

**Report
of
An Expert Lecture on ‘Protection and Safety on Power systems
with Highly Renewable Distributed Energy Resources’**

By Prof. Dr. Nirmal Kumar C Nair

Date: 09/04/2019 (10:00 a.m. onwards)

**Venue: PG Seminar Hall, Institute of Technology,
Nirma University**

Dr. Nirmal Kumar C Nair has BE from M.S. University, Baroda, ME in High Voltage from IISC and PhD from Texas A and M. He has held several industry, research and academic posts in India, USA and New Zealand. Currently, he is an Associate Professor in Electrical and Computer Eng. at University of Auckland. He works on protection, renewable grid integration, electricity markets, blackouts, restoration and resilience and engages on industry projects through consultancy. He is passionate about life-long-learning, energy policy, innovation and media outreach. He was the special reporter for "Protection under System Emergency Conditions" during CIGRE B5 Paris session (26-31 Aug 2018).

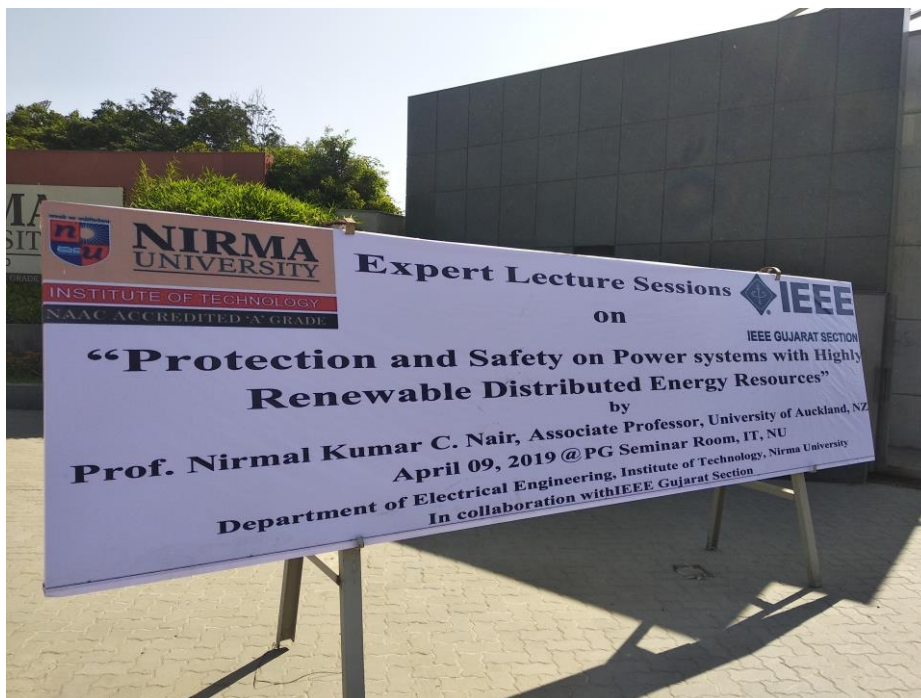
He has delivered an expert talk on ‘Protection and Safety on Power systems with Highly Renewable Distributed Energy Resources’ on April 09, 2019 at Institute of Technology, Nirma University from 10:00 am to 04:00 pm. Around 50 participants (PG students and faculties) from PDPU, Gandhinagar, L.D. Engineering College, Ahmedabad, GEC Bhuj, GEC Rajkot, Institute of Technology, Nirma University, Ahmedabad have attended the expert session.

Following is the summary of the expert session delivered by Dr. Nair.

The United Nations Climate Change Paris Agreement (COP21) amongst 196 countries has triggered the rise in penetration of renewable distributed energy resources (DER) into AC interconnected power systems. Integration of different technologies and varying scales of renewable generation across interconnected transmission and distribution grids will accelerate resulting in pressure on ensuring safety and operational integrity of existing reliable power system operation. In this context one of the critical aspects impacted is the practice of power system protection and safety which this plenary will address. Existing knowledge of traditional safety and protection philosophies, schemes, practices and related system impacts will continue

to be revisited to factor unique DER fault/abnormal characteristics and how they are electrically seen by the existing AC system and Intelligent Electronic Devices (IEDs) protection devices. This plenary will highlight forward-looking and global transformative power system protection/safety concepts that helps understand challenges that highly distributed DER penetration causes and identify possible solutions using existing and newer technologies. The lecture will address the following items:

- Power System Protection issues associated with DER connected to transmission and sub-transmission network:
- Protection and Safety impacts due to large-scale penetration of DER connected to MV and LV distribution network:
- Newer concepts, analysis, techniques to enable effective sensitivity and selectivity for grid protection schemes with DER





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