ISO 9001:2015 AICTE-CII: GOLD Category Institute NAAC-'A' Grade Institute (CGPA: 3.21) NIRF-2020 Rank Band: 201-250
KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE
Opp : Yerragattu Gutta, Hasanparthy (Mandal), WARANGAL - 506 015, Telangana, INDIA.
काकतीय प्रैद्योगिकी एवं विज्ञान संस्थान, वरंगल - ५०६ ०१५ तेलंगाना, भारत
కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ - ౫౦౬ ౦౧౫ తెలంగాణ, భారతదేశము
(An Autonomous Institute under Kakatiya University, Warangal)
(Approved by AICTE, New Delhi; Recognised by UGC under 2(f) & 12(B); Sponsored by EKASILA EDUCATION SOCIETY)
website: www.kitsw.ac.in E-mail: principal@kitsw.ac.in ✆ : +91 9392055211, +91 7382564888

**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

# ELECTROMANIA

***A Technical Magazine***

**VOL-XIV**

**Academic Year: 2024-2025**

**Vision of the Department**

- Develop the department into a full-pledged center of learning in various fields of Electronic and Communication Engineering in pursuit of excellence in Education, Research, Entrepreneurship and Technological services to the society.

**Mission of the Department**

- Imparting quality education to develop innovative and entrepreneurial professionals fit for the globally competitive environment.
- To nurture the students in the field of Electronics and Communication Engineering with an overall back-ground suitable for attaining a successful career in higher education, research and Industry

**PG – M.Tech (COMMUNICATION ENGINEERING AND SIGNAL PROCESSING)**

**PROGRAM EDUCATIONAL OBJECTIVES (PEOs):** The post graduates of Communication Engineering and Signal Processing program will be able to…

**PEO1(Research and Innovation):** *engage in research, innovation and in teaching in HE institutions*

**PEO2(Technical expertise and Successful career):** *excel in profession in industry, and entrepreneurship with updated technologies in signal processing, wireless technologies domains.*

**PEO3(Soft skills and Lifelong learning):** *exhibit professional ethics, effective communication, and teamwork in solving engineering problems by adapting contemporary research towards sustainable development of society.*

**PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)**

**PROGRAM OUTCOMES (POs):** At the time of graduation, the post graduates of **Communication Engineering and Signal Processing** program will be able to …

**PO1:** *An ability to independently carry out research /investigation and development work to solve practical problems.*

**PO2:** *An ability to write and present a substantial technical report/document*

**PO3:** *Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.*

**PROGRAM SPECIFIC OUTCOMES (PSOs):**

**PSO1:** *apply knowledge of signal processing, embedded systems, communication systems, artificial intelligence & machine learning and wireless technologies for development of effective and innovative solutions to engineering problems.*

**PSO2:** *apply appropriate methodology, contemporary hardware and software tools to solve complex engineering problems related to signal processing, embedded systems, communication systems, artificial intelligence & machine learning and wireless technologies.*

## B.Tech (ELECTRONICS & COMMUNICATION ENGINEERING)

Program Educational Objectives (PEOs) of the Department

The PEO's of the B. Tech (Electronics and Communication Engineering) program are focused on making our graduates technologically superior and ethically strong

**PEO-I:** Building on fundamental knowledge, graduate should continue develop technical skills within and across disciplines in Electronics and Communication Engineering for productive and successful career maintaining professional ethics

**PEO-II:** Graduates should develop and exercise their capabilities to demonstrate their creativity in engineering practice and team work with increasing responsibility and leadership

**PEO-III:** Graduates should refine their knowledge and skills to attain professional competence through lifelong learning such as higher education, advanced degrees and professional activities

**Program Outcomes (POs) of the Department**

Engineering program must demonstrate that their students attain the following outcomes:

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) of the Department**

**PSO1:** Readiness for immediate professional practice.

**PSO2:** An ability to use fundamental knowledge to investigate new and emerging technologies leading to innovations.

# EDITORIAL BOARD

## Principal Message

I'm delighted with the initiative taken by the Department of Electronics & Communication Engineering in launching ELECTROMANIA, a technical magazine dedicated to the department. This publication promises to provide insights into the latest engineering trends and their piratical applications in industry and science. Through ELECTROMANIA, students will have the opportunity to improve their technical skills by engaging in discussions about the latest developments in science and technology. I am confident that this magazine will be warmly welcomed by both the student body and faculty members.

**- Dr. K. Ashoka Reddy**

Principal

## Editor In-Charge Message

We are pleased to announce the release of volume-XIV of "ELECTROMANIA," the magazine published by the Department of Electronics & Communication Engineering. I extend my congratulations to the Faculty Editorial Board and the student members for their remarkable efforts in bringing forth this edition. The research articles contributed by both faculty and students across various domains will serve as a valuable resource for the student community, aiding them in staying updated with the latest advancements. It is my hope that this will provide students with exposure to cutting-edge technologies and enhance opportunities for research and work in core areas. With the support of the Management and Principal, the Department of ECE has recently established new labs.

**- Dr. V. Venkateshwar Reddy**

**HoD,ECE**

## Faculty In-Charge Message

We are delighted to announce the release of volume-XIV of "ELECTROMANIA," a technical magazine by the Department of

Electronics & Communication Engineering. This publication will be a valuable resource for students, providing them with updates on the latest developments and helping them stay connected with advancements in the field. The fast-paced evolution of technology offers students opportunities to enhance their technical skills across various domains. We extend our gratitude to the student members for their innovative contributions to this endeavor.

**-Dr. M. Chandrasekhar,** Asst. Prof.

**-Dr. B. Dhanalaxmi,** Asst. Prof.

CONTENTS

# WHAT TO LEARN

## The Internet of Things: A Future of Endless Possibilities

The Internet of Things (IoT) is transforming the world as we know it. By 2025, experts predict that the IoT will have a profound impact on our daily lives, revolutionizing the way we interact with technology and each other [1].

### Key Trends and Developments

**Increased Connectivity:** The IoT will connect an estimated trillions of devices, from household appliances to wearable technology, making our lives more convenient, efficient, and enjoyable.
**Smart Cities and Homes:** Cities and homes will become increasingly automated, with sensors and devices working together to optimize energy consumption, traffic flow, and waste management.
**Wearable Technology:** Wearable devices will become more sophisticated, enabling users to track their health, fitness, and lifestyle in real-time.
**Artificial Intelligence and Machine Learning:** AI and ML will play a critical role in analyzing the vast amounts of data generated by IoT devices, enabling businesses and individuals to make data-driven decisions.

### Benefits and Challenges

**Improved Efficiency and Productivity:** The IoT will streamline processes, reduce waste, and enhance productivity across various industries.
**Enhanced Customer Experience:** IoT-enabled devices will provide personalized experiences, improving customer satisfaction and loyalty.
**Job Creation and Skills Development:** The IoT will create new job opportunities and require workers to develop new skills, such as data analysis and AI development.
**Security and Privacy Concerns:** The IoT raises significant security and privacy concerns, as the increased connectivity and data exchange create vulnerabilities that can be exploited by hackers.


### Expert Insights

- Paul Saffo, managing director of Discern Analytics, predicts that devices will become increasingly interconnected, with the biggest shift being a move away from single, do-everything devices to multiple devices with overlapping functions.
- Justin Reich, a fellow at Harvard University's Berkman Center for Internet & Society, warns that the IoT will have both positive and negative effects, including conveniences and privacy violations .

### Conclusion

The Internet of Things is poised to revolutionize the world, transforming the way we live, work, and interact with technology. While there are challenges to be addressed, the benefits of the IoT far outweigh the drawbacks. As we move forward into 2025 and beyond, it's essential to prioritize security, privacy, and skills development to ensure that the IoT realizes its full potential.

# Satellite Communication: Revolutionizing Global Connectivity

The satellite communication market has witnessed significant growth in recent years, driven by emerging markets, investments in satellites, and the launch of advanced low-earth orbit satellites. The market size is expected to grow from $61.82 billion in 2024 to $66.75 billion in 2025, at a compound annual growth rate (CAGR) of 8.0% [1].

## Key Trends and Developments

**Increased Adoption of Low-Earth Orbit Satellites:** The increasing adoption of low-earth orbit satellites in various sectors is driving the satellite communication market.

**Government Support:** Robust government support, investments, and initiatives are fueling the growth of the satellite communication market.

**Product Innovations:** Companies are introducing innovative products, such as advanced satellite payloads and ground stations, to stay competitive in the market.

**Technological Advancements:** Technological advancements, such as the use of artificial intelligence and machine learning, are enhancing the capabilities of satellite communication-systems.

## Market Segmentation

The satellite communication market can be segmented into several categories, including:

**Component:** Transponder, transceiver, antenna, receiver, and other components.

**Technology:** SATCOM automatic identification system, SATCOM VSAT, SATCOM on-the-move (SOTM), SATCOM on-the-pause (SOTP), and SATCOM telemetry.

**Application:** Asset tracking/monitoring, airtime, data backup and recovery, navigation and monitoring, broadcasting, drones' connectivity, tele-medicine, and other applications.

**Vertical:** Government and military applications, civil satellite communications, commercial applications, and other verticals.

## Conclusion

The satellite communication market is poised for significant growth in the coming years, driven by emerging trends, technological advancements, and government support. As the demand for satellite-based services continues to increase, companies are investing in innovative products and technology to stay competitive in the market.

# WHAT'S TRENDING NOW

## Neuromorphic Computing

Neuromorphic computing is a revolutionary approach to computing that is inspired by the structure and function of the human brain. Here's a reflection on this exciting field:

**Key Characteristics:**

**1. Inspired by Biology:** Neuromorphic computing is based on the principles of neural networks, synapses, and neurons found in the human brain.

**2. Parallel Processing:** Neuromorphic systems process information in parallel, similar to the brain, allowing for faster and more efficient processing.

**3. Adaptive and Dynamic:** Neuromorphic systems can adapt to changing conditions and learn from experience, much like the brain.

**Advantages:**

**1. Improved Efficiency:** Neuromorphic computing can reduce power consumption and increase processing speed.

**2. Enhanced Learning:** Neuromorphic systems can learn and adapt in real-time, enabling applications like autonomous vehicles and intelligent robots.

**3. Increased Robustness:** Neuromorphic systems can tolerate faults and failures, making them more reliable than traditional computing systems.

**Challenges:**

**1. Complexity:** Neuromorphic computing requires complex algorithms and architectures, making it challenging to design and implement.

**2. Scalability:** Currently, neuromorphic systems are difficult to scale up to large sizes, limiting their applicability.

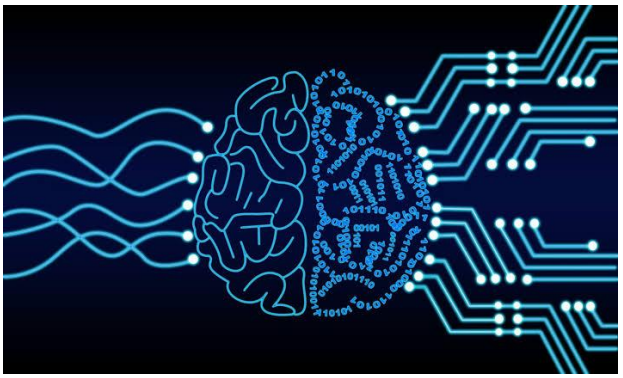
**3.Programming:**Programming neuromorphic systems requires new paradigms and languages, which are still being developed.

**Applications:**

**1. Artificial Intelligence:** Neuromorphic computing can enable more efficient and adaptive AI systems.

**2. Robotics:** Neuromorphic systems can be used to control and navigate autonomous robots.

**3. Internet of Things**: Neuromorphic computing can enable more efficient and adaptive IoT devices.



In conclusion, neuromorphic computing has the potential to revolutionize the way we approach computing, enabling more efficient, adaptive, and intelligent systems. While there are challenges to overcome, the field is rapidly advancing, and future directions hold much promise.

## Silicon photonics

Silicon photonics is a revolutionary technology that integrates photonic devices and systems with silicon electronics. Here's a reflection on this exciting field:

**Key Characteristics:**

**1. Silicon-based:** Silicon photonics uses silicon as the primary material for photonic devices, leveraging the existing silicon manufacturing infrastructure.

**2. Integration with electronics:** Silicon photonics integrates photonic devices with electronic circuits, enabling the creation of compact, high-performance optoelectronic systems.

**3. High-speed data transmission:** Silicon photonics enables high-speed data transmission over optical fibers, with potential applications in data centers, high-performance computing, and telecommunications.

**Advantages:**

**1. Cost-effective:** Silicon photonics leverages existing silicon manufacturing infrastructure, reducing costs and increasing scalability.

**2. High-speed data transmission:** Silicon photonics enables high-speed data transmission over optical fibers, reducing latency and increasing bandwidth.

**3. Low power consumption:** Silicon photonics devices typically consume less power than traditional optical devices, reducing energy consumption and heat generation.

**Challenges:**

**1. Material limitations:** Silicon has limitations as a photonic material, including relatively low optical nonlinearities and limited wavelength range.

**2. Integration complexity:** Integrating photonic devices with electronic circuits can be complex and requires sophisticated design and manufacturing techniques.

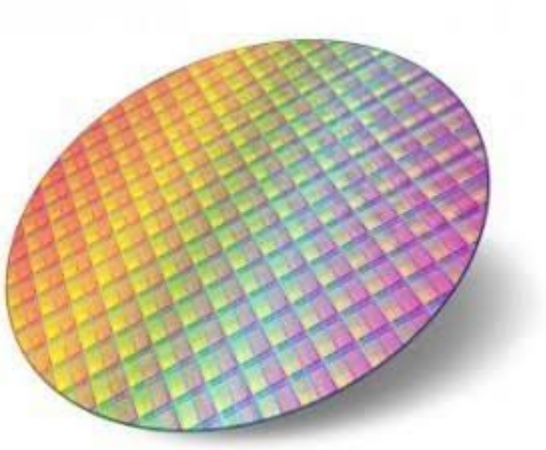
**3. Scalability:** Silicon photonics devices can be challenging to scale up to large sizes while maintaining performance and yield.

**Applications:**

**1. Data centers:** Silicon photonics can enable high-speed data transmission between servers and data centers, reducing latency and increasing bandwidth.

**2. High-performance computing:** Silicon photonics can enable high-speed data transmission between computing nodes, reducing latency and increasing performance.

**3. Telecommunications**: Silicon photonics can enable high-speed data transmission over long distances, reducing latency and increasing bandwidth.



# WHATS NEXT?

## AI-Driven Chip Design: Revolutionizing the Semiconductor Industry

The semiconductor industry is rapidly evolving with AI-driven chip design, transforming traditional workflows and accelerating innovation. AI enhances Electronic Design Automation (EDA), verification, power optimization, and architecture design, making chips faster, more efficient, and cost-effective.

**Key Advancements**

**AI-Powered EDA**: Tools like Google's deep learning for chip placement and Synopsys DSO.ai optimize design workflows, reducing development time and power consumption.

**Automated Verification & Testing**: AI detects design flaws early, optimizes test coverage, and accelerates debugging, minimizing costly errors.

**Power & Performance Optimization**: AI manages transistor-level power, predicts efficiency trends, and supports Dynamic Voltage and Frequency Scaling (DVFS).

**Generative AI in Architecture**: Neural Architecture Search (NAS) and AI-driven designs power specialized chips like Google's TPU, NVIDIA's GPUs, and Apple's Neural Engine.

**AI in Semiconductor Manufacturing**: AI enhances yield prediction, defect detection, and process control, improving production efficiency.

**Challenges & Future Outlook**

Despite its advantages, AI-driven chip design faces challenges like data availability, high computational demands, and security risks. However, future trends include:

- **Fully Automated Chip Design** with minimal human intervention.
- **Self-Optimizing Chips** that dynamically adapt to workloads.
- **AI-Quantum Computing Synergy** for next-gen computing.
- **Democratization of Chip Design** through open-source AI tools.

**Conclusion**

AI-driven chip design is revolutionizing semiconductors, making chips smarter, more efficient, and optimized for future technology. As AI advances, it will shape the next generation of computing, communication, and innovation.

## Aerospace Electronics: Powering the Future of Aviation

Aerospace electronics is driving advancements in aviation, enhancing navigation, communication, and sustainability. The industry is evolving rapidly, with innovations in propulsion, autonomy, and connectivity shaping next-generation aircraft.

,

**Key Developments:**

**Electric & Hybrid-Electric Propulsion**: Airbus and Boeing are advancing electric aircraft with high-capacity batteries and energy management systems.

**Autonomous Flight Systems**: AI-driven drones and passenger aircraft leverage real-time data for safer, more efficient flights.

**Advanced Communication**: 5G and satellite systems improve in-flight connectivity and air traffic management, benefiting UAV applications.

**Sustainability & Challenges:**

**Green Aviation**: Lightweight materials, hydrogen fuel cells, and biofuels reduce emissions and improve efficiency.

**Cybersecurity & Regulations**: The rise of connected aircraft increases security risks, requiring stringent cybersecurity and regulatory measures.

**Workforce Development**: Specialized training is essential for managing complex aerospace systems.

**Hyperloop & Aerospace Synergy**

Hyperloop and aerospace electronics are converging, with autonomous navigation and energy-efficient propulsion inspiring next-gen transportation networks.

**Conclusion:**

Aerospace electronics is reshaping aviation with smarter, greener, and more efficient technologies. As innovation continues, the industry is set to transform global transportation for a more connected and sustainable future.

# PERSONALITIES WHO MADE DIFFERENCE

## Ramalingam Chellappa

Ramalingam “Rama” Chellappa (Ranked # 56 in the World , # 39 in the Nation), a college park professor in electrical and computer engineering (ECE) is a pioneer in facial recognition technology. An internationally recognized expert in computer vision, machine learning, pattern recognition and artificial intelligence, Chellappa's work has had an impact on areas including biometrics, smart cars, forensics, and 2D and 3D modelling of faces, objects, and terrain and has a range of applications—including medicine. Chellappa has been a faculty member ofthe University for 29 years and served as chair of the department of ECE from 2011-2018 and as the Director of Centre for Automation Research for 12 years. A Fellow of IEEE, IAPR, OSA, AAAS, ACM, AAAI and NAI, Chellappa holds eight patents. He is currently the Bloomberg Distinguished Professor in the Departments of Electrical and Computer Engineering and Biomedical Engineering (School of Medicine) at Johns Hopkins. Chellappa has received many awards from IEEE, the International Association of Pattern Recognition, and the University of Maryland.

## Dinesh Manocha

Dinesh Manocha (Ranked # 76 in the World, # 51 in the Nation), is a Distinguished University Professor of the University of Maryland, where he is the Paul Chrisman Iribe Professor of Computer Science and Professor of Electrical and Computer Engineering. Heis also affiliated with the Institute for Systems Research and the Robotics Center. He is also the Phi Delta Theta/Matthew Mason Distinguished Professor Emeritus of Computer Science at the University of North Carolina at Chapel Hill. Manocha’s research focuses on AI and robotics, computer graphics, augmented/virtual reality, and scientific computing. He co- leads major research group UMD GAMMA with more than 25 members on geometric and simulation algorithms with applications to computer graphics, robotics, affective computing,

and virtual environments. A Fellow of AAAI, AAAS, ACM, IEEE and the Sloan foundation, Manocha is a member of the ACM SIGGRAPH Academy, and a Bézier Award recipient from the Solid Modeling Association. Manocha was also the co-founder of Impulsonic, a developer of physics- based audio simulation technologies, which was acquired by Valve Inc in November 2016.

## K. J. Ray Liu

K. J. Ray Liu stands as a luminary figure in the realm of academia, occupying the esteemed position of Distinguished University Professor at the University of Maryland. Within this institution, he assumes the prestigious role of the Christine Kim Eminent Professor of Information Technology, a testament to his profound contributions to the field. Boasting a remarkable global standing, Liu's name is synonymous with excellence, as evidenced by his impressive rank of #273 in the world and #177 nationally.

Liu's illustrious career is adorned with numerous accolades, reflecting his unparalleled expertise and dedication to the advancement of knowledge. Among his most notable achievements are two IEEE Technical Field Awards: the coveted 2021 IEEE Fourier Award for Signal Processing and the esteemed 2016 IEEE Leon K. Kirchmayer Graduate Teaching Award. Additionally, Liu has been honored with the IEEE Signal Processing Society 2009 Technical Achievement Award and the 2014 Society Award, underscoring his profound impact on the discipline. A trailblazer in his field, Liu's contributions have been recognized through over a dozen best paper and invention awards, attesting to the significance of his research endeavours. Furthermore, his status as a Highly Cited Researcher by the prestigious Web of Science serves as a testament to the endur- ing influence of his work. In recognition of his exceptional contributions, Liu has been elected as a fellow of esteemed organizations such as IEEE, AAAS, and the U.S. National Academy of Inventors, further cementing his status as a leading figure in the academic community. His ascension to the role of 2021 IEEE President-Elect underscores his unwavering commitment to driving innovation and excellence in the realm of information technology. Through his exemplary leadership and scholarly pursuits, K. J. Ray Liu continues to leave an indelible mark on academia, inspiring future generations to push the boundaries of knowledge and discovery.

# Career Prospectives

## Exploring Career Paths after B. Tech in Electronics and Communication Engineering (ECE)

Embarking on a journey post-B. Tech ECE opens up a plethora of avenues, spanning across core job roles, non-core opportunities, government positions, entrepreneurial ventures, and further academic pursuits. Let's delve deeper into each category:

## Core Job Opportunities after B. Tech ECE

Upon completing their undergraduate studies, ECE graduates often gravitate towards core job roles, primarily within companies directly involved in the electronics sector. These companies, though relatively scarce, offer enticing prospects for those with a specialized background. Noteworthy organizations in this domain include Semiconductors, Alstom Corporate, Bharat Heavy Electricals, Havells, Crompton Greaves, Neolex Cables, HBM Power Systems, and Exide Industries, among others. However, it's crucial to acknowledge the competitive landscape within these firms. Despite the allure of core positions, vacancies may be limited, with instances where suitable openings are scarce. Nonetheless, roles such as Design Engineer, ASIC Engineer Trainee, Jr. Embedded Engineer, or Network Support Engineer remain viable options. These positions grant access to diverse fields such as circuit design, wireless communications, robotics, VLSI, Nanotechnology, Embedded Systems, and more.

## Non-Core Jobs (Across Various Fields) after B. Tech ECE

For individuals encountering challenges in securing core positions, exploring non-core opportunities becomes imperative. The software industry emerges as a fertile ground, offering roles where technical expertise in electronics is not mandatory. Instead, proficiency in programming languages such as C/C++ and strong communication skills take precedence. Leading private sector entities including Wipro, Tata Consultancy Services, Accenture, Infosys, HCL, and Genpact extend employment opportunities to ECE graduates. Roles such as Assistant Software Engineer, Junior Software Engineer, Programmer, Net Engineer, and Quality Analyst are frequently available. These positions come with competitive pay scales and often include benefits and perks.

## Government Jobs after B. Tech ECE

Government positions represent another avenue for B.Tech ECE graduates. Recruitment for these roles typically occurs through exams conducted by the Public Service Commission of India. Public sector undertakings (PSUs) such as BSNL, MTNL, ISRO, BHEL, ONGC, and SAILregularly hire technicians and engineers. Additionally, financial institutions like

IBPS and SBI offer employment opportunities for engineering graduates across various roles. Keeping abreast of recruitment schedules and updates via official websites is essential for aspiring candidates seeking government positions. Furthermore, opportunities exist in sectors beyond telecommunications, including defense, education, and more.

## Entrepreneurial Ventures after B. Tech ECE

While venturing into entrepreneurship entails inherent risks, it presents an avenue for B. Tech ECE graduates to leverage their knowledge and skills. Despite the relatively low number of startups in the ECE industry, establishing a venture in domains such as VLSI, Robotics, Nanotechnology, Optical Communication, and Embedded Systems remains viable. Success in entrepreneurship hinges on meticulous planning, strategic execution, and a willingness to persevere through challenges. Those with innovative ideas and a strong work ethic stand poised to carve a niche for themselves in the competitive startup landscape.

## Higher Education Pursuits after B. Tech ECE

For individuals inclined towards further academic pursuits, options such as pursuing postgraduate studies offer avenues for career advancement and specialization. Programs including M.Tech, Ph.D., M.S., and MBA enable graduates to augment their skill sets, broaden their horizons, and enhance their employability. Thorough research into various courses and institutions, considering factors such as faculty expertise, research facilities, and industry connections, is imperative before embarking on a journey of higher education. By strategically aligning their academic pursuits with career objectives, B. Tech ECE graduates can unlock a myriad of opportunities and chart a fulfilling career trajectory.

# PROJECTS

## "LIBRARY MANAGEMENT SYSTEM "

The Library Management System (LMS) is a computer-based application designed to efficiently store and manage the details of students and books in a library. It utilizes Java Database Connectivity (JDBC) and SQL to provide a robust mechanism for storing, accessing, and manipulating data. This project aims to enhance students' coding skills in Java, as well as their understanding of database management through practical implementation. The primary objective of the project is to develop an LMS that allows users to effortlessly manage library data. This includes tasks such as creating book IDs, adding book details, checking issue dates, student renewal dates, and monitoring book counts. By automating these processes, the system aims to reduce clerical work, improve efficiency, and provide faster access to information. The project employs JDBC and SQL to establish connectivity between the Java program and the database. The following steps outline the process:

1. Import Packages: Necessary packages are imported to facilitate database connectivity within the Java program.
2. Load Drivers: The appropriate drivers, such as the Oracle JDBC driver, are loaded using Class. For Name ( ) or Driver Manag- er. Register Driver ( ).
3. Register Drivers: The drivers are registered with the Driver Manager to enable database connection.
4. Establish Connection: A connection to the database is established using the Connection class object, specifying the URL, username, and password.
5. Create Statement: A statement object is created to execute SQL queries.
6. Execute Query: SQL queries are executed to perform database operations.
7. Close Connection: Finally, the connection is closed to release resources.

By K. Sai Dhanush Reddy(B21EC073)

## SIMPLE BANKING SYSTEM

The Simple Banking System project rep resents a fundamental yet crucial application aimed at efficiently managing user account details within a database. Developed using Java programming language, this project serves as a practical exercise for students to enhance their coding skills and gain a deeper understanding of database management principles. By implementing this project, students delve into various aspects of software development, including user input handling, data validation, database connectivity, and transaction processing. At its core, the Simple Banking System is designed to provide users with a seamless banking experience while ensuring the security and integrity of their financial information. The project revolves around the concept of creating a user-friendly interface that allows users to perform essential banking operations such as account creation, balance inquiries, deposits, and withdrawals. Through

practical implementation, students explore the intricacies of programming log-

algorithm design, and error handling, thereby honing their problem-solving abilities and enhancing their coding proficiency.The choice of Java programming language for this project stems from its widespread adoption and versatility in software development. Java is renowned for its simplicity, platform independence, and robustness, making it an ideal choice for developing scalable and reliable applications. By working on a Java-based project, students not only reinforce their understanding of core programming concepts but also gain exposure to industry-standard tools and practices, preparing them for future endeavors in software development.The primary objective of the Simple Banking System project is to develop an intuitive and efficient banking application that caters to the diverse needs of users. Through a combination of tex- tual prompts and menu-driven options, users can input their account details, per- form banking transactions, and receive timely updates on their account

By R.Gayathri(B23EC)

## BLOOD BANK

The blood bank is an application which maintains the blood records of patients. A computerized blood bank is provided which reduces manual and paper work. It provides an efficient and secured way for faster data entry, retrieval and data access.The blood bank system is an application for storing the details of person's blood efficiently in the database. A computer- based management system with database is designed to store the details of the user.The system will pro- vide the set of services like blood group, pincode according to the user's require- ments and also checks the existence of the user in the database. The reason why I have taken course project in Java programming is because it is one of the important programming languages for every student which helps us to increase the coding skills in Java. By doing this project we will experience the real use of syntaxes and concepts, so that we gain grip on many concepts of Java programming language which is further useful for handling pro- jects in future.

**PROBLEM DEFINATION**

When in an emergency situation of a patient, who needs an emergency blood it is Hard to find in less time. It may result in death. So, this online blood bank will instantly shows the details of blood donors, thus it can save life of a person. The main objective of the project is to bridge the gap between blood donors and accep- tors. we will display the donor details. De- tails of those registered with us, to be use- ful for people who are searching for blood donors.

**Algorithm:**

**Step 1:** START

**Step 2:** A donor can login with username and password.

**Step 3:** if he/she does not have any user name and password new donor login page will be opened.

**Step 3.1:** Now taking the donor details like blood group, pincode, district pincode,mail id.

Step 4: Storing the details of donor in Oracle

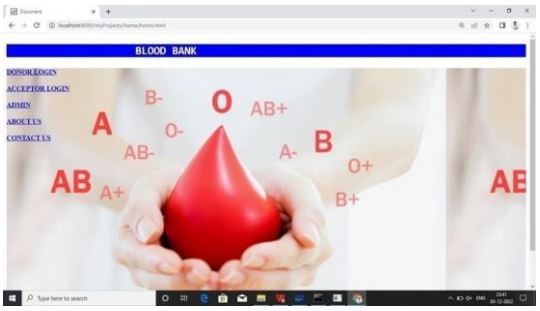
Step 5: A acceptor can login with username and password.

Step 6: if he/she does not have any user name and password new acceptor login page will be opened.

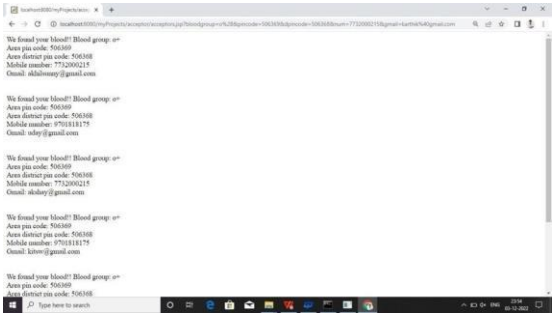
Step 7: Now taking the acceptor details like blood group, pincode, district pincode,mail id.

Step 8: Checking the donor and acceptor details and comparing the blood group.

Step 9: If details match showing the details of donor.




**Finally:** The design and development of this project provides a well-organized and secured approach for giving donor details. And by this project a blood acceptor can easily and fastly gets the donor details without any paperwork and user friendly.



By V. Anurag Reddy (B22EC0)

## TECHNOLOGY NEW AGE PROBLEM SOLVER

### Robotics:

The field of robotics is experiencing rapid advancements, with robots being developed for an ever-expanding array of a pplicat io ns. From industr ial manufacturing and logistics to healthcare and personal assistance, robots are increasingly utilized to perform tasks that are hazardous, repetitive, or beyond the capabilities of humans. One of the most exciting frontiers in robotics lies in the development of humanoid robots, designed to mimic human appearance and behavior, thereby facilitating seamless interaction and collaboration with humans in diverse environments. Recent advancements in robotics have propelled the development of highly dexterous and adaptable robots capable of navigating complex

### Virtual Reality (VR);

Virtual reality has emerged as a transformative technology, offering immersive experiences that transcend the boundaries of physical reality. While VR has been in existence for decades, recent advancements in hardware and software have propelled its widespread adoption across various industries and domains. In the realm of entertainment, VR enables users to escape into virtual worlds, interact with digital environments, and experience visceral sensations that blur the line between fiction and reality. Gaming, film, and interactive storytelling are just a few examples of industries that have embraced VR to captivate audiences and unlock new levels of engagement. Beyond entertainment, VR holds immense potential for training, education, and simulation. From medical training and surgical simulations to virtual classrooms and corporate training programs, VR empowers users to learn and practice in safe, controlled environments, fostering experiential learning and skill development. Furthermore, VR is revolutionizing fields such as architecture, urban planning, and tourism by enabling virtual exploration and visualization of complex structures and environments.

# TECHNOLOGY NEWS

In the ever-evolving landscape of technology, each passing year brings forth groundbreaking advancements that reshape our lives. Recent years have witnessed the dawn of a new technological era characterized by remarkable breakthroughs in artificial intelligence, robotics, virtual reality, and the internet of things. In this comprehensive exploration, we delve into the realms of these exciting new technologies, examining their applications, advancements, and potential implications for the future.

"Breakthroughs in Quantum Dot Displays Propel Creation of Ultra-High-Definition Screens, Elevating Color Accuracy to Unprecedented Levels" In a significant stride towards visual perfection, quantum dot display technology has achieved a milestone in the realm of screen quality. Recent advances in quantum dot displays have ushered in a new era of ultra-highdefinition screens, characterized by unparalleled color accuracy and vibrancy.At the heart of this technological breakthrough lies the integration of quantum dots – nanoscale semiconductor particles – into display panels. These quantum dots possess unique optical properties, enabling precise control over the emission of light across the visible spectrum. By harnessing quantum effects, display m a n u f a c t u r e r s c a n a c h i e v e exquisite color reproduction and fidelity that surpasses traditional LCD and OLED screens.The result is a visual experience characterized by lifelike hues, deeper blacks, and brighter whites, delivering images with stunning clarity and realism.

With quantum dot displays, viewers can immerse themselves in a world of breathtaking detail. One of the key advantages of quantum dot displays is their ability to achieve a wider color gamut, covering a broader range of colors than conventional display technologies. This expanded color palette translates into more accurate representation of real-world scenes, ensuring that images appear true to life with e ve ry sha d e f a i t h f u ll y reproduced.Furthermore, quantum dot displays offer enhanced energy efficiency and longevity compared to traditional LCD and OLED screens. By minimizing power consumption and reducing the risk of image burn-in, these displays pro- vide both environmental benefits and cost savings over their operational lifetime.As advancements in quantum dot technology continue to push the boundaries of display quality, the potential applications are vast and diverse. From high-end televisions and professional monitors to mobile devices and augmented reality headsets,quantum dot displays promise to revolutionize the way we perceive and interact with digital content. In the quest for visual excellence, quantum dot displays stand at the forefront of innovation, offering a glimpse into a future where every pixel is a masterpiece of color and clarity. With each advancement, the boundaries of display technology are pushed ever closer to perfection, ensuring that the quest for visual fidelity continues unabated.

## "AI-Powered Smart Antenna Systems Revolutionize Wireless Communication, Amplifying Coverage and Capacity"

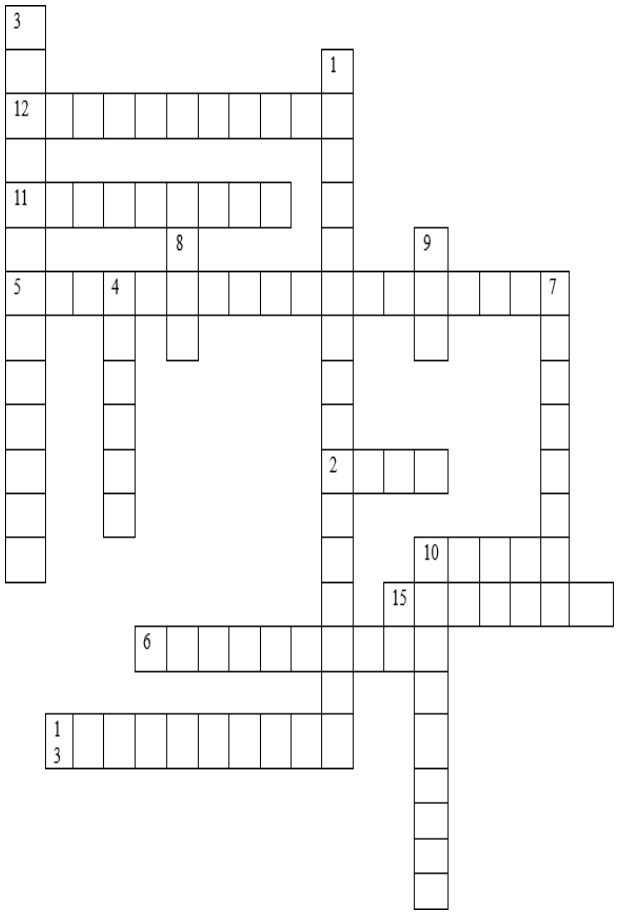
In a groundbreaking leap forward for wireless communication, AI-driven smart antenna systems have emerged as a transformative force, poised to redefine the landscape of connectivity. These innovative systems, imbued with the intelligence of artificial intelligence algorithms, herald a new era of enhanced coverage and capacity in wireless networks. Traditionally, wireless communication has been constrained by the limitations of static antenna configurations, which struggle to adapt to dynamic environmental conditions and user demands. However, with the integration of AI capabilities, smart antenna systems transcend these constraints, dynamically optimizing signal transmission and reception in real time. At the core of these advancements lies the ability of AI algorithms to analyse vast amounts of data and make informed decisions to maximize performance. By continuously monitoring the wireless environment, including factors such as signal strength, interference, and user mobility, AI-powered smart antennas adapt their beamforming patterns and transmission parameters to optimize signal quality and coverage. The impact of AI-driven smart antenna systems is profound, unlocking a multitude of benefits for both consumers and network operators. Users experience improved signal reliability, faster data rates, and reduced latency, enhancing their overall wireless experience. Meanwhile, operators benefit from Increased network efficiency, enhanced spectrum utilization, and the ability to accommodate growing demands for dataintensive applications. From urban environments with dense user populations to remote rural areas with challenging terrain, AI-powered smart antennas prove invaluable in extending coverage and capacity to previously underserved regions. Furthermore, their ability to dynamically adapt to changing conditions ensures resilience in the face of interference and network congestion. As research and development in AI-driven smart antenna technology continue to accelerate, the future of wireless communication shines brightly. With the promise of even greater performance enhancements and scalability, these revolutionary systems are poised to shape the next generation of wireless networks, ushering in an era of ubiquitous connectivity and seamless communication experiences for all. "Advancements in Neuromorphic Computing Propel Development of Brain-Inspired AI Chips, Revolutionizing Processing Efficiency" In the rapidly evolving landscape of artificial intelligence, groundbreaking progress in neuromorphic computing has sparked a transformative leap forward. Researchers and engineers have achieved remarkable milestones in the development of braininspired AI chips, heralding a new era of unparalleled processing efficiency. Drawing inspiration from the intricate architecture and functionality of the human brain, these innovative chips mimic the parallel processing and adaptive learning capabilities of neural networks. By leveraging principles of neurobiology, such as synaptic plasticity and

spiking neural networks, these advanced AI chips demonstrate unprecedented levels of computational prowess. The integration of neuromorphic computing principles into and the ability to accommodate growing d e m a n d s f o r d a t a - i n t e n s i v e applications. From urban environments with dense user populations to remote ru ral areas with challenging terrain, AI powered smart antennas prove invaluable in extending coverage and capacity to previously underserved regions. Furthermore, their ability to dynamically adapt to changing conditions ensures resilience in the face of interference and network congestion. As research and development in AI-driven smart antenna technology continue to accelerate, the future of wireless communication shines brightly. With the promise of even greater performance enhancements and scalability, these revolutionary systems are poised to shape the next generation of wireless networks, ushering in an era of ubiquitous connectivity and seamless communication experiences for all.

## "Advancements in Neuromorphic Com- putting Propel Development of Brain- Inspired AI Chips, Revolutionizing Processing Efficiency"

In the rapidly evolving landscape of arti ficial intelligence, groundbreaking progress in neuromorphic computing has sparked a transformative leap forward. Researchers and engineers have achieved remarkable milestones in the development of brain-inspired AI chips, heralding a new era of unparalleled processing efficiency. Drawing inspiration from the intricate architecture and functionality of the human brain, these innovative chips mimic the parallel processing and adapt tive learning capabilities of neural networks. By leveraging principles of neurobiology, such as synaptic plasticity and spiking neural networks, advanced AI chips demonstrate unprecedented levels of computational prowess. The integration of neuromorphic computing principles into Additionally, AI-powered chatbots are increasingly prevalent, revolutionizing customer service and support by auto- mating interactions Despite its transformative potential, AI also raises ethical and societal concerns, including issues related to privacy, bias, and the displacement of human labor. As AI continues to permeate various aspects of daily life, it is im- perlative to address these challenges and ensure that its benefits are equitably dis- tributed while mitigating potential risks.

# ELECTRONIC PUZZLE



## ACROSS:

2) A basic component of electronic device.

5) An electronic circuit that generates a sinusoidal waveform, typically in the radio frequency.

6) It is scenario consistently increasing and never decreasing or vice versa.

10) A word which is used in medical science as well as in waves.

11) A storage space for units of memory that are used to transfer data for immediate use by the CPU.

12) When_____materials are placed in an electric field, practically no current flows in them.

13) It is a vector operator that operates on a vector field producing a scalar field.

15) The expected value of a real function of a random variable is

## DOWN:

1 ) For attenuation of high frequencies, we should u s e

2) A SCR is a_____switch.

3) It stimulates and analyse your analog and mixed signal circuits within ORCAD.

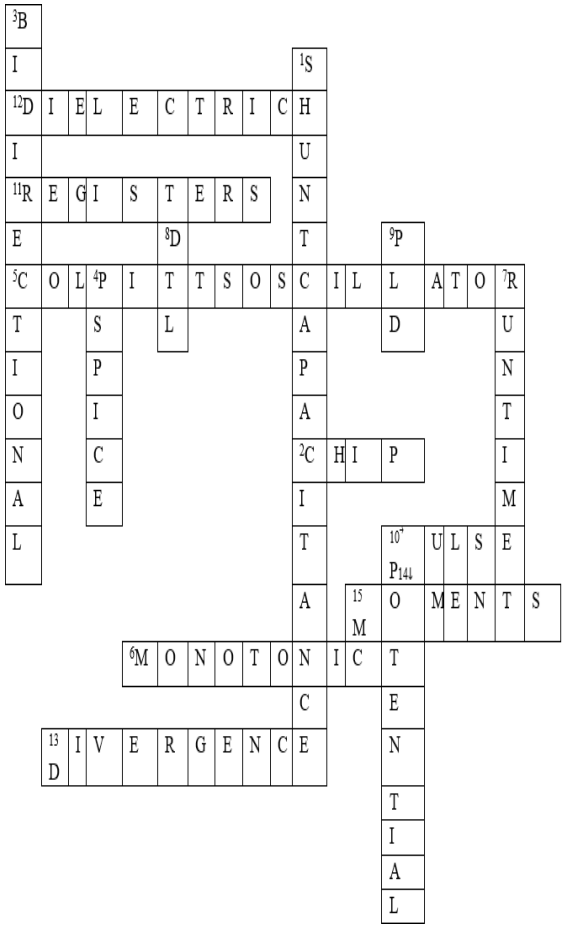
7) In which polymorphism, the compiler resolves the object at runtime, and then it decides which function call should be associated with that object?

8) A logic family which has high fanout and a slower speed.

9) One of the simplest programming technologies is to use fuses.

14) The amount of work done to move a unit positive charge from an infinitely long distance to that point.

# ANSWERS


3B
I
1S
12D I E L E C T R I C H
I U
11R E G I S T E R S N
E 8D T 9P
5C O L 4P I T T S O S C I L L A T O 7R
T S L A D U
I P P N
O I A T
N C 2C H I P I
A E I M
L T 10 P144 U L S E
A 15 M O M E N T S
6M O N O T O N I C T
C E
13 D I V E R G E N C E N
T
I
A
L

**FACULTY PUBLICATIONS**

(Academic Year: 2024-2025)

**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

| S.No | Faculty Name | No. of Journals | No. of Conferences | Total |
|---|---|---|---|---|
| 1. | Dr. K. Ashoka Reddy | 1 | 0 | 1 |
| 2. | Dr. B. Rama Devi | 1 | 1 | 2 |
| 3. | Dr. V. Venkateshwar Reddy | 1 | 0 | 1 |
| 4. | Dr. J. Tarun Kumar | 1 | 0 | 1 |
| 5. | Dr. R. Srikanth | 1 | 1 | 2 |
| 6. | Dr M Chandrasekhar | 1 | 0 | 1 |
| 7. | Dr. K. Sowjanya | 1 | 0 | 1 |

# KAKATIYA INSTITUTE OF TECHNOLOGY AND SCIENCE, WARANGAL

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### JOURNALS / CONFERENCES/ BOOK CHAPTERS/ BOOKS/ PATENT LIST

### ACADEMIC YEAR: 2024-2025

| S.No. | Name of the Faculty | Journal / Conference/ Book/ Book Chapter/ Patent |
|---|---|---|
| 1 | Dr. K. Ashoka Reddy | **Journals: 01**<br>1. Boddu, R.D., Komalla, A.R. Energy Efficient Hybrid Led Luminary Illumination Control Mechanisms. *Wireless Pers Commun* **139**, 1375–1391 (2024). https://doi.org/10.1007/s11277-024-11618-x **(SCI)** |
| 2 | Dr. B. Rama Devi | **Journal: 01**<br>1. Boddu, R.D., Komalla, A.R. Energy Efficient Hybrid Led Luminary Illumination Control Mechanisms. *Wireless Pers Commun* **139**, 1375–1391 (2024). https://doi.org/10.1007/s11277-024-11618-x **(SCI)**<br>**Conference: 01**<br>1. B. Rama Devi, Rohit Sanam, Sai Sharan K, et.al, "Decoding the Eye: AI-Driven Diabetic Retinopathy Classification for Precision Healthcare", 2024 International Conference on Integrated Circuits, Communication, and Computing Systems (ICIC3S). |
| 3 | Dr. V. Venkateshwar Reddy | **Journal: 01**<br>1. V. Venkateshwar Reddy, Suman Nelaturi, Rama Sanjeev B R, Sulakshana N, "Meta-Material Inspired Circularly Polarized Semi-Circled Fractal Boundary Antenna for Broadband and Multiband Applications" Microwave Review December 2024, Vol. 30, No. 2, pp. 15-22 DOI: 10.18485/mtts_mr.2024.30.2.2. (Scopus) |
| 4 | Dr. J. Tarun Kumar | **Journal: 02**<br>1. Manoharan, Thiyagarajan et al. Biomedical image classification using seagull optimization with deep learning for colon and lung cancer diagnosis. Indonesian Journal of Electrical Engineering and Computer Science, [S.l.], v. 35, n. 3, p. 1670-1679, sep. 2024. ISSN 2502-4760. doi:http://doi.org/10.11591/ijeecs.v35.i3.pp1670-1679. **(Scopus)**<br>**Patent: 01**<br>1. J. Tarun Kumar Patent Granted to "Visual Aid Based Drowsiness Detection and Warning Initiation System and Method Thereof", Patent No.547268, Application No.:202241023366, Dt. 07-08-2024. |
| 5 | Dr. R. Srikanth | **Journal: 01** |

| | | |
|---|---|---|
| | | 1. Lingaiah Jada, Rangu Srikanth and Kalagadda Bikshalu, "Effective low-exposure color image enhancement based on histogram equalization with spatial contextual information", Published 21 November 2024, Eng. Res. Express 6 (2024) 045236, https://doi.org/10.1088/2631-8695/ad8988. **(ESCI)**<br>**Conference: 01**<br>**1.** R. Srikanth, B. Nagarjuna, K. Varshith, G. Supriya and S. P. Reddy, "Enhancing of Night Time Vehicle Images using CLAHE Method," *2024 15th International Conference on Computing Communication and Networking Technologies (ICCCNT)*, Kamand, India, 2024, pp. 1-8, doi: 10.1109/ICCCNT61001.2024.10725464. |
| 6 | Dr M Chandrasekhar | **Journal: 01**<br>M Chandrasekhar, Ketavath Kumar Naik , "Design a Dual-Band with CSRR Cascaded Patch Antenna Array for Wireless Communications", Progress In Electromagnetics Research C, Vol. 149, 155-163, 2024, doi:10.2528/PIERC24090602. **(Scopus)** |
| 7 | Dr. K. Sowjanya | **Journal: 01**<br>1. Kotte, S., Injeti, S.K., Thunuguntla, V.K. *et al.* Energy curve based enhanced smell agent optimizer for optimal multilevel threshold selection of thermographic breast image segmentation. *Sci Rep* 14, 21833 (2024). https://doi.org/10.1038/s41598-024-71448-6 **(SCI)** |

***HoD, Dept. of ECE***