SPECTRA

HORIZON

An initiative of

SRIJAN

THE SOCIETY OF ELECTRONICS

PREFACE

This magazine is an initiative of "Srijan" The Society of Electronics. It aims at bringing togetherthe electronic advancements of the currentage to all its readers. All the articles aim at going beyond the bounds of the curriculum and step into the real world. We aim at introducing any advancements and problems that concern the electronics world to our readers, which will broaden theirperspective. This will help to gather the perspectives and problems of the industrial world which will aid them in their professional careers. We want all the readers to have a look at electronics through the eyes of a trouble-shooter, so that they can analysemodern problems.

On behalf of the entire editorial team, I would like to thank everyone who contributed in any way in the formation of this magazine.

- THANK YOU

MESSAGE FROM CHAIRMAN'S DESK

Dear students, the four years of engineering are crucial and will be a key factor in shaping your future. There will be plethora of choices in front of you and you will hold the power to steer your life the way you want. This will require determination as you will need to persevere through enormous challenges to gain success in both professional and personal endeavour.

- Er. R D. SINGH
CHAIRMAN - KIPM TECHNICAL CAMPUS

MESSAGE FROM SECRETARY DESK

My dear students, KIPM is not elitist in its approach. While we do try to select brilliant students, we also accept those who are potentially sound. KIPM rather than restricting itself to the quality of students coming in, emphasizes on the quality of students going out from the Institution. A strong academic orientation lays the foundation for life-long learning. Thus, all activities at KIPM are oriented towards creating opportunities for students to discover, explore and learn not just within the confines of their curriculum but also outside the boundaries of classroom.

I welcome you all at KIPM which is not only an institute, but also a place of culture that strives at producing the new breeds of professionals.

Mr. VINOD KUMAR SINGH
SECRETARY - KIPM TECHNICAL CAMPUS

MESSAGE FROM DIRECTOR'S DESK

My dear students, every endeavor for this college will be dedicated towards advancement of knowledge and educate our students in Science, Technology, and other distinguish areas of scholarship that will best serve the community, society, Nation and the world in the 21st century at large.

– Dr. SURYAKANT PATHAK

DIRECTOR – KIPM COLLEGE OF ENGINEERING & TECHNOLOGY

MESSAGE FROM HOD'S DESK

Electronics and Communication Engineering is an exciting stream that yielding very good career opportunities in different areas of technology. Here we provide healthy environment to every student and teacher to carry out inter department collaborative research in fields like VLSI Design, digital communication, internet of things, robotics, etc. The department conducts various workshops, expert talks and additional training programmes recent trends in on Electronics and Communication Engineering. I am sure that all passing out students of the department are capable of visualizing, planning and developing big projects of commercial and research interests in their respective fields of expertise. The graduates of the Electronics and Communication stream have been selected by some of the leading software and hardware companies of the country.

- Er. BHASKAR PANDEY
HOD - ELECTRONICS AND COMMUNICATION

JUNE 2023

R & D in ELECTRONICS

The electronics sector is a key player in the economy and one of the most globalised Industries in the world. The estimated demand for electronics hardware in India is projected to be USD400 billion by the year 2020. In order to progressively increase the value addition in electronic product manufacturing, a sustained R&D programme in the electronics sector is essential for the development of indigenous technology, its transfer to industry for commercialization, and to increase the Intellectual Property (IP) content of product design and development.

- VIVEK SHARMA
STUDENT - ELECTRONICS AND COMMUNICATION

JUNE 2023

ANALYSIS OF THE RELATIONSHIP B/W ELECTRONIC TECHNOLOGY AND COMMUNICATION ENGINEERING

Electronics has been widely used in the field of communication engineering, and of communications engineering. There is a and of communication engineering depends on electronic technology in turn drives the development communications they drive the development and progress relationship between close engineering communication electronic technology. The development the development of electronic technology, and the development of engineering.

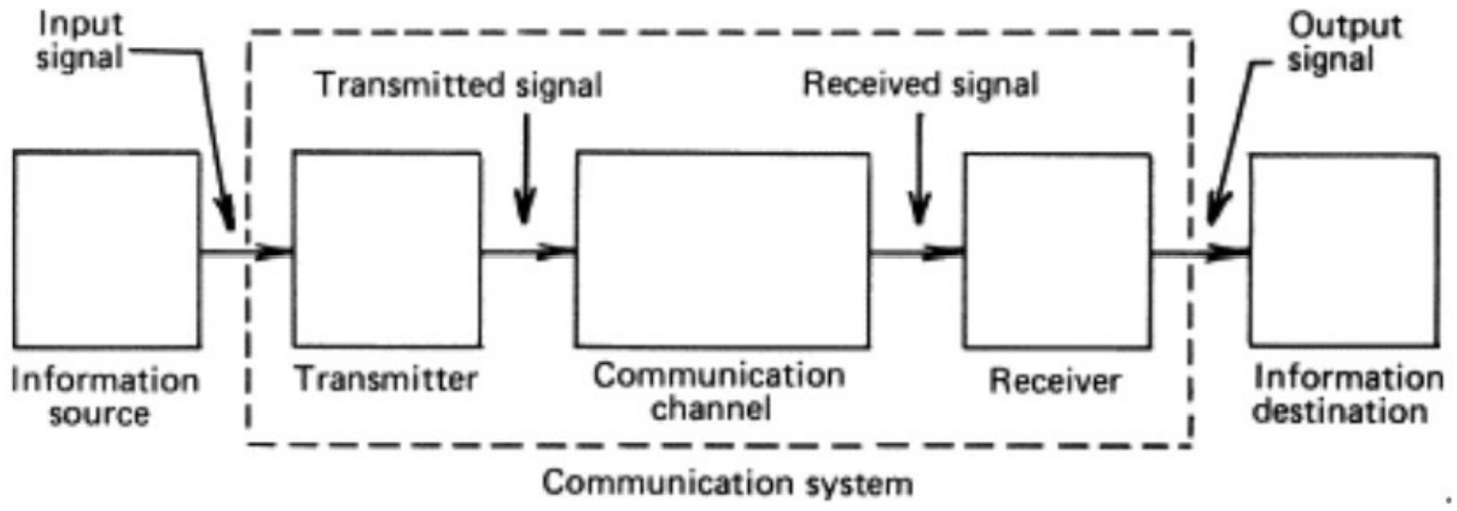
For example, the popularization of mobile communication technology has greatly promoted information exchange and communication and also strengthened the application of electronic technology in communication engineering. At the same time, the network broadband equipment, communication equipment, and image processing equipment, which are often used in our daily lives are all created through the combination of electronic technology and engineering. Therefore, electronics and communications engineering go hand in hand.

- ABHISHEK YADAV
STUDENT - ELECTRONICS AND COMMUNICATION

DATA TRANSMISSION MEDIA

III Communication Channels

A block diagram of an electronic communication system is shown in Fig. 2. It consists of an input signal, a transmitter, a communication channel, a receiver, and an output signal from the receiver. The transmitter modifies the input message signal into a form suitable for transmission over the channel, which is the transmission path for providing communication between transmitter and receiver. The purpose of the receiver is to recreate the original message signal at the output. For example, when digital data signals must be sent over a communication channel designed primarily for analog signals, the transmitter has to convert the digital signals to analog signals by a process known as modulation. The receiver then demodulates the analog signal back to digital form and passes it on to its ultimate destination.



The communication channel can consist of various media such as wire, coaxial cable, optical fibers, or free space, in which case the signal is radiated as an electromagnetic wave as in conventional television or radio broadcasting. Communication channels have practical limitations, such as bandwidth, and suffer from various impairments, such as nonlinearities as well as noise and interference, which may be introduced from within or from outside the channel. Transmitters and receivers must be carefully designed to match the signals to be transmitted to the physical properties of the communication channel and to minimize the effects of channel impairments on the quality of reception.

We can classify communication channels as analog or digital depending on the basic signals they transmit. Analog channels can be further classified as voice, program, or video channels depending on their intended use and the kind of signals they carry. They may be characterized by their bandwidth, which is the range of frequencies they transmit. Thus, a voiceband channel may be called a 4-kHz channel while broadband channels may be 48- or 240-kHz channels. Digital channels are usually characterized by their bit rate. Channels with a bit rate of 1540 kbps (kilobits per second), for example, are used with increasing frequency and can be used to transmit simultaneously several lower bit rate channels through multiplexing, as explained in Section VII.

Analog and digital channels can also be classified as simplex, half-duplex, or full-duplex. Simplex channels transmit in one direction only and are used for radio broadcast but seldom for data communication, which usually requires two-way transmission. Half-duplex channels can send in both directions but only in one direction at any given time. In other words, they provide nonsimultaneous two-way communication. Full-duplex channels, on the other hand, allow simultaneous two-way communication.

- MANSI JAISWAL
STUDENT - ELECTRONICS AND COMMUNICATION

JUNE 2023

5G TECHNOLOGY

5G technology, the fifth generation of wireless communication, represents a significant advancement in the telecommunications industry. It promises to revolutionize the way we connect, communicate, and interact with the world around us. In this note, we will explore the key features and potential impacts of 5G technology.

One of the most prominent aspects of 5G is its incredible speed. With data transfer rates of up to 10 gigabits per second, 5G is significantly faster than its predecessor, 4G. This high speed enables seamless streaming of high-definition videos, faster downloads and uploads, and smooth real-time communication.

Another crucial aspect of 5G is its low latency, which refers to the time it takes for data to travel between devices. 5G has a latency of just a few milliseconds, making it ideal for applications that require real-time responsiveness. This low latency is essential for technologies such as autonomous vehicles, remote surgeries, and Internet of Things (IoT) devices.

Furthermore, 5G technology has the capacity to connect a massive number of devices simultaneously. This enhanced network capacity opens doors for the widespread adoption of loT devices, smart homes, and smart cities. It allows for a seamless connection between various devices, creating a highly interconnected ecosystem.

- KAMAL KANT SHUKLA
STUDENT - ELECTRONICS AND COMMUNICATION

JUNE 2023

The Evolving Landscape of the Semiconductor Industry

The semiconductor industry is a vital component of the global technology ecosystem, providing the foundation for countless electronic devices and enabling technological advancements in various sectors. From smartphones and laptops to automobiles and healthcare equipment, semiconductors play a vital role in driving innovation and shaping the modern world. The past few years have witnessed a significant demand for semiconductors, emerging technologies such as 5G, Al, IoT, and cloud computing. This increased demand and supply.

Semiconductor technology continues to advance rapidly, driven by Moore's Law, which states that the number of transistors on a chip double approximately every two years. Advancements in materials, manufacturing processes, and design techniques such as 7-nm and 5-nm nodes, with companies already exploring even smaller nodes, such as 3-nm and beyond. The demand for higher performance and functionality grows.

Semiconductors are the backbone of modern technology, enabling various applications across industries. Here are a few key areas where semiconductors are indispensable:

1. Consumer Electronics: Semiconductors power our smartphones, tablets, computers, and televisions, enabling us to communicate, access information, and be entertained.

2. Automotive: Advanced driver-assistance systems (ADAS), electric vehicles, and autonomous driving heavily rely on semiconductors for processing data, controlling systems, and ensuring safety.

3. Healthcare: Semiconductors contribute to medical imaging devices, wearable health trackers, and implantable devices, revolutionizing diagnostics, treatment, and patient monitoring.

4. Energy Efficiency: Semiconductors play a significant role in renewable energy systems, such as solar panels and wind turbines, optimizing energy conversion and storage.

As the world becomes more conscious of environmental sustainability, the semiconductor industry is under increasing pressure to improve energy efficiency and reduce its carbon footprint. Efforts are being made to develop more energy-efficient manufacturing processes, explore alternative materials, and adopt circular economy practices to minimize waste and extend the lifecycle of semiconductor products.

In conclusion, the semiconductor industry is witnessing a transformative period, driven by unprecedented demand, technological advancements, and evolving market dynamics. We require collaborative efforts from industry stakeholders, governments, and academia to ensure a sustainable and thriving semiconductor ecosystem.

- ARPITA SHARMA
STUDENT - ELECTRONICS AND COMMUNICATION

JUNE 2023

Key Highlights of NEP-2020 in Higher Education

- **Increase GER to 50 % by 2035:**
- **NEP 2020 aims to increase the Gross Enrolment Ratio in higher education including vocational education from 26.3% (2018) to 50% by 2035. 3.5 Crore new seats will be added to Higher education institutions.**
- **Holistic Multidisciplinary Education:**
- **The policy envisages broad based, multi-disciplinary, holistic Under Graduate education with flexible curricula, creative combinations of subjects, integration of vocational education and multiple entry and exit points with appropriate certification.**
- **UG education can be of 3 or 4 years with multiple exit options and appropriate certification within this period.**
- **For example, Certificate after 1 year, Advanced Diploma after 2 years, Bachelor's Degree after 3 years and Bachelor's with Research after 4 years.**
- **Regulation:**
- **Higher Education Commission of India(HECI) will be set up as a single overarching umbrella body the for entire higher education, excluding medical and legal education.**
- **HECI to have four independent verticals - National Higher Education Regulatory Council (NHERC) for regulation, General Education Council (GEC) for standard setting, Higher Education Grants Council (HEGC) for funding, and National Accreditation Council (NAC) for accreditation.**

- **HECI will function through faceless intervention through technology, & will have powers to penalise HEIs not conforming to norms and standards.**
- **Public and private higher education institutions will be governed by the same set of norms for regulation, accreditation and academic standards.**

- **Rationalised Institutional Architecture:**
- **Higher education institutions will be transformed into large, well resourced, vibrant multidisciplinary institutions providing high quality teaching, research, and community engagement.**
- **The definition of university will allow a spectrum of institutions that range from Research- intensive Universities to Teaching-intensive Universities and Autonomous degree-granting Colleges.**

- SATISH PRAJAPATI
STUDENT - ELECTRONICS AND COMMUNICATION

JUNE 2023

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Glimpses of Nirmanam'23-By The society of ECE 10:23 am

Different technical and non-tech activities were carried out in 3-day long Event. 10:25 am

JUNE 2023

PHOTOGRAPHS

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