MINCHU
Newsletter

Department of Electrical & Electronics Engineering

Volume 3 | Issue 3 | December - 2020

Vision and Mission of the Institute

Vision

- To be one of the premier Institutes of Engineering and Management Education in the country

Mission

- To provide Engineering and Management education that meets the needs of human resources in the country
- To develop leadership qualities, team spirit and concern for environment in students

Objectives

- To achieve educational goals as stated in the vision through the mission statements which depicts the distinctive characteristics of the Institution
- To make teaching-learning process an enjoyable pursuit for the students and teachers

Vision and Mission of the Department

Vision

- To be a premier department for education in Electrical and Electronics Engineering in the state of Karnataka, moulding students into professional Engineers

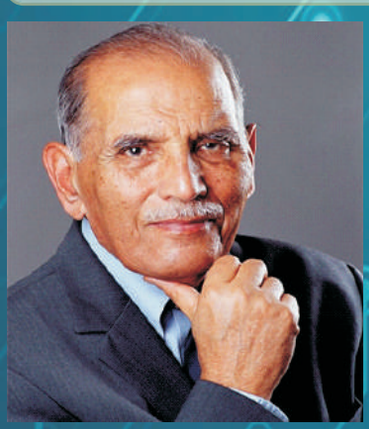
Mission

- To provide teaching/ learning facilities in Electrical and Electronics engineering better than prescribed by University for easy adaptation to industry and higher learning
- To provide environment for self-learning to meet the challenges of changing technology and inculcate team spirit and leadership qualities to succeed in professional career
- To empathize with the societal needs and environmental concerns in Electrical Engineering practices

Program Educational Objectives (PEOs):

After 2/3 years of graduation, the students will have the ability to:

- Analyse, design, and propose solutions in the field of Electrical and Electronics Engineering and adapt to changes in technology by self-learning.
- Work effectively as an individual or as an entrepreneur and exhibit leadership qualities in a team to meet the goals of the organization.
- Work with professionalism and concern for environment to meet the societal needs.
- Excel in professional career by achieving higher learning and contribute to technological innovations.



This edition of Minchu is dedicated to Faqir Chand Kohli, the founder and the first CEO of Tata Consultancy Services (TCS). He is referred to as the father of the Indian IT industry for his role in setting up the Indian IT services industry and contributing to its growth to be a $190 billion industry. He was at the forefront of institutionalising a culture of innovation and excellence in the tech industry. He was a true legend, who laid the very foundation for India's spectacular IT revolution and set the stage for the dynamic and spectacular economy we enjoy today. Mr. Kohli led innovations in areas far-ranging from adult literacy, water purification, software engineering, software automation, complex-systems, and cybernetics.

Contents

Vidyayāmruthamashnuthe

B. N. M. Institute of Technology

(Approved by AICTE, Affiliated to VTU, Accredited as grade A Institution by NAAC

All UG branches - CSE, ECE, EEE, ISE & Mech.E Accredited by NBA for academic years 2018-19 to 2020-21 & valid upto 30.06.2021)

Post box No. 7087, 27th Cross, 12th Main, Banashankari II Stage, Bengaluru-560070, INDIA

Ph: 91-80- 26711780/81/82 Email: principal@bnmit.in, www. bnmit.org

EDITOR'S DESK

Dear Readers,

MINCHU, the newsletter of the Department of Electrical and Electronics Engineering has come alive for its 3rd volume and 3rd issue with the active support of the management, faculty and the editorial team.

This edition of the newsletter provided us a chance to reflect on what the department has achieved in the past six months. It has also given us the opportunity to present and share the knowledge acquired, either through the realm of education or otherwise, even in this new found situation of facing the pandemic.

Considering the increased influence of Information and Communication Technologies (ICT) in the Power Industry, we chose this area as the basis on which the articles are presented. The authors have taken great care to cover trending research aspects of Smart Grids, Electric Vehicle and Battery Technologies.

Phill Jackson said "The strength of the team is each individual member. The strength of each member is the team". Apropos, we would like to thank everyone who travelled, guided, and supported us in this endeavour.

Wishing the readers, a very educative reading.

Editorial Team

About the Department

Ever since its inception in the year 2002, the Electrical and Electronics Engineering Department of BNMIT has got a respectable name both in the state and the region. The Department of Electrical and Electronics Engineering offers an undergraduate program in Electrical and Electronics Engineering.

The faculties of Electrical and Electronics Engineering are highly acclaimed individuals with the skill set, covering wide areas of industrial and applied research. They ensure that the courses foster deep learning and increased engagement amongst the students. Such commitment from our fraternity not only gives our graduates an edge in deciding which career path is right for them but also guarantees that by the time they graduate with a degree, they will have vast hands-on, real-world experience in Electrical and Electronics Engineering.

The students are highly motivated by the project funding provided by the New Gen IEDC from the Department of Science and Technology, Govt. of India. Industrial personals are frequently invited by the department to train the students with the latest skillset. The Department of EEE has been accredited by the National Board of Accreditation (NBA) which is an additional feather on its crown.

ARTICLE OF DEDICATION

Faqir Chand Kohli (19 March 1924 – 26 November 2020) was the founder and first CEO of TCS Tata Consultancy Services, India's largest Software Services Company. He was also associated with other companies within Tata Group including Tata Power Company and Tata Elxsi and had been The President of Indian Information Technology (IT) services advocacy body NASSCOM. He was a recipient of the Padma Bhushan, India's third-highest civilian honour, in 2002 for his contributions to the Indian software industry. He is referred to as the 'Father of the Indian IT Industry', for his contributions to the establishment and growth of the Indian IT industry.

After obtaining bachelor's degrees in English and applied Mathematics and Physics from Punjab University, Lahore, Mr. Kohli received a Bachelor's Degree in Electrical Engineering from Queen's University in Kingston, Ontario, Canada, in 1948. He then earned a Master's Degree in Electrical Engineering in 1951 from the Massachusetts Institute of Technology, Cambridge, Massachusetts, U.S.

After having studied the issues regarding power transmission in Mumbai, India he wrote a technical paper in 1961 recommending that to build a national power grid the government should invest in 400 kV or 500 kV transmission lines to achieve maximum efficiency. The result is what we see today as public sector PGCIL-Power Grid Corporation of India.

He joined the Tata Electric Company where he helped set up a load dispatching system to manage system operations in 1963. He went on to work for Tata Consulting Engineers in 1966 before returning to become the

Director of Tata Electric Company. During this time, he is noted to have introduced the use of digital computers for power system design.

The biggest achievement of Kohli has been the building of TCS (Tata Consultancy Services) which is today in neck to neck competition with Accenture and the fabled IBM in terms of the number of engineers working in it, nearly half a million, as well as market valuation, making it, the unrivalled Jewel in the Crown of Tata Group.

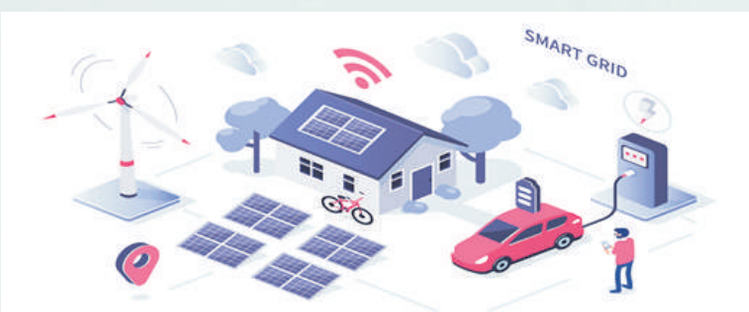
Mr. Kohli set TCS on a totally different orbit. India was not the only market TCS would serve. Right from the early 1970s, he wanted an international presence for TCS, initially through alliances and thereafter directly. He worked with Indian Universities to create Computer Science Departments in those early days. He convinced the Government to let TCS import the latest generation of computers, with the promise that TCS would get substantially more in foreign exchange through its exports. Mr. Kohli did all this in the 1970s and created the ecosystem of foreign exchange which helped India in a bigger way.

Mr. Kohli did not rest on his laurels even after he retired in the year 2000. He focussed on using information technology capabilities to help solve large national problems, like illiteracy, water purification, software automation etc. He set India on a path which has brought glory to it. He pushed for the creation of a community of engineers to solve both technical and societal problems. IEEE recently honoured him with its Founders Medal. The first Indian to be thus honoured.

In 2002, Kohli was awarded the Padma Bhushan, India's third-highest civilian honour, for his contribution to the Indian software industry. He was awarded honorary degrees from Shiv Nadar University, University of Waterloo, Canada, Robert Gordon University in Scotland, IIT Bombay, IIT Kanpur, Jadavpur University, Queen's University and University of Roorkee. He was a fellow of IEEE US, IEE UK, Institution of Engineers India, and the Computer Society of India, among others.

Technical Articles

Vehicle-to-Grid Technology



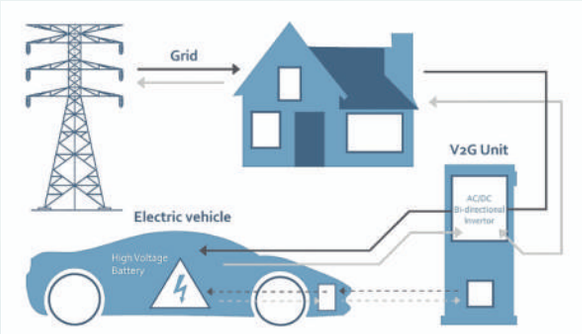
Global warming is one of the major issues faced by the world. Greenhouse gas emission, fast depletion of fossil fuels, the oil crisis and the increased cost of petroleum products are the major factors that compel a need to shift from internal combustion engines. Electric vehicle (EV) technology attracts public and government interests due to increasing environmental concerns and rising fossil fuel prices. The convergence of the transport and power system would lead to numerous problems for the smart grid. The wide penetration of EVs would, for example, increase the grid load while they are charging. However, the expected adoption of EVs has also opened the way for Vehicle to Grid (V2G) technology deployment.

V2G involves the management and control of electric vehicle loads via the local aggregators or electrical utility. They do so by communicating with both the smart grid and vehicles. V2G uses power from the regional EV population and transmits it to the smart grid. In general, V2G includes systems such as vehicle to grid chargers, power grid aggregators, electric vehicles, power loads, power transmission systems and communication systems.

Proper communication is an essential part of the V2G system. The proper communication between the power grid and the EV battery is necessary for controlling the power flow. The power operator wants the desired benefits from the communication facility. The main points of the consideration include profit maximization, greenhouse gases emission reduction and improvement in the power quality of the grid.

Unidirectional V2G:

Unidirectional V2G technology regulates the EV battery charging rate between the smart grid and EV when power is flowing in a single direction. Realizing unidirectional V2G is inexpensive, as it incorporates a basic device for controlling the charging rate. The deployment of the unidirectional V2G requires an alluring power exchange policy between electrical utility and EV users. To increase the EV user's participation, this power exchange strategy must promise them income if they don't charge their EVs during peak time. The electrical company can simultaneously prevent peak hours overloading as EVs will be charged during off-peak hours.



Bidirectional V2G:

Bi-directional V2G enables energy flow in both directions, from supplier to user and vice versa. Until now, electric vehicle owners have been content to charge their vehicles' batteries for their use while the network carried this electricity to the charging points. This one-way energy flow is something that Vehicle-To-Grid technology redefines. Bi-directional charging is now about charging or draining the electric vehicle battery depending on the user's needs and the volume of electricity available in the network. The flow goes in both directions, letting the supplier draw on the electric car battery occasionally. Bi-directional power flow refers to a technology, in which there is a power flow in both directions between the EVs and the power grid. It has several advantages over unidirectional V2G. For the bidirectional power flow, it has an AC/DC converter and a DC/DC converter.

Merits of V2G:

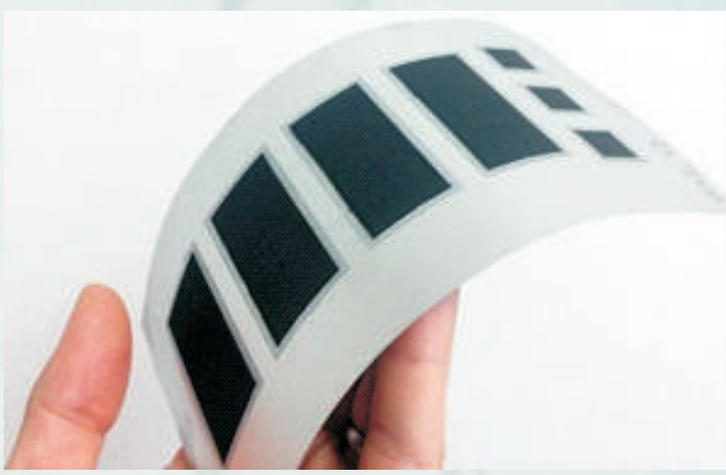
- The Electric utility system used in V2G gets its power from the vehicle during peak load demand.
- It reduces pollution by reducing the use of renewable sources.
- The environment for V2G can be houses, parking lots, employers working places and publicly available charging stations.

PRITHVI G KOUNDINYA
1BG18EE034
5TH SEM EEE

References:

1. W. Kempton and J. Tomia, "Vehicle-to-Grid Power Implementation: From Stabilizing the Grid to Supporting Large-scale Renewable Energy", J. Power Sources 144, 280 (2005).
2. W. Kempton and J. Tomić, "Vehicle-to-grid power fundamentals vol. 144, no. 1, pp. 268–279, 2005.

Germs Power New Paper Batteries



Engineers in upstate New York have invented a folded paper device that looks like a decorated art project. This is a paper-based battery. It does not look like any of those metal batteries running flashlights or smartphones. This is alternative to electronics is based on paper. It represents a step forward in the field of papertronics (short for paper electronics). In these systems, the battery can be printed on a page. The battery's power consists of living bacteria.

Paper electronics are simple to make and inexpensive. These batteries also would be flexible and disposable. And powered by germs, they need no electrical outlet to recharge. They just need more bacteria, which can be found everywhere including in dirty water.

Most batteries use chemicals to generate electricity. Substituting bacteria can be an advantage. They are cheap, self-repairing and self-maintained. Paper-based batteries will not generate much power. They do, however, create enough to run small devices in faraway or dangerous places such as a battlefield. They might also find use in medicine. For instance, they might power tiny sensors, such as the types used to measure blood sugar.

Such devices are based on an observation made more than a century ago, i.e., microbes produce a trickle of electricity as they digest food. Scientists refer to the bio-batteries based on this principle as microbial fuel cells.

A fuel cell generates electricity like a regular battery. But a regular battery stops producing electricity when its internal chemical reactions stop. A fuel cell uses fuel that can be replenished. In this case, bacteria serve as the fuel. By replenishing more germs, as needed, scientists can keep these fuel cells running.

Papertronics Advantages:

Ordinary electronics often contain toxic materials. Paper-based bacterial batteries may offer a safer choice. A

battery powered by germs may never run out of juice. It can go on forever, as long as the bacteria have enough to eat.

Ordinary batteries convert chemical energy into electrical energy. They have three main parts. One is the anode (AN-ode). It produces negatively charged particles called electrons. (Flowing electrons make electricity.) Another is the cathode (KATH-ode). It receives electrons from the anode. The third is a chemical electrolyte. It is usually found between the anode and the cathode. Chemical reactions among the materials cause electrons to leave the anode. They travel along a conductor to the cathode. From there they can move on to power a connected device.

The scientists, in the battery used wax to hold everything in place. The wax also made the paper hydrophobic that means water will not soak in and weaken it. Their anode was an electricity-conducting material painted on one side of the paper. Silver, sprayed onto the paper's bottom, provides the cathode. The anode and cathode are separated by the wax and paper. The paper layer of the battery also acts like a small container where the bacteria can dwell.

Here is how to power the battery:

To power the battery, a user adds water to the reservoir that contains bacteria and organic compounds. Organic compounds contain carbon. A simple sugar, such as glucose, would be a good choice here. As bacteria digest their meal, they release electrons. Those electrons pile up at the anode. Then, when a device or wire connects to the anode and cathode, the electrons flow to the cathode. To recharge the battery, someone need only add water hosting more bacteria. The beauty of the paper battery is that you can simply stack them or fold them to connect them.

ANUSHA SINGH V H
1BG17EE001
7TH SEMESTER, EEE

Reference:
1. https://www.sciencenewsforstudents.org/article/germs-power-new-paper-batteries (accessed on December, 2020)

Contrast between Shadows and Light can Generate Electricity

A new device called Shadow-effect energy generator uses the contrast between bright spots and shade to create an electric current. The greater the contrast between light and dark, the more energy generator can provide. The electric current can power small electronics, such as a watch or LED lights.

This device measures 4 cm (1.6 inches) long and 2 cm wide and is made by coating silicon with a thin layer of gold. Silicon is often used in solar cells that produce electricity from sunlight.

Electrons are one of the particles that make up atoms and have a negative electric charge. As in solar cell, light shining on the generator energizes electrons in the silicon and those electrons then jump into the gold. Light boosts the voltage of the lit metal, making it higher than in the dark part of the generator. Electrons flow from high to low voltage, so the difference in light levels creates an electric current.

Sending electrons through a circuit makes a flow of current that can power a small gadget. In low light, eight generators powered an electronic watch. This device can also serve as a self-powered motion sensor. For instance, when a toy car passes by, its shadow falls on the generator which creates enough electricity to light an LED. Boosting how much light the generators can absorb would allow making better use of the shadows.

The generators are compared to commercial solar cells that are typically used under full sunlight, with half of each device in shadow; the generators produced roughly twice as much power per surface area as the solar cells. These are designed to use indoor light.

CHETHAN R
1BG17EE009
7TH SEMESTER, EEE

Reference:
1. https://www.sciencenewsforstudents.org/article/device-generates-electricity-using-shadows (accessed on December, 2020)

Department activities

Faculty Development Programme

A Five-day International Virtual FDP on 'Upskilling for the Future: Technical Innovations & Research Opportunities in Power Engineering' was organized by the Department of EEE, BNMIT, from 10th – 14th Aug 2020.

Participant Takeaways:

- Understand the basics of Smart Grid Technologies
- Overview of Electricity Markets
- Role of Power Electronics in Renewable Energy Integration & Electric Vehicle Technology
- Research opportunities in higher academia and industry with an emphasis on Machine learning
- Machine learning, how it is applied to various applications, and how it is processed on various platforms.
- An excellent learning opportunity for researchers and faculties who focus on applied research.

Skill Development Programme

The Department of Electrical & Electronics Engineering had organized a Virtual Skill Development Program (SDP) on 'Design & prototype of power electronic converters and controllers using Multisim software'. The SDP was aimed at providing hands-on skills to the 2nd year students in design, simulation and prototype of Electrical and Electronic circuits specially focusing on analog & digital circuits, power converters and controllers using multisim software. The SDP Program was held on Microsoft team's platform from 29th July 2020 to 18th August 2020 (50 Hrs). Students were also given an opportunity to take-up mini projects based on the learning's.

E -Quiz

An inhouse E-quiz competition 'Know the Unknown' was organized by the Department of Electrical & Electronics Engineering on 11th November 2020 at 2:00 pm. The event was organized in association with ISTE Student Chapter – BNMIT. The event was conducted online via microsoft teams. 59 Students from third and fifth semester of EEE participated in the quiz. Ms. Aditi D Sagar of 3rd semester won the first place and Manjesha K of 5th semester secured the second place.

Webinar

A two-day webinar on 'Research & Advancement in Electric Vehicle Technology' was organized by the Department of EEE under Institution of Engineers (India) Students' Chapter, BNMIT on 12/11/2020 & 13/11/2020. This event provided an opportunity for the second year, pre-final year, and final year students to enrich their knowledge and skills in developing various engineering solutions in the field of Electric Vehicle Technology.

Students' Achievements

Bhavana C of 7th Sem Secured 2 Gold medals in 3rd Shotokan Karate National Championship under Kata and Kumite event organized by Japan Karate Shotokan Academy, Bangalore on 22nd December, 2020.

Students' Activities

Semester	Events	No. of Students Participated
III	Webinar	1
V	Technical Competition/ Fest	29
	Quiz - Non-Technical	13
	FDP	2
	Webinar	3
	Workshop	2
VII	Technical Competition/ Fest	6
	Quiz - Non-Technical	5
	Webinar	1

Online courses completed by Students

Courses Offered by	Semester	No. of Courses Successfully
Coursera	V	32
	III	10
Microsoft AI Classroom Series	III	2
LinkedIn Learning	III	1
TCS ION	V	1
Great Learning Academy	III	2

Faculty Achievements

Smt. Shubha Rao K, Associate Professor, Department of Electrical & Electronics Engineering has successfully defended her Ph.D. research work under Visvesvaraya Technological University titled 'Design and Implementation of Load Aware High Performance Switching Mode Power Supply for System on Chip (SoC)' on 21st December, 2020.

Sl. No.	Name of the Faculty	Particulars
1	**Dr. R. V. Parimala** Prof & HoD	• Serving as a coordinator in "Modernization of Relay and High Voltage Laboratory", Project Cost: Rs. 13,00,000/- a grant-in-aid under AICTE- MODROB scheme. • Member – BOE, DSCE Bangalore, autonomous institution for the academic year 2020-21
2	**Dr. Venkatesha K** Professor	• Served as a Resource person for online FDP on "Advancement in EV Technology in the Present Scenario" organized by department of EEE, Rajeev Institute of Technology, India on 25/11/2020 • Served as a Resource person for AICTE ATAL FDP No. 437 "Smart Charging in EV Technology" organized by department of EEE, JNNCE, Shivamogga on 07/10/2020 • Served as a Resource person for International online FDP on "Electrical Vehicle Technology: An overview in the Present Scenario" organized by department of EEE, BNMIT, Bangalore, India on 14/08/2020. • Served as a Resource persons for one month Internship on "Power Electronic Converter Design for Electric Vehicle Technology using MATLAB" organized by Dept. of EEE, BNMIT, Bangalore, in association with M/s SKILLBOT, Bangalore, India during 20th July - 14th August 2020. • Served as a Resource person for a five-day national online FDP on "Role of Power Electronics in EV Technology" at BMSIT, Bangalore, India on 05/08/2020. • Served as a Resource person for a five-day national online FDP on 'Overview of Electrical Vehicle Technology in the present scenario' at Dr. TTIT, K.G.F., India on 21/07/2020 • Session chair for 'International (Virtual) Conference on Recent Trends in Technology, Engineering and Applied Science [ICRTTEAS]' organized by Dr. Thimmaiah Institute of Technology, K.G.F., held on 25th, July, 2020. • BOE Member, VTU

3	**Dr. V. Muralidhara** Professor	• BOE & BOS member in EEE, RV College of Engineering, Bangalore. • Member of Academic Audit Syndicate Committee at Dayananda Sagar Academy of Technology & Management, Bangalore. (2020) • Committee member for development of Technical Dictionary in Kannada for Electrical & Electronics Branch, VTU
4	**Dr. Priyashree S** Associate Professor	• Served as a Resource person for Online Internship Program on "Power Electronic Converter design for EV Technology using MATLAB", in association with SKILLBOT for EEE Final year students during 20th July - 14th August 2020. • Served as a session chair on 8th – 9th Dec 2020 in the "3-Day International Virtual Conf. on Recent Trends in Electrical, Electronics, Telecommunications, Instrumentation, Medical Electronics Engr. & Physics" organized by Departments of ECE, ETCE, EIE, EEE, MLE, and Physics, Dayananda Sagar College of Engineering, Bangalore.
5	**Dr. S Sudalai Shunmugam** Associate Professor	• Served as a Resource person for webinar on 'Recent advancements in High Voltage Engineering' organized by the Department of EEE, SRM Valliammai Engineering College, Chennai on 09th November 2020. • Serving as a Subject Expert in "Modernization of Relay and High Voltage Laboratory", Project Cost: Rs. 13,00,000/- a grant-in-aid under AICTE- MODROB scheme.
6	**Dr. Madhu S** Associate Professor	• Served as a Resource person for Online Internship Program on "Power Electronic Converter design for EV Technology using MATLAB", in association with SKILLBOT for EEE Final year students during 20th July - 14th August 2020. • Jury member, Online Project Exhibition "Project Expo 2020", under IEEE Power and Energy Society student Branch, Global Academy of Technology on 12th November 2020.
7	**Dr. Shubha Rao K** Associate Professor	• Member of Technical committee for "IEEE International Conference on Power and Energy Application" Busan, South Korea, Oct 9-11, 2020.
8	**Y Pavan Kumar** Assistant Professor	• Committee member for development of Technical Dictionary in Kannada for Electrical & Electronics Branch, VTU

Faculty Publications (With Students)

Sunil KM, Radhika, Samrain Fathima, Kavya K, Sujith T Presented a paper entitled "Power Generation using Roof top Ventilator and Possible Enhancements" in IEEE International Conference on PEREA, GEC Kannur, Kerala, pp. 1- 6, 27th – 28th Nov 2020

Equipment commissioned in the relay and high voltage laboratory of the EEE department under the AICTE-MODROBS grant-in-aid.

Magnetic Stirrer with Hot Plate & Digital Speed Indicator

Negative Sequence Relay with Test Kit

Numerical Directional/ Non-Directional Over Current Relay

EDITORIAL TEAM

Faculty

Dr. S. Sudalai Shunmugam, Associate Professor

Smt. Ashwini A, Assistant Professor

Sri. R. N. Tiwari, Assistant Professor - English

Students

Sanjeev B, VII Sem
Seema S Rao, VII Sem
Prithvi G Koundinya, V sem
Pooja, III Sem

Media Coordinator

Sri. Anthony George

Designed by

Sri. P. M. Anand, System Manager

For your kind suggestions & advice, kindly email to: sudalaishunmugam@bnmit.in