

GIAN PROGRAMME

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भारतीय प्रौद्योगिकी संस्थान
भारतीय खनि विद्यापीठ
धनबाद



IIT
ISM INDIAN INSTITUTE
OF TECHNOLOGY
INDIAN SCHOOL OF MINES
DHANBAD



सत्यमेव जयते
Ministry of Education
Government of India

Gian
GLOBAL INITIATIVE OF ACADEMIC NETWORKS



IIT (ISM)
DHANBAD
1926-2026
100 YEARS OF EXCELLENCE IN
EDUCATION & RESEARCH

Course Code: 2700113

OPERATION AND CONTROL OF DISTRIBUTION SYSTEMS WITH RENEWABLE ENERGY SOURCES

Organized by
Indian Institute of Technology (Indian School of
Mines) Dhanbad



16th – 20th June 2025



Overview

In today's era, the traditional passive distribution systems have observed many changes due to the integration of distributed energy resources which are mainly the renewable energy sources as we shift from the conventional grid to the smart grid. As a result of these renewable energy sources, the challenges in the planning and operation of modern distribution systems have increased manifolds. It is therefore necessary to consider these aspects in the design, economics, protection, operation, and control of distribution systems. The shift towards isolated power systems called microgrids have made the operation and control of distribution systems even more interesting to the power system engineers nowadays. Considering these, this course is designed to introduce the concepts required for power system engineers, faculties, students, and researchers to learn and understand the important aspects of operation and control of distribution systems with renewable energy sources. The course is designed to provide insights to the challenges faced in the operation of distribution systems. It will cover important topics related to the operation and control including planning, economics, automation, protection, operation of distribution systems, control of renewable energy sources, and microgrids. A tutorial session on microgrid control will further enhance the skills and understanding of the participants.

Objective

The primary objective of the course is to make the participants learn and understand the following concepts of modern and smart distribution systems.

- i) Understand fundamentals of planning of distribution systems, load forecasting methods, load characteristics, criteria, and standards for distribution systems design.
- ii) Learn the economic aspects of distribution systems.
- iii) Know the different types of energy pricing used in smart power distribution systems.
- iv) Develop an understanding of the methods used for automation of modern distribution systems.
- v) Develop an understanding of the fundamentals of protection systems used for smart distribution systems.
- vi) Understand the operation and control of renewable energy sources commonly integrated in distribution systems.
- vii) Know the control methods of microgrids which form an important part of distribution systems.
- viii) Learn to simulate and understand the microgrid control methods by simulations.

Course Details

The course will be conducted between the June 16 – June 20, 2025 (5 working days): 12 hrs lectures (In-person), 02 hrs tutorials (In-person) and lab/site visit (In-person). The course will consist of 5 modules (subtopics), each covering various related topics in detail.

Modules	<ol style="list-style-type: none">1. Distribution system planning, economics and automation2. Renewable energy sources (RESs) integration3. Distribution system protection4. Microgrid architecture and control: Control of grid-following and grid-forming converters5. Hierarchical control of microgrids <p>*Number of participants for the course will be limited to fifty.</p>
You Should Attend If...	<ul style="list-style-type: none">• Engineers, scientists, and researchers from academia, industries, research labs, and other government organizations• Students at all levels (B.Tech./M.Tech./Ph.D.)• Post-doctoral and project research fellows• Faculty from academic institutions

Fees

The participation fees for taking the course are as follows:

Participants from abroad: US \$300

Industry/ Research Organizations: INR 10000 + GST

Academic Institutions: INR 6,000 + GST

JRF/SRF/PDF/RA: INR 3,000 + GST

Students: INR 900 + GST

The above fee includes instructional materials, working lunch, computer use for tutorials and lab/site visit. The participants will be provided with accommodation on payment subject to availability on a first come first serve basis.

Note: There is no central registration on the GIAN portal (gian.iith.ac.in); registration will be managed directly by the hosting institute.

The Faculty



Prof. Anil Pahwa, University Distinguished Professor, is the lead faculty member in electrical power and energy systems at Kansas State University and Logan-Fetterhoof Electrical and Computer Engineering Faculty of Distinction Chair. His research focuses on reliability, automation and optimization of power distribution systems. Specifically, his research has provided innovative and practical solutions for the application of advanced communication and cyber technologies for automation of distribution of electricity to customers, and large-scale integration of renewable energy resources in the system to decrease dependence on fossil fuels. He is a Fellow of IEEE.



Prof. Sukumar Mishra is the Director of Indian Institute of Technology (Indian School of Mines) Dhanbad and Professor in the Department of Electrical Engineering at Indian Institute of Technology (Indian School of Mines) Dhanbad. His research expertise lies in fields of Power System, Power Quality Studies, Renewable Energy and Smart Grid. He is a fellow of IEEE, IET UK, IETE India and IE India and has won many accolades. He founded SILOV SOLUTIONS PRIVATE LIMITED under the Companies Act, 2013.



Prof. Dushyant Sharma is an Assistant Professor in the Department of Electrical Engineering, Indian Institute of Technology (Indian School of Mines) Dhanbad, India. His research interests include automatic load frequency control, renewable energy systems, distributed control in power systems, microgrids, and active power control of interconnected power systems. He is a recipient of the POSOCO Power Systems Award.

Course Coordinator

Prof. Dushyant Sharma

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Registration Link:

<https://forms.gle/x3Catq7NygPiwEuc9>

