SCIENCE AND ENGINEERING OF INSULATION IN POWER SYSTEMS AND ALLIED DISCIPLINES

……..

Overview

The behavior of insulating materials under electric fields continues to be an area of study that has fascinated physicists, chemists, material scientists, electrical engineers, and more recently experts in areas as diverse as medical science, food technology, electrical vehicles, molecular biology and many more. Theories that explain aspects of insulation behavior in the traditional area of power engineering are also applicable to the insulating barrier in metal oxide semiconductors or interlayer insulation of integrated circuits. Search for sustainable technologies to replace the traditional internal combustion engines powered by fossil fuels extends to applications in harsh environments such as outer space and nuclear installations. There is particular interest in the application of theories of insulation behavior in handheld devices and satellites for weather monitoring or exploring outer space.

Managing the insulation system as a whole in given equipment or environment needs a deeper understanding of the interaction of electric fields with atoms and molecules at a fundamental level. Deeper insight in to the interaction between electric fields and molecules has relisted in new applications with research continuing at an ever increasing volume and scope. The range of sophistication in expertise required for mastering this vast area of scientific endeavor is a blend of theory, complex instrumentation, field experience and advanced manufacturing techniques. Application of quantum mechanics has become as relevant as application of complex mathematics or nanosecond technology; as relevant as improving traditional materials, configuring newer polymers, inorganic insulating materials and nano-dielectrics.

Longer service life, lower requirement of regular maintenance, reduced costs for installation and replacement are the driving forces to keep abreast of theory and practice for a country like India with varying degrees of sophistication and possessing high level of technological and scientific resources within.

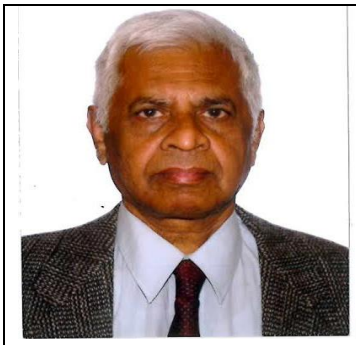
The course deals with these aspects of insulation science and engineering over a wide range of electric fields and environmental conditions. It has been designed to cover the aspects briefly mentioned above by the course provider who has worked in the area of Science and Engineering of Insulation for over 50 years, and acquired international experience in the laboratory and industries. The course is designed, not offered in any other course anywhere else, with a blend of science, engineering, practical experience, and industrial situations.

Objectives

The primary objectives of the course are as follows:

1. Exposing participants to the fundamental concepts of Insulation.
2. Providing exposure to practical problems in the Science and Engineering aspects.
3. Enhance the capability of the participants to understand the basics of interaction between electric fields and molecules.
4. Provide pathways to laboratory techniques in as wide an area as impulse testing of huge power transformers and bench experiments for study of phenomena at various operating conditions.

Modules	**1.** Internal field in insulating materials in steady electric fields **2.** Dielectric properties at low electric fields: Influence of frequency and temperature, relation to molecular properties and Meaning of molecular relaxation in the context of dielectric properties. **3.** Organic insulating materials and their properties: A brief compendium for selection. **4.** The invisible disease: Absorption and desorption currents in materials: Meaning and role in insulation aging and Inorganic materials in industry and research: A brief compendium for selection. **5.** Laboratory techniques under various conditions in service and laboratory. **6.** Application of Science and Engineering of insulating materials in allied disciplines: Electrical vehicles, Sustainable energy, Fuel cells, corrosion studies, Agricultural and Food Sciences, Medical Sciences, and Civil Engineering. **7.** What causes large currents to flow? High field conduction in materials. **8.** Materials in different phases: What role gaseous electronics plays in the arsenal of materials. **9.** Materials in liquid phases: Challenges for theoretical studies and practicing engineers and Materials in the solid phase: An overview of problems and solution. **10.** Techniques for researchers in the laboratory. What are thermally stimulated phenomena? Application to practical problems. Why do electrical charges accumulate in insulating materials? Traditional view and recent explanations. Space charge. **11.** Nanodielectrics. What are these? Conclusion-Aerial global view of the Science and Engineering of Insulating Materials.
You should attend if…..	1. Students of B Tech/MSC/MTech/ME, Ph. D. in all disciplines of Engineering 2. Faculty from reputed academic and technical institutions in the above fields 3. Engineers in manufacturing and research departments of manufacturing industries.
Fees	**1. Participants from abroad** : US $600 **2. Industry/ Research Organizations:** Rs. 10000/- **3. Academic Institutions:** Rs. 2000/- **4. NIT Mizoram Faculties, students and Researchers:**Rs.200/- *The above fee includes all instructional materials, computer use for tutorials, free internet facility. The participants will be provided with single bedded accommodation on payment basis.* To register or for any questions please send an email to pabitra.eee@nitmz.ac.in, or anagha.eee@nitmz.ac.in



Professor Gorur Govinda Raju obtained the B. Eng. Degree from the University of Bangalore (India) and the Ph. D. degree from the University of Liverpool, England (1963). He has held the Leverhulme Fellowship and Leverhulme travel Fellowship at the University of Liverpool during graduate studies. He then worked as Research Engineer at the Associated Electrical Industries, Manchester, England where he was awarded a research premium for one of his research papers. He joined the Department of High Voltage Engineering, Indian Institute of Science, Bangalore (1965) and became the Professor and Chairman during the years 1975-1980. He has held the Commonwealth Fellowship and concurrently, visiting lecturer at the University of Sheffield (1972-73) and (1973-74). He has been a Visiting Professor to Bhabha Atomic Research Centre, Trombay and University of Bangalore. He joined the University of Windsor, Canada in 1980 and became the Head of the Electrical and Computer Engineering Department during 1989-97 and 2000-2002. He has been on the board and Program Committee of the Conference on Electrical Insulation and Dielectric phenomena (IEEE) for a number of years. He is currently an Emeritus Professor at the University of Windsor. He is a Fellow of the Institution of Engineers, India, registered Professional Engineer of Ontario, and Life Senior member of Institution of Electrical and Electronics Engineering, USA (IEEE) and cited by the non-commercial publication, American Men and Women of Science. He has published many papers in international journals spanning years 1958-2016 and conferences and five books. His Latest book is: DIELECTRIC FIELDS: II Edition (Revised and Enlarged) Published by Taylor and Francis LLC. Boca Raton, 2016. His experimental and theoretical contributions on gaseous electronics and dielectrics continue to be cited in research papers and books. His hobbies are reading biographies of scientists and playing computer chess. He and his wife, Padmini, reside in Windsor, Ontario, Canada and Bangalore, India.

August 22, 2016 – August, 31, 2016

National Institute of Technology Mizoram

Pabitra Kumar Biswas is an Assistant Professor in the Department of Electrical and Electronics Engineering, National Institute of Technology, Mizoram, India. He has published a numbers of research papers in National/International Conference Records/Journals. From 16.07.2007 to 05.02.2015, he served as an Assistant Professor in Electrical Engineering in Asansol Engineering College, Asansol, India. His research interests include Electromagnetic Levitation System, Active Magnetic Bearing, Power electronics Converters and Machine Drives.

Mr Anagha Bhattacharya is working as an Assistant Professor in the Department of Electrical & Electronics Engineering, National institute of Technology Mizoram. He has got over 8 years of teaching experience. His research interests includes Micro grid, Power System Deregulation, Power system Protection.

Course Coordinators

Dr. Pabitra Kr Biswas & Mr. Anagha Bhattacharya
Email: pabitra.eee@nitmz.ac.in, anagha.eee@nitmz.ac.in

……

http://www.gian.iitkgp.ac.in/