

## Faculty Development Program (Blended/Hybrid mode)

# On Hybrid Microgrid: Opportunities and Challenges for Renewable Energy Resources (HMOCRER-2022)

December-12-23, 2022



Organized by  
School of Renewable Energy and  
Efficiency (SREE)  
National Institute of Technology,  
Kurukshetra



Sponsored by  
AICTE Training and Learning  
(ATAL) Academy

**Preamble:** The extensive penetration of renewable energy resources and operation of the microgrid defines the barriers and challenges of microgrid. The smart distribution network will require advanced energy management techniques as well as demand response programs (DRPs) and has an impressive impact on the operation of the grid. There is a need of proposing optimal solutions for operation and the management to address them. With respect to the active and influential role of microgrids in the restructured environment, it is essential to achieve optimal operation of grid energy management. This requires comprehensive analytic studies and rigorous research in the area of the hybrid microgrid. In this regard, a new strategy of operation of the smart distribution system and its optimal energy management of a microgrid in the presence of an Electric Vehicle Charging Station (EVCS), Distributed Energy Resources (DERs), storage devices, and electrical vehicles considering the uncertainties of renewable energy resources is required. The minimization of operation

costs of energy storage facilities, environmental emission, the costs corresponding with the energy not supplied (ENS), and excess generation capacity are the main objectives to be addressed. The technical constraints of distributed generation resources and energy storage facilities need to be imposed for optimal utilization of the microgrids-based smart distribution systems.

In the pursuance of the vision of AICTE ATAL academy, this FDP could offer multiple milestones by delivering Technical knowledge, skills, and awareness of the electrical power distribution system of Indian and Global perspectives.

### Objective of ATAL Academy:

To Plan and help in imparting quality technical education in the country and to support technical intuitions in fostering research, innovation, and entrepreneurship through training in various emerging areas.

### Objective of the FDP :

The primary concern is to impart the knowledge of analysis of the operation of hybrid microgrid with renewable energy sources regarding their opportunities and challenges. Objectives are as follows:

- Imparting the concepts of microgrid and key challenges and issues.
- To study the role of a renewable energy system in the future hybrid microgrid.
- Roadmap for higher renewable energy source penetration and its impact on the hybrid microgrid – Challenges and Mitigation Measure.
- To share the advanced techniques for analysis and operation of the hybrid microgrid.
- Virtual synchronous generator concept for improving the resiliency in renewable energy sources integration the recent trend of a microgrid.
- To identify the thrust of research and innovation in the microgrid systems and energy management.

### Our Proposed Experts:

- Prof. Bhim Singh, Professor, Department of Electrical Engineering, Indian Institute of Technology Delhi.
- Prof. Debapriya Das, Professor, Department of Electrical Engineering, Indian Institute of Technology, Kharagpur
- Dr. Nishant Kumar, Assistant Professor, Department of Electrical Engineering, Indian Institute of Technology Jodhpur
- Prof. R. P. Chauhan, Professor, Department of Physics, National Institute of Technology Kurukshetra
- Dr. Rajesh Kumar, Professor, Malaviya National Institute of Technology Jaipur
- Prof. N. P. Padhy, Professor, Department of Electrical Engineering, Indian Institute of Technology Roorkee.
- Prof. B.V. Ramana Reddy, Director, National Institute of Technology Kurukshetra
- Aditya Jha, Senior software Engineer in Oracle, India
- Dr. S. Mishra Department of Electrical Engineering, Indian Institute of Technology Delhi
- Dr. B K Panigrahi, Professor, Department of Electrical Engineering, Indian Institute of Technology Delhi.
- Dr. Mukhtiar Singh, Professor, Professor, Department of Electrical Engineering, Delhi Technological University
- Dr. D.K Jain, Professor, Department of Electrical Engineering, Deenbandhu Chhotu Ram University of Science and Technology, Murthal (Sonapat) Haryana
- Dr Ujjwal Kumar Kalla, Associate Professor Department of Electrical Engineering, Maulana Azad National Institute of Technology, Bhopal.
- Prof. Ratna Dahiya, Professor, Department of Electrical Engineering, National Institute of Technology Kurukshetra
- Prof. Ashwani Kumar, Professor, Department of Electrical Engineering, National Institute of Technology Kurukshetra
- Dr. Shivam, Assistant Professor, Department of Electrical Engineering, National Institute of Technology Kurukshetra



## About AICTE Training And Learning (ATAL) Academy

AICTE is committed for development of quality technical education in the country by initiating various schemes launched by Govt. of India, Ministry of Human Resource Development e.g. SWAYAM, MOOCs, Start-up Initiatives, Prime Minister Kaushal Vikas Yojana, Sansad Adarsh Gram Yojana (SAGY), Swachh Bharat/ Unnat Bharat Abhiyan, Yoga Activities etc. Council understands that there is a need of the day to train the young generation in skill sector and having faculty & technicians to be trained in their respective disciplines. It was felt that Training with the latest tools and technologies is vital to keeping an institute competitive and more productive. National Education Policy (NEP)-2020 is a lighthouse for this journey of transformation. Quality teachers' community is always a potential force to enforce the changes and plays a pivotal role in the development of knowledge building, knowledge sharing, and its dissemination. The dream of Vishwa Guru cannot be reinforced without the active role of potential masses of quality higher education teachers. Training is required for increasing the knowledge and skills of students to make them more employable to acquire global competencies. It also transforms them to harmonize with society and most importantly makes them good citizens of the country. It is planned that AICTE Training and Learning (ATAL) Academy will conduct a series of training programs in various thrust areas in all four academies.

## About NATIONAL INSTITUTE OF TECHNOLOGY KURUKSHETRA

NIT Kurukshetra, formerly known as Regional Engineering College, Kurukshetra was founded in 1963. It was conferred upon the NIT status, with Deemed University on June 26, 2002. The Institute offers several courses, in various disciplines of B.Tech., M.Tech., MBA and MCA, and Ph.D. with an annual intake of about 1500 students. Institute also provides excellent facilities for advanced research in the emerging areas of Engineering, Science, and Technology. The institute has well-qualified and dedicated faculty along with supporting staff, laboratories, and other infrastructure. The infrastructure is geared to enable the institute to produce technical personnel of high quality.

Kurukshetra is popularly known for its historical and religious importance. Here, the Lord Shree Krishna delivered the divine message as enshrined in the holy book "Shrimad Bhagwad Gita". It is also known as DHARAMKSHETRA and it attracts devotees from all corners of the world all around the year.

## About School of Renewable Energy and Efficiency (SREE),

School of Renewable Energy and Efficiency was established in 2012. The School offers M. Tech., and Ph.D. Degrees since its inception. Research and development activities on various relevant aspects of non-conventional energy sources have been envisaged keeping synergy with the evolving innovations and developments in Renewable Energy.

### Organizing Team

#### Patron

Prof. B.V. Ramana Reddy  
Director, NIT Kurukshetra

#### Coordinator

Prof. Ratna Dahiya

Coordinator of School of Renewable Energy and Efficiency, Professor in Electrical Engineering

Department, NIT Kurukshetra

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#### Co-coordinator

Dr. Shivam

Assistant Professor, Electrical Engineering  
Department, NIT Kurukshetra

## Registration

- No Registration Fee
- The registration in the FDP will be done through online portal of ATAL academy. <https://atalacademy.aicte-india.org/signup>
- The selection of the participants will be based on first come first serve basis.

## Who can register?

The faculty members of AICTE approved institutions, research scholars, PG Scholars, participants from Government, MoE/AICTE/UGC, bureaucrats/technicians/participants from industry, CBSE teachers, etc., and staff of host institutions (not more than 10%). Participants: Min/Max Limit- 30/50 participants from the HEIs from the same city/within 100 km of the host institute.

Participants shall bear the cost of travelling and boarding/lodging if he/she wishes to attend ATAL FDP. However, refreshment & lunch would be provided for free.

## Certification

Continuous comprehensive assessment of attendees- Overall 70% to receive a certificate, 90% and above distinction. Attendance-10% (Individual)-the minimum required 80% attendance.

## FDP Learning Management Platform for week 1

Google Meet: [meet.google.com/bsq-xnvr-kjq](https://meet.google.com/bsq-xnvr-kjq)

## Contact Person

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