



## Nikola Tesla (10 July 1856 – 7 January 1943)

### The Genius of Nikola Tesla



- International Belgrade Airport is named as “Nikola Tesla Airport”.
- “Nikola Tesla Year 2006” had been proclaimed by UNESCO and Serbian and Croatian Government.
- Proposal for “Nikola Tesla Day”, July 10<sup>th</sup>, made by Tesla Memorial Society of New York and Tesla Forum of Australia was accepted by the United Nations.
- The Archive of the Nikola Tesla Museum in Belgrade had been named as “Memory of the World” by UNESCO.
- Nikola Tesla’s letter to the American Red Cross announcing he had received an extraterrestrial communication (by Prof. James Corum).
- Nikola Tesla and George Westinghouse built the first hydro-electric power plant in Niagara Falls and started the electrification of the world.

**“The practical success of an idea, irrespective of its inherent merit, is dependent on the attitude of the contemporaries. If timely, it is quickly adopted; if not, it is apt to fare like a sprout lured out of the ground by warm sunshine, only to be injured and retarded in its growth by the succeeding frost.”**

*“This is the great fact: Strength is life, weakness is death. Strength is felicity, life eternal, immortal; weakness is constant strain and misery, weakness is death.” – Swami Vivekananda.*

## DEPARTMENTAL NEWS :

Paper published on “**Improvement of Voltage Stability Margin in a Reconfigured Radial Power Network using Graph Theory**” in Canadian Journal on Electrical and Electronics Engineering Vol. 2, No. 9, September 2011 by Dipu Sarkar, Sanjay Goswami, Abhinandan De, Chandan Kumar Chanda, A. K. Mukhopadhyay.

**Abstract:** Interconnected power distribution networks often have a radial design for effective coordination of their protection systems. A radial system presents low short circuit current, lower cost of operation and construction, and facilitates efficient load transfer from one feeder to another in the event of faults etc. In this paper application of Graph Theory has been proposed to convert an interconnected power network comprising of multiple lines and switches into a radial system for obtaining the best operational characteristics, cost and control. Out of a large number of feasible alternative combinations of lines and switches, attempt has been made to find out the best possible radial combination, resulting in highest voltage stability of the overall system. Graph theory, supported by DFS algorithm has been efficiently used to develop a methodology for obtaining the optimum switching combination. The proposed technique has been tested on an IEEE 14-bus system and the results are encouraging.

## NIT NEWS :



www.nit-iccia.org

Organized by:



**NIT**  
Narula Institute of Technology  
An Educational Initiative of JIS Group  
81 Nilgiri Road, Agrapara, Kolkata 700109  
West Bengal, India, Website : www.nit.ac.in  
Phone: 91-33-2563777/8888, Telefax: 91-33-25637029  
nitconference2011@gmail.com



**JIS GROUP**  
Educational Initiatives  
www.jisgroup.org



**IEEE**

## INTERNATIONAL CONFERENCE ON COMMUNICATION AND INDUSTRIAL APPLICATION

**26 - 28th December 2011**  
At Science City, J.B.S. Haldane Avenue, Kol-700046.

IMPORTANT DATES		SUB - THEME	
Events	Dates	Communication & Computing Track	Industrial Application Track
Paper Submission Deadline	15th, September 2011	Emerging Technologies and Information Technology	Industrial Application and Automation Sensor and Transducers
Notification of Acceptance	31st, October 2011	Control, Communication and Networking	Industrial Application and Signal Processing
Submission of Camera Ready Paper	20th, November 2011	Ad-hoc and Sensor Networking	Industrial Application of Microprocessors based systems
Early Registration	7th, November 2011	Cloud Computing	Industrial Application in Water Sector
Tutorials	26th, December 2011	Coding Theory	Industrial Application in Petroleum Sector
Conference	27th & 28th, December 2011	Cryptography and Security Research Communication	Industrial Application in Power Sector
		Hardware Transmission	Industrial Application in Telecom Sector
		Interconnection	
		Industrial Communication	
		Mobile Computing	
		Network Protocols	
		Personal Computing	
		Robot Communication	
		Quantum & Grid Computing	
		Software Engineering	
		Systems to Communication	
		Energy Conservation in Communication	
		Environmental Electronic Communication	

## NATIONAL NEWS :

- Twenty-seventh National Convention of Electrical Engineers ‘**Powering India by 2020 : A Roadmap for Greener India**’  
Kolkata, November 11-12, 2011  
The Honorary Secretary, IEI, West Bengal State Centre, 8 Gokhale Road, Kolkata 700020.
- All India Seminar on ‘**Powering the Future, Challenges and Solutions**’  
Kollam, November 04-05, 2011  
The Honorary Secretary, IEI, Kollam Local Centre, TKM College of Engineering, PO: TKM College, Kollam 691005.
- All India Seminar on ‘**Power System Management**’  
Guwahati, October 14-15, 2011  
The Honorary Secretary, IEI, Assam State Centre, Panbazar Overbridge, East Lane, Guwahati 781001.
- All India Seminar on ‘**Electrical Safety and Conservation**’  
Palghat, September 16-17, 2011  
The Honorary Secretary, IEI, Palghat Local Centre, XIII/1082, Nerukakkad, PO: Kallepully, Palakkad 678005.
- All India Seminar on ‘**High Speed Trains**’  
New Delhi, November 04 -05, 2011  
The Honorary Secretary, IEI, Delhi State Centre, Bahadur Shah, Zafar Marg, New Delhi 110002.

## INTERNATIONAL NEWS :

- **IBM** celebrates centenary in June 16, 2011. **IBM** completes 100 years globally and 60 years in India (with gap during 1977-1991).
- **Google** launches StreetView in India on June 9, 2011 (starting with Bangalore).
- **Apple** announces iCloud music service, iOS 5 and Mac OS 10 new release Lion on June 6, 2011.
- **RIM** launches BlackBerry Playbook in India on June 22, 2011.
- **Nokia** announces MeeGo-powered N9 for the global market and Dual SIM India made phone for the Indian market.
- **SNK E-Tax** launches online tax filing E-Tax on June 15, 2011.
- India-born Professor Chandrakasan to head EECS Department at MIT from July 2011.
- Bar code creator Alan Haberman of Ohio died on June 15, 2011 (the first bar code reader in Marsh supermarket went live on June 26, 1974!)
- **WWW** is 20 years old on August 4, 2011.

---

**Paper Contest on “Renewable Energy Sources”**


---

All students of B. Tech. EE and M. Tech. EE – Power System are invited to submit paper on above topic. The content should be between 600–800 words. Submission may be by an individual or a group of students. The paper shall be reviewed by senior professors of NIT. The best paper will be awarded a cash prize of Rs. 1000/- and shall be published in the next issue of “**Synthesis**”.

## Energy News

### 1. 35th WORLD ENERGY ENGINEERING CONGRESS

October 31 - November 2, 2012

Georgia World Congress Center : 285 Andrew Young International Blvd., NW, Atlanta, Georgia 30313-1591

The WEEC conference and expo target the complete spectrum of technologies and services of greatest importance to our delegates in attendance, including, but not limited to:

- Energy efficiency and energy management
- Renewable, green and alternative energy
- Combined heat & power/cogeneration/distributed generation
- Smart grid and electric metering innovations
- Integrated building automation & energy management
- Lighting efficiency
- HVAC systems and controls
- Thermal storage and load management
- Boilers and combustion controls
- Geoexchange technologies
- Solar and fuel cell technologies

2. ClearEdge Power, a Hillsboro, Ore., startup that makes small-scale fuel cells, has scored \$73.5 million in one of the bigger green tech funding rounds of the year.

Fuel cells generate power and heat by converting hydrogen, natural gas or biofuels into electricity through an electrochemical process while minimizing the emission of pollutants associated with global warming and health problems. At 5-kilowatts, a single ClearEdge fuel cell produces the equivalent amount of electricity of a large residential solar panel array at peak output. But unlike solar panels, a fuel cell operates 24/7. Ford said that ClearEdge has an annual manufacturing capacity of 2,500 units and will use the \$73.5 million it has raised to finance expansion into new markets.

### 3. World's Smallest Fuel Cell Powered by Bacteria

Source: Carnegie Mellon

Carnegie Mellon University's Kelvin B. Gregory and Philip R. LeDuc have created the world's smallest fuel cell powered by bacteria. Future versions of the biology-powered fuel cell could be used for self-powered sensing devices in remote locations where batteries are impractical, such as deep ocean or geological environments.

## Journey of Power Electronics

Mrs. Shilpi Bhattacharya  
(Asst. Professor)

Though Power Electronics is considered as one of the newest branches of Electrical Engineering; its journey actually started much earlier than many of us think today. The earliest recorded event which laid down the foundation stone of Power electronics is in the year **1883**, when **Selenium Diode** was

used by C.T. Fritts as a rectifier & 3 phase bridge rectifier circuit (Graetz Ckt) in 1897. Peter Copper Hewitt demonstrated the glass bulb mercury arc rectifier in 1901 and thermo ionic diode was first used by J.A. Fleming for the reception of radio signals in 1904. Till then it was only restricted to uncontrolled devices.

The invention of three element thermo ionic vacuum tube by L. De Forest initiated the venture for controlled conversion in 1907. World War I and the decade of 1920 witnessed a great growth in vacuum tube technology, dominating the low power application. Introduction of Thyatron and Mercury arc Ignitron brought power controllability to a very high power between 1926 and 1933. Throughout the years of 1930-1940 popularity of vacuum tube increased and the term "**Industrial Electronics**" was used for high power application purposes other than communications.

The era of **solid state semiconductor control** was theoretically initiated by the invention of '**Transistor**' in **1948** but really became viable by the commercial availability of Silicon Diode from 1956 followed by **SCR in 1958** and came to be known as Thyristor Technology. SCR revolutionized Power Electronics and led to the development of non fragile, high voltage, high current, small weight & size and efficient equipment for widespread applications. Demands of better efficiency and low maintenance, portability, compactness & automated features triggered off technological developments of newer semiconductor devices one after another. In spite of advantages, applications of SCR's for controlled turnoff circuits has the disadvantages of commutation circuits which causes additional cost and size and trapped energy causes severe voltage stress across the device. It has additional energy loss and a hurdle to fast rate switching.

Considerable efforts in R&D gave results in the early 1970 by Toshiba Corporation of Japan as 'Giant Transistor' which eliminated commutation circuit, low noise and improved efficiency of the converter, followed by '**POWER MOSFET**' capable of self commutation at a frequency of 100 kHz. In the year 1980 Japanese companies introduced GTO which showed latching device like SCR with gate controlled turn off feature, eliminating commutation circuit. But very soon, closest to an ideal device was introduced in the mid of 1980's in the form of **Insulated Gate Bipolar Transistor** by General Electric Company, U.S.A. All these devices of wide voltage and current ranges made power electronics very attractive and commercially acceptable.

Power Electronic Converters have gone through several changes in the last few decades and is moving towards high frequency switching technology. It is expected that by the end of this decade at least 25% of the total electricity consumed will be controlled by Power electronics. Compared to earlier dominance in industrial and traction areas power generation, transmission and distribution will become larger. Power Electronics has a long history of evolution and has become a major, multidisciplinary subject. The need for efficient power control with a good quality form not readily available is creating an ever increasing diversity of its application area.

## Final Year Projects Undertaken 2011-2012

**Title :** EXCEL based design calculation of a three-phase induction motor and preparation of final data sheet and to study the performance of the motor.

**Brief Description :** Design calculations of different parts and relevant parameters of a three-phase induction motor by using Microsoft EXCEL and to study the performances of the motor under different type of loads.

**Members :** Prashant Kumar, Md. Waris Ahmad, Monsurali Sekh, Sayantan Ray, Tankar Chakravarti, Manas Bera, Atri Hazra, Gopal Chandra Ghorai.

**Guided by :** Arkendu Mitra.

**Title :** Design and fabrication of a PC based Level Indicating Controller using inductive type transducer and a Signal Processing Unit.

**Brief Description :** Objective of the present work is to design and fabricate a PC based Level Indicating Control system using inductive pick-up type Level Sensor. The present work consists the design and fabrication of (a) proposed level sensor, (b) Wein Bridge Oscillator, (c) Instrumentation Amplifier, (d) Signal Processing Unit and finally assembling of whole control system.

**Members :** Sutanu Paul, Alokparna Acahrya, Sayandeep Dhabal, Arijit Maity, Sautrik Dutta Mantrani, Nabanita Gupta, Pallabi Mukherjee, Paramita Deb.

**Guided by :** Suman Das.

**Title :** Simulation, Design and Analysis of a Buck-Boost Converter.

**Brief Description :** The main application of such a converter is in DC regulated power supplies, where a negative polarity output may be desired with respect to the common terminal of the input voltage, and the output voltage can be either higher or lower than the input voltage.

**Members :** Partha Koner, Victor Hazra, Sanjit Guhathakurta, Arindam Das, Chandrasekhar Chatterjee, Debanjan Acharya, Dipanjan Kanti Bagchi, Nishan Hazra.

**Guided by :** Shilpi Bhattacharya.

**Title :** A model project on AC transmission and distribution system.

**Brief Description :** To make a model to demonstrate the AC transmission and distribution system.

**Members :** Pratik Kumar Gupta, Sumit Sarkar, Atanu Chandra, Abhishek Jana, Amitava Bosu, Biswarup Roy Chowdhury, Sayandeep Mukherjee, Sirsha Majumder.

**Guided by :** Dipu Mistry and Kamalika Banerjee.

**Title :** Microprocessor based IDMT Relay.

**Brief Description :** Under abnormal conditions of a system, the current magnitude rises to a higher value. The flow of

abnormal current depends on network parameters and the magnitude of fault current and flow of abnormal current and its duration of flow are indications of the health of a network and by measuring them, a network may be protected.

**Members :** Kanishka Pal, Anand Kumar Singh, Subir Ghosh, Aritra Chatterjee, Madhuparna Pramanik, Rohit Singh, Aditya Goyal, Md. Ashraf Ali Ansari.

**Guided by :** Debasree Saha.

**Title :** Reactive Power compensation in a power system network with the help of FACTS device.

**Brief Description :** After a load flow study of power system network, all the bus voltages are to be recorded without any compensating device. An SVC is to be connected with the system and all the changes in the system parameters are to be carefully recorded. Thus after this a comparison will be carried on between the two conditions and ultimately the reactive power contribution to the system will be observed.

**Members :** Aritra Mukherjee, Supriyo Majumder, Sinjini Maitra, Shubhodeep Das, Tanveer Mondal, Souvik Saha.

**Guided by :** Dipu Mistry and Kamalika Banerjee.

**Title :** Radial network configuration from an interconnected system at voltage stability margin.

**Brief Description :** A case study will be performed for selection of best radial configuration from an interconnected system at highest voltage stability margin. Improving voltage stability by network configuration involves study of switching options which enhances voltage stability under a given loading and generation condition. The improvement of instability is achieved only by altering topological structure of the power lines and does not involve any additional hardware line installation of SVC, capacitor bank, tap-changing transformers etc.

**Members :** Sujoy Kumar Dutta, Arnab Rakshit, Abhishek Dhar, Nabadeep Kundu, Biswarup Das, Kaushik Dhar, Mithilesh Kumar Singh, Alik Biswas.

**Guided by :** Dipu Sarkar.

**Title :** Microcontroller based Digital Voltage measuring scheme.

**Brief Description :** This is a voltage measuring scheme where microcontroller is used to make it a program based system. The required voltage is connected to the ADC and then to the microcontroller. Microcontroller will calibrate the value of the voltage. Any instantaneous change of the voltage will be reflected to the display.

**Members :** Sayani Das, Upama Bose, Pritam Ghosh, Arkopal De, Partha Pratim Das, Subhajit Basak, Joydeep Chowdhury, Parijat Das.

**Guided by :** Rumpa Saha.

**Call for Contribution :** Contribution for the Quarterly Newsletter are invited from all faculty, staff and students of NIT. The contributions may be in the form of an article not exceeding 800 words, local, national and global news related to Electrical Engineering. The prospective contributors are requested to forward their contributions to the mail address : "arkendu83@gmail.com".

**Published by :** Prof. Amlan Chakrabarti, HOD, Department of Electrical Engineering, Narula Institute of Technology, 81, Nilgunj Road, Agarpara, Kolkata – 700109, W.B. The newsletter is available in NIT website : [www.nit.ac.in](http://www.nit.ac.in).