A NAAC Accredited Institution
KINGS
COLLEGE OF ENGINEERING
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Affiliated to Anna University, Chennai

**A REPORT ON**

**IEEE MAS SPONSORED FACULTY DEVELOPMENT PROGRAM TITLED**

# "SMART GRID- TRENDS AND FUTURE PERSPECTIVE"

**8th and 9th NOVEMBER 2021**

**Organized by**

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**KINGS COLLEGE OF ENGINEERING, PUNALKULAM**

## INTRODUCTION

Department of Electrical and Electronics Engineering has organized a Faculty Development Program on **"SMART GRID- TRENDS AND FUTURE PERSPECTIVE"** on 8th and 9th November, 2021**.** Smart grid technology aims to bring utility electricity delivery systems into the 21st century, using computer-based remote control and automation. These systems are made possible by two-way communication technology and computer processing that has been used for decades in other industries. The rise of smart grid is a boon not only to society as a whole but to all who are involved in the electric power industry, its customers, and its many stakeholders. The aim of organizers is to bring up professional discussions on smart grid technologies and its trends to provide dissemination of the knowledge to the participants.

## OBJECTIVES

- To educate the participants about the concept of smart grid, the rationale for smart grid technology and its characteristics
- To provide a detailed exposure to faculty members about the most recent innovations and trends in the field of smart grid

## ABOUT THE FDP

The FDP was planned to be conducted in virtual mode. Dr. A. Albert Martin Ruban, HOD/EEE was the convener and Dr.M.Meenalochani AP/EEE was the coordinator of the FDP. The registration link was created through Google forms and the link was circulated through social media websites and WhatsApp groups. Around 80 responses were received from various institutions. A confirmation mail was sent for all the registered participants. The registered participants were asked to join in the whatsapp group named "IEEE FDP on Smart Grid". Instructions for all the events were given to the participants through the respective whatsapp group. The meeting link was circulated to all the registered participants one day before the commencement of the FDP through their e-mail and also through the WhatsApp group.

## DETAILS OF RESOURCE PERSONS

**Day1- Session 1:** Dr.M.Venkatakirthiga,
Associate Professor/EEE
National Institute of Technology, Trichy

**Day1- Session 2:** Dr.M.Meenalochani
Assistant Professor/EEE
Kings College of Engineering

**Day 2- Session 1:** Dr.R.Arulraj
Assistant Professor/EEE
Kings College of Engineering

**Day 2- Session 2:** Dr.N.Kumarappan, Chair, IEEE Madras Section
Professor/EEE
Annamalai University

**DAY 1(8.11.2021)**

The FDP was inaugurated at 9.45 A.M on 8th November 2021. The Chief Guest to the session was Dr.N.Kumarappan, Chair, IEEE Madras Section. Dr.M.Meenalochani, coordinator of the FDP welcomed the dignitaries and participants. Dr.J.Arputha Vijaya Selvi, Principal of KCE delivered the Presidential Address. In her address, she highlighted the importance of smart grid and the role of smart grid in India. The inaugural address was given by Dr.N.Kumarappan. In his address, he appreciated Kings College of Engineering for organizing such a program and welcomed all the enthusiastic participants. He explained the emergence of different types of electric grids such as micro grids, nano grids, super grids and gave an introduction to smart grid technology. He also stated that success of an FDP lies in the dissemination of knowledge gained by faculty to their students in an efficient manner.

Then the session was handed over to the Resource person Dr.M.Venkatakirthiga ,Associate Professor/EEE, NIT, Trichy. She gave an introduction to distributed generation and microgrids. She also detailed about the architecture and modes of operation of microgrids. A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected or island-mode. She lectured on the concepts of smart grid, its components and a brief introduction to electric vehicles. The session ended at 12.30 P.M.

The next session was started at 2.00 P.M. The resource person for session 2 was Dr.M.Meenalochani, AP/EEE, Kings College of Engineering. The topic of her presentation was Artificial Intelligence (AI) in smart grid. She gave an overview of human intelligence and the concepts of AI. She highlighted the real time examples of AI applications used in websites such as Amazon, Facebook, Netflix etc. where the AI based systems give recommendations to human

beings based on their search. Then, she briefed her lecture on different AI techniques such as Artificial Neural Networks, fuzzy logic, computer vision, machine learning, deep learning etc. and detailed on fuzzy logic. She explained in detail about the basics of fuzzy logic, difference between fuzzy and conventional Boolean logic and the similarity between fuzzy logic and human reasoning. Finally, she concluded with the advantages and applications of fuzzy logic in real time. The session ended at 3.30 P.M.

**Day 2(9.11.2021)**

On the second day, the forenoon session was started at 10.00 A.M. The resource person for session 3 was Dr.R.Arulraj, AP/EEE, Kings College of Engineering. The topic of his presentation was optimization techniques. He lectured on the basics of optimization and how to solve any optimization problem. He explained real time applications of optimization problems and the methods for solving those problems. He detailed on the terminology in optimization such as objective function, decision variables, constraints etc. with examples. He provided an in-depth knowledge on formation of objective function for any optimization problem. He gave an introduction to genetic algorithm for solving an optimization problem. The session ended at 11.30 A.M.

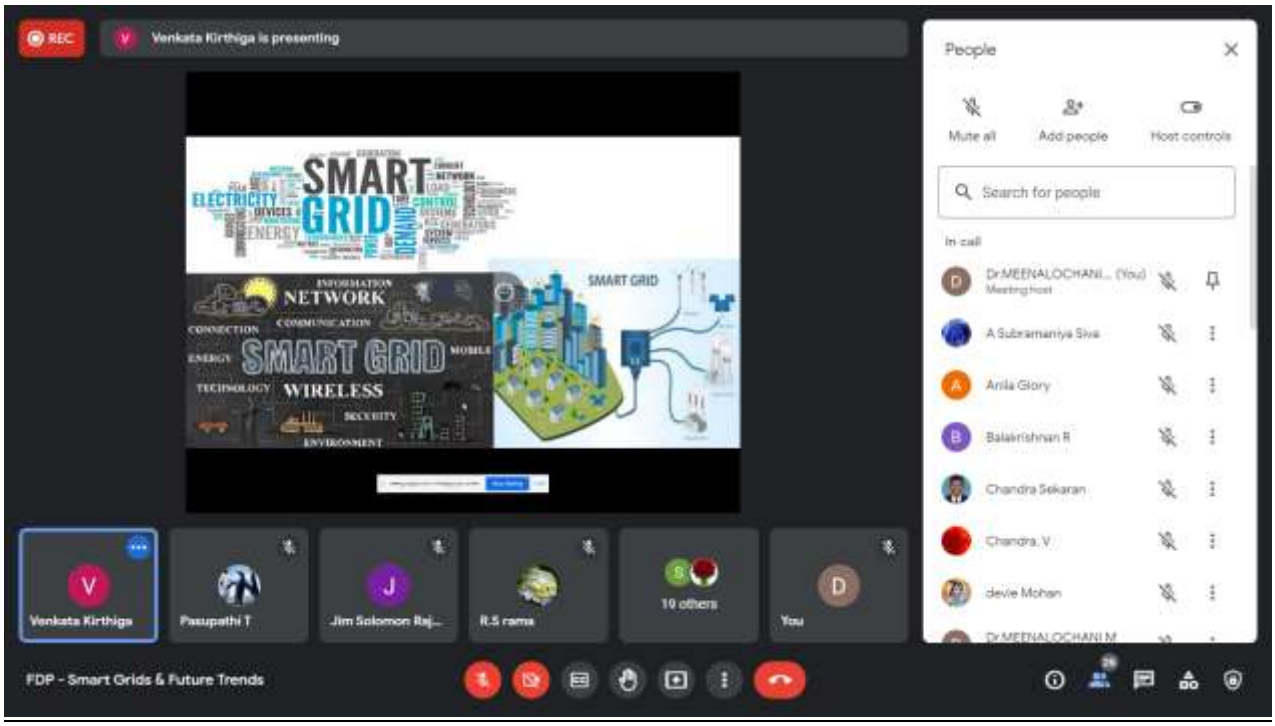
The afternoon session started at 2.00 P.M. The resource person was Dr.N.Kumarappan, IEEE MAS Chair and Professor/EEE, Annamalai University. He delivered his lecture on grid to vehicle integration using hybrid optimization techniques. He clearly explained the bidirectional transfer of power in interconnected systems. The participants were taught about the basics of hybrid optimization algorithm used for vehicle to grid power transfer. The hybrid algorithm utilizes the benefits of Tabu search as well as binary Particle Swarm Optimization. The algorithm aims to reduce the operating cost and emissions and increase the reserving capacity of the vehicle. The session finally ended up at 3.30 P.M. Mr.T.Pasupathi, AP/ECE and IEEE SB In-charge, delivered **V**ote of thanks for the FDP.

**OUTCOMES**

- Participants are enhanced with the knowledge on smart grid and the latest innovations in Smart Grid
- The content knowledge of the participants in the respective domain is updated
- Faculty can be able to make the students aware in smart grid and guide them for doing projects in that area

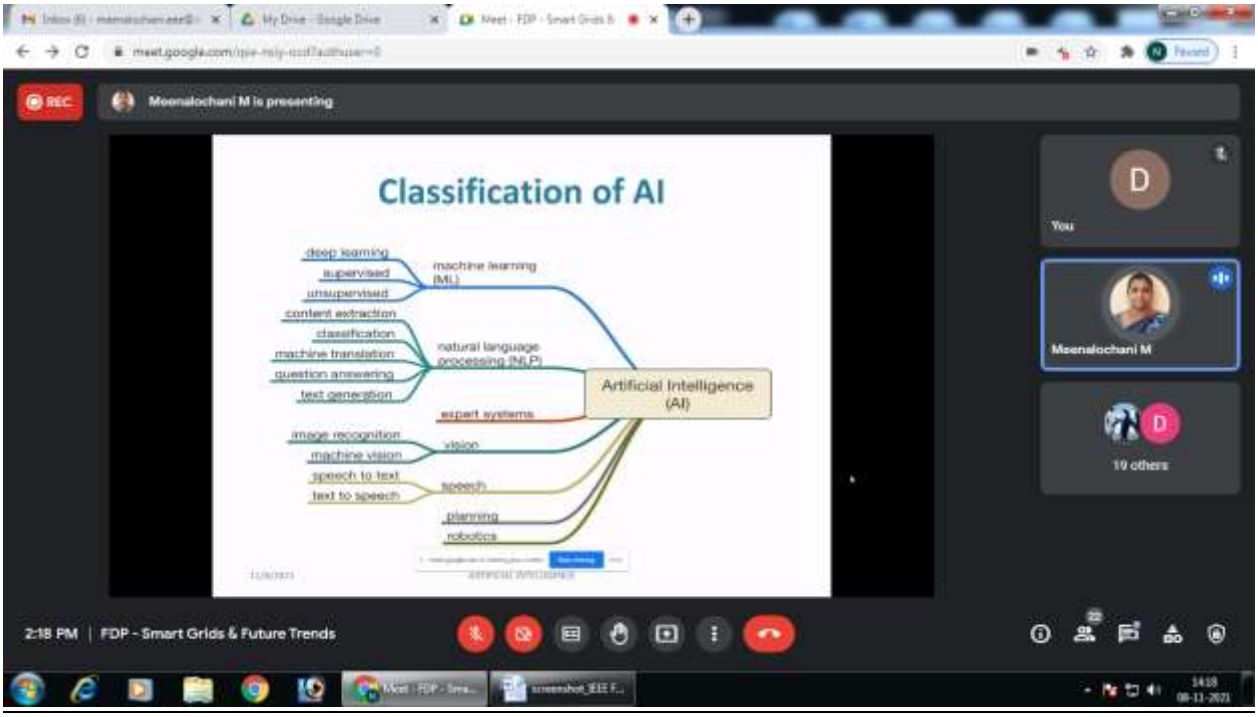
## SNAPSHOTS OF THE SESSIONS

### Session 1



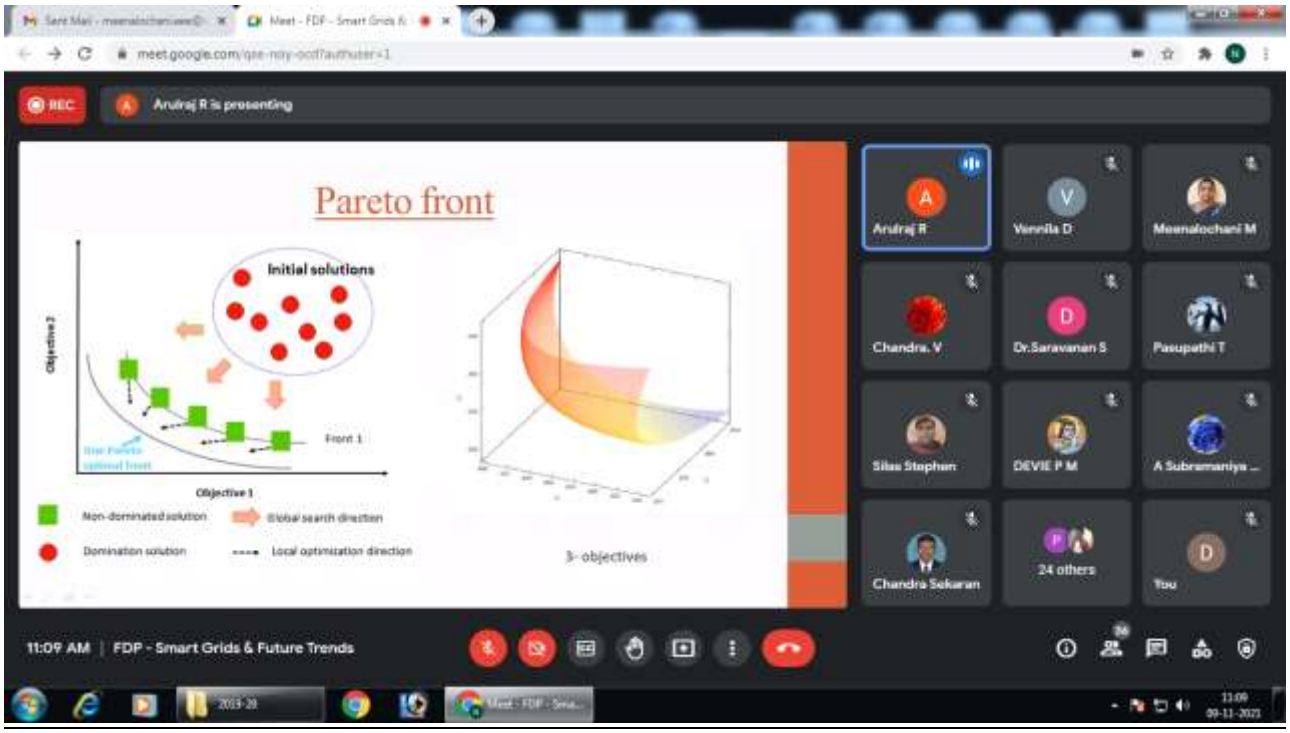

**Dr.M.Venkatakirthiga, Assoc.Prof./EEE, NIT, Trichy delivering her lecture**

### Session 2




**Dr.M.Meenalochani, AP/EEE, KCE delivering her lecture**

## Session 3




**Dr.R.Arulraj, AP/EEE, KCE delivering his lecture**

## Session 4


**Dr.N.Kumarappan, Chair, IEEE Madras Section delivering his lecture**

**BROCHURE**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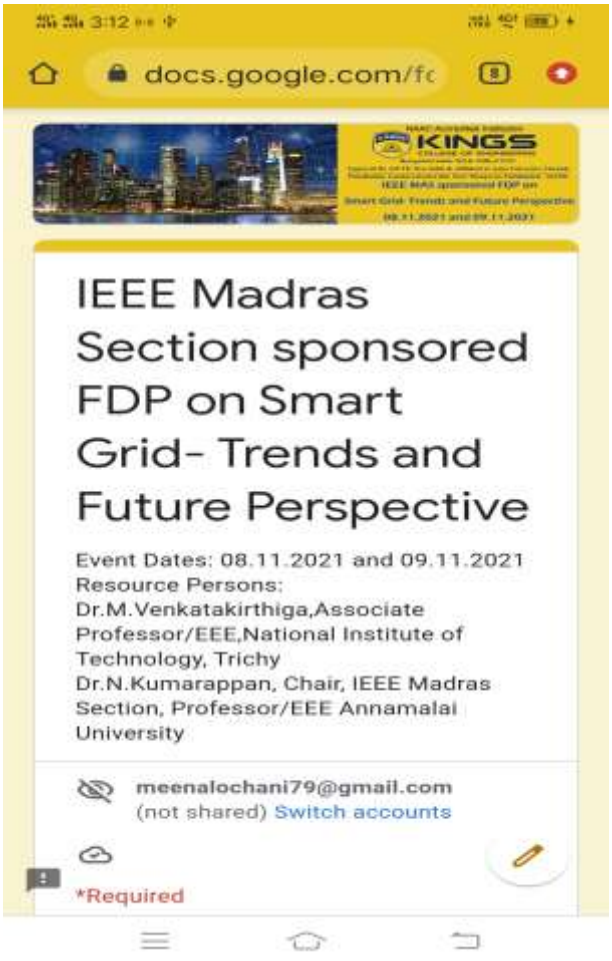
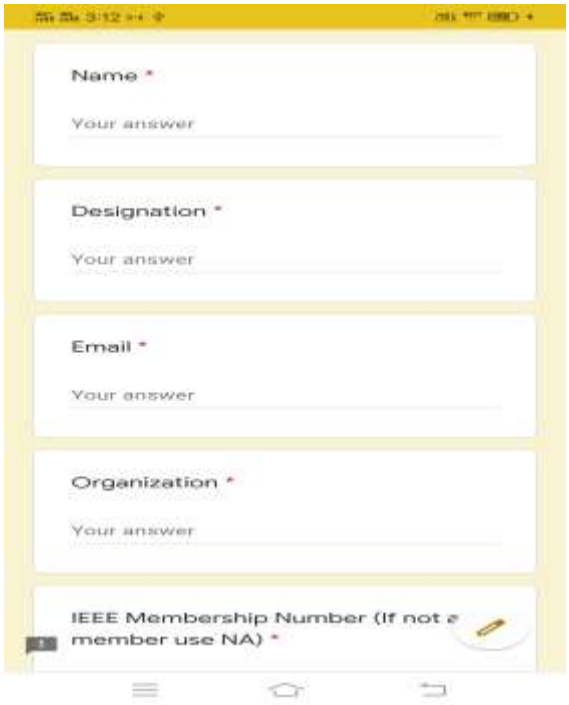
Approved By AICTE, New Delhi & Affiliated to Anna University, Chennai
Punalkulam, Gandarvakottai (tk), Near Thanjavur, Pudukkottai - 613303
Department of Electrical & Electronics Engineering
IEEE Madras Section sponsored
Faculty Development Programme on
SMART GRID
Trends & Future Perspective
08.11.2021 & 09.11.2021
Resource Persons
Dr. N. Kumarappan
Chairman - IEEE MAS
Prof/EEE
Annamalai University, Chidambaram
Dr. M. Venkata Kirthiga
Associate Professor/EEE
NIT, Trichy
and Faculty of KCE
Coordinator
Dr. M. Meenalochani, AP/EEE
Convener
Dr. A. Albert Martin Ruban
HOD/EEE
Patron
Dr. J. Arputha Vijaya Selvi
Principal

# REGISTRATION FORM

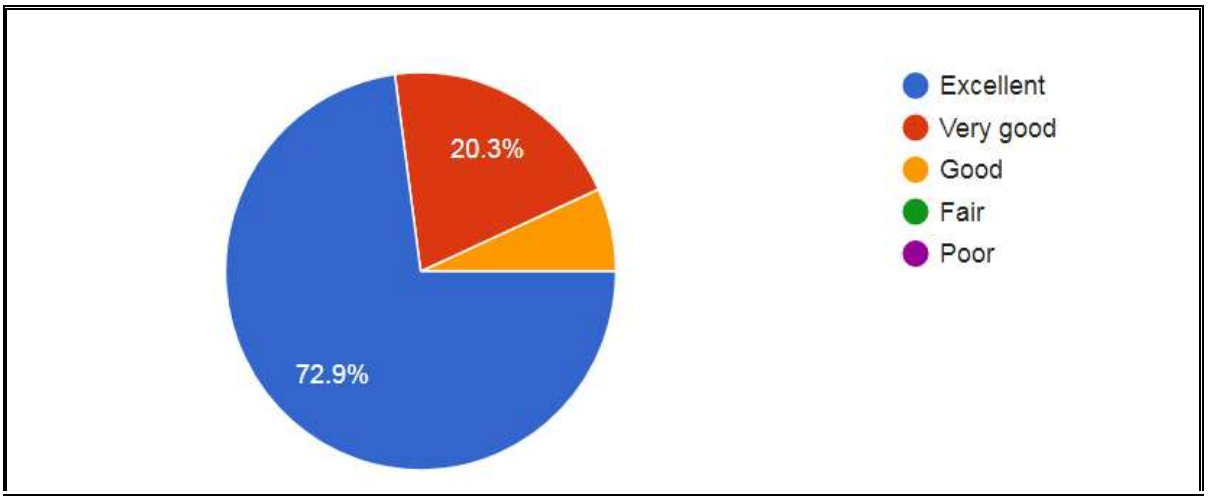


## DETAILS OF PARTICIPANTS

| S.NO | NAME OF THE INSTITUTION | NO. OF PARTICIPANTS |
|---|---|---|
| 1. | K.Ramakrishnan College of Engineering, Trichy | 2 |
| 2. | Anjalai Ammal Mahalingam Engineering College,Tiruvarur | 9 |
| 3. | Loyola-ICAM College of Engineering and Technology, Chennai | 1 |
| 4. | St.Joseph's College of Engineering and Technology,Thanjavur | 6 |
| 5. | Kuppam Engineering college, AP | 4 |
| 6. | P.T.Lee Chengalvaraya Naicker College of Engineering and Technology, Kanchipuram | 1 |
| 7. | Jayaram College Of Engineering and Technology, Trichy | 1 |
| 8. | Saranathan College of Engineering , Trichy | 5 |
| 9. | Kamaraj College of Engineering and Technology, Madurai | 3 |
| 10. | A.V.C College of Engineering, Mayiladuthurai | 7 |
| 11. | Panimalar Engineering College, Chennai | 1 |
| 12. | Vel Tech Rangarajan Dr Sagunthala R & D Institute of Science and Technology, Chennai | 1 |
| 13. | Kalaivanar N S K College of Engineering,Nagerkoil | 1 |
| 14. | E.G.S Pillay Engineering College, Nagapattinam | 2 |
| 15. | Arunai Engineering College,Tiruvannamalai | 1 |
| 16. | University College of Engineering Pattukkottai | 5 |
| 17. | Muthayammal Engineering College, Namakkal | 3 |
| 18. | AMET Deemed to be university, Chennai | 1 |
| 19. | Sai Rajeswàri Institute of Technology,AP | 1 |
| 20. | Sree Sakthi Engineering College, Coimbatore | 1 |
| 21. | Pandian Saraswathi yadav Engineering College, Madurai | 2 |
| 22. | K. S. K College of Engineering And Technology, Kumbakonam | 1 |
| 23. | CSI college of Engineering, Ketti | 1 |
| 24. | SASTRA deemed to be University, Thanjavur | 1 |
| 25. | Sri Sairam Engineering College, Chennai | 1 |
| 26. | St. Anne's College of Engineering and Technology | 1 |
| 27. | Kongu Engineering college, Perunduari, Erode | 1 |
| 28. | Kings College of Engineering, Pudukottai | 21 |
| Total number of participants | | 85 |

## FEEDBACK-DELIVERY OF CONTENTS BY RESOURCE PERSONS




## SAMPLE CERTIFICATE


**Coordinator** **HOD/EEE** **PRINCIPAL**