OPERATION AND PLANNING OF POWER DISTRIBUTION SYSTEMS

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PRE-REQUISITES : Basic electrical engineering, Electrical power system

INTENDED AUDIENCE : PG students and industry engineers

INDUSTRIES APPLICABLE TO : Course will be useful for any public/private distribution companies (DISCOM), for example Tata power, Reliance power, CESC, all the state owned DISCOM, etc.

COURSE OUTLINE :

Due to the inception of various automation technologies and integration of distributed energy resources, the electrical power distribution systems are slowly transformed into smart and active networks. This course will provide an overview of modern power distribution systems. The course will start with the discussions of different components and layouts of power distribution systems, load models, different reliability assessment techniques, and different planning approaches. The conventional reactive power compensation techniques will also be covered. Then, the impact of distributed generation on distribution systems will be discussed. Modeling of different types of distributed generation units and storage will also be discussed. Finally, the evolution of distribution systems toward smart network will be covered.

ABOUT INSTRUCTOR :

Prof. Sanjib Ganguly was born in West Bengal, India. He obtained Bachelor of Engineering degree in Electrical Engineering from Indian Institute of Engineering, Science, and Technology (IIEST), Shibpur {Formerly, Bengal Engineering and Science University} in 2003. He received Master of Electrical Engineering degree from Jadavpur University, Kolkata in 2006. He was awarded with the Ph.D degree from the Department of Electrical Engineering, Indian Institute of Technology Kharagpur in 2011. He worked in the Tata Power Company Ltd., as a Sr. officer, electrical maintenance of 2×500 MW thermal power units in Trombay Thermal Power Station, Mumbai from 2006-2007. He worked as the Assistant Professor in NIT Rourkela from 2011-2015, before joining in IIT Guwahati in 2015. He is presently working as Associate Professor in the Department of Electronics and Electrical Engineering, IIT Guwahati. His research interest includes distribution system planning and optimization, voltage control and stability, multi-objective optimization, custom power devices, hybrid energy systems, and evolutionary algorithms. He has authored 45 papers in international journals, which include IEEE Transactions, IET, and different Elsevier, Springer, and Wiley journals with more than 2265 citations according to the Google scholar, till date. He has published sole-authored papers in IEEE Transactions Power Systems, IEEE Transactions Power Delivery, and IET Generation, Transmissions, and Distribution. He is enlisted to the World's top 2% scientist list in the years of 2019, 2020, 2021, 2022 according to the list published by authors of Stanford University, USA.

COURSE PLAN :

Week 1**:** Introduction, overview, and Load modelling

Week 2**:** Load modelling

Week 3**:** Basic features of distribution systems

Week 4**:** Basic features of distribution systems

Week 5**:** Reliability and Power quality assessment of distribution systems

Week 6**:** Reliability and Power quality assessment of distribution systems

Week 7**:** Distribution system load flow approach

Week 8**:** Reactive power compensation in distribution systems

Week 9**:** Distribution system planning and reconfiguration: Different approaches

Week 10**:** Distribution system planning and reconfiguration: Different approaches

Week 11**:** Active distribution networks with the integration of Distributed Generation (DG)

Week 12**:** Distribution system automation and smart grid