GALGOTIAS COLLEGE OF ENGINEERING & TECHNOLOGY

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Chief Editor : Dr.R. V. Purohit (Prof. and Head, ECEDept)
Faculty Editor : Mohd Alamgir khan(Asst.Professor)
Student Editor : Anushka Maurya

About ECE Department

Electronics and Communication Engineering is headed by Dr. Rahul Vivek Purohit and has 41 faculty members who have received their higher education from top-notch universities. The faculty members of this department are consistently doing well in teaching and research. The department offers B.Tech (Electronics and Communication Engineering) with 180 intake.

Presently, the B.Tech ECE program has been accredited by the National Board of Accreditation.

The B.Tech program attracts the brightest students in the state every year. The placement record of the department has always been impressive. Almost 100% of the students get jobs from the campus placement and many of them are getting it in core companies every year. We encourage the students to do design and research- based projects during their B.Tech degrees.

The department has state-of-the-art laboratories in almost all the areas of Electronics and Communication that has the latest simulation tools to cater to various specializations and are equipped with facilities for measurement, characterization, and synthesis of experimental as well as theoretical results. The department is actively involved in R&D activities and regularly publishes its research in reputed Journals and Conferences. The research areas include Wireless Communication and Networks, Microwave Engineering, Antenna design, VLSI Design, Signal and Image Processing, Communication Engineering, and Embedded Systems.

The Department holds MoU's with distinguished Organizations and Industries, mentioning a few include Huawei - ICT Academy, 3ST Technologies Pvt. Ltd., Noida, Maven Silicon, Bengaluru, Department of Electronics - Pattern Recognition and Machine Intelligence Group, Shantou University, China. It prides in having students placed in reputed companies with smart package and also focuses on developing and escalating the skill of analysis, designing and problem solving, amongst students required to extend their career growth.

A Center of Excellence (CoE) in IoT typically aims to establish a specialized and highly proficient team or facility focused on the effective and efficient use of IoT for various engineering and scientific applications. The primary objectives of a IoT Center of Excellence may include:

- Facilitate collaboration with other CoEs, departments, and external entities.
- Host knowledge-sharing sessions, workshops, and seminars on IoT-related topics
- Provide training programs and resources to enhance the IoT skills of team members.
- Encourage innovation in IoT applications for solving complex engineering challenges.

COE-RF Circuits and Antenna Simulation aim to provide students with practical experience and understanding in the design, analysis, and simulation of high frequency circuits. The learning objectives are as follows:

Gain knowledge about the key components used in RF circuits, such as antenna, amplifiers, filters, mixers, and oscillators.

Use simulation tools to model and analyze the performance of antennas in different scenarios. This may include optimizing antenna parameters for specific applications.

Understand the fundamental principles of antennas, including types, radiation patterns, and impedance matching. Explore the design and analysis of basic antenna structures.

Drone Technology and Ham Radio

To encourage the students to gain the knowledge and work for the application in aerial photography, agriculture, plant protection, micro selfie, express transportation, disaster rescue, wildlife observation, monitoring infectious diseases, mapping, news reporting, power inspection. Surveillance in areas and terrains where troops are unable to safely go.

Amateur radio, also known as ham radio, is the use of the radio frequency spectrum for purposes of non-commercial exchange of messages, Learning and practicing ham radio skills can be intellectually stimulating. It involves understanding radio equipment, antennas, propagation, and communication protocols. Ham radio provides fast and reliable communication during emergencies

Vision of Institute

To be a leading educational institution recognized for excellence in engineering education and research producing globally competent and socially responsible technocrats.

Mission of Institute

IM1: To provide state of the art infrastructural facilities that support achieving academic excellence.

IM2: To provide a work environment that is conducive for professional growth of faculty and staff.

IM3: To collaborate with industry for achieving excellence in research, consultancy and entrepreneurship development.

Vision of Department

To be recognized as a center of excellence in Electronics and Communication Engineering for the quality and global education, interdisciplinary research and innovation, to produce committed graduates who can apply knowledge and skills for the benefit of society.

Mission of Department

DM1: To provide quality education by providing state of the art facility and solutions for global challenges.

DM2: To provide a framework for promoting the industry-institution collaboration and empower the students in interdisciplinary research.

DM3: To transform students into socially responsible, ethical and technically proficient engineers with innovative skills and usage of modern tools.

DM4: To make the students corporate ready with spirit and necessary interpersonal skills.

Program Outcomes

PO1 **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 **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.

PO3 **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.

PO4 **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.

PO5 **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.

PO6 **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.

PO7 **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.

PO8 **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 **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.

PO11 **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.

PO12 **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

By the completion of Electronics & Communication Engineering program the student will be able to:

PSO1: Design and develop models for analog & digital electronic circuits and systems.

PSO2: Design, develop and test electronic and communication systems for applications with real Time constraints.

Program Educational Objectives

PEO 1	Graduates will excel in their career by acquiring knowledge in the field of Electronics and Communication Engineering with the usage of modern tools and emerging technologies.
PEO 2	Graduates will have the capability to analyze real life problems of the society and produce innovative solutions.
PEO 3	Graduates exhibit professionalism, ethical attitude, communication skills and team work in core engineering, academia and research organizations through professional development and lifelong learning.

List of Faculty in The Department:

S. No	Name	Qualification	Area of Specialization	Designation
1	Dr. Rahul Vivek Purohit	Ph.D	Microwave Engineering	Prof. & HoD
2	Dr. R.L. Yadava	Ph.D	Microwave Antennas and communincations	Prof.
3	Dr. Jaspreet Kour	Ph.D	Pattern Recognition	Prof.
4	Dr. Shahid Eqbal	Ph.D	Medical Image Processing	Asso. Prof.
5	Dr. Monika Bhatnagar	Ph.D	Antenna and Communication Engineering, IoT system and Applications	Asso. Prof.
6	Dr. Kuldeep Singh	Ph.D	Optical Communication	Asso. Prof.
7	Dr. Richa	Ph.D.	Antenna Design, Communication Engineering and Data Communication	Asso. Prof.
8	Dr. Ashish Gupta	Ph.D.	IOT	Asso. Prof.
9	Mr. Atul Kumar	M.Tech	Semiconductor Devices, Renewable energy	Asso. Prof.
10	Dr.Brajesh Kumar Singh	PhD	Signal Processing	Asso. Prof.
11	Dr. Sachin Kumar Gupta	Ph.D	RF & Microwave	Asso. Prof.
12	Dr. Nitin Garg	Ph.D	Wireless Communication	AP - III
13	Dr. Ashish Pandey	Ph. D.	Wireless Communication, Optimization, AIML	AP - III
14	Dr. Ningombam Ajit	PhD	Semiconductor Devices	AP - III
15	Dr. S. Mohamed Sulaiman	PhD	VLSI DESIGN	AP - III
16	Dr. Shilpee Patil	Ph.D	Microwave & Antenna Design	AP - III
17	Ms. Avinash Kaushal	M.tech	Sensors, Digital Design	AP - III
18	Mr. Amanpreet Singh Saini	M.S.	Antenna Design, RF, DataCommunication	AP - III
19	Mr. Mukesh Chauhan	M. TECH	Image Processing	AP - III
20	Mr. Deependra Sinha	M.Tech	Communication	AP - III

21	Mr. Anil Kr. Pandey	M. TECH	Antenna Design and Machine Learning	AP - III
22	Mr. Shivam Gupta	M. TECH	PROCESS CONTROL	AP - III
23	Mr. Gavendra Singh	M. TECH	6G and beyond (thrust area)	AP - III
24	Mr. Amit Gupta	M.Tech	VLSI DESIGN	AP - III
25	Ms. Ranjana Kumari	M.E	Microwave & Antenna Design	AP - III
26	Ms. Ruchi Agrawal	M.Tech.	Antenna Design	AP - III
27	Mr. Bishnu Deo Kumar	M.Tech	Control System, Signal Processing	AP - III
28	Mr. Mohd. Alamgir Khan	M.Tech	Renewable Energy	AP - III
29	Mr. Alok Kumar	M. Tech	Image Processing, Machine Learning, Electronic Devices, Control System	AP - III
30	Ms. Sakshi Mittal	M.Tech, PhD pursuing	Image Processing, Microprocessor	AP - III
31	Dr. Priyanka Mathur	Ph.D	Graph Signal Processing, Biomedical Signal Analysis	AP - III
32	Mr. Dhinakaran M	M.E	Image Processing and AI,ML	AP - II
33	Mr. Ausaf Hasan Tarique	M.Tech	Image Processing	AP – II
34	Mr. Ravi	M.Tech	Speech Processing	AP – II
35	Dr. Maksud Alam	Ph.D	Antenna design	Asso. Prof.
36	Dr. Rajesh Kumar	Ph.D	RF VLSI Design	Asso. Prof.
37	Dr. Vijay Shanker Choudhary	Ph.D	Photonics	Asso. Prof
38	Mr. Bholanath Gupta	M.Tech	Digital communication	AP – III
39	Dr. Arun Rana	Ph.D	IoT	AP – III
40	Mr. Amit Kumar Kesarwani	M.Tech	Microwave Antenna Design	AP – II

ARTICLE 1: USE CASES OF HOW CHATGPT WILL REVOLUTIONIZE CONVERSATION

It's no mystery that ultra-modern language fashions like ChatGPT have long passed our wildest expectancies. It's surprising and even truly eerie to suppose that a language model possesses a broad expertise base and the potential to answer (nearly) any query convincingly.

Just a few hours after the release of this version, the hypothesis started approximately which fields of activity may be enriched or even changed by way of these models, which use instances can be carried out, and which of the various new begin-up thoughts arising from ChatGPT will prevail.

As choice-makers in an employer, it's crucial to apprehend how those advancements can be used to feature fees.

In this weblog publish, we can focus on the background in preference to the hype, offer examples of particular use cases in company conversation, and explain how implementing these AI structures may succeed.

There isn't any doubt that the continuous improvement of synthetic intelligence is gaining momentum. While ChatGPT is primarily based on a 3rd-technology version, a "GPT-4" is already on the horizon, and competing merchandise also are awaiting their vast second.

Fig 1. Chatbot

Ms. Shivam Gupta
Asst.Prof./ECE/GCET

ARTICLE 2: THE TRUTH ABOUT HUMANOID ROBOTS

Humanoids, entities resembling humans, are becoming integral to robotics, leading to the development of "humanoid robots." These robots typically have a human-like structure—torso, head, arms, and legs—and come in various sizes: small, medium, and large. Some may also have facial features like eyes and mouths and are designed to appear male or female. The purpose of humanoid robots varies based on their biomechanics, functions, costs, and design complexity.

Developing humanoid robots involves extensive research to ensure they are user-friendly and accessible. Sensors play a crucial role in enabling these robots to mimic human behavior by enhancing their ability to perform various tasks. Different sensors provide capabilities like detecting position (proprioceptive sensors), proximity (proximity sensors), distance (range sensors), inclination (tilt sensors), and acceleration (accelerometers). These advanced sensors help robots adapt to their environment and perform tasks autonomously, from basic reflexive actions to more complex ones, without requiring high intellectual effort.

Some humanoid robots, like Androids, exhibit highly human-like behavior, including talking, running, jumping, and climbing stairs. Such robots are used in various roles, from industrial tasks to household chores. Examples of advanced humanoid robots include Sophia, DARwIn-OP, DARwIn Mini, NAO Evolution, and Pepper.

Sophia, developed by Hanson Robotics, is an AI-powered robot known for her ability to mimic human expressions and interact with people. Introduced in 2016, Sophia became the first robot to receive citizenship, granted by Saudi Arabia in 2017. **DARwIn-OP**, created by Virginia Tech's RoMeLa and partners, is designed for education and research, while the smaller DARwIn Mini is a lightweight, 3D-printable robot kit for hobbyists. **NAO** Evolution, by Aldebaran Robotics, is a compact robot equipped with advanced sensors that enable complex movements and tasks. Pepper, also from Aldebaran in collaboration with SoftBank, is designed for high-level human interaction, using advanced voice recognition to understand speech, expressions, and tone.

Humanoid robots are rapidly advancing and finding applications in diverse fields, from education and research to social and industrial settings. Equipped with sophisticated sensors, these robots can adapt to their surroundings and perform tasks autonomously. For example, in educational settings, humanoid robots like DARwIn-OP are used as teaching tools in robotics

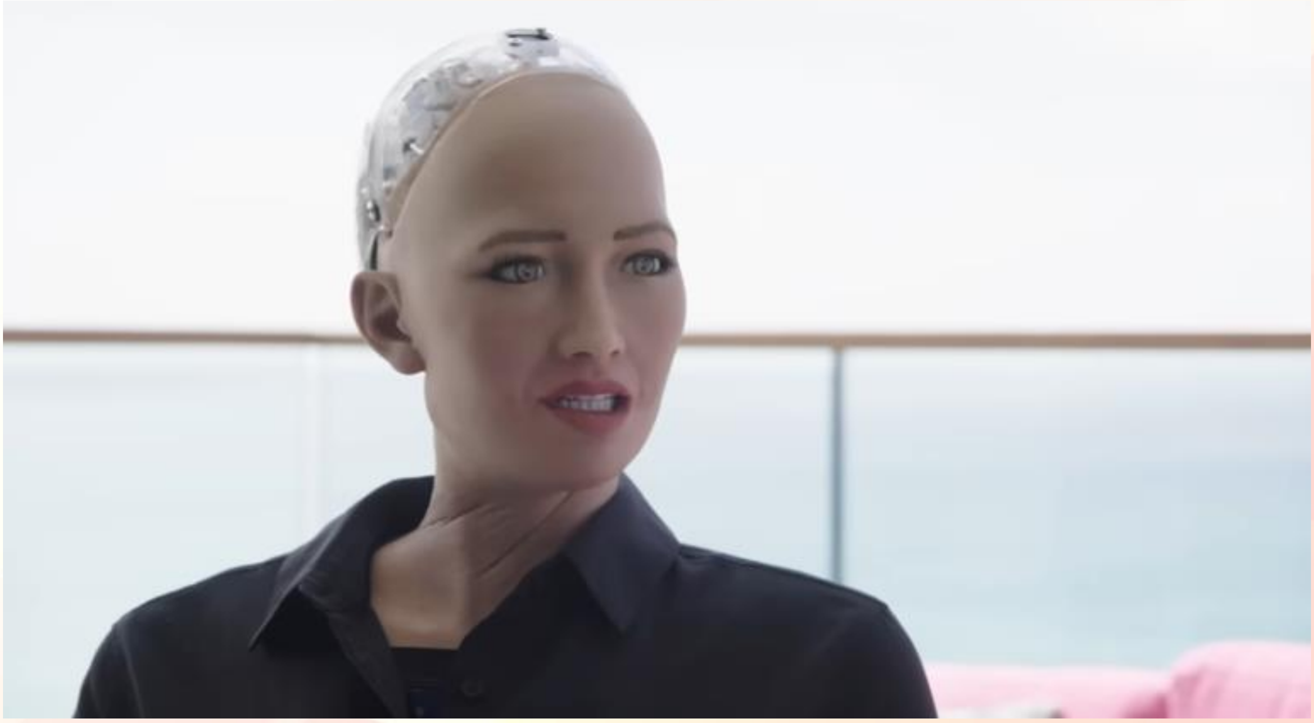

Fig 2. HUMANOID ROBOTS

and artificial intelligence programs, helping students learn about complex concepts such as programming, machine learning, and sensor integration. In research, robots like NAO Evolution are utilized to study human-robot interactions, advancing our understanding of how machines can assist in healthcare, therapy, and elderly care. In industrial environments, humanoid robots can perform repetitive, dangerous, or labour-intensive tasks with precision, improving efficiency and safety. Socially interactive robots like Pepper and Sophia are designed to engage with humans in more personal and conversational roles, such as customer service, companionship, and entertainment, where their ability to recognize and respond to human emotions is particularly valuable. These applications demonstrate how humanoid robots are transitioning from novelty to necessity, becoming vital tools that bridge the gap between human and machine interactions and enhance the capabilities of various sectors. As technology continues to evolve, the role of humanoid robots is expected to grow, making them an essential part of the future landscape across multiple industries.

Mr. Ravi
Assistant.Prof./ECE/GCET

Article 3: India Semiconductor Mission - Future of India in electronics

The India Semiconductor Mission (ISM) is a strategic initiative launched by the Indian government in 2010 to establish India as a global hub for semiconductor design and manufacturing. The mission aims to foster innovation and promote the growth of the electronics industry in India, with a focus on developing new technologies and creating high-value jobs. The ISM has three main objectives: to build a strong semiconductor ecosystem in India, to promote innovation and R&D in the semiconductor industry, and to encourage collaboration and partnerships between industry, academia, and government.

To achieve these objectives, the government has invested heavily in research and development, infrastructure, and talent development. One of the key components of the ISM is the establishment of semiconductor fabrication facilities, or fabs, in India. These fabs are state-of-the-art facilities that enable the manufacturing of complex semiconductor chips, which are used in a wide range of electronic devices, including smartphones, computers, and medical equipment. The government has partnered with several international semiconductor companies to establish fabs in India, which is expected to create thousands of high-value jobs and promote the growth of the electronics industry in the country.

Another important aspect of the ISM is the promotion of innovation and R&D in the semiconductor industry. The government has established several research centers and incubators across the country to support start-ups and innovators working in the semiconductor industry. These centers provide funding, mentorship, and infrastructure support to help start-ups develop new technologies and bring them to market. The ISM has also focused on talent development, with a particular emphasis on developing the skills of young engineers and scientists. The government has launched several initiatives to promote education and training in semiconductor design and manufacturing, including the establishment of specialized training programs and partnerships with leading universities and research institutions.

Looking towards the future, the ISM is expected to play a key role in driving the growth of the electronics industry in India. With the establishment of fabs, research centers, and incubators, India is poised to become a major player in the global semiconductor industry. The growth of the electronics industry is expected to create new job opportunities and stimulate economic growth while also fostering innovation and promoting technological development.

One of the key benefits of the ISM is the potential for India to become self-sufficient in semiconductor manufacturing. Currently, India imports the vast majority of its semiconductor chips from other countries, which can be costly and limit the country's technological capabilities. With the establishment of fabs in India, the country will be able to manufacture its own semiconductor chips, reducing its reliance on imports and strengthening its position in the global market.

The ISM is also expected to have a ripple effect on other industries in India. The growth of the electronics industry is likely to stimulate demand for other products and services, including software development, IT services, and telecommunications. This can create new business opportunities and drive economic growth across a range of sectors. Moreover, the ISM is expected to play a critical role in addressing some of the key challenges facing India, including job creation, poverty reduction, and social inequality. The growth of the electronics industry is likely to create new job opportunities and stimulate economic growth, particularly in rural areas where job opportunities are limited. This can help to reduce poverty and promote social mobility, enabling individuals and families to achieve a better quality of life.

Finally, the ISM is expected to have a positive impact on India's international standing. By establishing itself as a global hub for semiconductor design and manufacturing, India can enhance its reputation as a leader in technological innovation and drive further investment and collaboration with other countries. This can help to position India as a key player in the global economy, with the potential to drive further growth and development in the years to come.

In conclusion, the India Semiconductor Mission is a strategic initiative that has the potential to transform India's electronics industry and position the country as a global leader in semiconductor design and manufacturing. With its focus on innovation, collaboration, and talent development, the ISM is expected to drive economic growth, create new job opportunities, and promote technological development in India. The future of India in electronics looks bright, thanks to the vision and commitment of the ISM.

Dr. Kuldeep Singh
Assoc.Prof./ECE/GCET

ARTICLE 4: TRANSITION FROM IC TO ELECTRIC : FUTURE OF PERSONAL COMMUTE

The world of personal transportation is rapidly changing, with a significant shift toward electric vehicles (EVs) driven by environmental concerns about fossil fuels. This transition marks a fundamental change from internal combustion (IC) engines, which have dominated for over a century, to cleaner, more efficient alternatives that help reduce emissions and combat climate change.

Advances in battery technology are a key factor in making EVs more practical, with improved range, faster charging times, and decreasing costs. EVs are not only environmentally friendly but also quieter, smoother, and require less maintenance than IC engine vehicles. They offer the convenience of home charging, saving time and money. Additionally, EVs can be powered by renewable energy sources like solar or wind, further reducing their environmental impact and promoting energy independence.

However, challenges remain, particularly the need for expanded charging infrastructure to accommodate the growing number of EVs. Governments worldwide are investing in this area to support the transition. This shift is also spurring innovation, creating opportunities for new technologies in charging infrastructure, battery improvements, and renewable energy.

The automotive industry is being transformed as traditional automakers develop new electric models and new players like Tesla disrupt the market with innovative vehicles. The trend extends beyond cars, with electric buses, trucks, and planes being developed to reduce emissions in the broader transportation sector.

In summary, the move to electric vehicles represents a significant and positive transformation in personal transportation, driving towards a cleaner, more sustainable future.

Sachin Singh

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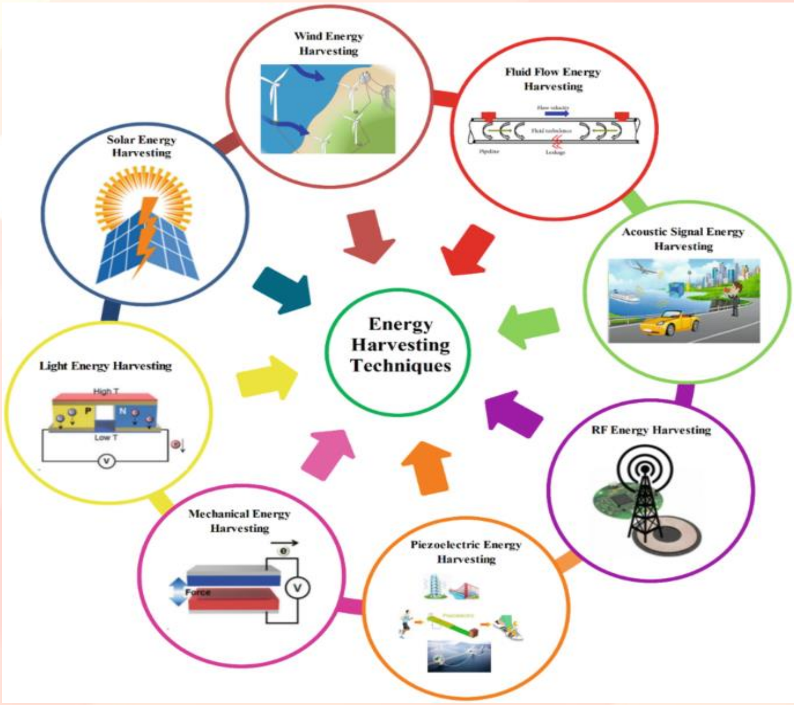
ARTICLE 5: ENERGY HARVESTING AND STORAGE

Energy harvesting and storage are critical components of modern sustainable energy systems, enabling the capture of ambient energy from the environment and its subsequent storage for later use. Energy harvesting involves converting various forms of energy—such as solar, thermal, mechanical, and electromagnetic—into electrical energy. This process is increasingly important as the demand for low-power, autonomous devices grows, particularly in applications like the Internet of Things (IoT), wearable technology, and remote sensors. Solar cells, thermoelectric generators, and piezoelectric devices are among the most common technologies used for harvesting energy, each leveraging different environmental energy sources.



Once harvested, the energy must be efficiently stored to ensure its availability when needed. Advanced energy storage systems, such as batteries and super capacitors, are integral to this process. These systems not only store energy but also regulate its release, ensuring a steady and reliable power supply. The development of high-capacity, long-life energy storage technologies is essential to maximizing the utility of harvested energy, especially in applications where power demand fluctuates or where energy generation is intermittent, such as in solar power systems. By combining efficient energy harvesting with advanced storage solutions, it is possible to create self-sustaining devices and systems that reduce reliance on traditional power sources, contributing to a more sustainable energy future.

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Eminent Recruiters: