

Message from the Desk of Mentor, EE, SIT.

Mr.D.Bhattacharjee



It has been a great pleasure and satisfaction for Electrical Engineering Department to bring out the volume 2, issue -I of the departmental news letter. A news letter is like a mirror which reflects a clear picture of all sorts of activities undertaken by the department and develops writing skills among students in particular.

We are actually in the midst of explosion of technology and volume 2, issue -I of newsletter will enrich the readers by sharing new ideas, thoughts and information regarding up gradation of modern science and technology and the interesting facts going around the world. It would inspire all of us for a new beginning by providing a common platform for exposing the merits, achievements of the department, be it academic or non academic, training and placement activities, different types of co-curricular activities being conducted by the department. This new volume of news letter has been launched to give an opportunity to the students to craft and showcase their knowledge and skills and focuses on the technical advancements and achievements in the field of Electrical Engineering.

I congratulate our H.O.D and the entire team for their dedication in publishing this new volume of news letter and I extend my best wishes also to all the faculties and staff members and also students

Message from the Desk of Editorial Board.

"Department of Electrical Engineering - A Legacy of Learning"

-Editorial Board

On behalf of Department of Electrical Engineering, S.I.T., We are happy to come up with the next issue of the newsletter of the department "ELECTROWRITE".

The purpose of this technical newsletter has been to allow a platform to grow awareness about the major highlights of the department and also about the technical advancements in the field of Electrical Engineering.

We convey our heartfelt thanks to the teachers and students of the department for their continuous support in this journey. Special credit goes to our beloved students of 2nd year as a whole and Arkajit Fouzder and Abhijit Das in particular for publishing the volume 2, issue I of the newsletter.

We take the opportunity here to announce that our students are coming up with a wall magazine shortly. We expect more students to participate actively in this process. If we work together as a team then this effort can yield great result in future. We hope that this issue will be informative to our readers.

Any suggestions for betterment towards this will be highly appreciated. Please send suggestions and comments to newsletter.ee.sit@gmail.com.

DEPT. MISSION & VISION

Vision of the Department

To emerge as a leading Department of Electrical Engineering that caters to the latest needs of power sector, electrical & allied industry by the year 2020 in the region.

Mission of the Department

To evolve as an innovative & globally competent Electrical Engineering department that contributes to the socio-economic growth of region by utilizing the advancement in Electrical Engineering by providing conducive learning and interactive environment to students and faculty

Did You know

Satyndra Nath Bose (01.01.1894 - 04.02.1974)



- One of the teachers in secondary school remarked that in his mathematics paper Satyen deserved 110 out of 100 marks.
- Rabindranath Tagore dedicated his only book on science, Visva-Parichay, to this eminent scientist.
- Bose was Member of the Rajya Sabha, Chancellor of Viswa Bharati University and also Govt. of India appointed him as national professor.
- Bose received a Bachelor of Science in mixed mathematics in 1913 from Presidency College and a Master of Science in the same subject in 1915 from Calcutta University. He received such high scores on the exams for each degree that not only was he in first standing, but, for the latter, he even created a new record in the annals of the University of Calcutta, which has yet to be surpassed.

Dmitri Mendeleev (08.02.1834 - 02.02.1907)



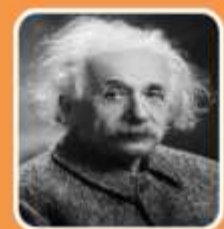
- In the periodic table, The Element 101 Md (mendelevium) was named after him.
- Dmitri Mendeleev was known to have long hair and a long beard. He would trim his hair once every year.
- There is a crater in the moon named after Mendeleev.
- In the center of the Saint Petersburg University there is a memorial named after him.
- One of the founding fathers of Russian Chemical Society was Dmitri Mendeleev. Through this organization, all of scientists living in US and Europe could communicate each other.
- There are many other disciplines that Mendeleev mastered when he was alive. You are wrong if you think that he is only good in the branch of chemical technology. He was good in physics, chemistry, and economy.
- Many scientists lay the research on their own data collection. It seems that Mendeleev had different approach when he conducted a research. He made contact with other scientists around the globe about the data that they had collected.

Galileo Galilei (15.02.1564 - 08.01.1642)



- Galileo was an accomplished lutenist, learning from his father, Vincenzo Galilei, who was a composer and music theorist.
- While Galileo firmly believed in Copernicus's theory that the Earth was not the center of the universe, he did not believe in his Kepler's theory that the moon caused the tides.
- In the last year of his life, when he was totally blind, Galileo designed an escapement mechanism for a pendulum clock called Galileo's escapement.
- The University of Pisa hired Galileo as a professor of mathematics, but because he was difficult to work with and inappropriate with his students, the university chose not to renew his contract.
- Galileo enrolled to do a medical degree at the University of Pisa but never finished, instead choosing to study mathematics.
- A hundred years after he died, when his body was being moved for reburial, a fan snipped off the middle finger of his right hand as a memento. Galileo's finger is now on display, erect, at the Museum of the History of Science in Florence. The finger points toward Rome.

Albert Einstein (14.03.1879 - 18.04.1955)



- He was a great musician. If the whole "genius" thing didn't work out, Einstein could have become a violinist.
- He could have been the President of Israel. When Israel's first president, Chaim Weizmann, died, Einstein was offered the position, but he declined.
- In 1921, He received Nobel Prize not for the general or special theory of relativity, but rather for the photoelectric effect.
- His brain was stolen. After Einstein died, the pathologist who did his autopsy took his brain without permission. He eventually got the permission necessary from Einstein's son, but he was fired from Princeton when he refused to turn the brain over. He kept it for over forty years before finally returning it in 1998.
- For the first time ever, scientists have directly detected gravitational waves, bizarre ripples in space-time foreseen by Einstein a century ago. The discovery was the final, acid test of Einstein's general theory of relativity.



Pathways to Sustainability -Mitul Ranjan Chakraborty, Asst. Prof., Dept. of EE

With development in technology with time we are facing a great challenge now-a-days. Global warming is a big threat to mankind in recent days. Therefore time has come to think of sustainable economic growth. It will definitely require changes in the amount & type of resources used, types of manufactured products and obviously the industrial processes. We should use our resources available more judiciously and control industrial processes in such a way that wastes are minimized and re-used i.e. we must make our path to a more energy-efficient civilization. Technologies involving all societal activities must reflect the goals of sustainable economic growth.

Energy-Evolution of energy technologies is a key factor for sustainability. This can be classified into two - short term and long term. Talking about short term policy, we can't deny the dependency on fossil fuels. But at one point of time, use of fossil fuels must be reduced. An all-out effort must be given to increase the efficiency of energy supply, optimized energy usage and above all use of these fuels in less polluting manner. Natural gas gives fewer pollutants than oil or coal and hence can prove helpful towards the journey to less fossil fuel dependent economy. Throughout the world improvement in energy efficiency of transportation system may be helpful. In fact many countries have already taken initiatives towards fuel-efficient automobiles and integrated mass transit arrangements. Important work in energy storage e.g. electric, fuel cells and hydrogen systems are also going on.

In the long term scenario, for better energy future of world lots of options are being explored. Renewable energy sources are fast becoming popular and economic. Appreciable advances in solar cell based power generation with better efficiency are taking place. Wind, bio-mass and other forms of renewable energy may also be realistic option depending upon the situation. Nuclear power is also a good possible future source of energy depending upon the public acceptance. But at the same time safe operation of nuclear power plants and very efficient management of radioactive waste are to be ensured. Safe nuclear power definitely represents an indispensable resource for future.

Public Infrastructure-For being able to achieve sustainable development through efficient functioning of society, public infrastructures are very important. It broadly includes water resource and supply systems, power systems, bridges, roads, communications and transportation facilities etc. In most of the cases technologies are well developed. Necessary steps to be taken to implement the same in developing countries, where they are most needed.

Water-Water treatment and recycling very important in sustainable development of public, industrial, and agricultural sectors. For public sector, ensuring public health is most important thing of water systems – treatment technology & transportation of water safely should be of high importance. Controlling of micro pollutants (organic) is definitely a big challenge in future. For industrial sector, where water is heavily consumed, minimization of water is must and it is going to play an important role for sustainable development of the industrial products. For agricultural sector also new technologies are to be developed for irrigation which will optimize the water consumption and prevent unsustainable groundwater extraction.

Food-Enhancement in food production and better means of storage and distribution is necessary to support hugely growing population worldwide. Biotechnology has helped by producing new strains of crops resistant to disease and drought. With new advancements in technology it is expected that crop varieties resistant to pests are no far and it will then reduce the harmful effects of toxic materials used in pesticides. Genetic engineering can also help in aquaculture resulting increased production of marine & freshwater seafood. With chemical industry producing quickly degradable pesticides, it seems that environmentally sustainable farm practices are within reach. An awareness campaign is needed and also proper training to the farmers to be provided. Crop rotation system, integrated pest management, taking the help of computer for proper chemical use etc. are few pathways for a sustainable future of agricultural sector.

Manufacturing and Mining-It is a good thing that manufacturers have already paid attention to recycle & reuse materials for better industrial ecosystems. Wastes from one part of the system are being used as input to other parts of the system. Industrial uses of renewable agricultural and forestry resources are expanding. Mining industries are also trying their best to adopt environment healthy practices and already in the process of developing various technologies for compensating past environmental damage.

Materials-For development of any civilization the raw materials plays an immense role. Scientists & engineers are doing a lot of research to modify traditional materials or design new materials to reduce environmental impact. In future we are expecting creation of new materials with specific and controlled properties. These new materials are supposed to consume less mineral resources and to be more energy efficient, lighter, stronger and recyclable.

Information Technology-It is already a proven fact that information technology has power to change the lives of people. It is helping the enterprises to be managed with better proficiency. It has already improved the efficiency of air, land, and water-based transportation systems. It is helping us in permit real-time monitoring of environmental conditions. With the help of information technology we are being able to precisely control various industrial processes which in turn are minimizing pollution to give better energy efficiency.

Action Agenda-For environmentally sound sustainable development technical advancements are obvious but while pursuing that balance is to be made between various components namely - actions of governments, international agencies, consumers, private industry, educational institutions and of course social acceptability. In spite of many obstacles to the transition to sustainable development, technology must overcome them. Developed and developing countries should cooperate to increase the technical capacity of developing nations.

Government's role: To encourage industry via provisions of incentives to develop environment friendly technologies, To support research institutions to develop environment friendly technologies, To promote new generations of environmental technologies through international collaboration, To recognize opportunities and limitations of technology in making international agreements on environmental issues.

Industry role: To balance the efficiency of its operations with its responsibilities for environmental actions. To pursue the opportunities presented by the global market for environmentally advantageous technologies, thereby diffusing them throughout the world., **International funding agencies should** pursue policies that encourage recipient governments and institutions to take advantage of environmental sustainable technologies developed by both the public sector and the private sector., **Educational institutions should** integrate sustainable development concepts into all levels of education., **Engineering institutions should** advance the concepts of sustainable development as an important and integral part of their activities.

WIRELESS POWER TRANSMISSION

Akanksha Kumari

WPT is exactly what the name states; to transfer electrical power from a source to a destiny without the aid of wires. The electrical energy is first converted into microwaves then beamed to geosynchronous satellite and beamed back on earth where needed and converted back to electrical energy.

Needs of WPT: Why not Wires?

1. Wires are made up of different metals and different alloys so that they can allow the electric current to pass through them so that power can be easily transmitted from one place to another place but during the process of transmission the power which is send by the source is not totally send to the receiver, a lot of power is lost in the path of transmission. Using wire in transmission is not economical for utilization, it needs a little bit of modification or we can say there is a need to transfer electricity without using wires or conductors.
2. According to the World Resources Institute (WRI). India's electricity grid has the highest transmission and distribution losses in the world-a whopping 27%.
3. This is attributed to technical losses and theft.

Methods of transmission:

1. Induction.
2. Electromagnetic transmission
3. Evanescent wave coupling
4. Electrodynamics induction

CURRENT TECHNOLOGIES:

1. MICROWAVE TRANSMISSION THEORY
2. LASER TECHNOLOGY

Power transmission via radio waves can be made more directional, allowing longer distance power beaming ,with shorter wavelengths of electromagnetic radiation, typically in the microwave range.

- Microwave generated using the magnetron from the base station can be received at any location on earth with the help of Geosynchronous receiving and transmitting satellites.
- These satellites will use microwaves to beam power to the receiving station and mobile power receiving devices.
- Since the low orbit microwave beam would spread less, the ground based rectenna could be smaller.

The power can be received at rectenna which will be located on Earth, comprising a mesh of dipoles and diodes for absorbing microwave energy from a transmitter and converting it back into electrical power.

Laser Transmission :

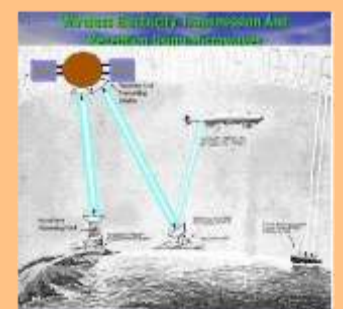
- LASER converts electricity to light using laser, and projects that light onto a specialized solar cell array, which then converts the light back into electricity.
- The "wireless extension cord" delivers thousands of watts at ranges up to many kilometers
- The wireless transmission of power via laser is useful in situations where it is impractical or uneconomical to run wires, including unmanned aerial vehicles (UAVs), unmanned ground vehicles (UGVs), unattended sensors, communication towers, forward operating bases, and disaster relief
- Laser is highly directional, coherent

Advantages of wireless electricity transmission

- Power loss is very less as compared to wired electricity transmission.
- There is no need of transmission lines.

Disadvantages of wireless electricity transmission

- The size of rectenna will be massive
- The cost of this prototype project will be \$74 billion
- Would require a network of hundreds of satellites



Smart grid in India

- J.B.BASU, HOD,EE

The world's electricity systems face a number of challenges, including ageing infrastructure, continued growth in demand, the integration of increasing numbers of variable renewable energy sources and electric vehicles, the need to improve the security of supply and the need to lower carbon emissions.

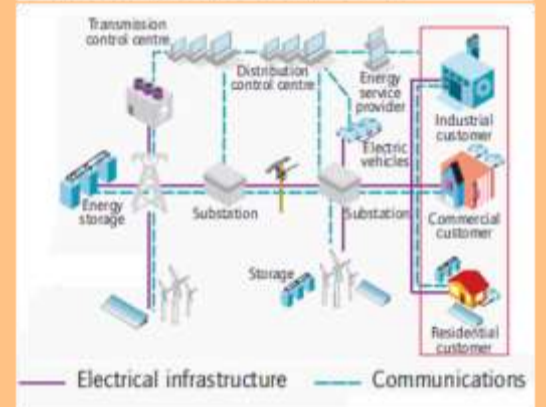
Smart grid technologies offer ways not just to meet these challenges but also to develop a cleaner energy supply that is more energy efficient, more affordable and more sustainable. Smart grids provide an opportunity to link *societal, financial, technology and regulatory and policy objectives*.

The main characteristics of smart grids are:

- Enables informed participation by customers
- Accommodates all generation and storage options
- Enables new products, services and market
- Provides the power quality for the range of needs
- Optimizes asset utilization and operating efficiency
- Provides resiliency to disturbances, attacks and natural disasters

The main differences between existing & smart grid are:

Existing	Smart grid
Electromechanical	Digital
One-way communication	Two-way communication
Centralized Generation	Distributed Generation
Few sensors	Sensors throughout
Manual monitoring	Self monitoring
Manual restoration	Self healing
Failures & Blackouts	Adaptive & Islanding
Passive Consumers	Active Consumers



Smart Grid Pilot Projects in India.

Ministry of Power has allocated 14 Smart Grid pilot projects that will be implemented by state-owned distribution utilities in India

The functionalities of these projects are

- Advanced Metering Infrastructure- Residential Consumer (AMI R)**
- Advanced Metering Infrastructure-Industrial Consumer (AMI I)**
- Outage Management System (OMS)**
- Peak Load Management (PLM)**
- Power Quality Management (PQM)**
- Micro Grid (MG)**
- Distributed Generation (DG)**

In West Bengal one such pilot project has been identified as detailed below

Utility: West Bengal State Electricity Distribution Company Limited, West Bengal, **Project Area:** Siliguri Town in Darjeeling District, **Consumers:** 4,404

Functionalities : AMI I, AMI R, and PLM

The key challenges India is going to face while implementing Smart Grid are:

- Power theft:
- Inadequate Grid Infrastructure:
- Low metering efficiency:
- Lack of awareness:

For a sustainable growth & energy infrastructure smart grid has no alternative right now. Hence together researchers and decision makers, and practitioners from academic, government, and industry need to share their research works, new ideas and requirements for advancing the knowledge and progress for building smart grids in India.

WIRELESS ELECTRICITY

- Ashim Sarkar

Technology is the collection of techniques, skills, methods and processes used in the production of goods or in the accomplishment of objectives, such as scientific investigation. Basically it is the purposeful application of information in the design, production, and utilization of goods and in the organization of human activities. I am sure we all know about electricity. Yes electricity, the greatest gift of science to mankind. We have reached a point of our civilization when electricity is used for all purposes. Without it, our existence will be impossible. Just imagine Benjamin Franklin, who discovered electricity by flying a kite with silk string in 1752, would have ever thought that electricity would become such a vital part of our life. Now when we say electricity, what come to our mind the very first? Wires and cables and plugs. What if we could transmit electricity without wires and cables. When I speak wireless the question come how are we going to transmit power without cables. Well, various methods of transmitting power wirelessly have been known for centuries. The innovation of wireless electricity started way back in 2007 at MIT (Massachusetts Institute of Technology, Cambridge United States). The CEO of MIT-inspired WiTricity (An American engineering company that manufactures devices for wireless energy transfer using resonant transfer based on oscillating magnetic fields), Eric Giler has a plan to beam electric power through the air to wirelessly power our laptop or recharge our car. WiTricity's technology of wireless electricity approach is called magnetic coupled resonance, which can provoke an energetic response at a distance between two coils, one powered, and the other not. If the two coils are correctly tuned to one another, energy flows from the connected one (installed, say, on the ceiling of a room) into the other (inside, say, our Laptop). Giler presented a demo of it at TED Global 2009. Japanese scientists from Japan Aerospace Exploration Agency (JAXA) have succeeded using microwaves to deliver 1.8kilowatts of power through the air to the pinpoint target 55 meters away. Though the energy was only enough to run an electric kettle and the distance was not huge, this appears to be a giant leap in developing new energy sources. The successful experiment could pave the way to collecting inexhaustible solar energy in space and transmitting it to Earth. Experiments in power transmission without wires in the range of tens of kilowatts have been performed at Goldstone in California in 1975 and at Grand Bassin on Reunion Island in 1997. The world's first MPT experiment in the ionosphere called the MINIX (Microwave Ionosphere Non-linear Interaction Experiment) rocket experiment is demonstrated in 1983 at Japan. Similarly, the world's first fuel free airplane powered by microwave energy from ground was reported in 1987 at Canada. This system is called SHARP (Stationary High – Altitude Relay Platform). In 2003, Dryden Flight Research Centre of NASA demonstrated a laser powered model airplane indoors. Japan proposed wireless charging of electric motor vehicles by Microwave Power Transmission in 2004. Power cast, a new company introduced wireless power transfer technology using RF energy at the 2007 Consumer Electronics show. A physics research group, led by Prof. Marin Soljacic, at the Massachusetts Institute of technology (MIT) demonstrated wireless powering of a 60W light bulb with 40% efficiency at a 2m (7ft) distance using two 60cm-diameter coils in 2007. Recently in 2008, Intel reproduced the MIT group's experiment by wirelessly powering a light bulb with 75% efficiency at a shorter distance. In the conclusion, it is clear that wireless power transmission would be extremely beneficial to society if it is implemented in homes and home electronics. From an environmental standpoint, this technology could replace disposable batteries and cords, reducing dangerous chemicals and potential for poisoning communities. The disadvantages of wireless power are greatly outweighed by the benefits and from an ethical standpoint, thus it is necessary to further develop wireless power technology to the point of large-scale production. We have the means and design; it is now a matter of obligation to create wireless powerless power on mass scales for the betterment of society.

Mystery of the Devil's sea

- D.Bhattacharjee (Mentor)

The " Devil's Sea", also known as the "Dragon 's Triangle, " is a region in the Pacific ocean roughly located around the Japanese island of Miyake, about 100 kilometres south of Tokyo. The vast triangular area of ocean with imaginary points in Bermuda, Florida and Puerto Rico, popularly known as the "Bermuda Triangle" has long been associated with mysterious disappearances, paranormal activity. Like that the Dragon's Triangle or Devil's sea also is a triangle between Japan and the islands of Bonin, including a major portion of the Philippine sea. Here the ships and planes have disappeared mysteriously where the Vile Vortex of sea due to the pull of the planet's electromagnetic waves is the strongest. Chinese believed that there was a huge dragon in the sea that pulled the ships and the air-crafts to satisfy the hunger. There are many stories about the disappearances of the sea-going vessels and the aircrafts.

In the 1200s, Kublai Khan tried several times to invade Japan by crossing the Devil's sea. In this process he lost his vessels and 40,000 men in the area of the triangle. In the early 1800s many persons claimed to have seen a mysterious lady sailing in a ship in that area. In 1952 the Japanese government sent out a research vessel, the Kaio Maru No 5, to investigate the mysteries of the Devil's sea. The Kaio Maru No 5 and its crew of 31 people disappeared. While investigating under sea, about 5km south of the Devils Sea, it was destroyed by an eruption on 24 September 1952. Some wreckage was discovered later. For centuries Japanese fishermen have been lost to the waters of Devil's sea. More recently Modern ships and Aircraft have inexplicably fallen victim to these unforgiving waters too, some disappearing without trace. The Japanese government declared the place unsafe for marine voyaging and transporting in 1990s. Several investigations were carried out on the Dragon's triangle. Charles Berlitz published a book on his research where it has been reported that the vessel was actually destroyed by an undersea volcano on september24, 1952. Some parts of the wreckage were later recovered by the Japanese government and the Dragon triangle is a volcanically active area, due to both volcanoes and seismic activity, small islands in that area frequently disappear and new island appear. Though there are scientific reasons provided , people still believe that there are some forces beyond science and laws

"Despuès de to do nosotros estan innovador ingenieros"

(After all we are innovative engineers)

- Abhijit Das

Sometime just an idea or a circuit, to create something from nothing. As an Electrical Engineering student I have a deeper vision of the electric industry. I can think more about what the people will follow. Top ten causes or reason, whatever you say, to study engineering or to be an Engineer are – Lessons summary + Money; Prestige; Professionalism; Flexibility & choice; Challenges; Creativity; Discovery; Helping society and last of all to make a new path which will be followed by the other people. So do creative, think creative not only in technology, on any other platform you want. Let's focus on some current affairs related to technology.



NASA's Ten-Engine Electric Plane "GL-10" prototype completed successful Flight test : The National Aeronautics & Space Administration (NASA) successfully developed & flight tested the prototype of a ten engine electric plane 'Greased Lightning (GL) – 10' . It was revealed by the US space agency on 1st May, 2015 on its website.



Key Features of GL-10 :The aircraft was conceptualized by the NASA in order to enhance its capabilities in using remotely piloted aircrafts in science investigations & to argument technology development for aircraft. It is a battery powered ten engine remotely piloted aircraft having eight electric motors on the wings & two electric motors on the tail. It weighs a maximum of 62 pounds (28.1 kilogram) at take off & has a 10 foot wingspan. It produces less noise in the sense that it is quieter than a neighbor mowing the lawn with a gas powered motor. It can take off like a helicopter & can fly like an airplane. In later stage, a scaled up version which can accommodate up to four persons will be developed.

Innovation by Vortex Engineering. Use of 'Solar powered bio-metric ATMs' : Vortex Engineering, a venture capital-funded company, in March 2010 announced its decision to use 'Solar powered bio-metric ATMs' to expand ATMs in villages. This ATMs wouldn't require air-conditioning & their maintenance cost would be marginal. Solar-powered ATM is expected to save Rs. 10,000 a month on electricity bills as they consume only 72 units of power compared with the conventional ATMs which consume 1,800units. For the first time in India State Bank of India has placed order worth Rs. 18 corer with Vortex Engineering for 545 Bio-metric ATMs of which 300 would be solar powered. This kind of technologies will help the society & will be able to reduce the power consumption.

So above all the things are new innovations in last few years. All of these are gifts of Technology & Engineers. So always bear in mind that success is finding satisfaction in giving a little more than you take. Always go with the words of the great man, Sir Stephen Hawking that "Intelligence is the ability to adapt to change."



PARENT - TEACHER MEETING



Student inspired by Honorable M.D



AIR FORCE TEAM VISIT

CONGRATULATIONS

- 6 Students selected in **TLC**.
- 7 Students selected in **TCS**.
- 1 Student selected in **CAPE ELECTRIC**.
- 1 Student selected in **ALTIMETRIK**.

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MAJOR ORGANISATION WHERE THE STUDENTS HAVE UNDERGONE TRAINING

- NEEPCO (North-Eastern Electric Power Co-operation Ltd)
- North-East Frontier Railway (NJP Power House)
- South-Eastern Railway (Jamshedpur)
- ONGC (Tripura)
- NHPC (Rumbhi)
- DMRC (Delhi Metro Railway Co-operation)
- TSECL (Tripura State Electricity Co-operation)
- DSP (Durgapur)
- DVC (Mejia unit)
- Power Grid Substation (Patna)



- EDITORIAL TEAM**
- Jayanta Bhusan Basu. (H.O.D)
 - Mitul Ranjan Chakraborty. (Asst. Prof)
 - Shrabani Pal. (Asst. Prof)
 - Srijan Banerjee. (Asst. Prof)
 - Subhjit Roy. (Asst. Prof)
 - Mousumi Basu Das. (Asst. Prof)
 - Arkajit Foujder (Student, 2nd Year)
 - Abhijit Das (Student, 2nd Year)

