditation under the Washington Accord
- Establishment of new labs and upgradation of existing labs
- Restarting of PhD program in Electrical Engineering
- Initiating two new BS programs: Energy Systems Engineering and Information Security Engineering
- Holding of IEEE First International Conference on Power Energy and Smart Grid (IEEE ICPESEG), as Chief Organizer (<https://ieeexplore.ieee.org/xpl/conhome/8375185/proceeding>)
- Working as Program Evaluator for Pakistan Engineering Council for accreditation of Electrical Engineering
- Worked as Resource Person for OIC Ministerial Standing Committee on Scientific and Technological Cooperation (COMSTECH) Islamabad
- Successful implementation of HEC post-graduate policies as a member and Director of AS&RB

B. COMSATS University Islamabad

Assistant Professor in electrical engineering from 1st July 2015 to 5th May 2016 and lecturer from 1st August 2013 to 30th June 2015.

Roles: Teaching, Research and Administrative Support

Achievements: Research Productivity Award for 2013, 2014 and 2015

C. Pakistan Atomic Energy Commission

Design Engineer for power plants.

Roles: Senior Design Engineer (1st December 2009 to 31st July 2013), Junior Engineer (29th November 2007 to 30th November 2009), Fellowship and on Job Training (14th December 2005 to 28th November 2007)

Achievements

- Participation in the Design installation and commissioning of power plants of 1000 and 325 MW
- Design and review of electrical systems used in power plants in collaboration with Shanghai Nuclear Engineering Research and Design Institute (SNERDI) and East China Electric Power Design Institute (ECEPDI).

D. Teaching, Curriculum Design and Course Coordination

- I have been following **OBE-based** teaching since **2011** and working as an **OBE trainer** since 2017
- Recognized as Pakistan Engineering Council's **Program Evaluator** for Electrical Engineering in Pakistan
- Served as **Head of Department** of Electrical Engineering MUST for three years (2019-22) and successfully transformed the non-OBE curriculum to OBE-based syllabi and achieved accreditation for three years under the **Washington Accord**
- I have been serving as a **member of: Board of Studies (BoS), Advanced Studies and Research Board, 'Faculty Council' and 'Academic Peer'** for four universities in Pakistan.
- Three years of serving (2021-24) as **Member of Senate** MUST which is the highest statutory body for governance of administrative and academic matters under the headship of chancellor (Head of State).

E. List of Courses Taught

Graduate Level

- Smart Grids
- Advanced Power Distribution and Utilization
- Power System Planning
- Power System Operation and Control
- Fault-Tolerant Power Systems
- Advanced Electric Machines
- Electric Power Quality
- Energy Conversion Technologies
- Special Topics in Power Systems

Undergraduate Level

- Linear Circuit Analysis
- Electric Machines (DC/AC)
- Electric Machine Design
- Power Distribution and Utilization
- Smart Grids
- Power System Protection
- Power System Operation and Control
- Fault Tolerant Power Systems
- Mechanics and Thermodynamics

F. Establishment and Upgradation of Labs

I have played a key role in the establishment and upgradation of the following labs in MUST as chairperson and head of the technical qualification and purchase committees.

1. Graduate Research Lab
 2. Power Distribution and Utilization Lab
 3. Power System Protection Lab
 4. Power Transmission Lab
 5. Power Electronics Lab
-

3. Education

- **PhD [Electrical Engineering (Power and Energy)]**
COMSATS University Islamabad (CUI), ISLAMABAD
Thesis: Simulation Study for Optimized Demand Side Management in Smart Grid
 - **Master of Engineering [Nuclear Power]**
NED University Karachi, Pakistan
Thesis: Design and Implementation of Stability Analyzer for Linear Control Systems used in Nuclear Power Plants
 - **BE [Electrical Engineering]**
UCET, University of Azad Jammu & Kashmir, Pakistan
 - **Training and Certifications:** Smart Grids, Dynamic Energy Management, HEC PHD Supervision, OBE, HR, etc.
-

4. Research

A. Research Metrics (Overview)

- **ORCID = 0000-0002-4504-1557**
- **Google Scholar Citations = 3924**
- **Publications/Proceedings/Book Chapters = 94** (48 Journal Publications and 45 Int. Conference Proceedings, 1 Book Chapters)

- **H-index = 28 and i10-index = 46**
- **Research Interest Score at RG ~2457** (Higher than **98%** of 25 million RG members)

B. Supervision of PHDs

Successfully produced two PHDs under the thesis titles:

- Coordinated Charging Scheduling of Electric Vehicles incorporating Optimal Network Performance and Customer Satisfaction
- Optimization of Economic Operation for RE Integrated Power Systems
- Occupancy Detection and IoT-based Building Energy Management System (In Progress)

C. Journal Publications (48)

1. Ubaid Ahmed, Rasheed Malik, Syed S. Abbas, Imran Aziz, A. Mahmood, "Short-Term Wind Power Forecasting Using Integrated Boosting Approach," *Front. Energy Res. Sec. Smart Grids*, Volume 12 - 2024 | doi: 10.3389/fenrg.2024.1401978.
2. Ubaid Ahmed, Rasheed Muhammad, Syed Sami Abbas, Imran Aziz, **A. Mahmood**, "Short-Term Wind Power Forecasting Using Integrated Boosting Approach," Accepted in *Frontiers of Energy Research*, May 2024.
3. Iqra Rafiq, **A. Mahmood**, et al., "A Hybrid Approach for Forecasting Occupancy of Building's Multiple Space Types," in **IEEE Access**, vol. 12, pp. 50202-50216, **2024**, doi: 10.1109/ACCESS.2024.3383918.
4. Ubaid Ahmed, **A. Mahmood**, Majid Ali Tunio, Ghulam Hafeez, Ahsan Raza Khan, Sohail Razzaq, "Investigating Boosting Techniques' Efficacy in Feature Selection: A Comparative Analysis," *Energy Reports*, Volume 11, issue, June **2024**, Pages 3521-3532, ISSN 2352-4847, <https://doi.org/10.1016/j.egy.2024.03.020>.
5. Ubaid Ahmed, Ahsan Raza Khan, **A. Mahmood**, Iqra Rafiq, Rami Ghannam, Ahmed Zoha, "Short-term Global Horizontal Irradiance Forecasting Using Weather Classified Categorical Boosting," *Applied Soft Computing (The Official Journal of the World Federation on Soft Computing (WFSC))*, 155 (2024): Pages, 111441. **February 2024** DOI: <https://doi.org/10.1016/j.asoc.2024.111441>
6. Asif, Muhammad; Amin, Adil; Jamil, Umar; **A. Mahmood**; Ahmed, Ubaid; Razzaq, Sohail; Mahdi, Fahad Parvez "Combined Emission Economic Dispatch using Quantum-inspired Particle Swarm Optimization and its Variants," *Energy Exploration & Exploitation*. **2024;0(0)**. doi:10.1177/01445987241235419
7. Q. Akhtar, A. Siddique, S. Alqathani, **A. Mahmood**, et al., "Efficient Energy Management for Household: Optimization-Based Integration of Distributed Energy Resources in Smart Grid" in *IEEE Access*, vol. 11, pp. 85716-85727, **2023**, doi: 10.1109/ACCESS.2023.3303204.
8. Adil Amin, **A. Mahmood**, et al., "A Two-Stage Multi-Agent EV Charging Coordination Scheme for Maximizing the Grid Performance and Customer Satisfaction," *MDPI Sensors* 23, no. 6: 2925, **2023**. <https://doi.org/10.3390/s23062925>

9. S. Razzaq, C. Xydeas, **A. Mahmood** et al. "Efficient Optimization Techniques for Resource Allocation in UAVs Mission Framework", PLoS ONE 18(4): e0283923., **2023** <https://doi.org/10.1371/journal.pone.0283923>
10. Zulfiqar Ali, Syed Zagam Abbas, **A. Mahmood**, et al. "A Study of Generalized Photovoltaic System with MPPT Using Perturb and Observer Algorithms Under Varying Conditions," *Energies*, **2023**, 16(9), 3638; <https://doi.org/10.3390/en16093638>
11. **A. Mahmood**, F. Baig, N. Javaid., et al., "An Enhanced System Architecture for Optimized Demand Side Management in Smart Grid." *Applied Sciences*, 6, no. 5: 122., **2016**, <https://doi.org/10.3390/app6050122>
12. **A. Mahmood**, N. Javaid, S. Razzaq., "A Review of Wireless Communications for Smart Grid." *Renewable and Sustainable Energy Reviews*, Vol. 41 (January **2015**), 248 – 260. (2015). DOI: [10.1016/j.rser.2014.08.036](https://doi.org/10.1016/j.rser.2014.08.036)
13. **A. Mahmood**, N. Javaid, A. Zafar *et al.*, "Pakistan's Overall Energy Potential Assessment, Comparison of LNG, TAPI and IPI Gas Projects," *Renewable and Sustainable Energy Reviews* Vol. 31 (March **2014**), 182 –193. DOI: [10.1016/j.rser.2013.11.047](https://doi.org/10.1016/j.rser.2013.11.047).
14. I. Rafiq, **A. Mahmood**, Sohail Razzaq, SHM Jafri, Imran Aziz, "IoT Applications and Challenges in Smart Cities and Services" *The Journal of Engineering, J. Eng.* 2023,1–25 (2023), <https://doi.org/10.1049/tje2.12262>
15. S. Razzaq, R. Zafar, N. A. Khan, A. R. Butt, **A. Mahmood**, "A Novel Prosumer-Based Energy Sharing and Management (PESM) Approach for Cooperative Demand Side Management (DSM) in Smart Grid", *Applied Sciences*, 2016, *Appl. Sci.* **2016**, 6(10), 275; [doi:10.3390/app6100275](https://doi.org/10.3390/app6100275).
16. Amir Mushtaq, Usman Mussadiq, **A. Mahmood**, SHM Jafri, "The Impact of Equivalent Resistance on Power Generation Using PV Module During Different Seasons," *Journal of Power Technologies*, [S.I.], v. 102, n. 4, p. 175 -- 186, Mar. 2023. ISSN 2083-4195. Available at: <https://papers.itc.pw.edu.pl/index.php/JPT/article/view/1824>
17. A. Basit, G.A.S. Sidhu, **A. Mahmood**, F. Gao, "Efficient and Autonomous Energy Management Techniques for the Future Smart Homes," in **Smart Grid, IEEE Transactions on**, no. 99, pp.1-10, Dec. **2015** doi: [10.1109/TSG.2015.2504560](https://doi.org/10.1109/TSG.2015.2504560),
18. S.Z. Abbas; Z. Ali; **A. Mahmood**, et al., "Review of Smart Grid and Nascent Energy Policies: Pakistan as a Case Study," *Energies* 2022, 15, 7044. <https://doi.org/10.3390/en15197044>
19. Usman, Muhammad, Wajahat U.K. Tareen, **A. Mahmood** et al., "A Coordinated Charging Scheduling of Electric Vehicles Considering Optimal Charging Time for Network Power Loss Minimization" *2021 Energies* 14, no. 17: 5336. <https://doi.org/10.3390/en14175336>
20. Faisal Mehmood Butt, Lal Hussain, **A. Mahmood**, Kashif Javed Lone, "Artificial Intelligence based accurately load forecasting system to forecast short and medium-term load demands," *Mathematical Biosciences and Engineering*, 2021, Volume 18, Issue 1: 400-425. doi: [10.3934/mbe.2021022](https://doi.org/10.3934/mbe.2021022)
21. Adil Amin, **A. Mahmood** et al., "A review of Optimal Charging strategy for Electric Vehicles under Dynamic Pricing Schemes in the distribution charging network," *Sustainability*, 2020; 12(23):10160. <https://doi.org/10.3390/su122310160>
22. Adil Amin, **A. Mahmood** et al. "An integrated approach of optimal charging scheduling of electric vehicles (EVs) integrated with improved medium voltage network reconfiguration for power loss minimization," *Sustainability* **2020**, 12, 9211. <https://doi.org/10.3390/su12219211>.

23. Usman Mussadiq, **A. Mahmood**, Saeed Ahmed, Sohail Razzq, Insoo Koo, “Economic and Climatic Impacts of Different Peer-to-Peer Game Theoretic–based Energy Trading Systems”, in *IEEE Access*, vol. 8, pp. 195632-195644, 2020, doi: [10.1109/ACCESS.2020.3033811](https://doi.org/10.1109/ACCESS.2020.3033811).
24. Raja Arslan Naseer, Muneeba Nasim, Muhummad Sohaib, Ch. Jabbar Younis, Anzar Mehmood, Mehboob Alam, Yehia Massoud, “VLSI architecture design and implementation of 5/3 and 9/7 lifting Discrete Wavelet Transform,” *Integration*, ISSN:0167-9260, <https://doi.org/10.1016/j.vlsi.2022.07.009>.
25. N. A. Khan, G. A. S. Sidhu, A. Awan, Z. Ali, **A. Mahmood**, “Modeling and Economic Operation Optimization for RE Integrated Micro-grids Considering Energy and Environmental Aspects”, *International Journal of Energy Research*, 43.13 (2019): 6721-6739, DOI: [10.1002/er.4604](https://doi.org/10.1002/er.4604)
26. N. I. Ratyal, S. Razzaq, **A. Mahmood**, et al. "Three-Dimensional Face Recognition using Variance based Registration and Subject Specific Descriptors, " *International Journal of Advanced Robotic Systems*. 2019;16(3). doi:[10.1177/1729881419851716](https://doi.org/10.1177/1729881419851716)
27. N. I. Ratyal, Intiaz Ahmed, Muhammad Sajid, **A. Mahmood**, Sohail Razzaq *et al.* , "Deeply Learned Pose Invariant Image Analysis with Applications in 3D Face Recognition" *Mathematical Problems in Engineering*, Volume 2019, Article ID 3547416, 21 pages, <https://doi.org/10.1155/2019/3547416> May 2019,
28. S. Razzaq, C. Xydeas, M. Everett, **A. Mahmood**, T. Alquthami. Three-Dimensional UAV Routing with Deconfliction. *IEEE Access*, pp. 1-16, Issue 1, Volume 6, April, **2018**, Print ISSN: 2169-3536, Online ISSN: 2169-3536, Digital Object Identifier: [10.1109/ACCESS.2018.2824558](https://doi.org/10.1109/ACCESS.2018.2824558),
29. Syed Zagam Abbas, Anila Kousar, Sohail Razzaq, Amir Saeed, Mehboob Alam, **A. Mahmood**, “Energy Management in South Asia,” *Energy Strategy Reviews* 21 (2018) 25–34 **2018**, <https://doi.org/10.1016/j.esr.2018.04.004>.
30. Manuel S. Alvarez-Alvarado, Z. A. Khan, **A. Mahmood**, Angel A. Recalde, Fernando Vaca-Urbano and Abdullah Altamimi, “Grounding Points Model for Safety Enhancement in Autotransformer Configuration Railway System,” *Pakistan Journal of Engineering and Applied Sciences*, UET Lahore, Vol. 23, July, **2018**, PP. 66-76. [2018: VOLUME 23 JULY 2018](https://doi.org/10.1016/j.pjes.2018.07.018)
31. K. P. Amber, **A. Mahmood**, M. W. Aslam, Anila Kousar, et al. “Energy Consumption Forecasting for University Sector Buildings,” *Energies* **2017**, 10(10), 1579; doi:[10.3390/en10101579](https://doi.org/10.3390/en10101579)
32. R. Zafar, **A. Mahmood**, S. Razzaq, W. Ali, U. Naeem, K. Shehzad, Prosumer based energy management and sharing in smart grid, *Renewable and Sustainable Energy Reviews*, Available online 11 July **2017**, ISSN 1364-0321, <https://doi.org/10.1016/j.rser.2017.07.018>.
33. A. R. Khan, **A. Mahmood**, A. Safdar, Z. A. Khan, N. A. Khan, “Load forecasting, dynamic pricing and DSM in smart grid: A review,” *Renewable and Sustainable Energy Reviews*, Volume 54, February **2016**, Pages 1311-1322, ISSN 1364-0321, <http://dx.doi.org/10.1016/j.rser.2015.10.117>.
34. S. Ahmed, **A. Mahmood**, A. Hasan, G. A. S. Sidhu, M. F. Butt, “A comparative review of China, India and Pakistan renewable energy sectors and sharing opportunities,” *Renewable and Sustainable Energy Reviews*, Volume 57, May **2016**, Pages 216-225, ISSN 1364-0321, <http://dx.doi.org/10.1016/j.rser.2015.12.191>.
35. M. A. Khan, N. Javaid, **A. Mahmood**, et al. A generic demand-side management model for smart grid. *International Journal of Energy Research*, volume 39, issue 7, Pages 954-964 **2015** <https://onlinelibrary.wiley.com/doi/full/10.1002/er.3304>.

36. N. A. Khan, A. B. Awan, **A. Mahmood** et al. Combined emission economic dispatch of power system including solar photo voltaic generation. *Energy Conversion and Management*. DOI: [10.1016/j.enconman.2014.12.029](https://doi.org/10.1016/j.enconman.2014.12.029).
37. **A. Mahmood**, N. Javaid, M. A. Khan, S. Razzaq. An Overview of Load Management Techniques in Smart Grid. *International Journal of Energy Research*, Volume39, Issue11, September 2015, Pages 1437-1450, <https://doi.org/10.1002/er.3350>
38. **A. Mahmood**, I. Khan, S. Razzaq, Z. Najam, N.A. Khan, M.A. Rehman, N. Javaid, “Home Appliances Coordination Scheme for Energy Management (HACS4EM) Using Wireless Sensor Networks in Smart Grids, *Procedia Computer Science*, Volume 32, **2014**, Pages 469-476, ISSN 1877-0509, <http://dx.doi.org/10.1016/j.procs.2014.05.449>.
39. **A. Mahmood**, M.N. Ullah, S. Razzaq, A. Basit, U. Mustafa, M. Naeem, N. Javaid, “A New Scheme for Demand Side Management in Future Smart Grid Networks” *Procedia Computer Science*, Volume 32, **2014**, Pages 477-484, ISSN 1877-0509, <http://dx.doi.org/10.1016/j.procs.2014.05.450>.
40. **A. Mahmood**, A. Ismail, Z. Zaman, H. Fakhar, Z. Najam, MS Hassan, SH Ahmed. A Comparative Study of Wireless Power Transmission Techniques. *J. Basic. Appl. Sci. Res.*, 4(1)321-326, **2014**.
41. G. Aleem, M. Y. Wani, R. Ahmed, **A. Mahmood**, Gohar Zaman, “Role of smart meter in demand side management for future smart grids,” *International Journal of Technology and Research*, **2015**.
42. Syed Irtaza Ali, Mohammad Naeem, **A. Mahmood**, Sohail Razzaq, Zeeshan Najam, Saeed Ahmed, Syed Hassan Ahmed, “Methods to Regulate Energy Consumption in Smart Homes”, *J. Basic. Appl. Sci. Res.*, 4(1)166-172, **2014**
43. F. Baig, **A. Mahmood et al.** (2013). Smart Home Energy Management System for Monitoring and Scheduling of Home Appliances Using Zigbee. *J. Basic. Appl. Sci. Res.*, 3(5)880-891, **2013**
44. M. U. Farooq, **A. Mahmood et al.** Wind Power and Smart Grid as an Environmental Obligation in Context of Energy Security for Pakistan. *Journal of Basic and Applied Scientific Research*. 3(9):518-527, **2013**
45. M. A. Khan, **A. Mahmood et al.** Improvement in Perturb and Observe Method for Maximum Power Point Tracking of photovoltaic panel. *Journal of Basic and Applied Scientific Research*, 3(9):456-466, **2013**
46. M. N. Ullah, **A. Mahmood**, Razzaq, S., Ilahi, M., Khan, R. D., Javaid, N. (2013). A Survey of Different Residential Energy Consumption Controlling Techniques for Autonomous DSM in Future Smart Grid Communications. *J. Basic. Appl. Sci. Res.*, 3(3)1207-1214, **2013**
47. I. Khan, **A. Mahmood**, Javaid, N., Razzaq, S., Khan, R. D., & Ilahi, M. (2013). Home Energy Management Systems in Future Smart Grids. *J. Basic. Appl. Sci. Res.*, 3(3)1224-1231, **2013**
48. M. S. Hasan, **A. Mahmood et al.**, Design and Fabrication of Solar Thermal Battery using Molten Salt. *Journal of Basic and Applied Scientific Research*, 3(6):1141-1150, **2013**

D. [Book Chapters \(01\)](#)

1. Sohaib Manzoor, Hira Manzoor, Mehak Manzoor, **Anzar Mahmood**, “A Load Balancing Mechanism for a Multi-controller Software Defined WiFi Network” In: Sun, X., Zhang, X., Xia, Z., Bertino, E. (eds) *Advances in Artificial Intelligence and Security. ICAIS 2021. Communications in Computer and Information Science*, vol 1422. Springer, Cham. https://doi.org/10.1007/978-3-030-78615-1_1. Part of the book series: Communications in Computer and Information Science (CCIS, volume 1422).

E. International Conference Proceedings (45)

1. Ubaid Ahmed, Syed Samee Abbas, Sohail Razzaq, Anzar Mahmood, “A Novel Integrated Approach for Short-Term Wind Power Forecasting,” Accepted in 2024 7th International Conference on Energy Conservation and Efficiency (ICECE), 6-7 March, 2024, **UET Lahore, Pakistan.**
2. Sabiha Rani, Anzar Mahmood, Ubaid Ahmed, Sohail Razzaq and Sohaib Manzoor, “A Short Term Load Forecasting by Using Hybrid Model,” Accepted in IEEE 20th IBCAST2023 (20th International Bhurban Conference on Applied Sciences & Technology 2023), **MURREE, Pakistan.**
3. Ubaid Ahmed, Ahsan Raza Khan and Anzar Mahmood, “Comparison of Memory-less and Memory-based Models for Short-Term Solar Irradiance Forecasting,” in 7th International Multi-Topic ICT Conference 2023 (IMTIC'23), Karachi and Jamshoro, **Pakistan.**
4. Iftikhar Ahmed, Anzar Mahmood et al. “Impacts of Distributed Renewable Energy Generation on Power System,” Accepted in 2022 IEEE Electrical Power and Energy Conference (EPEC 2022), **Canada.**
5. Afnan Mehmood Malik, Munawar Sultan, Anila Kousar, Anzar Mahmood and Khursheed Sabeel, “Distributed Generation in AJK: a Case Study”, 7th International Conference on Electrical and Electronics Engineering (ICEEE 2020), April 14-16, 2020, **Antalya, Turkey.**
6. Babar Hussain, Adil Amin and Anzar Mahmood, “An Optimal Site Selection for Distributed Generation in the Distribution Network by QPSO Algorithm”, Proceedings of ICEET 2020, February 22-23, 2020 at Superior University Lahore, **Pakistan.**
7. Mohammad Noman Iqbal, Anzar Mahmood, Hira Arshad, Adil Amin, “Voltage Regulation and Power Loss Minimization by Using Unified Power Flow Control Device” ICEET **2019**, Superior University Lahore, **Pakistan.**
8. Nabeeha Qayyum, Adil Amin, Umar Jamil and Anzar Mahmood, “Optimization Techniques for Home Energy Management: A Review” IEEE iCoMET **2019**, IBA Sukkur, **Pakistan.**
9. Khursheed Sabeel, Shahbaz Baig, Jabbar Aziz Baig, Qasim Mehmood, Anzar Mehmood, “Big Data Processing in Smart Grid for the Sustainable Energy Using the Concept of Demand Side Management through Advanced Robotics Network” in proceedings of 2019 3rd International Conference on Control Engineering and Artificial Intelligence (CCEAI 2019) Jan.24-26, 2019, **Los Angeles, USA**
10. Muhammad Usman, Afnan Mehmood Malik, Anzar Mahmood and Anila Kousar, “HOMER Analysis for Integrating Solar Energy in Off-Grid and On-Grid SCO Telecommunication Sites,” IEEE Global Power, Energy and Communication Conference 2019 (IEEE GPECOM 2019 – ISBN: 978-1-5386-8086-5), June 12-15, **Cappadocia, Nevsehir, Turkey.**

11. Umar Jameel, Nabeeha Qayoum, Anzar Mahmood, Adil Amin, “Control Grid Strategies for Reduction of Real & Reactive Line Losses in Radial Power Distribution System,” in proceedings of the 1st International Conference on Electrical, Communication and Computer Engineering (ICECCE) 24-25 July 2019, **Swat, Pakistan**.
12. Imtiaz Ahmed, Tauqeer Ul Islam Bhatti, Ahsaan Ul Haq Choudhry, Waqar Raheem and Anzar Mahmood, “A Hardware Implementation of Energy Sharing within a Prosumers Community,” in 2018, International Conference on Renewable Energy and Power Engineering (REPE 2018), **Toronto, November 24-26, 2018, Canada**.
13. Manuel S. Alvarez-Alvarado, Zafar A. Khan, **A. Mahmood**, Angel Recalde, Fernando Vaca-Urbano and Abdullah Altamimi, “Grounding Points Model for Power Flow Applied to an Autotransformer Configuration Railway,” IEEE, 5th International Conference on Electrical Engineering (ICEE **2018**), **UET Lahore, Pakistan**.
14. Muhammad Arsalan, **A. Mahmood**, Iqra Rafiq, Anila Kousar, “Experimental Investigation of Evacuated Gas Tube Solar Collectors for Water Heating Applications,” IEEE International Conference on Engineering and Emerging Technologies, 22-23 February **2018**, Superior University Lahore, **Pakistan**.
15. Hira Arshad, Akhtar Nawaz Malik, Ali Anwer, **A. Mahmood**, “Selection Process of Faculty and their Retention in Engineering Institutions,” IEEE International Conference on Engineering and Emerging Technologies, 22-23 February **2018**, Superior University Lahore, **Pakistan**.
16. Khursheed Sabeel, Samia Jarral, Faheem Ashiq, Mirza Ateeq Ahmed Baig, **A. Mahmood**, “Waste Management and Climate Change: An Overview of Azad Kashmir,” IEEE International Conference on Engineering and Emerging Technologies, 22-23 February **2018**, Superior University Lahore, **Pakistan**.
17. Khursheed Sabeel, Anila Kousar, Adil Amin, Muhammad Usman, Mamoona Akbar and **A. Mahmood**, “Prospects of Smart Grid in Azad Jammu and Kashmir” in IEEE, 1st International Conference on Power, Energy and Smart Grid, ICPEGS-**2018**, 9-10 April 2018, Mirpur Azad Kashmir, **Pakistan**.
18. Umar Jamil, Adil Amin and **A. Mahmood**, “A Comparative Study of Control Techniques for Power Loss Minimization in a Distribution Network” in IEEE, 1st International Conference on Power, Energy and Smart Grid, ICPEGS-**2018**, 9-10 April 2018, Mirpur Azad Kashmir, **Pakistan**.
19. Ahsan Raza Khan, Sohail Razzaq, Thamer Alquthami, Muhammad Riaz Moghal, Adil Amin, **A. Mahmood**, “Day Ahead Load Forecasting for IESCO using Artificial Neural Network and Bagged Regression Tree” in IEEE, 1st International Conference on Power, Energy and Smart Grid, ICPEGS-2018, 9-10 April **2018**, Mirpur Azad Kashmir, **Pakistan**.
20. M. S Hasan, Muhammad Iftikhar Khan, Zamran Rabeel, Muhammad Usman and **A. Mahmood**, “Design and Fabrication of Indoor Solar Thermal Cooker using Therminole” in IEEE, 1st International Conference on Power, Energy and Smart Grid, ICPEGS-2018, 9-10 April **2018**, Mirpur Azad Kashmir, **Pakistan**.

21. **A. Mahmood**, U. Mussadiq, R. Zafar, et al. "Energy Sharing and Management for Prosumers in Smart Grid with Integration of Storage System", in Proceeding of 5th International İstanbul Smart Grid and Cities Congress and Fair 19 – 21 April 2017 İstanbul Congress Center, **Turkey**.
22. **A. Mahmood**, I. Rafiq, A. Kousar, S. Ejaz, Manuel S. Alvarez-Alvarado and Zafar A. Khan, "Optimization of Home Energy Management System in Smart Grid for Effective Demand Side Management," 5th International Renewable and Sustainable Energy Conference (IRSEC) December 04-07, **2017, Tangier, Morocco**.
23. Abdul Rehman, Faisal Baig, Yousaf Hameed Khattak, Bernabé Marí Soucase and **A. Mahmood**, "Centralized Intelligent Home Energy Management System," 5th International Renewable and Sustainable Energy Conference (IRSEC) December 04-07, **2017, Tangier, Morocco**.
24. **A. Mahmood**, N. Javaid, N. A. Khan and S. Razzaq, "An Optimized Approach for Home Appliances Scheduling in Smart Grid," IEEE INMIC-2016, 5-6 December, **2016**, Air University Islamabad, **Pakistan**.
25. **A. Mahmood**, S. Razzaq, A. R. Khan, S. Zia Ud Din and A. Hussain, "Pakistan's Energy Import Options," IMDC-**2016**, 19-20 December, 2016, University of Lahore, Gujrat Campus, **Pakistan**.
26. S. Ejaz, I. Rafiq, M. A. Choudhary, **A. Mahmood**, "Performance Improvement of Pendulum Cart System Using Fractional Controller," IEEE INMIC-2016, 5-6 December, **2016**, Air University Islamabad, **Pakistan**.
27. Syed Bilal Javed, **A. Mahmood**, Rida Abid, Khurram Shehzad, M. S. Mirza and Rafiah Sarfraz, "Implementation of Generalized Photovoltaic System with Maximum Power Point Tracking," IMDC-2016, 19-20 December, **2016**, University of Lahore, Gujrat Campus, **Pakistan**.
28. Mubashir Ali, Mirza Osama, Adil Nadeem, Tamoor Shafique, Mirza Jabbar Aziz Baig, Rehman Zafar and **A. Mahmood**, "Development of DSM based HEMS Model for Energy Management in Smart Grid," IMDC-**2016**, 19-20 December, **2016**, University of Lahore, Gujrat Campus, **Pakistan**.
29. Syed Zia ud deen, **A. Mahmood et al.** A Simulink based Adaptive UFLS scheme. In IMTIC **2015**, Mehran Engineering University Jamshoro, **Pakistan**.
30. Arsalan Masood, Q. Hasan, **A. Mahmood**. Flexible AC Transmission System Controllers: A Review. Accepted in IMTIC **2015**, Mehran Engineering University Jamshoro, **Pakistan**.
31. Ahsan Raza Khan, **A. Mahmood**, Awais Safdar, Zafar A. Khan, Syed Bilal Javaid, Naveed Ahmed Khan *et al.* Load Forecasting and Dynamic pricing based DSM through HEMS- A Review. Accepted in IMTIC **2015**, Mehran Engineering University, Jamshoro, **Pakistan**.
32. Wamiq Ali, Usman Naeem, Rehman Zafar, Khurram shehzad, **Anzar Mahmood**. Review of Social Networking based Energy Management in Smart Grid. IMTIC **2015**, Mehran Engineering University, Jamshoro, **Pakistan**.
33. A. Arbaz, M. Waqas, K. Shehzad, **A. Mahmood**. Home Energy Management and Knapsack Technique in Smart Grid Environment. ICEET **2015**, Superior University Lahore, **Pakistan**.
34. R. Zafar, U. Naeem, W. Ali, **A. Mahmood**. Applications of ZigBee in Smart Grid: A Review. ICEET **2015**, Superior University Lahore, **Pakistan**

35. H. Ashraf, A. Hasan, U. Khurshid, **A. Mahmood**. Peak Load Shaving Model based on Individual's Habit. IEEE 9th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS-2015), Blumenau, **Brazil**.
36. Zain ul Abedin, Uruj Shahid, **A. Mahmood**. Application of PSO and GA for HEMS in smart grid. IEEE 9th International Conference on Complex, Intelligent, and Software Intensive Systems (CISIS-2015), Blumenau, **Brazil**.
37. Zafar Ali Khan, **A. Mahmood** *et al.* Optimization based Individual and cooperative DSM in Smart Grid Environments. PGSRET 2015 Islamabad, **Pakistan**.
38. Mohammad Waqas, Anzar Mahmood, Sohail Razzaq, Mohammad Hussain Ayyaz, Nadeem Javaid, "Optimized Energy Management System Using Electric Water Heater," in proceeding s of IEEE BWCCA 2015 Poland .
39. **A. Mahmood** *et al.* "Analysis of Wireless Power Transmission". IIISC 2014, International Industrial Information System Conference Chiang Mai **Thailand**.
40. **A. Mahmood**, S. I. Ali, *et al.* Home Energy Management in Smart Grid. IIISC 2014, International Industrial Information System Conference Chiang Mai **Thailand**.
41. M. N. Ullah, N. Javaid, **A. Mahmood** *et al.* "Residential Energy Consumption Controlling Techniques to Enable Autonomous Demand Side Management in Future Smart Grid Communications," Eighth International Conference on Broadband and Wireless Computing, Communication and Applications (2013), **FRANCE**
42. I. Khan, N. Javaid, **A. Mahmood** *et al.*, "A Survey of Home Energy Management Systems in Future Smart Grid Communications" Eighth International Conference on Broadband and Wireless Computing, Communication and Applications (2013), **FRANCE**
43. Anas, M.; Javaid, N.; **A. Mahmood**, "Minimizing Electricity Theft Using Smart Meters in AMI" , *Seventh International Conference on P2P, Parallel, Grid, Cloud and Internet Computing (3PGCIC)*, pp.176,182, 12-14 Nov. 2012. November 12-14, **2012**, University of Victoria, Victoria, **Canada**.
44. Javaid, N.; Sharif, A.; **A. Mahmood**, "Monitoring and Controlling Power Using Zigbee Communications", *Seventh International Conference on Broadband, Wireless Computing, Communication and Applications (BWCCA)*, vol., no., pp.608,613, 12-14 Nov. **2012** University of Victoria, Victoria, **Canada**.
45. Hayat, S.; Javaid, N.; **A. Mahmood**; Bouk, S.H., "Energy Efficient MAC Protocols," *9th International Conference on Embedded Software and Systems (HPCC-ICISS)*, 2012 IEEE, vol., no., pp.1185,1192, 25-27 June **2012** Liverpool **UK**.

F. Submitted Papers (8)

1. "Neuromorphic Computing-Based Model for Short-Term Forecasting of Global Horizontal Irradiance" under review in IEEE Transactions on Industrial Informatics, manuscript No. TII-24-1106.

2. “Integrated Stacking Approach for Improved Short-term Solar Irradiance” under review in IEEE Transactions on Artificial Intelligence, TAI-2024-Mar-A-00447.
3. “A Hybrid Approach for Forecasting Building Load through Real-Time Occupant Count Data” Under Revision in Arabian Journal for Science and Engineering.
4. “Electric Vehicle Charging Station Load Forecasting with an Integrated DeepBoost Approach,” submitted to Alexandria Engineering Journal.
5. “Medium-Term Load Forecasting with Power Market Survey: GEPCO Case Study” submitted to Journal of Academia Green Energy,
6. “An Energy Management Approach Through Appliances Scheduling” submitted to International Transactions on Electrical Energy Systems.
7. “An Overview of Recent Wireless Technologies for IoT-Enabled Smart Grids,” Submitted in Journal of Electrical and Computer Engineering, Article ID: 2568751
8. “Dual Attention Empowered Long Short-Term Memory Network for Short-Term Electric Load Forecasting,” submitted in IEEE iEnergy, ID: iEng-2024-0005

G. Papers in Progress (6)

1. “A Spiking Neuron Long Short-Term Memory Network for Short-Term Load Forecasting”
2. “Design and Development of Digital Hearing Aid System for Multiple Environments”
3. “Cost Optimization Model for Short-Term Hydropower Unit Commitment Problem”
4. “Transforming Plastic Bag Waste into Energy Efficient Thermal Insulation Roofing Tiles- An Optimization Study and Performance Assessment”
5. “An optimized approach for home appliances scheduling in smart grid” (PhD thesis last chapter)
6. “Data driven wind power forecasting for KSA”

H. Research Collaborations

- James Watt School of Engineering, University of Glasgow, Glasgow, **UK**
- Dept. Electrical and Computer Engineering, The University of Texas, **USA**
- Alabama A&M University, **USA**
- Department of Electrical Engineering, National Kaohsiung University of Science and Technology, Kaohsiung City, **Taiwan**
- University of Hull, **UK**
- COMSATS University Islamabad, **Pakistan**
- Artificial Intelligence Research Center (AIRC), College of Engineering and Information Technology, Ajman University, **UAE**
- Department of Energy, Politecnico di Milano, Milano, 20133, , **Italy**

I. Research Funding Projects

1. Higher Education Commission (HEC) Pakistan’s grant for International Conference on Power Energy and Smart Grid (ICPESG-2018)
2. HEC Research Travel Grant No. 278.92 for presentation of Research Work in Morocco.
3. Pakistan Science Foundation (PSF) grant for International Conference on Power Energy and Smart Grid (ICPESG-2018)

4. PI for ORIC MUST Grant, “Electricity Theft Detection Mechanism for Effective Estimation, Location Finding and Elimination”
5. PI for ORIC MUST Grant, “Design and Development of Digital Hearing Aid System for Multiple Environments”
6. Co-PI for HEC NRPU-P#3362 PV Solar Cell Based Power System for Electrical Engg. Dept of Mirpur University of Science and Technology (MUST), Mirpur
7. Team Member for project titled “Advanced Metering Infrastructure (AMI) Project in Rawalpindi Circle, Taxila Division, B-I & B-II Customers of Entire Company and New Modern Billing System for Entire Company in (IESCO)” funded by Asian Development Bank.
8. Research Collaborator for “Development of Advanced Data Driven Hybrid Model for Solar and Wind Energy Forecasting in KSA” for project of Deanship of Scientific Research, Qassim University, KSA worth Saudi Riyals 26200/- (~2 million PKR)

J. Submitted Funding Projects (3)

- “Research on intelligent control and security protection technologies for power systems with high penetration of renewable energy”, submitted under call for joint research projects between Pakistan Science Foundation and National Natural Science Foundation China, Sep 2023. Project Code/No. (PSF): PSF-NSFC/202307/343
- “Development of Advanced Solar Energy Hybrid Forecasting Model to Meet the Target of 7% GHGs Reduction in the Sultanate of Oman” submitted under Research Funding Call from The Research Council (TRC), Ministry of Higher Education, Research and Innovation through Majan University College, OMAN.
- “Development and Promotion of climate-smart electric loader vehicle for labor reduction of rural women in Pakistan to mitigate the climate change effects,” submitted under the call of Bill & Melinda Gates Foundation for Accelerating Catalyzing Solutions for Climate Change’s Impact on Health, Agriculture, and Gender on Jan 30 2024 01:35 PM (PKT).

5. Events Organization, Invited Talks and Presentations

I have been organizing and participating in various international conferences and events which is reflected by the following responsibilities/roles:

- **Chief Organizer** and Publication Chair for IEEE First International Conference on Power, Energy and Smart Grid (ICPESG-2018)
(<https://ieeexplore.ieee.org/xpl/conhome/8375185/proceeding>)
- **Chief Organizer** of one day International Seminar on IIoT – Cybersecurity risks in the face of Quantum Computing, and should 6G Security Architecture be based on Quantum Cryptography?
- **Chief Organizer** of one day International Seminar on Importance of Cyber Security in Modern Society
- **Distinguished Speaker** at “Energy Access and Efficiency Challenges in HKH (Himalaya, Karakoram, Hindukush) region of Pakistan” on 30th November 2022, at Sustainable Development Policy Institute, Islamabad.
- Invited Talk on “Prosumer based Energy Sharing and Management” as **Resource person, OIC** Ministerial Standing Committee on Scientific and Technological Cooperation (**COMSTECH**) **Islamabad**

- Technical Program Committee Member for 2023 10th International Conference on Electrical and Electronics Engineering (ICEEE 2023) **Istanbul Turkey**
- Technical Program Committee Member for IEEE ICOS 2014 and IEEE ICOS 2015 **Malaysia**.
- **Session Chair** IMDC-2016, University of Lahore
- **Technical Program Committee Member and Session Chair** for IEEE ICEET 2018, 2019
- Technical Program Committee Member for IEEE INMIC 2016, Air University Islamabad
- **Three talks as Resource Person** for Pakistan Engineering Council (PEC), Continuous Professional Development (**CPD**) on Power Factor Improvement and Smart Metering
- Serving as reviewer for highly reputed journals of IEEE, Wiley, Elsevier, Hindawi etc.

6. Supervision at Graduate Level

S. No.	Student Name	Thesis Title	Session	Status
PHD				
1.	Adil Amin	Coordinated Charging Scheduling of Electric Vehicles incorporating Optimal Network Performance and Customer Satisfaction	2018	Completed July-2023
2.	Naveed Ahmed Khan	Optimization of Economic Operation for RE Integrated Power Systems	2016	Completed May-2021
3.	Iqra Rafiq	Occupancy Detection and IoT based Building Energy Management System	2018	In Progress (Synopsis Approved)
MS				
1.	Ubaid Ahmed	A Hybrid Model for Short-Term Global Horizontal Irradiance Forecasting	2022	Completed
2.	Sabeeha Rani	QLSTM based hybrid model for Load Forecasting	2022	Completed
3.	Sheeza Maryam	Load forecasting for GEPCO feeders a case study	2022	Completed
4.	Muhammad Zeeshan Kiani	Cost Optimization Model for Short Term Hydropower Unit Commitment Problem	2021	Completed
5.	Basit Khursheed	Hardware Implementation of Electricity Theft Detection and Mitigation System	2019	Completed
6.	Ahsan Raza Khan	Day Ahead Short-Term Load Forecasting Model for IESCO for Efficient Demand Side Management in Smart Grid	2019	Completed
7.	Muhammad Qamar Akhtar	Dynamic Energy Management with Renewable Energy and Storage System in Smart Grid	2019	Completed
8.	Asrar Ahmed	Design and Implementation of Protection Scheme for Prosumer Communities	2019	Completed
9.	Muhammad Babar	Optimal EVs charging using QPSO	2019	Completed
10.	Muhammad Asif	QPSO and its Variants to Solve Combined Economic Emission Dispatch Problem	2019	Completed
11.	Muhammad Usman Zafar	Homer Analysis for Integrating Solar Energy in Off-Grid and On-Grid SCO Telecommunication Sites	2018	Completed
12.	Umar Jamil	Power Loss Minimization of Distribution Network using Different Grid Strategies	2018	Completed
13.	Nabeeha Qayoum	Energy Cost Minimization through Home Energy Management in Smart Grid Environment	2018	Completed
14.	Muhammad Sajid	Simulation of Electricity Theft Detection and Mitigation System	2018	Completed
15.	Muhammad Noman Iqbal	Voltage Regulation and Power Loss Minimization by Using Unified Power Flow Control Device	2018	Completed

16.	Abdul Samad	Impact of Changing Maintenance Regime of Hydro Power Plant – A Case Study	2018	Completed
17.	Aneeq Haider	Storage Modeling for Prosumer Communities	2018	Completed
18.	Muhammad Afnan Malik	Case Study of PV-Geothermal and PV-Wind Hybrid Micro Grids	2017	Completed
19.	Muhammad Usman Mussadiq	Energy Sharing and Management for Prosumers in Smart Grid with Integration of Storage System	2017	Completed
20.	Iqra Rafiq	Home Energy Management System with inclusion of Renewable Energy Sources in Smart Grid	2017	Completed
21.	Muhammad Arsalan	Experimental Investigation of Evacuated Gas Tube Solar Collectors for Water Heating Application	2017	Completed
22.	Muhammad Sajjad-ul-Hassan	Design and Fabrication of Solar Thermal Battery	2012	Completed
23.	Muhammad Faisal Baig	Design of Smart Home Energy Management System	2012	Completed
24.	Muhammad Faisal Baig	Design of Smart Home Energy Management System for Monitoring and Scheduling of Home Appliances using ZigBee	2012	Completed
25.	Muhammad Adnan Zafar	Study of Smart Grid System Operation in Pakistan	2012	Completed

In addition, successfully supervised final year design and research projects of 21 groups (64 students) at undergraduate level during eleven years of teaching experience.