VELAMMAL
INSTITUTE OF TECHNOLOGY

Chennai - Kolkata Highway, Panchetti, Ponneri

INSTITUTION'S INNOVATION COUNCIL
(Ministry of HRD Initiative)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTRA 24

(A Technical Magazine)

Academic Year 2023-2024

INSTITUTE VISION

To be a leader in imparting quality technical education, research & enterprising skills in pursuit of professional excellence.

INSTITUTE MISSION

- To promote quality education & technical skills to meet the industry requirements.
- To incorporate team work, leadership skills & lifelong learning.
- To facilitate career development & higher education assistance.
- To encourage innovative ideas for research & development and entrepreneurship for societal needs.
- To inculcate ethical responsibility & human values.

VISION OF THE DEPARTMENT

To produce highly competent Electrical Engineers and Researchers to fulfil the technological needs of society through innovation and product development.

MISSION OF DEPARTMENT

- To educate graduates with fundamental principles to acquire advanced technical knowledge in domains of Electrical and Electronics Engineering.
- To provide a progressive environment for innovative creations and rigorous practical training through creative activities in conventional and thrust areas of Electrical and Electronics Engineering.
- To inculcate Societal and Ethical values among the faculties and students.

PROGRAMEDUCATIONALOBJECTIVES (PEOs)

1. Graduates of the program will have successful technical and professional career.
2. Graduates of the program will reveal life-long learning to enhance technical skills and Managerial skills.
3. Graduates of the program will undertake societal responsibilities with ethical practice.

PROGRAMMESPECIFICOUTCOMES (PSOs)

1. **Foundation of Electrical Engineering:** Ability to understand the principles and working of electrical components, circuits, systems and control that are forming a part of power generation, transmission, distribution, utilization, conservation and energy saving. Students can assess the power management, auditing, crisis and energy saving aspects.
2. **Foundation of Mathematical Concepts:** Ability to apply mathematical methodologies to solve problems related with electrical engineering using appropriate engineering tools and algorithms.
3. **Computing and Research Ability:** Ability to use knowledge in various domains toidentify research gaps and hence to provide solution which leads to new ideas and innovations.

<u>**PROGRAM OUTCOMES(POs)**</u>

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 independent and life-long learning in the broadest context of technological change.

TEAM MEMBERS

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Mr Madhappan Lokesh

IV Year EEE Student

Mr S Dhanush,

III Year EEE Student

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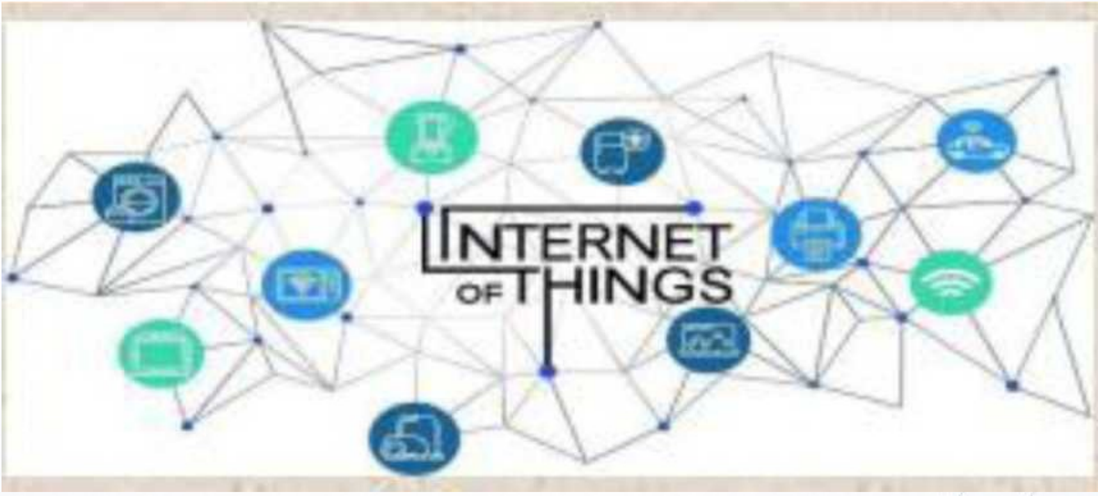
Velammal Institute of Technology

Internet of Things (IoT)



Internet of Things (IoT) Another promising new technology trend is IoT. Many “things” are now being built with WiFi connectivity, meaning they can be connected to the Internet—and to each other. Hence, the Internet of Things, or IoT. The Internet of Things is the future, and has already enabled devices, home appliances, cars and much more to be connected to and exchange data over the Internet. As consumers, we’re already using and benefitting from IoT. We can lock our doors remotely if we forget to when we leave for work and preheat our ovens on our way home from work, all while tracking our fitness on our Fitbits. However, businesses also have much to gain now and in the near future. The IoT can enable better safety, efficiency and decision-making for businesses as data is collected and analyzed. It can enable predictive maintenance, speed up medical care, improve customer service, and offer benefits we haven’t even imagined yet. And we’re only in the beginning stages of this new technology trend: Forecasts suggest that by 2030 around 50 billion of these IoT devices will be in use around the world, creating a massive web of interconnected devices spanning everything from smartphones to kitchen appliances. The global spending on the Internet of Things (IoT) is forecast to reach 1.1 trillion U.S. dollars in 2022. New technologies such as 5G is expected to drive market growth in the coming years. And if you wish to step foot in this trending technology, you will have to learn about Information security, AI and machine learning fundamentals, networking, hardware interfacing, data analytics, automation, understanding of embedded systems, and must have device and design knowledge.

Mr Deevi Rohith Kumar, IV Year EEE

Self-driving car

A self-driving car (sometimes called an autonomous car or driverless car) is a vehicle that uses a combination of sensors, cameras, radar and artificial intelligence (AI) to travel between destinations without a human operator. To qualify as fully autonomous, a vehicle must be able to navigate without human intervention to a predetermined destination over roads that have not been adapted for its use. How self-driving cars work AI technologies power self-driving car systems. Developers of self-driving cars use vast amounts of data from image recognition systems, along with machine learning and neural networks, to build systems that can drive autonomously. The neural networks identify patterns in the data, which is fed to the machine learning algorithms. That data includes images from cameras on selfdriving cars from which the neural network learns to identify traffic lights, trees, curbs, pedestrians, street signs and other parts of any given driving environment. For example, Google's self-driving car project, called Waymo, uses a mix of sensors, Lidar (light detection and ranging -- a technology similar to RADAR) and cameras and combines all of the data those systems generate to identify everything around the vehicle and predict what those objects might do next. This happens in fractions of a second. Maturity is important for these systems. The more the system drives, the more data it can incorporate into its deep learning algorithms, enabling it to make more nuanced driving choices. Companies developing and/or testing autonomous cars include Audi, BMW, Ford, Google, General Motors, Tesla, Volkswagen and Volvo. Google's test involved a fleet of self-driving cars -- including Toyota Prii and an Audi TT -- navigating over 140,000 miles of California streets and highways. Cars with self-driving features Google's Waymo project is an example of a self-driving car that is almost entirely autonomous. It still requires a human driver to be present but only to override the system when necessary. It is not self-driving in the purest sense, but it can drive itself in ideal conditions. It has a high level of autonomy. Many of the cars available to consumers today have a lower level of autonomy but still have some self-driving features. The selfdriving features that are available in many production cars as of 2019 include the following: • Hands-free steering centers where the car without the driver's hands on the wheel. The driver is still required to pay attention. • Adaptive cruise control (ACC) down to a stop automatically maintains a selectable distance between the driver's car and the car in front. • Lane-centering steering intervenes when the driver crosses lane markings by automatically nudging the vehicle toward the opposite lane marking.

Mr Rajavel Rahul, III Year EEE

Home automation

Home automation or demotics is building automation for a home, called a smart home or smart house. A home automation system will monitor and/or control home attributes such as lighting, climate, entertainment systems, and appliances. It may also include home security such as access control and alarm systems. When connected with the Internet, home devices are an important constituent of the Internet of Things ("IoT"). A home automation system typically connects controlled devices to a central smart home hub (sometimes called a "gateway"). The user interface for control of the system uses either wall-mounted terminals, tablet or desktop computers, a mobile phone application, or a Web interface that may also be accessible off-site through the Internet.While there are many competing vendors, there are increasing efforts towards open-source systems. However, there are issues with the current state of home automation including a lack of standardized security measures and deprecation of older devices without backwards compatibility. Home automation has high potential for sharing data between family members or trusted individuals for personal security and could lead to energy saving measures with a positive environmental impact in the future

Mr C Shiviksan, III Year EEE

Star ship

Starship is a fully reusable two-stage launch vehicle under development by American company SpaceX, comprising of a first stage booster named Super Heavy and a second stage spacecraft named Starship. The launch vehicle is expected to be the tallest, heaviest, and most powerful rocket in the world, capable of producing 72 meganewtons or 17,000,000 pound-force of thrust at lift-off—more than twice that of a Saturn V rocket. Starship can launch 100 t (220,000 lb) to low Earth orbit and with the same capacity to higher Earth orbits, the Moon, or Mars via transferring propellant in orbit. To accommodate Starship's features, a non-traditional launch complex would be used, including a launch tower that can lift and recover both stages. Both stages will be powered by Raptor engines and constructed out of stainless steel.

Ms M Soumiya, II Year EEE

SPACE TECHNOLOGY

Space exploration has always been a fascinating field, and electrical engineers play a crucial role in advancing this technology. From powering satellites to designing communication systems for interplanetary missions, their innovations help humanity explore the vast universe. One of the key contributions of electrical engineers is in spacecraft power systems. Solar panels, which generate electricity for satellites and space stations, rely on advanced electrical engineering for maximum efficiency. Additionally, battery storage and energy management systems ensure continuous power supply, even when the sun is not visible. Another critical area is communication. Space missions require reliable and high-speed data transmission between Earth and spacecraft. Furthermore, electrical engineers contribute to propulsion systems, robotics, and automation in space technology. Innovations like ion thrusters, robotic arms on the International Space Station (ISS), and autonomous navigation for rovers on Mars all rely on electrical and electronic systems. As space technology continues to evolve, electrical engineers will play an even bigger role in developing sustainable energy solutions, improving satellite technology, and enabling future manned missions to Mars and beyond.

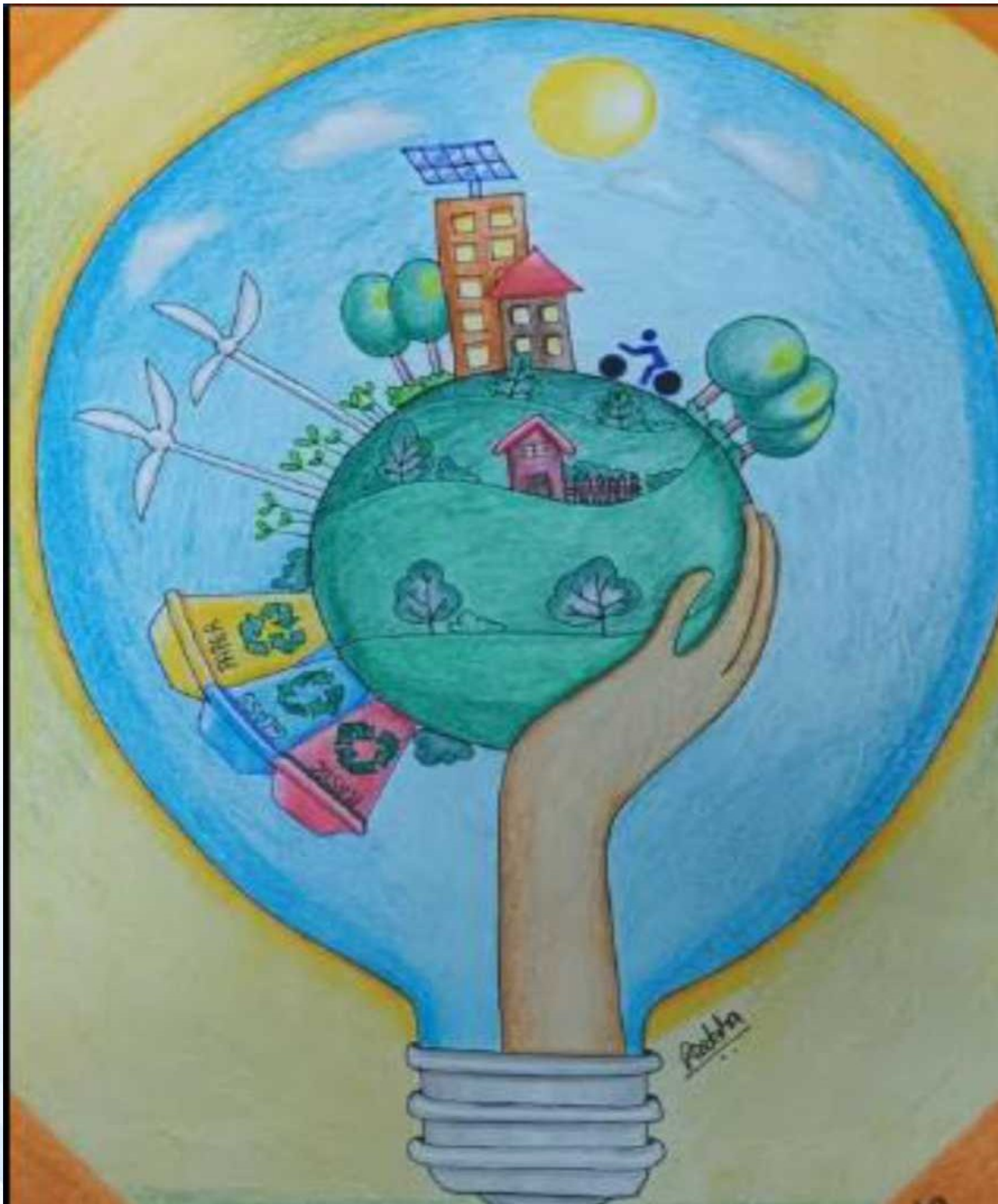
Mr S Kamalesh, II Year EEE

ELECTRICAL ENGINEERING IN PROSTHETICS AND ASSISTIVE DEVICE

The integration of electrical engineering with biomedical science has catalyzed groundbreaking advancements in prosthetics and assistive devices, transforming the landscape of healthcare and rehabilitation. These innovations have redefined the boundaries of human capability, offering a renewed sense of autonomy to individuals with physical impairments. At the forefront of these advancements are myoelectric prosthetics, which harness the power of bioelectrical signals generated by residual muscle activity. Precision engineered sensors detect these subtle electrical impulses, while advanced microprocessors interpret and translate them into fluid, lifelike movements. This remarkable interplay between biology and technology restores not only mobility but also dignity, enabling users to perform complex tasks with unparalleled ease and control. Equally transformative are brain-computer interfaces (BCIs), a marvel of modern engineering that bridges the gap between neural activity and machine functionality. These systems allow users to command prosthetics or assistive devices through thought alone, bypassing traditional physical limitations. Such innovations rely heavily on intricate circuitry, robust algorithms, and seamless communication protocols—areas in which electrical engineers excel. Moreover, wearable robotic exoskeletons represent another frontier of this dynamic field. By leveraging state-of-the-art sensors, actuators, and control systems, these devices augment human strength and mobility, playing a pivotal role in rehabilitation and enhancing quality of life for those with neuromuscular disorders.As the field evolves, electrical engineering continues to push the envelope. From the integration of artificial intelligence to enable adaptive learning in devices, to innovations in energy efficiency and renewable power sources, the potential for further transformation is boundless. These advancements not only redefine technological capabilities but also inspire a deeper commitment to inclusivity and accessibility in design. In this intersection of engineering and empathy, electrical engineering is not merely a tool—it is a catalyst for empowerment, a beacon of hope, and a testament to the boundless ingenuity of human endeavor.

Mr P Vivek, Assistant Professor, EEE

DRAWINGS



Mr Shamitha T, III year EEE

Ms M Yuvasree, III Year EEE

Ms R Nemika, IV Year EEE

Mr K Shoban, II Year EEE

Ms A Logapriya, II Year EEE

Ms Lathika Saran S, II Year EEE
Ms A Hema Latha, II Year EEE

POEM

The Little Dream

A little dream lives in my heart,
Growing softly from the start.
It shines like stars up in the sky,
Whispering, "Reach and always try.”

Through cloudy days and rainy weather,
Hope and courage stay together.
Step by step along the way, Learning
something every day.

Mountains high may block the road,
Heavy may become the load.
Still I walk and still I smile, Resting
only for a while.

Dreams become real when we believe,
With patient hands that never leave. For
every journey, big or small, Begins with
faith inside us all.

Mr I Vijay Ganesh, III Year EEE

Electric Power

Electricity runs all around,
A silent force without a sound.
It lights our homes both day and night,
Giving every room its light.

Through wires it travels fast and free,
Powering things for you and me.
Fans may spin and bulbs may glow,
Helping our daily life to flow.

From switches on the wall we start,
Energy plays an important part.
Useful power we use each day,
Making life easier in every way.

Mr C K Surendhar, IV Year EEEE

Electricity

Electricity is power bright, Giving
homes and streets their light.
Through wires it moves every day,
Helping us in many ways.

Fans can spin and bulbs can glow,
Making life easier as we go.
A useful gift we all can see,
Powering our world with energy.

Mr G Youshies Yeshwanth, IV Year EEEE

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