

**Bharat - Singapore SPARC
International Workshop
On
Digital Twins and Data Fusion for
Smart Grid-Integrated Solar Energy
and EV Charging Systems**

13–18 July 2026



*Sponsored by Scheme for Promotion of
Academic and Research Collaboration
(SPARC), MoE, Govt. of India*

Organized by



Department of Electrical Engineering,
Department of Energy Science & Engineering,
Department of Computer Science and Engineering
**Maulana Azad National Institute of Technology
Bhopal (An Institute of National Importance)**

In Collaboration with

Department Of Electrical Engineering,
National University of Singapore (NUS), Singapore

Coordinator(s)

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About SPARC:

SPARC is a flagship initiative of the Ministry of Education (MoE), Government of India, aimed at promoting international academic and research collaboration. The program facilitates partnerships between leading Indian institutions and top global universities from selected countries to address problems of national and international importance. Its key objectives include:

- 1) **Enhance Research Collaboration:** Facilitate collaboration between Indian researchers and leading global experts to generate impactful and innovative research outcomes.
- 2) **Foster Internationalization of Education:** Strengthen the global presence and outreach of Indian higher education institutions.
- 3) **Capacity Building:** Develop the skills and research capabilities of Indian researchers and students through interaction with world-class international researchers.
- 4) **Address Societal Challenges:** Promote research that focuses on solving critical national and global issues of societal importance.

About MANIT Bhopal

Maulana Azad National Institute of Technology Bhopal (MANIT Bhopal) was started as Maulana Azad College of Technology (MACT) in 1960. It was declared as NIT in 2002 and an institution of national importance in India in 2007. The institute offers various undergraduate courses (including B.Tech and B. Arch) and post graduate courses (including M. Tech, MSc, MBA, MCA) and PhD research programs. Under various departments and centers, MANIT is producing technocrats who are resources to Nation and the world. The bright students of MANIT with excellent technical skills have always contributed to the successes of various sections towards the technical group. The total area of campus is 650 acres. The entire campus consists of administrative and academic buildings, workshops, teaching blocks, learning resource center, library, community center, residential area accommodation for students and staff and other general amenities such as post office, shopping complex,

a school for children, dispensary, auditoriums and sports complex with vast expanse of open area.

About NUS Singapore

National University of Singapore (NUS) is Singapore's flagship public research university and one of the leading universities in Asia with QS ranking 7. Established in 1905, NUS is known for its excellence in education, multidisciplinary research, innovation, and global collaborations. It offers a wide range of undergraduate, postgraduate, and doctoral programs across engineering, computing, business, medicine, science, law, public policy, and the humanities. The university is recognized for its strong industry partnerships, research centers, entrepreneurial ecosystem, and focus on addressing global challenges through technology and innovation. For researchers and professionals, NUS is particularly renowned for its work in Artificial Intelligence, Data Science, Smart Cities, Sustainable Energy, Healthcare Technologies, Robotics, and Digital Transformation.

About the Departments

The Electrical Engineering Department was established in the year 1960. The department offers undergraduate program, postgraduate degrees in Power Electronics & Drives and Integrated Power System and doctoral program. The department has highly qualified and competent faculty members and adequate facilities to support teaching and learning activity.

The Department of Energy Science and Engineering at MANIT established in 1994 under the Indo-UK REC's project and formally inaugurated by the former President of India, late Dr. Shankar Dayal Sharma, the Department at MANIT Bhopal stands at the forefront of sustainable technological education. Recognized by the Ministry of New and Renewable Energy (MNRE) for prestigious postgraduate and doctoral fellowships, the department offers industry-aligned programs including B.Tech in Energy and Electric Vehicles Engineering, M.Tech in Renewable Energy, and M.Sc in Energy Economics and Management. Balancing academic rigor with cutting-edge research, the department boasts nine specialized

laboratories spanning solar, wind, and energy conservation technologies, further enhanced by an exclusive collaboration with Bajaj Auto under the BEST scheme to develop five state-of-the-art electric vehicle labs.

The Computer Science and Engineering Department (CSE) was established in the year 1986. Since the inception, it has consistently created its place of excellence not only within the institute but among its counterparts in the country and abroad. Bright students from all the parts of the country for quality education in computer science and engineering at undergraduate, postgraduate, and doctoral levels are attracted. The department has highly qualified and competent faculty members, and adequate facilities to support teaching and learning activity.

Course Objective

The workshop on “Digital Twins and Data Fusion for Smart Grid-Integrated Solar Energy and EV Charging Systems” aims to introduce participants to advanced digital technologies for intelligent energy management and sustainable power systems. It focuses on the application of Digital Twin technology for creating virtual models of solar PV systems, EV charging infrastructure, and smart grids to enable real-time monitoring, simulation, and optimization. The workshop will provide an understanding of data fusion techniques for integrating information from sensors, IoT devices, smart meters, and grid monitoring systems to support informed decision-making. Participants will explore the role of Artificial Intelligence (AI), Machine Learning (ML), and analytics in forecasting energy generation and demand, fault detection, predictive maintenance, and grid stability enhancement. Through practical demonstrations and case studies, the program aims to develop skills for designing efficient, reliable, and resilient smart energy systems, enabling participants to address challenges associated with renewable energy integration, EV charging management, and future smart grid applications.

Topics covered:

- Introduction to Digital Twin technology for smart energy systems.
- Fundamentals of Data Fusion for multi-source energy data analysis.
- Application of Artificial Intelligence (AI) and Machine Learning (ML) in energy management.
- Energy generation and load forecasting for Solar PV and EV charging systems.
- Smart charging strategies and demand response management.
- IoT-enabled sensing, communication, and data acquisition techniques. Cloud and edge computing for scalable Digital Twin deployment.
- Hands-on demonstrations and practical implementation approaches.

Course Outcomes

The course is designed with approximately 30% fundamentals, 30% AI/ML and Deep Learning concepts, and 40% hands-on training, demonstrations, applications, and field visits. Upon completion, participants will understand the principles of Digital Twins and AI-driven techniques for smart energy management, predictive analytics, and intelligent decision-making. The course provides practical exposure to data acquisition, processing, analysis, and AI-based modeling through hands-on sessions, real-world case studies, and field visits.

Resource Persons

Foreign Faculty:

- **Prof. Dipti Srinivasan**, NUS - National University of Singapore.
- **Prof. Sanjib Kumar Panda**, NUS - National University of Singapore.

All other experts from IITs, IIITs, NITs, and leading institutions, R&D organizations, and industries.

Who should attend?

The program is designed to target motivated professionals, teachers, and researchers with a keen interest in these areas, including solar plant research and scientific research. Additionally, graduate, postgraduate, and Ph.D. students with a strong desire to excel in their scientific, agricultural, and engineering research pursuits are welcome.

How to apply

The registration form in the prescribed format duly filled up in all respects, should reach the coordinator through Google Form: <https://forms.gle/DnjdDdnCMw25NVfUA> before the last date. OR Scan Here for registration Link:



Important dates:

Last date (Application)	30.06.2026
Selection List by E- mail	05.07.2026

Note:

- No participant fees will be collected. Participants are limited to 50.
- Registration Fee: Rs. 500/- (Refundable upon Full Attendance).

For query contact:

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