Department of Electrical And Electronics Engineering

VIDYUTH
–Explore–Create–Inspire–

Technical Magazine JUL - DEC 2019

INSTITUTION

Vision of the Institute:
To be a premier center of learning in Engineering and Management education that evolves the youth into dynamic professionals with a social commitment

Mission of the Institute:

M1: To provide quality teaching- learning practices in engineering and management education by imparting core instruction and state-of-the-art infrastructure.

M2: To engage the faculty and students in acquiring competency in emerging technologies and research activities through Industry Institute Interaction.

M3: To foster social commitment in learners by incorporating leadership skills and ethical values through value-based education

DEPARTMENT

Vision of the Department:
"To be recognized for producing meritorious electrical engineers with research proficiency and social commitment".

Mission of the Department:

M1: Impart quality education with practice-based learning in producing electrical engineers with ethical values.

M2: Encourage the faculty and students to acquire mastery in cutting edge technologies.

M3: Implement research activities with social commitment.

Program Educational Objectives (PEOs)

PEO-I : Acquire a profound knowledge for a successful career in electrical engineering and allied fields

PEO-II :Pursue higher education and involve in research activities of electrical and electronics engineering.

PEO-III : Exhibit intellectual skills ethically and pursue life-long learning with social commitment.

EEE PBRVITS | DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Program Outcomes (POs)

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO-1 : Analyze industrial electrical challenges by applying knowledge of fundamental electrical circuits, electronics and drives

PSO-2 : Apply standard practices in electrical power and control systems with safety and societal considerations.

DEPARTMENT PROFILE

The Department of Electrical and Electronics Engineering was established in 1998 with the approval of the All India Council for Technical Education (AICTE). The Department of Electrical and Electronics Engineering (EEE) is one of the oldest department in the institution, spanning 25 years of existence, and offers the undergraduate program B.Tech-EEE (and one post-graduate program, Power Electronics). The department has qualified and experienced faculty and excellent infrastructural facilities. It is well equipped with laboratories, audio-visual facilities, and software tools such as Multisim, MATLAB, and Pspice.

We also take up the social responsibility of inculcating awareness about energy conservation by promoting programmes about the same. Collaboration with industries for timely amendments of curriculum and laboratories is another credential of the department. The long-term goal of the department is to develop a centre for research and development activities in the thrust areas of solar and wind energy. The main objective of the department is to provide a better solution for industrial problems and to carry out academic and sponsored research projects.

The department is committed to providing students with exposure to state-of the art technologies by signing a Memorandum of Understanding (MoU) with reputed companies. The students exhibit their co-curricular and extra-curricular skills through the activities of the EEE student association and other student exhibition platforms. The Department of Electrical Engineering is committed to excelling in Electrical and Electronics Engineering through education and research with well-qualified and experienced faculty and technical staff members.

PROFESSOR DESK

Welcome to the Department of Electrical and Electronics Engineering, PBR VITS, Kavali, Andhra Pradesh. As a well-known fact, we cannot imagine the world without electricity. The Department of Electrical and Electronics Engineering is a center of preeminence where we nurture young talents by imparting technical training to them so that they can take up the challenges of real world. The Department of Electrical and Electronics Engineering was established in the year 1998 with an objective to develop professionals through quality education with an intake of 60 students.

The B.Tech and M.Tech programs are designed to achieve a balance between depth of knowledge acquired through specialization and breadth of knowledge gained through exploration. The courses offered by the department provide a comprehensive foundation in the core topics of EEE coupled with an area of specialization relevant to emerging engineering challenges.

The faculty in the department is a rich blend of personnel with industrial and professional experience. The dedicated staff members have sound knowledge in emerging areas like power systems, power electronics, and control engineering, etc. The breadth and depth of the research interests of the academic staff ensures a high standard of lecture courses and provides excellent opportunities for challenging and stimulating final year projects. All faculties supplement their delivery using videos, animations overhead projectors. The faculty keeps up with the latest technologies by publishing in reputed journals and presenting at various national and international conferences.

The department is active in organizing the various workshops and seminars for the growth and development of faculty and students' research knowledge further. Our department students are also highly encouraged to implement their innovative research ideas with the help of the expert faculty members and the available standard lab facilities in the department.

"Education can be a powerful weapon to change the world"

Dr. V. MadhuSudhana Reddy
Professor & HOD, EEE.

Internet of Things-Aided Smart Grid

A traditional power grid consists of a large number of loosely interconnected synchronous Alternate Current (AC) grids. It performs three main functions: generation, transmission and distribution of electrical energy in which electric power flows only in one direction, i.e., from a service provider to the consumers. Firstly in power generation, a number of large power plants generate electrical energy, mostly from burning carbon and uranium based fuels. Secondly in power transmission, the electricity is transmitted from power plants to remote load centers through high voltage transmission lines. Thirdly in power distribution, the electrical distribution systems distribute electrical energy to the end consumers at reduced voltage. Each grid is centrally controlled and monitored to ensure that the power plants generate electrical energy in accordance with the needs of the consumers within the constraints of power systems. Nearly, all the generation, transmission and distribution of electrical energy is owned by the utility companies who provide electrical energy to consumers and bill them accordingly to recover their costs and earn profit. The traditional power grid worked very well from its inception in 1870 until 1970.

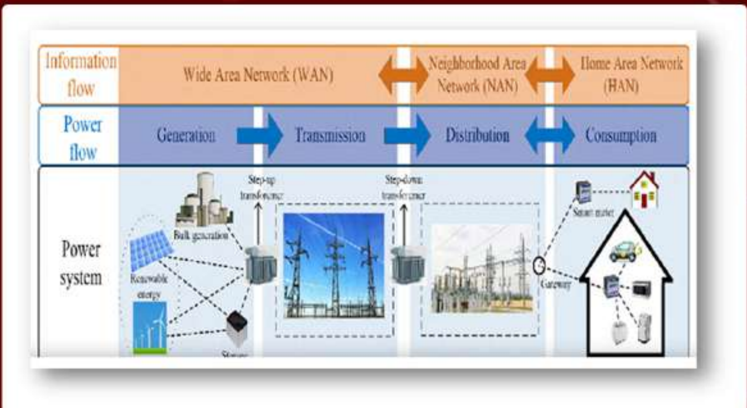
Even though the consumers' demand for energy grew exponentially, it was still rather predictable. However, there has been a dramatic change in the nature of electrical energy consumption since 1970, as the load of electronic devices has become the fastest growing element of the total electricity demand and new sources of high electricity consumption have been developed, such as electric vehicles (EVs). The power grids endure a significant wastage of energy due to a number of factors, such as consumers' inefficient appliances and lack of smart technology, inefficient routing and dispensation of electrical energy, unreliable communication and monitoring, and most importantly, lack of a mechanism to store the generated electrical energy. Furthermore, power grids face some other challenges as well, including growing energy demand, reliability, security, emerging renewable energy sources and aging infrastructure problems to name a few. In order to solve these challenges, the Smart Grid (SG) paradigm has appeared as a promising solution with a variety of information and communication technologies. Such technologies can improve the effectiveness, efficiency, reliability, security, sustainability, stability and scalability of the traditional power grid. SG solves the problem of electrical energy wastage by generating electrical energy which closely matches the demand.

SG helps to make important decisions according to the demand of energy, such as real time pricing, self healing, power consumption scheduling and optimized electrical energy usage. Such decisions can significantly improve the power quality as well as the efficiency of the grid by maintaining a balance between power generation and its usage. SG differs from traditional power grids in many aspects.

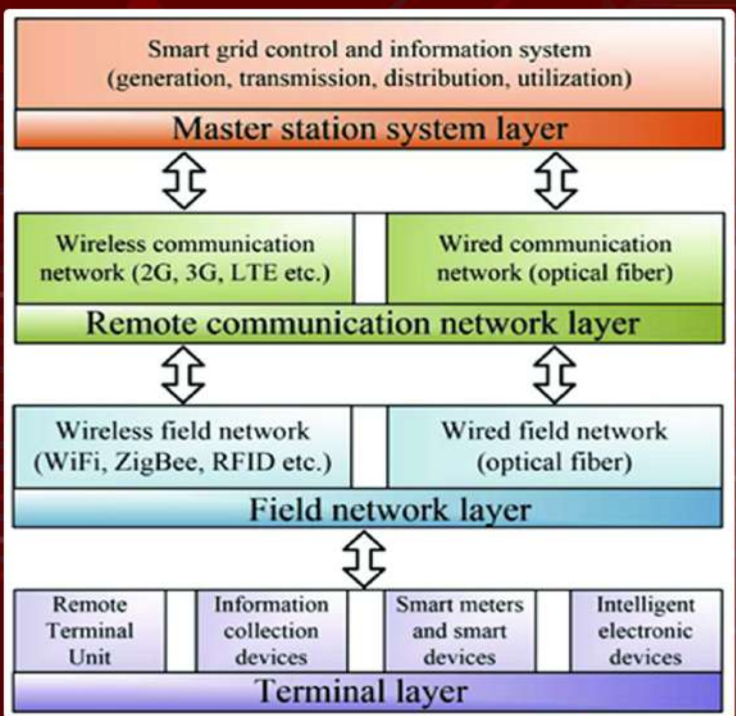
For instance, SG offers a bi-directional communication flow between service providers and consumers, while a traditional power grid only offers only uni-directional communication from the service provider to the consumer. SG provides supervisory control and data acquisition (SCADA), advanced metering infrastructure (AMI), smart meters, fault tolerance unauthorized usage detection, and load balancing , as well as self-healing, i.e., detection and recovery From faults. SG deploys various types of devices for monitoring, analyzing and controlling the grid. Such monitoring devices are deployed at power plants, transmission lines, transmission towers and distribution centers and consumers premises. The numbers of such devices is large. One of the main concerns for SG is the connectivity, automation and tracking of such large number of devices, which requires distributed monitoring, analysis and control through high speed, ubiquitous and two-way digital communications.

It requires distributed automation of SG for such devices or “things”. This is already being realized in the real world through the Internet of Things (IoT) technology.

IOT AS A PART OF SMART GRID:-



IOT-AIDED SMART GRID SYSTEM ARCHITECTURE



A.BHAKTHA VASTALA
Lecturer, Department of EEE

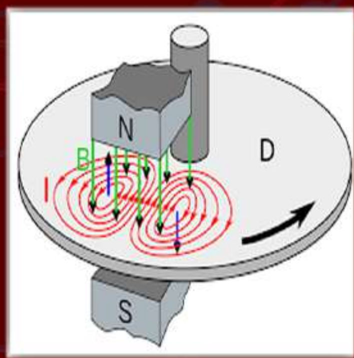
EDDY CURRENT BRAKE

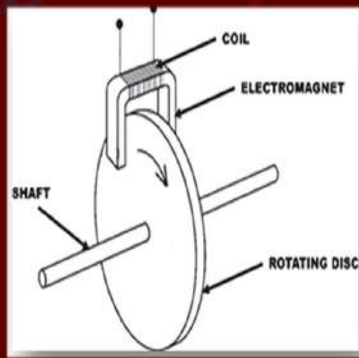
Need For It:-

Many of the ordinary brakes, which are being used now a day's to stop the vehicle by means of mechanical blocking. This causes skidding and wears & tears of the vehicle and if speed of the vehicle is very high, the brake can’t provide that much high braking force & it will cause problem .These drawbacks of ordinary brakes can be overcome by "The Eddy current brake".

Principle of Operations :- (It works according to Faraday's law of electromagnetic induction)

Essentially the Eddy current brake consists of two parts, a stationary magnetic field system and a solid rotating part, which include a metal disc. During braking the metal disc is exposed to a magnetic field from an electromagnet, generating Eddy currents in the disc. The magnet interaction between the applied field and the Eddy currents slow down the rotating disc. Thus the wheels of the vehicle also slow down since the wheels are directly coupled to the disc of the Eddy current brake, thus producing smooth stopping motion.





TYPES:-

It is of two types

1- Electrically excited eddy current brake

2- Permanent magnetic eddy current brake

Electrically excited eddy current brake:-

Electrically excited eddy current brakes are abruption-free method for braking. In high-speed trains they

Offer a good alternative to the mechanical rail brakes which are being used now a-days. During braking,

The brake comes in contact with the rail, and the magnetic poles of brakes are energized by a winding Supplied. Magnetic poles of brakes are energized by a winding supplied with current from the battery.

Then the magnetic flux is distributed over the rail. The eddy currents are generated in the rail, producing an electromagnetic braking force. These types of braking need an additional safety power supply when there are breakdowns in the electrical power supply. an electromagnetic braking force. These types of braking need an additional safety power supply when there are breakdowns in the electrical power supply.

The maximum diameter of the Eddy current brake is decided by

1- The spacing of vehicle chassis frame

2- Vehicle floor clearance
In this breaking system kinetic energy of the vehicle is converted to heat and this heat is dissipated
Through the rotating disc.

WORKING:-
When the vehicle is moving, the rotor disc of eddy current brake which is coupled to the wheels of the Vehicle rotates, in close proximity to stationary magnetic poles. When we want to brake the vehicle, a Control switch is put on which is placed on the steering column in a position for easy operation.

When the control switch is operated, current flows from a battery to the field winding, thus energizing the magnet. Then the rotating disc will cut the magnetic field. When the disc cuts the magnetic field, flux changes occur in the disc which is proportional to the strength of the magnetic field. The current will flow back to the zero field areas of the metal plate and thus create a closed current loop like a whirl or eddy. A flow of current always means there is a magnetic field as well. Due to Lenz's law, the magnetic field produced by the eddy currents works against the movement direction. Thus instead of mechanical friction, a magnetic friction is created. In consequence, the disc will experience a "drag" or the braking effect, and thus the disc stops rotation. The wheels of the vehicle, which is directly coupled to the disc, also stop rotation. Faster the wheels are spinning, stronger the effect, meaning that as the vehicle slows, the braking force is reduced producing a smooth stopping action.

The control switch can be set at different positions for controlling the excitation current to several set values in order to regulate the magnetic flux and consequently the magnitude of braking force. i.e. if the speed of the vehicle is low, a low braking force is required to stop the vehicle. So the control switch is set at the lowest position so that a low current will be supplied to the field winding. Then the magnetic field produced will be of low strength, so that a required low braking force is produced.

When the control switch is operated during the standby position of the vehicle, the magnet will be energized and magnetic field is created. But since the wheels are not moving, magnetic lines of force are not cut by it, and the brake will not work. However, a warning lamp is provided on the instrument panel to indicate whether the brake is energized. This provides a safe guard for the driver against leaving the unit energized.

When control switch is put in any one of the operating positions, the corresponding conductor in the contractor box is energized and current flows from the battery to the field winding to the contractor box. This current magnetizes the poles in stator, which placed very near to the rotor. When rotor rotates it will cut magnetic lines and eddy current will set up in the rotor. The magnetic field of this eddy current produces a braking force or torque in the opposite direction of rotation disc.

This kinetic energy of rotor is converted as heat energy and dissipated from rotating disc to surrounding atmosphere. Current in the field can change by changing the position of the controls switch. Thus we can change the strength of the
Braking force.

APPLICATION:-
In case of TRAINS, the part in which the current is induced is rail. Brake shoe is enclosed in a coil from an electromagnet, when the magnet is energized, Eddy current are induced in the rail by means of an electromagnetic induction probably producing braking action.

VISHNUPRIYA CHUNDI
(16731A0203)

ROBO PETS

Pets are often lovable companions that bring joy to their respective owners. However, one of the Inconveniences of pet ownership are the constant support that pets require as most are not self-sufficient. For those seeking a pet companion but not the responsibilities a robotic pet may be an option. While the Major benefit of a live pet is the unwavering companionship; robotic pets have nice benefits in their own right.

Fewer Responsibilities
Unlike a real pet, there is no need to continually refill the water and food bowls. Better yet, there are no sad, puppy-dog eyes seeking food off the dinner table. As there is no need to feed the robotic pet, there is also no dealing with any after-dinner walks. Andthere's the benefit of a home free of the odours associated with those bodily functions. Live animals, especially dogs, get dirty, can smell, and need a bath. However, with a robotic pet, none of that is required.

Robotic Pets won't be a "Bad" Pet
Real pets, especially those that are not trained, may chew on or damage furniture or other property. Animals may also bite those who feed, pet, or attempt to play with them. A live pet may make unwanted or excessive noises, such as loud barking from a dog or continuous chirping from a bird. (Time to call a trainer)On the other hand, a robotic pet's actions are always controllable.

Less in the Long Run
The price of a robotic pet will vary and the same is true for the price of a live pet as it would apply to the pet's breed, heritage, and consumer market. However, robotic pets will cost less in the long run as the majority of the expenses will be absorbed in the initial purchase, given that only batteries or electricity for recharging will need to be purchased in the future. The cost of a live pet becomes more expensive over time as an owner will continually have to purchase food, toys, and health care.

Robotic Pets Are Convenient
Some studies have shown that robotic pets are just as beneficial in preventing loneliness particularly among the senior population. Robotic-pet owners have full control over their pet and can initiate attentionand playtime because a robotic pet can be turned off. The absence of support required when an owner leaves the home or goes on vacation is another consideration.

Robotic Pets Do Things Live Pets Can't
Robots are programmed to perform certain functions, such as to communicate with the owner. Some highly-advanced robotic pets can be trained by the owner. If the owner prefers a pet that has the excitement of a new puppy, that's a behavioral option for the robotic pet allowing an owner to indefinitely have a puppy. Robotic pets will vary in technological capabilities, but robotic pets will only get better as technology continues to advance. A simple robotic pet may be stationary and have limited actions, typically facial movements such as closing and

Opening the eyes and mouth. Other robots may be available that are mobile, including the ability to follow an owner around, or that have more intricate features such as

Recognizing voice commands. While robotic pets may not fulfill the real-life aspect desired by some, the pets certainly do have their own advantages. Some of the benefits are directly the opposite of the negatives associated with a live pet, which will greatly appeal to some prospective owners. It will ultimately be a personal choice, but don't forget: Having one doesn't mean not having the other. Owning both is always a possibility, and an owner's live pet will possibly enjoy playing with the robotic pet too.

CONCLUSION
At last we can see that a robotic pet can also speak, where as only few birds can accomplish that feat; but who wants to carry on a conversion with their cat. A robotic dog won't bite or scratch you. robotic pet technology will soon be sophisticated enough to cover our emotional needs robotic dogs, for instance , will have social intelligence, providing what people need from their dogs, such as companionship, love, obedience, dependence etc. just because you have a robotic pet doesn't mean that you couldn't also have a live pet as well. Possessing both is always aprospect benefit from playing with the robotic pet as well

RAHUL PONGULURI
(16731A0242)

IMPACT OF ELECTRICAL ENGINEERING IN DIGITALIZATION

Today's world is world of high technology starting from most complex rocket science including AI robots. The technical world is dominating the human. Our country India which is developing country is digitalization in the Sector of electrical machinery, electronic manufacturing, high speed internet, broadband highway etc.

The electrification of Indian rail network was increasing day by day and In future we have high speed bullet train which get more electricity to run in high speed,

The electrification of airports in India was also increasing day by day and in future we have more airports To run this airports in future we want more electricity,

In India the vehicles are increasing day by day which need more petrol or diesel to run but in future we don't have more petrol or diesel to run. To short out this problem In future we have another good technology that is ELECTRIC CAR which needs electricity to run,

In future we have ROBOTS and there also we need electricity and In India the quantity of homes, buildings, and hospitals, super markets etc are increasing where we need more electricity. In this all field the hand of "ELECTRICAL ENGINEERING" is INVALUABLE. Electrical Engineering is the main force behind the digital India, make in India and the power ministry focus on three things one is the village electrification, second one is household electrification and umbrella program for 24×7 power supply. For the continuous supply of power to the smart cities, rails networks, airports, etc. is very essential to have strong and smart transmission and distribution systems.

The electrical machinery industry contributes massively to the capital goods sector of India and the electrical machinery industry holds about 69% share in the capital goods industry.

The Indian government has started "MAKE IN INDIA" plan and it is a way ahead. MAKE IN INDIA was launched in 25 September 2014 with objective of job creation, skill enhancement and transform India into global design and manufacturing hub.

Now India is the 4th largest wind power capacity in the world and its capacity stands at
34 GW, 6th largest solar power capacity in the world and its capacity stands at 22 GW and
7th largest producer of hydroelectric power in the world and its capacity at 44,594 MW
Biomass power is the installed in India which produces 8.1 GW power as in November 2017.
The total power generation in India is 70 GW in 2017-2018.

The Indian government has set target of adding 175 GW power in the country by 2022!!

After the surveying of all this above information we found that In future ELECTRICAL ENGINEERING is much more helpful for MAKE IN INDIA AND DIGITAL INDIA POGRAM.

HARIKA DANDU
(16731A0204)

SYMBOLS USED IN ELECTRICAL ENGINEERING

Frequently used symbols (selection)

1.		Direct current	18.		Conductor that is installed underground
2.		Alternating current	19.		Conductor installed on the plaster
3.		Direct or alternating current	20.		Conductor installed in the plaster
4.		Series connection	21.		Insulated conductor installed in a pipe
5.		Parallel connection	22.		Fix line connection
6.		Delta connection	23.		Removable line connection
7.		Y-connection	24.		Crossing without connection
8.		Line, generally	25.		Line runs upwards
9.		Line, flexible	26.		Line runs downwards
10.		Number of conductors	27.		Ground, generally
11.	L1 L2	Conductor identification	28.		Protective ground
12.	L3	Outer conductor	29.		Mass
13.	N	Neutral conductor	30.	V	Voltmeter
14.	PE	Protective grounding	31.	A	Ammeter
15.		Transformer	32.		Resistance, generally
16.		Capacitor	33.		Resistance, adjustable
17.		Fuse	34.		Coil

SIMPLE VIEW OF POWER SYSTEM