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K. S. R. COLLEGE OF ENGINEERING

(Autonomous)

Accredited by NAAC with"A"GradeApprovedby AICTE, New Delhi &
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TECHNICAL MAGAZINE

TRONIX 23

Department of

ELECTRONICS AND COMMUNICATION ENGINEERING

ACADEMIC YEAR 2022-2023

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An ISO 9001: 2008 Certified Institution.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

TRONIX 23

TECHNICAL MAGAZINE

ACADEMIC YEAR 2022 – 2023

K.S.R. COLLEGE OFENGINEERING

Vission

We envision to achieve status as an excellent educational institution in the global knowledge hub, making self-learners, experts, ethical and responsible engineers, technologists, scientists, managers, administrators and entrepreneurs who will significantly contribute to research and environment friendly sustainable growth of the nation and the world

Mission

IM1	To inculcate in the students' self-learning abilities that enable them to become competitive and considerate engineers, technologists, scientists, managers, entrepreneurs, and administrators by diligently imparting the best of education, nurturing environmental and social needs.
IM2	To foster and maintain a mutually beneficial partnership with global industries and Institutions through knowledge sharing, collaborative research, and innovation.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Vision

We envision as a center of excellence in the field of Electronics and Communication Engineering to produce technically competent graduates with diverse teaching and research environments.

Mission

DM1	To educate the students with the state of art technologies to meet the growing challenges of the industries.
DM2	To develop an innovate, competent and ethical Electronics and Communication Engineer with strong foundations to enable them for continuing education.

PEOs and PSOs

Program Educational Objectives (PEOs)

PEO1- **Employability and Higher Education** Excel in Professional career and higher education by acquiring knowledge in mathematical, social, scientific & engineering principles.

PEO2 - **Core Competence** Analyze, design and develop/implement core engineering problems in communication systems that are technically sound, economically feasible and socially acceptable.

PEO3 - **Interpersonal Skills and Team Work** Graduates will explore competency in the higher education and research and to become the State-of-the-art technocrat

Program Specific Outcomes (PSOs)

PSO1- **Professional Skill:** Specify design and test modern electronic systems that perform analog and digital processing functions.

PSO2- **Problem – Solving Skills:** Design essential elements (circuits and antennas) of modern RF/Wireless communication systems.

MAGAZINE

CHAIRMAN MESSAGE

Shri. R. Srinivasan, BBM., MISTE.,

Chairman, KSR Educational Institutions

Education is the foundation of a brighter tomorrow, and this magazine reflects the vibrant spirit of our learners. May it continue to inspire creativity, excellence, and lifelong curiosity in every reader..In the recent times, the role of KSRCE is to carry out proactive research and development activities to make the students as well as faculty member's intellectuals, which are very challenging and demanding. It is of great significance that this magazine is going to deliberate upon It will definitely explore new areas of practice and enhancing quality of professional services.

I am sure this magazine will be a milestone in ensuring the highest standards in this profession. I wish the organizers the very best in this and all their other endeavors.

I am eagerly looking forward to seeing you and enjoying this magazine in KSRCE Campus.

With best wishes

Mr. R. Srinivasan

Chairman

KSR Educational Institutions

PRINICIPAL MESSAGE

Dr. P. Senthil Kumar, M.E., Ph.D.

Principal

I extend my heartfelt congratulations to the Department of ECE for bringing out the prestigious biannual department magazine, TRONIX. This magazine provides a valuable platform for both students and faculty members to enhance their technical knowledge and showcase their literary talents. I am confident that such an initiative will ignite a passion for reading, foster creativity, and instill a strong sense of belonging within the department. I appreciate the efforts of the editorial board for taking on this responsibility with dedication and excellence. I wish the magazine great success and look forward to its continued contribution to academic and creative growth.

With best wishes

Dr. P. Senthil Kumar

Principal

CONTROLLER OF EXAMINATION

Dr. P.S.Periasamy, M.E., Ph.D.

Professor & COE

I am extremely happy that our department magazine TRONIX has come out very well. This magazine reflects the state of art of the department, highly qualified faculty and most prolific students. The magazine has helped in bringing out the creative instinct of the students and their proficiency. I am very happy to be a part of this magazine. I congratulate all the faculty and students in making this magazine a success.

With best wishes

Dr. P.S.Periasamy

Professor & COE

HOD MESSAGE

Dr.C.Gowri Shankar M.E.,Ph.D

Head of the Department

The HOD of ECE take great honour in congratulating the students who have contributed for the current year's Evolve magazine TRONIX. I really hope that this would be as useful as the last Evolve editions. Acknowledging the fact that the magazine is completely created and designed by the students I really hope this would kindle a spark in the minds of the students who are yet to contribute towards the progress of the Evolve Initiative in the upcoming years. All the best students!

With best wishes

Dr.C.Gowri Shankar

Head of the Department

EDITORIALS

- K.S.R. College of Engineering is on its 25th year. Being the pioneers in Engineering Education, our chairman, Thiru. R. Srinivasan, always wanted the Institution to be a model institution and working towards it.
- In this year of release, the editorial board cordially records its gratitude and indebtedness to the management for these novel practices.
- With congratulation to the outgoing engineers, we wish the students for a successful ensuring academic year. I expect more cooperation and commitment from the students which will eventually lead them for a better future.

EDITORIALBOARD

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GREEN COMMUNICATION

Green communication, often referred to as eco-friendly or sustainable communication, involves adopting practices that minimize the environmental impact of communication technologies and processes. It encompasses various strategies to reduce energy consumption, electronic waste, and carbon emissions associated with communication activities.

One aspect of green communication involves optimizing data centers and network infrastructures to be more energy-efficient, using renewable energy sources, and adopting advanced cooling techniques to lower electricity consumption. Another approach is promoting digital literacy and responsible usage to reduce the demand for excessive data and energy-intensive applications.

Recycling and proper disposal of electronic devices, such as smart phones and computers, play a crucial role in reducing electronic waste. Additionally, encouraging virtual meetings and telecommuting can decrease the need for travel, cutting down on transportation-related emissions.

In essence, green communication aims to strike a balance between technological advancement and environmental conservation. By incorporating sustainable practices into communication technologies and behaviors, we can contribute to a healthier planet and a more sustainable future.

The Role of ECE Students and Researchers

Students and researchers in the ECE department are uniquely positioned to lead innovations that align with environmental goals. From developing green signal processing techniques to creating sustainable network architectures, their contributions are key to reducing the ecological footprint of the communication sector.

Green Communication is not just a trend — it is a technological necessity and moral imperative. As we continue to push the boundaries of connectivity, the ECE community must ensure that our progress supports the planet, not just the market.

Meithiru Prakash B
II-ECE

USING A GSM MODULE WITH AN ARDUINO

Using a GSM module with an Arduino allows you to add cellular communication to your Arduino projects. Here are the basic steps to get started:

1. Select a GSM Module: Choose a GSM module compatible with Arduino, such as the SIM800 or SIM900 series. Ensure it supports the cellular network bands in your region.

2. Connect Hardware: Connect the GSM module to your Arduino using jumper wires. Typically, you'll need to connect pins for power, ground, TX, RX, and sometimes additional pins for control.

3. Install Libraries: In the Arduino IDE, install the necessary libraries for your GSM module. These libraries provide functions to control the module and send/receive SMS messages or make calls.

4**. Write Arduino Code**: Write Arduino code to initialize the GSM module, establish a connection with the cellular network, and perform tasks like sending SMS messages or making calls. The code will depend on your specific module and the functionality you want.

5. Test and Debug: Upload the code to your Arduino and test your project. Use the serial monitor for debugging and monitoring messages from the GSM module.

6. Power Supply: Ensure your project has a stable power supply since GSM modules can draw significant current during transmission.

This project demonstrates the integration of GSM technology with Arduino microcontrollers. It enables SMS-based communication between electronic systems and mobile phones. Students learn to use AT commands for controlling the GSM module. The system can send alerts, notifications, or data remotely via cellular networks.

It simulates real-world applications like intrusion detection, health alerts, or smart farming. The project enhances knowledge in embedded systems, serial communication, and IoT. It supports remote monitoring even in areas without internet access.

Low cost and reliable, it's ideal for smart system prototypes in rural areas. Students gain practical exposure to hardware-software interfacing and wireless tech. This foundational project opens doors to more complex IoT and automation solutions.

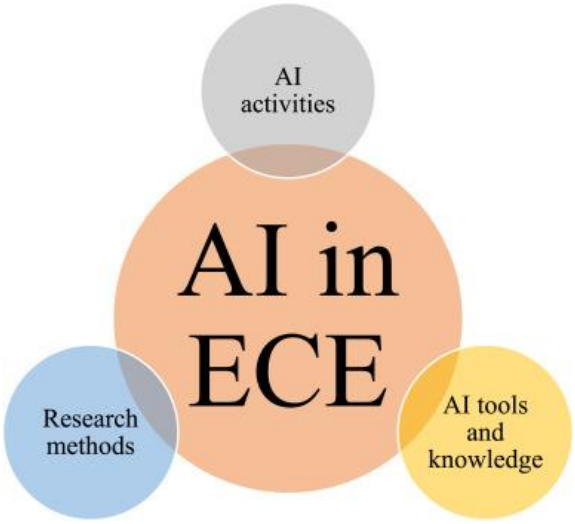
The integration of a GSM module with Arduino equips students with practical skills in wireless communication and embedded systems. This project lays the foundation for developing advanced IoT applications such as remote monitoring, smart alert systems, and mobile-controlled devices. In the future, this knowledge can be applied in domains like smart agriculture, healthcare, home automation, and industrial automation—where real-time data transmission is crucial.

Abhirami devi K R
II-ECE

AI-DRIVEN INNOVATIONS IN ELECTRONICS AND COMMUNICATION

Overview of AI

Artificial Intelligence (AI) has emerged as a revolutionary technology across various industries, transforming the way we live, work, and interact. In the field of Electrical and Computer Engineering (ECE), AI has made significant strides, opening new possibilities and applications. This article will explore the impact of AI in the ECE department and its potential for further innovation.



Evolution of AI

One area where AI has made a profound impact is in autonomous systems. ECE researchers are developing intelligent machines and robots that can perform tasks without human intervention. These autonomous systems rely on AI algorithms to analyze sensory inputs and make decisions in real-time. Applications range from self-driving cars and drones to industrial automation and smart homes. AI enables these systems to adapt to changing environments, improve safety, and enhance efficiency.

Furthermore, AI plays a crucial role in the design and optimization of complex electronic circuits and systems. ECE engineers are utilizing AI algorithms to develop intelligent tools for circuit design and optimization. Machine learning algorithms can automatically explore the design space and generate optimized solutions, reducing the time and effort required. This enables faster development cycles and more efficient electronic systems.

AI also enhances the capabilities of communication systems in the ECE department. With the advent of 5G and beyond, the demand for high-speed and reliable wireless communication is increasing. AI algorithms can be utilized to optimize the allocation of network resources, improve signal quality, and mitigate interference. Additionally, AI based signal processing techniques enable efficient data compression, reducing bandwidth requirements and enabling faster data transmission.

Future Scope

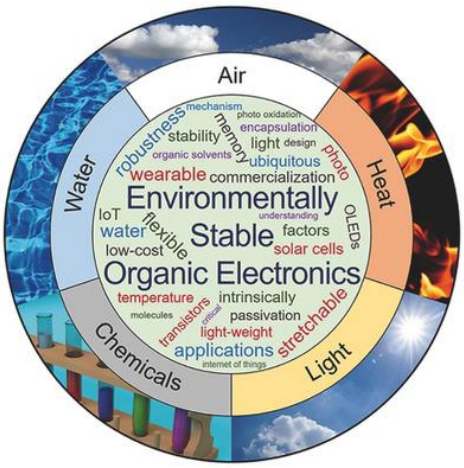
As industries increasingly adopt AI-driven automation, the demand for ECE engineers skilled in AI tools like Python, MATLAB, Tensor Flow, and machine learning algorithms will rapidly grow. The future promises vast opportunities in research, startups, and interdisciplinary roles that merge electronics with intelligent systems.

Thivyasri R
I-ECE

ORGANIC ELECTRONICS

Organic electronics refers to a field of technology that utilizes organic materials, which are carbon-based compounds, as the building blocks for electronic devices. These materials possess unique properties that enable their integration into a variety of applications, including displays, solar cells, sensors, and more.

Conventional electronics rely on inorganic materials like silicon to conduct electrical currents. However, organic electronics harness the semiconducting properties of certain organic compounds to achieve similar functions. Organic materials can be processed at relatively low temperatures and can be fabricated on flexible substrates, leading to the development of flexible and lightweight electronic devices.



One of the most notable applications of organic electronics is in organic light-emitting diodes (OLEDs), which are used in high-quality displays and lighting solutions. These displays offer vibrant colors high contrast ratios, and flexibility. Organic solar cells are another crucial aspect, offering the potential for low-cost and flexible solar energy harvesting. Additionally, organic sensors find applications in health care and environmental monitoring due to their compatibility with biological systems and the ability to detect various substances.

Research in organic electronics continues to push the boundaries of what's possible in terms of energy efficiency, device flexibility, and diverse applications. As this field evolves, it holds promise for revolutionizing how we interact with and integrate electronic technology into our daily lives.

Organic electronics, based on carbon-based conductive polymers and molecules, is an emerging field in electronics that promises lightweight, flexible, and cost-effective devices. For ECE students, this opens exciting research and career avenues in:

- Flexible Displays and OLED Technology
- Wearable and Biocompatible Sensors
- Organic Solar Cells for Green Energy
- Flexible RFID Tags and Smart Packaging
- Bioelectronics and Medical Diagnostics

As industries move toward eco-friendly, flexible, and printed electronics, ECE students with knowledge of organic semiconductors and device fabrication will play a vital role in next-generation consumer electronics, healthcare tech, and sustainable innovation.

Pradeepika M

II-ECE

WIRELESS SENSOR NETWORK

Wireless Sensor Networks (WSNs) play a vital role in the field of Electronics and Communication Engineering (ECE), as they integrate multiple core concepts of the discipline. ECE students study the design and functioning of electronic sensors that form the foundation of WSN nodes. These nodes rely on embedded systems and microcontrollers for data processing, which are key areas of focus in the ECE curriculum. The wireless communication between sensor nodes uses protocols like Zigbee, Bluetooth, and LoRa, all of which are studied under wireless and digital communication subjects.

Signal processing techniques are applied to filter and analyze the sensor data, ensuring accuracy and reliability. Moreover, power-efficient circuit design, which is essential for battery-operated WSNs, falls under the domain of electronic circuit design. Students also learn about networking principles, routing protocols, and antenna design, which are crucial for effective wireless communication. With the growing relevance of the Internet of Things (IoT), WSNs provide ECE students with hands-on opportunities to apply their knowledge in real-world smart systems. Thus, WSNs serve as an interdisciplinary platform, blending electronics, communication, computing, and system design—making them highly relevant for ECE professionals.

However, WSNs also face challenges like limited power resources, communication range constraints, and data security concerns. Researchers are continually working to improve the energy efficiency of sensor nodes, develop reliable routing protocols, and implement robust encryption techniques to address these issues.

As the Internet of Things (IoT) continues to expand, wireless sensor networks play a crucial role in enabling the connection and communication of various devices, contributing to a more interconnected and data-rich world.

Sangaragomathi S
II - ECE

AUTOMATION

Relay logic was introduced with factory electrification, which underwent rapid adaption from 1900throughthe 1920s. Central electric power stations were also under going rapid growth and the operation of new high-boilers, steam turbines and electrical substations create da large demand for instruments and controls. Central control rooms became common in the 1920s, but as late as the early 1930s, most process controls were on-off. Operators typically monitored charts drawn by recorders that plotted data from instruments. To make corrections, operators manually opened or closed valves or turned switches on or off.Control rooms also used color-coded lights to send signals to workers in the plant to manually make certain changes

The development of the electronic amplifier during the 1920s,which was important for long-distance telephony, required a higher signal-to-noise ratio, which was solved by negative feedback noise cancellation. This and other telephony applications contributed to the control theory.In the 1940s and1950s,German

mathematician Irmgard Flügge-Lotz developed the theory of discontinuous automatic controls, which found military applications during the Second World War to fire control systems and aircraft navigation systems.

The First and Second World Wars saw major advancements in the field of mass communication and signal processing. Other key advances in automatic controls include differential equations, stability theory and system theory(1938), frequency domain analysis(1940), ship control(1950), and stochastic analysis(1941)

Dhanush K
II-ECE


Toshiro Hitsugaya
DEEPAK D