MITS

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE

(Deemed to be University under section 3 of UGC Act, 1956)

A Report on

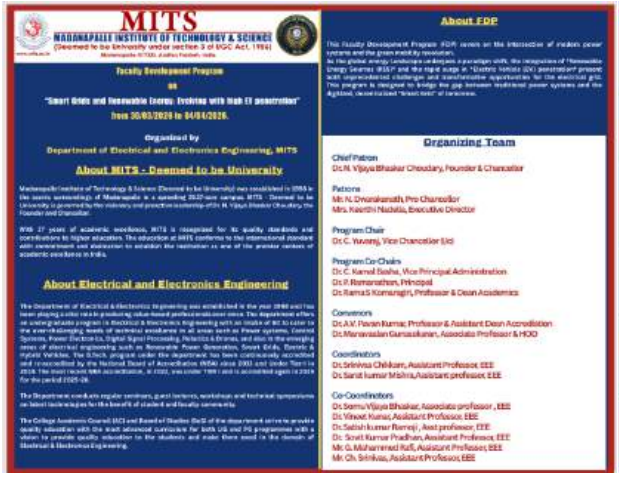
Six-Day Online Faculty Development Program on

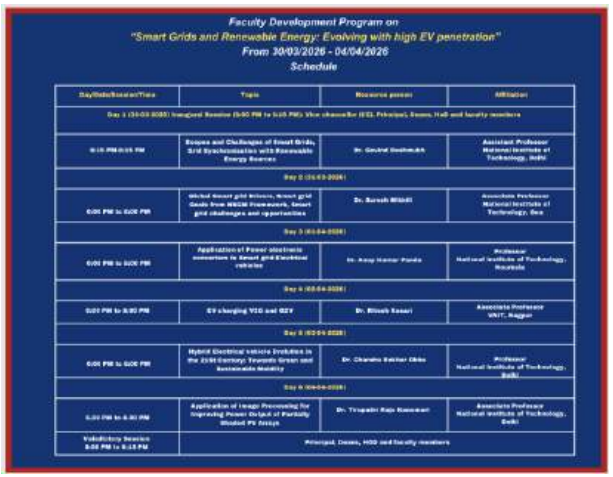
"Smart Grids and Renewable Energy: Evolving with high EV penetration"

Organized by

Department of Electrical and Electronics Engineering, MITS

from 30/03/2026 to 04/04/2026





Report Submitted by: Dr. Srinivas Chikkam, Assistant Professor, Department of Electrical and Electronics Engineering

&

Dr. Sarat Kumar Mishra, Assistant Professor, Department of Electrical and Electronics Engineering

Total No. of Registrations: 197 participants

Mode of Delivery: Online (Microsoft Teams)

About the FDP:

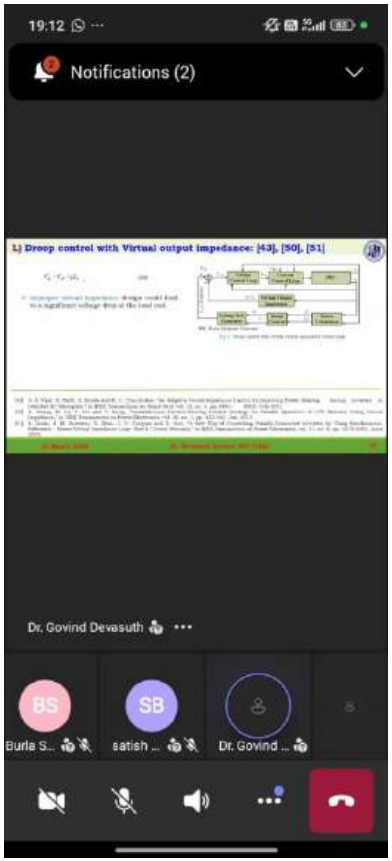
This Faculty Development Program (FDP) covers on the intersection of modern power systems and the green mobility revolution. As the global energy landscape undergoes a paradigm shift, the integration of *Renewable Energy Sources (RES)* and the rapid surge in *Electric Vehicle (EV) penetration* present both unprecedented challenges and transformative opportunities for the electrical grid. This program is designed to bridge the gap between traditional power systems and the digitized, decentralized "Smart Grid" of tomorrow.

Inaugural Session:

The FDP was inaugurated on 30 March 2026 at 6:00 PM with a welcome address by Dr. Srinivas Chikkam, Coordinator and Assistant Professor, Department of EEE.
The inaugural session also included addresses by Dr. Manavaalan Gunasekaran, Associate Professor & HOD, EEE and Dr. P. Ramanathan, Principal, MITS (Deemed to be University).
The speakers highlighted the importance of renewable energy and electric vehicles for reducing environmental pollution. They also emphasized on how the scenario of power system has changed due to the presence of renewable energy systems and the massive adoption of electric vehicles and the evolution of smart grid as the present-day needs.

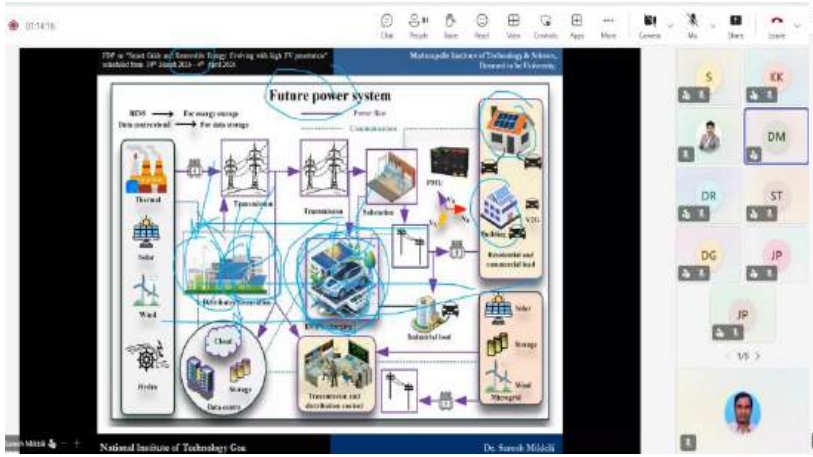
Day wise Session Details:
Day 1: 30 March 2026 (Monday)
Time: 6:30 PM – 8:00 PM
Resource Person: Dr. Govind Devasuth, Assistant Professor National Institute of Technology, Delhi
Topic: **Scopes and Challenges of Smart Grids, Grid Synchronisation with Renewable Energy Sources**

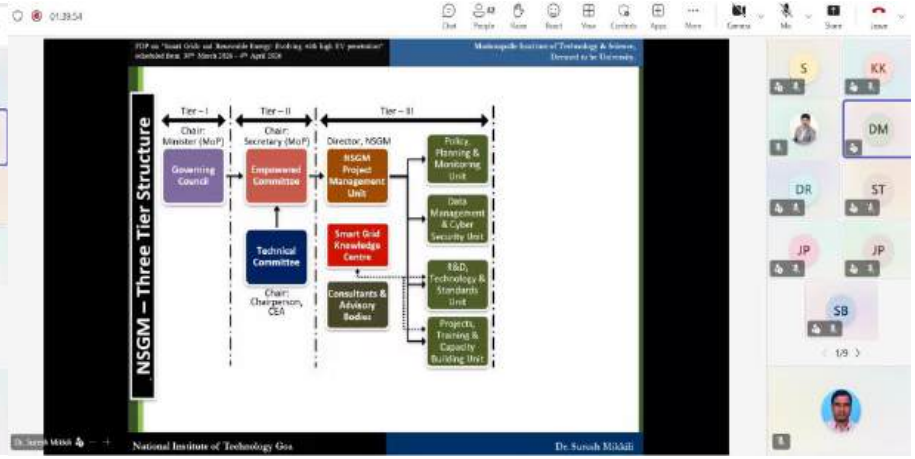
Dr. Devasuth started with an introduction to the concepts of Smart grid, how it is different from the old conventional grids and their applications in the present-day power system with renewable energy. He explained the scopes and challenges of smart grid with reference to the renewable energy and electric vehicles. In his session, he explained the role of power electronic converters in AC micro grid. He also explained some of the complex concepts like droop control with virtual output impedance and gave many ideas to the participant researchers about the current thrust areas of research.



Day 2: 31 March 2026 (Tuesday)
Time: 6:00PM – 8:00 PM
Resource Person: Dr. Suresh Mikkili, Associate Professor, National Institute of Technology, Goa
Topic: **Global Smart grid Drivers, Smart grid Goals from NSGM Framework, Smart grid challenges and opportunities**

Dr. Suresh Mikkili gave an insight into how the future power system will be taking the government policies and support into account. He enumerated many initiatives and incentives given by Govt. of India to support installation of renewable energy infrastructures like solar and wind. Dr. Mikkili explained the National Smart Grid Mission (NSGM) Framework initiatives, their implementation, challenges and opportunities.



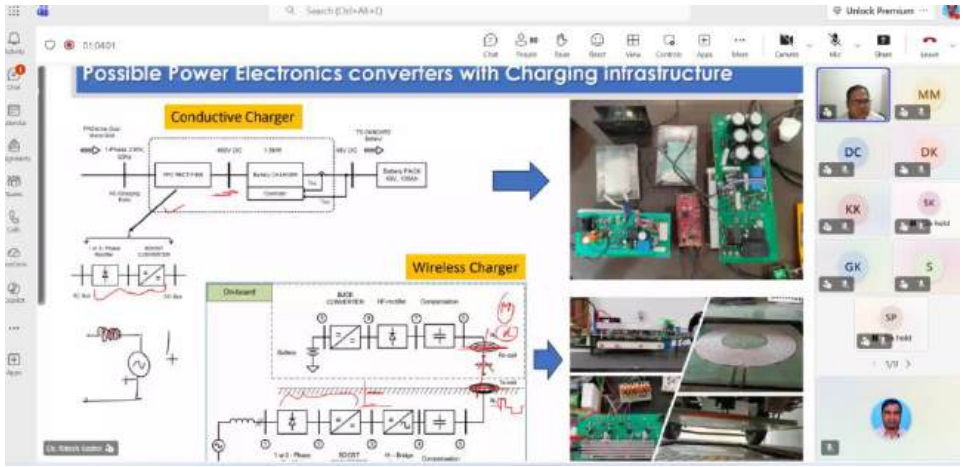


Day 3: 1 April 2026 (Wednesday)
Time: 6:00PM – 8:00 PM
Resource Person: Dr. Anup Kumar Panda, Professor (HAG), National Institute of Technology, Rourkela
Topic: **Application of Power electronic converters to Smart grid and Electrical vehicles**

Prof. Panda discussed about the different applications of power electronic converters and emphasised that the power quality issues are the major problems with power electronic converters used for smart grid and electric vehicle charging infrastructures. He discussed the various harmonics incorporated due to switching and their mitigation techniques. The various types of Filters used to reduce the harmonic content in the voltage and current waveform were also discussed by him.

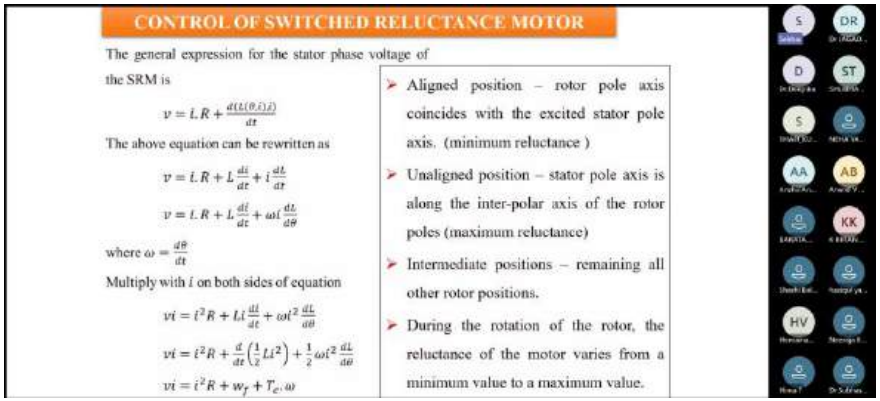
Day 4: 2 April 2026 (Thursday)
Time: 6:00 PM – 8:00 PM
Resource Person: Dr. Ritesh Kesari, Associate Professor VNIT, Nagpur
Topic: EV charging: V2G and G2V

Dr. Ritesh Keshri delivered a talk on the various types of EV charging devices and their ratings and standards. He discussed the practical aspects of power requirements, types of transmission in different electric vehicles, conductive and inductive (wireless) chargers etc. He also highlighted some of the research problems in the areas of Grid to Vehicle (G2V) and Vehicle to Grid (V2G)

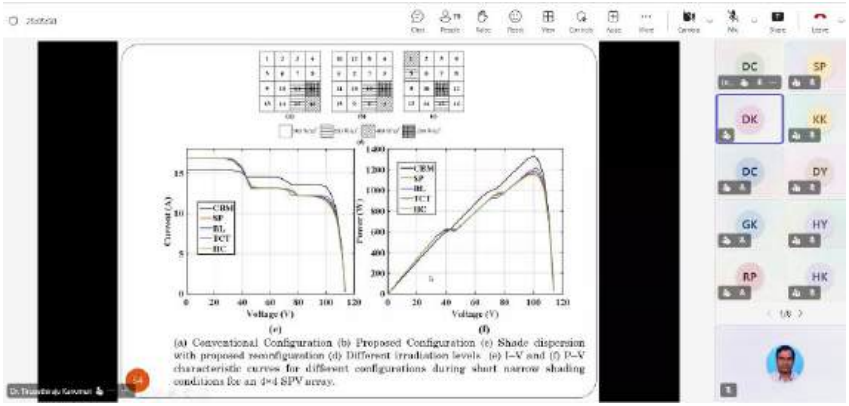


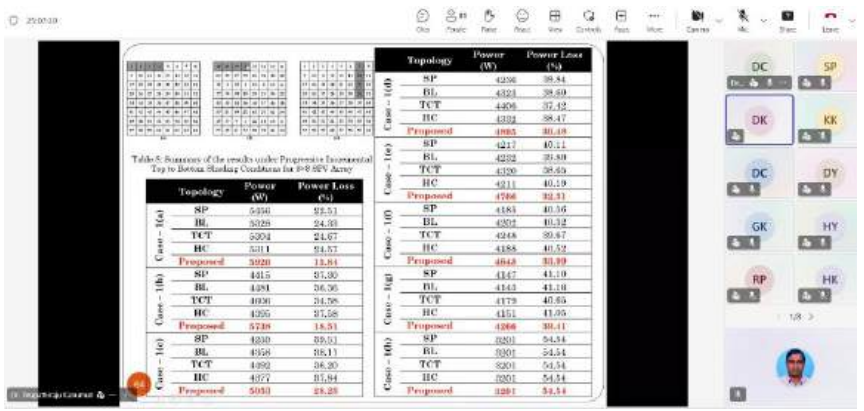
Day 5: 3 April 2026 (Friday)
Time: 6:00PM – 8:00 PM
Resource Person: Dr. Chandra Sekhar Obbu, Professor National Institute of Technology, Delhi
Topic: Hybrid Electrical vehicle Evolution in the 21St Century: Towards Green and Sustainable Mobility

Dr. Chandra Sekhar Obbu delivered a talk on the evolution of hybrid electric vehicles in the present scenario with the encouragement from the Govt. of India. He emphasized on the various types of advanced motors used in electric vehicles. He also discussed how to do research and development of high-performance motors for EV. He also described the control aspects of motors, battery and controllers etc.



Day 6: 4 April 2026 (Saturday)
Time: 6:00PM – 8:00 PM
Resource Person: Dr. Tirupathi Raju Kanumuri, Associate Professor National Institute of Technology, Delhi
Topic: **Application of Image Processing for Improving Power Output of Partially Shaded PV Arrays**





Dr. Thirupati Raju Kanumuri presented an excellent session on the application of image processing for improving power output of partially shaded PV arrays. He informed that when the shadow of any moving or stationary objects falls on the PV arrays, due to partial shading the power output decreases. Under such conditions, image processing techniques can be applied to maximize the power output of the PV arrays.

Valedictory Session:

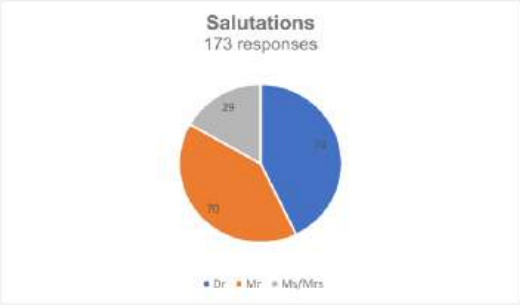
The FDP concluded with the valedictory session on 4 April 2026, where the organising team expressed gratitude to the eminent resource persons, the participants and University Chancellor, Pro-chancellor, Vice Chancellor, Principal for sponsoring the event. The organising team also expressed gratitude to all the employees of the university involved in the event for its grand success. Dr. Srinivas Chikkam delivered vote of thanks to all the resource persons, participants, faculty members for their support.

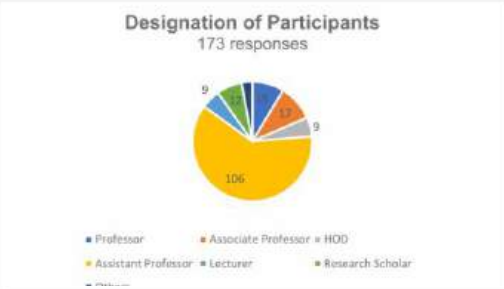
FDP Outcomes:

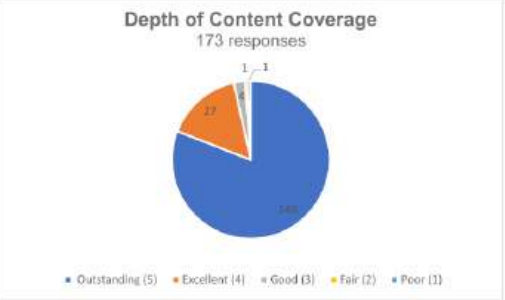
- Participants gained valuable concepts about **Smart grid and renewable energy systems**.
- The FDP enhanced the **awareness about the required changes in the power system operation and maintenance due to the presence of bulk load of EV charging**.
- Faculty members and researchers **gained insight about the government initiatives and schemes for smart grid and electric vehicle adoption**.
- The knowledge of **power quality issues in smart grids and EVs due to use of power electronic converters and their mitigation** was improved.
- Practical knowledge of the **types of EV charging infrastructures used in the present day, and their design aspects** was enhanced.
- Participants knew about the **emerging research areas of smart grid, EV charging and renewable energy**.

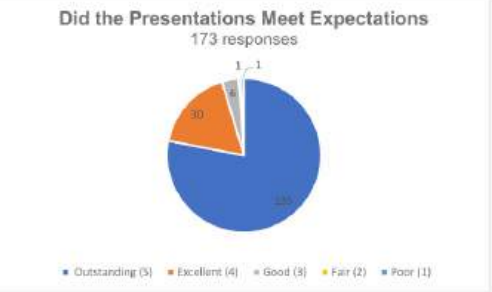
Participants Feedback Summary

The **Faculty Development Program (FDP)** received feedback from the participants including faculty members, research scholars and students from various institutions. Feedback was collected through online google forms after the end of each session. The outcome of the feedback is summarised in the pie charts as follows:









Conclusion of the FDP

The six-day online **Faculty Development Program (FDP) on "Smart Grids and Renewable Energy: Evolving with high EV penetration"** was successfully organized by the **Department of Electrical and Electronics Engineering, Madanapalle Institute of Technology & Science (MITS)** from **30 March 2026 to 4 April 2026**. The program brought together distinguished academicians from reputed institutions who delivered insightful sessions in the field of Smart Grid, Renewable Energy and Electric Vehicles. The FDP provided valuable exposure to the participants about the emerging areas of research and development in the field. The enthusiastic participation, interactive discussions and positive feedback from participants reflect the success of the program. Overall, the FDP helped in bridging the gap between academic learning and industry advancements.

Impact of the FDP on Teaching, Research and Industry Collaborations

The FDP contributed significantly enhancing the **teaching and research capabilities of faculty and researchers** in the areas of smart grid, renewable energy and EV technology. The faculty members gained new knowledge of the recent advancements in the field and can incorporate the same in their **future research activities**. The sessions were helpful to the participants to explore **interdisciplinary research** in the field. They also gained by interaction with expert speakers in developing new **network of research community** for future learning, research, conducting workshops and joint research activities. Overall, this FDP was helpful in creating a vast community of academicians and researchers for future activities.

Acknowledgement

We thank the **management of Madanapalle Institute of Technology and Science (MITS)** for allowing us to conduct this faculty development program. The organising team expresses sincere gratitude to **Dr. C. Yuvaraj, Vice Chancellor (I/C), Dr. D. Pradeep Kumar, Registrar (I/C) and Dr. P. Ramanathan, Principal** for providing all the financial and logistic support for this program.

Our special thanks to **Dr. G. Manavaalan, HOD, EEE and Dr. A. V. Pavan Kumar, Assistant Dean** for their initiation and constant motivation throughout the program. We also appreciate our **distinguished resource persons** for accepting our request and giving time and effort to deliver the sessions.

We thank all the **faculty members and staff of EEE department** who helped in the successful completion of the program. Finally, we sincerely thank all the **participants** for their enthusiastic participation and contribution for making this FDP successful.