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# Kamla Nehru

## Institute of Physical and Social Sciences

## Engineering Institute

Faridipur, Sultanpur, U.P.

Pathways to SUCCESS

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Diploma | B.Tech

# TECH-VISTA

## Annual Magazine 2021-22

## Volume 1

2021-22
(JULY)

KNIPSS
ENGINEERING
INSTITUTE
FARIDIPUR, SULTANPUR

Tech Vista Annual Magazine 2021-22
Volume 1

# Institute Vision

To be globally acclaimed technical institution producing competent engineering professionals with human values and societal concern.

# Institute Mission

M1: Providing contemporary knowledge of Science & Engineering in coordinated and integrated manner.

M2: Promoting culture of excellence in teaching learning practices supported by modern educational tools and techniques.

M3: Enhancing design and research culture to produce industry relevant professionals.

M4: Inculcating ethics, human values and societal responsibility

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Institute of Physical and Social Sciences

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Tech Vista Annual Magazine 2021-22
Volume 1

## Message from the Manager

I am delighted to unveil our college magazine, TECH-VISTA. The magazine is a testament to the extraordinary talent, creativity, and dedication of our students and faculty.

TECH-VISTA showcases the diverse range of thoughts that make our college a vibrant and intellectually stimulating environment. Beyond academic excellence, TECH-VISTA also highlights the importance of holistic development, encompassing intellectual, emotional, and spiritual prospective. This magazine celebrates the diverse talents, intellectual pursuits, and creative endeavors of our students and faculty. From cutting-edge research to artistic expressions, these pages showcase the multifaceted excellence that defines our institution

I extend my appreciation to the editorial team for their tireless efforts in bringing this exceptional publication to life..

**Shri. Vinod Singh Ji**
**Manager**

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Tech Vista Annual Magazine 2021-22
Volume 1

## Message from the Director

Greetings to our entire college community. The publication of our annual magazine is a moment of pride for the entire KNIPSS Engineering Institute Sultanpur family. In this rapidly evolving world of technology and innovation, education must transcend textbooks and classrooms.

Our institution is committed to prepare students who can think critically, innovate boldly, and lead responsibly. We believe that technical education must be coupled with a deep sense of purpose and responsibility toward society and the environment.

Through this magazine, we witness the creative potential, intellectual rigor, and human values . Each article, poem, and contribution reflects their growth as individuals and future professionals.

I encourage all students to embrace this platform as a means of self-expression and intellectual exploration. Let your voices be heard, your ideas be shared, and your perspectives be valued.

**Dr. Sarab Preet Singh**
**Director**

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Tech Vista Annual Magazine 2021-22
Volume 1

## Message from the Dean

It is with immense pride to present our college magazine, "TECH-VISTA." This publication represents the collective effort and creativity of our vibrant student and faculty community.

KNIPSS Engineering Institue stands as a beacon of technical education and innovation.

Our commitment extends beyond imparting knowledgewe aspire to develop individuals who are technically proficient, ethically grounded, and socially conscious.

This magazine celebrates the diverse talents, intellectual pursuits, and creative endeavors of our students and faculty. From cutting-edge research to artistic expressions, these pages showcase the multifaceted excellence that defines our institution.

I commend the editorial team for their dedication in bringing this publication to life. Their meticulous work has created a lasting record of our institution's growth and aspirations. As we continue our journey, I am confident that KNIPSS Engineering Institue will emerge as a center of excellence, contributing meaningfully to society through innovation and
sustainable practices.

**Mr. Ratnesh Singh**
**Dean**

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Tech Vista Annual Magazine 2021-22
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## Message from the Desk of Editorial Board

It is with great pride and profound satisfaction that I present the latest edition of our college magazine, TECH-VISTA. This publication embodies the intellectual vigor, artistic flair, and innovative spirit that define the KNIPSS community.

TECH-VISTA. serves as a remarkable platform to showcase the diverse talents and accomplishments of our students and faculty. Within these pages, you will find thought-provoking articles, imaginative literary works, and creative expressions that collectively reflect the dynamic culture of excellence at our institution.

**Mrs. Tazeem Fatima**
**Editor**

This magazine stands as a testament to the collaborative efforts and shared vision of our academic community. It not only highlights the achievements of our college but also reinforces our unwavering resolve to uphold the highest standards of education and creativity.

I extend my heartfelt gratitude to all the contributors for their exceptional efforts and to the students for their tireless dedication in bringing this publication to fruition. I am confident that TECH-VISTA will inspire its readers and serve as a source of pride for all associated with KNIPSS Engineering Institute.

**Mr. Manoj Bhargav**
**Editor**

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# Student coordinators

1- Omkar Sharma-Diploma 2nd Year Civil Engineering

2- Mirza Yaqub Beg -Diploma 2nd Year Civil Engineering

3- Swarit Srivastava - Diploma 2nd Year Electronics& Communication Engineering

4- Kalpana Dubey - Diploma 2nd Year Electronics& Communication Engineering

5- Abhishek Dubey -B.Tech 3rd Year Civil Engineering

6- Ankush Mishra -B.Tech 3rd Year Civil Engineering

7- Shani Agrahari -B.Tech 2nd Year Mechanical Engineering

8- Shivam Vishwakarma -B.Tech 3rd Year Mechanical Engineering

9-Rishabh Tiwari -B.Tech 4th Year Computer Science & Engineering

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# Department of Electronics & Communication Engineering

## Vision of the Department

To be a **leading department** producing **competent professionals** in the field of Electronics and Communication Engineering with **human values.**

## Mission of the Department

**M1:** Providing **contextual knowledge** & **skills** in line with industrial trends.

**M2:** Promoting **effective teaching** and **learning practices** using **modern tools** and techniques.

**M3:** Enhancing **the culture of innovation and product development**

**M4:** Inculcating **ethics** and **soft skills**.

## Program Educational Objectives (PEOs)

**PEO1: Equip** with contextual knowledge and technical skills to solve Electronics and Communication engineering problems.

**PEO2:Develop** leadership qualities and human values.

**PEO3: Prepare** for lifelong learning and communication skills.

## Program Outcomes

**PO1. Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

**PO2. Problem Analysis:** Identify and analyse well-defined engineering problems using codified standard methods.

**PO3. Design/ development of solutions:** Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

**PO4. Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

**PO5. Engineering practices for society, sustainability and environment:** Apply appropriate technology in context of society, sustainability, environment and ethical practices.

**PO6. Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

**PO7. Life Long Learning:** Ability to analyse individual needs and engage in updating in the context of technological changes.

### Program Specific Outcome's (PSO's)

**PSO1: Use of modern technological trends in the field of Communication Engineering.**

**PSO2: Use of modern technological trends in the field of embedded system for development of smart applications**

# Department of Civil Engineering Diploma Program

## Vision of the Department

To be a **leading department** producing **competent professionals** in the field of Civil Engineering with **human values.**

## Mission of the Department

**M1:** Providing **contextual knowledge & skills** in line with industrial trends.

**M2:** Promoting **effective teaching** and **learning practices** using **modern tools** and techniques.

**M3:** Enhancing the culture of **innovation** and **product development.**

**M4:** Inculcating **ethics** and **soft skills**.

## Program Educational Objectives (PEOs)

**PEO1:** **Equip** with contextual knowledge and technical skills to solve civil engineering problems.

**PEO2:** **Develop** leadership qualities and human values.

**PEO3:** **Prepare** for lifelong learning and communication skills.

## Program Outcomes

**PO1. Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

**PO2. Problem Analysis:** Identify and analyse well-defined engineering problems using codified standard methods.

**PO3. Design/ development of solutions:** Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

**PO4. Engineering Tools, Experimentation and Testing:** Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

**PO5. Engineering practices for society, sustainability and environment:** Apply appropriate technology in context of society, sustainability, environment and ethical practices.

**PO6. Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

**PO7. Life Long Learning:** Ability to analyse individual needs and engage in updating in the context of technological changes.

## Program Specific Outcome's (PSO's)

**PSO1:** Develop proficiency in handling infrastructure projects related to construction and restoration adopting sustainable materials and technologies, considering environmental responsibility and resource efficiency.

**PSO2:** Execute effectively in multidisciplinary teams, pursue higher studies and entrepreneurship, adopting modern tools and technologies

# Department of Civil Engineering B.Tech Program

## Vision of the Department

To **be** a **leading department** producing **competent professionals** in the field of Civil Engineering with **human values**.

## Mission of the Department

**M1:** **Providing contemporary knowledge** to students in line with industrial trends.

**M2:** **Promoting effective teaching** and **learning practices** using modern educational tools and techniques.

**M3:** **Promoting research environment** through training in emerging softwares and technologies.

**M4:** **Inculcating ethics and soft skills among students.**

## Program Educational Objectives (PEOs)

**PEO1:** Develop **professional competency** in Civil Engineering for global acceptance in **industry**, **research** and **premier institution** of higher studies**.**

**PEO2:** Develop **technical skills**, enabling them to **provide intelligent solutions** to meet **industry challenges**.

**PEO3:** Cope-up with **challenges** of **social** and **professional** concern by use of **modern** civil engineering tools and software.

**PEO4:** Exhibit **leadership quality and human values.**

**PEO5:** Demonstrate **effective communication and lifelong learning** 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, 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 Outcome's (PSO's)

PSO1: Analyze, design and supervise Residential and Public Buildings/ structures using the knowledge of Structural, Environmental, Irrigation and Transportation Engineering.

PSO2: Execute civil engineering profession ethically and to enhance lifelong learning by adopting modern engineering tools.

PSO3: Perform ethically and professionally fostering a collaborative work culture

# Department of Computer Science & Engineering

## Vision of the Department

**To be a leading department producing competent engineering professional in computer science and engineering with ethics and societal concerns.**

## Mission of the Department

**M1:** **Providing contemporary knowledge** to students in line with industrial trends.

**M2:** **Promoting Effective Teaching and Learning Practices using modern educational tools and techniques.**

**M3:** **Developing environment of research & development through training in emerging software and technologies.**

**M4:** **Inculcating ethics and soft skills among students.**

## Program Educational Objectives (PEOs)

**PEO1:** Develop professional **competency** in Computer Science and **Engineering** for global acceptance in **industries, research** and premier institution of higher studies.

**PEO2:** **Develop computing skills**, enabling them to provide **intelligent solutions** to meet industry challenges.

**PEO3:** **Compete** with the challenges of **social and professional concern** by use of modern tools and software.

**PEO4:** **Exhibit leadership quality** and **human values.**

**PEO5:** **Demonstrate effective communication** and **lifelong learning 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, 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.

## Specific Outcome's (PSO's)

**PSO1:** **Program Design/Development of Intelligent systems:** Design solutions of complex engineering problems and design system components and procedure that meet the trending smart space features required in different domains.

**PSO2:** **System verification and validation:** Design robust and fault tolerant components and systems

**PSO3:** **Collaborative work culture:** Perform ethically and prodfessionally fostering a collaborative work culture

# Department of Mechanical Engineering

## Vision of the Department

**To** be a **globally acclaimed department** producing competent professionals in the field of Mechanical Engineering with **human values**.

### Mission of the Department

**M1:** **Providing contextual knowledge** of science and engineering in coordinated and integrated manner.

**M2:** **Promoting effective teaching and learning practices** supported by modern educational tools and techniques.

**M3:** **Promoting research environment, use of simulation and automation.**

**M4:** **Inculcating ethics, soft skills** and **lifelong learning** among students.

### Program Educational Objectives (PEOs)

**PEO1: Develop professional competency** in Mechanical Engineering for **global acceptance** in industry, research and premier institutions of higher studies.

**PEO2: Develop technical skills**, enabling students to meet industry challenges.

**PEO3: Cope** up with **challenges of social** and **professional concern**.

**PEO4: Exhibit leadership quality** and **human values**

**PEO5: Demonstrate effective communication** and **lifelong learning** 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, 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.

## Specific Outcome's (PSO's)

PSO1: Advance Software Tools: Develop proficiency in designing through advanced software tools related to mechanical engineering.

PSO2: Multidisciplinary Approach: Adopt Multidisciplinary Approach to solve real world industrial problem.

PSO3: Collaborative work culture: Perform ethically and professionally fostering a collaborative work culture

## 5. Manufacturing the future

Manufacturing the future means embracing a digital-first, sustainable, and agile transformation, driven by AI, automation, IoT, and advanced analytics to create "smart factories," regionalized supply chains, and service-centric models, moving beyond cheap labor to skilled workforces and resilient, low-carbon operations, requiring significant investment in technology and skills for both developed and developing economies to foster innovation and global competitiveness.

**Key Drivers of the Manufacturing Revolution**

**Artificial Intelligence (AI) & Automation:** AI-powered systems enable autonomous, "lights-out" factories, optimizing energy use and drastically reducing defects, while advanced robotics handle complex tasks.

**Internet of Things (IoT):** Connected devices create real-time data streams, allowing for predictive maintenance, enhanced quality control, and seamless integration across the production ecosystem.

**Digital Twins & Advanced Analytics:** Virtual models simulate processes, enabling optimization, while data analytics predicts issues, improving efficiency and reducing waste.

**Additive Manufacturing (3D Printing):** Allows for rapid prototyping, complex part creation, and localized production, reducing reliance on traditional supply chains.

**Low-Carbon & Regional Supply Chains:** Manufacturers are moving production closer to demand centers (regionalization) to cut emissions, avoid tariffs (like CBAM), and build resilience, notes StartUs Insights.

**Evolving Business Models: Product to Service**

**Manufacturing-as-a-Service (MaaS):** Companies like Rolls-Royce (jet engines sold by usage) and John Deere (equipment advising on farming) shift from selling products to selling outcomes, powered by embedded sensors and data.

**Customer-Centric Value:** Continuous customer interaction and data analysis become central to value creation, offering personalized coaching (Babolat) or optimal resource use (John Deere).

**The Workforce & Skills Gap**

**Need for High-Skilled Labor:** The future demands educated workforces to build and operate smart factories, moving away from cheap labor reliance.

**Upskilling & Training:** Governments and industries must invest in education to equip workers with digital and tech skills, ensuring economic inclusion.

**Challenges & Opportunities**

**Resilience:** Post-pandemic, the industry seeks greater agility to counter disruptions through diversification and technology.

**Cybersecurity:** Digital infrastructure requires robust security, making it a crucial skill for all roles, from IT to plant management, according to Northeastern University.

**Global Competition:** Nations like India aim to boost manufacturing's GDP share (e.g., from 15-17% to 25-30%) through initiatives like Production Linked Incentives (PLI) and becoming a "China plus one" destination.

Manufacturing will be defined by hyper-connected, data-driven, and environmentally conscious operations that create new value streams, empower skilled workers, and build resilient, localized economies, requiring holistic system-level changes.

Prabhat Dubey

**Diploma 1st, Year CE**

## 6. Bladeless Wind Turbine

In the ever-evolving landscape of renewable energy, the **Bladeless Wind Turbine** stands out as a radical departure from the massive, rotating structures that have dominated wind farms for decades. Often referred to as "vortex" turbines, these sleek, pillar-like devices promise to solve the noise, maintenance, and ecological issues associated with traditional horizontal-axis turbines. Bladeless wind turbines represent a paradigm shift in wind energy, replacing rotating blades with oscillating masts that harness vortex-induced vibrations (VIV) for clean power, promising reduced noise, lower wildlife impact (especially birds), and easier urban deployment, though currently facing challenges in efficiency compared to traditional turbines, yet offering a potentially cheaper, simpler, and lower-maintenance future for distributed wind energy generation.

**The Core Technology: Harnessing "Vorticity"**

Unlike conventional turbines that use aerodynamic lift to spin blades, bladeless turbines operate on the principle of **Vortex-Induced Vibration (VIV)**.

**Vortex Shedding:** When wind flows past a cylindrical or conical mast, it creates a pattern of swirling air known as Von Kármán vortices. These vortices alternate from side to side, creating a fluctuating pressure difference that exerts a "lift force" perpendicular to the wind direction.

**Oscillation & Resonance:** The mast is designed to be flexible, often made of materials like carbon fiber or glass fiber reinforced polymers. When the frequency of these vortices matches the natural frequency of the structure, it enters a state of resonance, causing the mast to oscillate or "wobble" back and forth.

**Power Conversion:** This mechanical vibration is captured at the base by a linear alternator. Using neodymium magnets and copper coils, the kinetic energy of the swaying mast is converted into electrical energy via electromagnetic induction.

**Key Advantages over Traditional Turbines**

The bladeless design offers several distinct benefits that make it particularly attractive for modern energy grids:

## Key Advantages over Traditional Turbines

The bladeless design offers several distinct benefits that make it particularly attractive for modern energy grids:

**Low Maintenance:** With no gears, bearings, or rotating shafts, there is no need for oil or lubrication. This significantly reduces wear and tear, leading to an estimated **53% reduction in manufacturing costs** and much lower operational expenses.

**Wildlife Friendly:** The absence of high-speed rotating blades eliminates the risk of bird and bat strikes, one of the primary environmental criticisms of traditional wind farms.

**Urban Compatibility:** These units are nearly silent (operating at frequencies below 20 Hz, which are inaudible to humans) and have a tiny footprint. This makes them ideal for residential rooftops or densely populated urban areas where traditional turbines are prohibited.

**Low-Wind Operation:** Bladeless turbines can start generating power at wind speeds as low as **3 m/s (approx. 7 mph)**, allowing them to function in locations with less predictable breezes.

**Current Limitations and Challenges**

While promising, the technology is still maturing and faces specific hurdles:
**Lower Efficiency:** Currently, individual bladeless units produce about **3040% less energy** than a traditional turbine of the same height. However, proponents argue that because they have a smaller "swept area," you can pack more units into the same space to compensate for the lower per-unit output.

**Oscillation Stability:** Generating a steady voltage from variable vibrations is more complex than from a steady rotation. Companies like Vortex Bladeless use "tuning systems"magnetic repulsion mechanisms that adjust the mast's stiffness in real-time to maintain resonance across a wider range of wind speeds.

Researchers at the University of Glasgow recently used simulations to optimize a design that could generate up to **460 watts** from an 80 cm tall cylinderfour times the output of earlier prototypessignaling a major leap in efficiency for the near future. Bladeless wind turbines offer a compelling, innovative approach to wind energy, addressing key limitations of traditional designs. While not a replacement for large-scale farms, their unique ability to generate power quietly and safely in urban areas positions them as a valuable complementary technology, paving the way for broader, more accessible wind energy integration into our built environment.

**Mohd Zaid**

**Diploma 1st Year CE**

## 7. Adaptive Headlamps

Adaptive headlamps, often referred to as Adaptive Front-Lighting Systems (AFS) or Advanced Driving Beams (ADB), represent a major leap in automotive safety technology designed to enhance visibility during night driving. Unlike traditional fixed-beam headlights that only illuminate straight ahead, adaptive headlamps adjust the direction, range, and intensity of the light beam based on the vehicle's speed, steering angle, and surrounding traffic conditions.

This technology addresses a critical safety issue: while only 25% of traffic travels after dark, nearly half of all traffic-related fatalities occur in the dark.

**How Adaptive Headlamps Work**

Adaptive headlights utilize a combination of sensors, cameras, and microprocessors to analyze the driving environment in real-time.

**Sensor Inputs:** The system monitors the steering wheel angle, yaw rate (side-to-side movement), and vehicle speed.

**Actuators/Motors:** Electric motors within the headlight casings pivot the lamps left or right to follow the curve of the road.

**Vertical Adjustment:** Some systems also adjust the vertical aim of the beam to prevent blinding oncoming traffic when going uphill or downhill.
**Speed Sensitivity:** At higher speeds, the beams may adjust to illuminate further down the road, while at lower speeds, they may broaden to cover more of the side of the road.

**Key Types of Adaptive Lighting**
Adaptive technology generally falls into two categories, though modern systems often combine them:

**Curve-Adaptive Headlights:** These pivot side-to-side based on steering input, allowing drivers to see around corners before the car turns.

**Adaptive Driving Beams (ADB) / Matrix LEDs:** These systems use cameras to detect oncoming vehicles and, rather than switching to low beams, they dim or turn off specific LEDs in the matrix to "cut out" the oncoming vehicle, keeping the rest of the road brightly lit.

**Advantages of Adaptive Headlamps**
**Improved Safety:** By illuminating the path ahead rather than the shoulder of the road, drivers can identify hazards, pedestrians, and animals around corners much earlier.
**Reduced Driver Fatigue:** The improved, dynamic lighting reduces eye strain during long, dark, or winding journeys.
**No-Glare High Beams:** ADB systems allow for the frequent use of high beams without blinding other drivers.
**LED Efficiency:** Adaptive systems often use LED technology, which is more energy-efficient and has a longer lifespan than halogen, often lasting the life of the vehicle.

**Limitations and Considerations**
**High Cost:** These systems are complex, making them expensive to produce and repair. Replacement costs for damaged units can be very high.

**Sensitivity to Damage:** If cameras (often mounted behind the windshield) are misaligned, or if sensors are dirty, the system may not work correctly.

**Limited Turning Angle:** Current technology generally allows the lamps to turn only a limited number of degrees, often around 15 degrees from the center.

**Replacement Complexity:** They are typically sealed units, requiring the entire assembly to be replaced rather than just a bulb.
Once considered a high-end luxury feature, adaptive headlamps are increasingly becoming standard on many vehicles. The technology is advancing towards "robotic eye" headlights, which use advanced computer vision to actively read the road environment. Furthermore, regulatory changes in the United States, which previously had strict rules favoring fixed-beam headlights, now allow for Advanced Driving Beams (ADB), opening the door for wider adoption of this safer, smarter lighting technology.

**Akarshit Singh**

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## 8. Automatic street light system

An automatic street light system revolutionizes urban lighting by using sensors (like LDRs, motion, or IoT) and microcontrollers (Arduino, ARM) to detect darkness or activity, turning lights on/off and adjusting intensity, drastically cutting energy waste from manual systems, enhancing safety, and enabling smart city integration through wireless control and data analysis for efficient power management and proactive maintenance. An automatic street light system is an intelligent infrastructure solution that manages outdoor lighting by automatically switching lights on at dusk and off at dawn based on ambient light levels or motion detection. These systems eliminate the need for manual intervention, significantly reducing energy waste and maintenance costs while enhancing public safety.

**Technologies & Components**
Modern automatic street light systems typically employ one of three main control mechanisms:

**LDR (Light Dependent Resistor) Systems**: This is the most common and cost-effective method. The LDR sensor detects ambient light intensity; its resistance increases in darkness, triggering a microcontroller or transistor to turn the light ON.

**Motion-Based Systems (PIR/Ultrasonic)**: Often used in low-traffic areas or parking lots, these systems use PIR (Passive Infrared) or ultrasonic sensors to detect movement. Lights remain at a "dim" level or OFF until a vehicle or pedestrian is detected, at which point they switch to full brightness.

**IoT-Based Smart Systems**: The most advanced version, utilizing the Internet of Things to enable remote monitoring and centralized control. These systems can report faults automatically, adjust brightness based on real-time data, and integrate with solar energy management.

**Components**

Regardless of the complexity, most systems share these fundamental hardware and software components:

| Component | Description |
|---|---|
| Microcontroller | Acts as the "brain," typically an Arduino Uno, ATmega8, or 8051. |
| Sensors | LDR for light intensity, PIR for motion, or IR for object detection. |
| Light Source | Energy-efficient **LEDs** are preferred over traditional high-pressure sodium (HPS) lamps due to their 50,000+ hour lifespan. |
| Control Circuit | Includes relays to switch the high-voltage AC lights and transistors for signal processing. |
| Software | Written in languages like Embedded C, managing threshold values for light and motion. |

## Benefits

**Energy Efficiency**: Motion-based dimming can save up to **70-80%** of electricity compared to traditional lights that run at 100% power all night.

**Cost Reduction**: Municipalities can save millions annually. For example, a town with 1,000 LED lights could see a 70% reduction in energy costs, potentially saving over $7,000 monthly.

**Safety and Security**: Well-lit streets reduce night-time crashes by roughly **50%** and discourage criminal activity.

Lower energy consumption directly translates to a smaller carbon footprint, supporting s Automatic street light systems are a vital component of modern, sustainable urban infrastructure, transforming basic illumination into an intelligent, responsive utility. By leveraging sensors, microcontrollers, and IoT, these systems offer unparalleled energy savings, improved public safety, and reduced operational burdens, paving the way for truly smart cities that adapt to human needs and environmental conditions. mart city and net-zero goals.

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## 9. Social Problems: - wrote about Bullying, Ragging etc. Tricks to Tackle such Things

In the tapestry of human civilization, social cohesion is built on respect, empathy, and mutual understanding. However, this fabric is often torn by deep-seated social issues that create hostile environments, particularly for the youth. Among the most pernicious of these problems are bullying and ragging. Though often dismissed in the past as mere "child's play" or "bonding rituals," these behaviors are recognized today as serious antisocial,, and often criminal, acts. They violate human dignity, severely impact mental and physical health, and erode the foundation of a safe educational and social structure. Addressing these issues requires an understanding of their nature, consequences, and robust strategies to combat them.

**Bullying**

Bullying is defined as unwanted, aggressive behavior among school-aged children (or adults in workplaces) that involves a real or perceived power imbalance . It is characterized by repetitionthe behavior happens more than once or has the potential to be repeated. Bullying takes various forms:

**Physical Bullying:** Involves harm to a person's body or property (hitting, kicking, stealing, destroying belongings).

**Verbal Bullying:** Involves saying or writing mean things (teasing, name-calling, inappropriate sexual comments, taunting).

**Social/Relational Bullying:** Involves harming someone's reputation or relationships (spreading rumors, embarrassing someone in public, excluding someone on purpose).

**Cyberbullying:** Occurs over digital devices like cell phones, computers, and tablets, often allowing the bully to remain anonymous and causing 24/7 harassment.

The consequences of bullying are profound, leading to anxiety, depression, loss of self-esteem, poor academic performance, and in tragic cases, suicide.

## Ragging

While bullying is prevalent in schools, "ragging" is a specific form of harassment commonly found in higher education institutions, particularly in South Asia. It is often touted as a method for fostering camaraderie or welcoming juniors (freshers). However, in reality, it is a form of abuse that often involves physical violence, sexual harassment, psychological torture, and humiliation

Ragging is an assertion of power by senior students over juniors. It is not about bonding; it is about intimidation. The psychological trauma caused by ragging can leave permanent scars, causing victims to drop out of college or, in severe cases, take their own lives .Unlike bullying, which is often interpersonal, ragging is frequently institutionalized, with seniors acting in groups to intimidate, creating a culture of silence where victims fear reporting the perpetrators.

## The Shared Consequences and Societal Impact

Both bullying and ragging foster an environment of fear rather than growth. They create a victim-blamer culture where the injured party is often expected to remain silent to fit in. The victims frequently suffer from post-traumatic stress disorder (PTSD), severe anxiety, and, in many cases, a lifelong aversion to social interaction or educational environments. Furthermore, these behaviors breed future perpetrators; if not addressed, bullies and raggers often grow into individuals who abuse power in their professional or personal lives

## Tricks and Strategies to Tackle Bullying and Ragging

Combating these deeply rooted issues requires a multi-pronged approach involving individuals, educational institutions, and legal systems.

## Awareness and Education (Preventive Measures)

**Educational Campaigns:** Schools and colleges must conduct regular workshops explaining what constitutes bullying/ragging and its consequences.

**Open Dialogue:** Encouraging a culture where discussing problems is encouraged, and seeking help is not considered a weakness.

**Ethical Training:** Imparting values of empathy and respect for diversity in the curriculum.

**Empowerment of the Individual (Tackling Techniques)**

**The Power of 'No':** Victims should be trained to assert themselves calmly and firmly.

**Avoid Isolation:** Bullies target individuals who are alone. Staying in groups or maintaining a visible presence can deter potential attackers.

**Documentation:** Keeping a record of incidents (dates, times, witnesses, nature of the incident) is crucial for reporting.

**Cyber-Safety:** For cyberbullying, individuals should block the bully, take screenshots as evidence, and report the behavior to the platform.

**Institutional Responsibility**

**Zero Tolerance Policy:** Educational institutions must enforce strict, transparent, and non-negotiable policies against bullying and ragging.

**Anonymous Reporting Systems:** Installing complaint boxes, helpline numbers, or online portals where victims can report incidents without fear of retaliation.

**Anti-Ragging Squads:** Actively patrolling campuses, especially in hostels, during the initial months of the academic year.

**Legal and Administrative Action**

**Strict Punishment:** Penalties must be severe, including suspension, expulsion, or criminal charges for perpetrators.

**Legal Accountability:** Governments must ensure the enforcement of anti-ragging laws, making the institutions themselves liable if they fail to prevent such acts. Bullying and ragging are not just personal issues; they are social diseases that threaten the well-being of the next generation. They violate the fundamental right to safety and dignity. Eradicating these behaviors requires a collective effort to shift from a culture of apathy to one of empathy. By fostering an environment where every individual is respected, and by empowering victims to speak up while holding perpetrators accountable, society can tackle these problems effectively. A safe, respectful environment is not a luxury; it is a necessity for fostering a healthy, productive, and humane society.

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## 10. Motivational Quotes

Motivational quotes serve as powerful catalysts for action, mindset shifts, and resilience, offering distilled wisdom on success, failure, perseverance, and self-belief, transforming abstract goals into tangible steps through concise, memorable phrases from historical figures and thinkers that inspire courage, optimism, and persistent effort, making them essential tools for personal and professional growth. From Churchill's "Success is not final; failure is not fatal" to Gandhi's "Learn as if you will live forever," these nuggets of wisdom reframe challenges, encourage positive thinking, and remind us that our inner state dictates our outer reality, guiding us through difficulties and towards achieving our dreams.

**Lists of Motivational Quotes of some famous personalities.**

1. "Success is not final; failure is not fatal: It is the courage to continue that counts." Winston Churchill.
2. "The future belongs to the competent. Get good, get better, be the best!" Brian Tracy.
3. "We cannot solve problems with the kind of thinking we employed when we came up with them." Albert Einstein.
4. "Once you replace negative thoughts with positive ones, you'll start having positive results." Willie Nelson.
5. "Life is 10% what happens to you and 90% how you react to it." Charles R. Swindoll.
6. "The biggest adventure you can ever take is to live the life of your dreams." Walt Disney.
7. "Act as if what you do makes a difference. It does." William James.
8. "We may encounter many defeats but we must not be defeated." Maya Angelou.

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## 11. Led Light Blinker

LED (Light Emitting Diode) technology has revolutionized lighting, offering unmatched efficiency, durability, and versatility. Beyond static illumination, LED blinking systemsalso known as LED flashersare essential in modern applications, ranging from automotive turn signals and emergency lighting to decorative displays and indicators. This article explores the technology behind LED blinkers, their various applications, and the engineering principles involved in their design. An LED light blinker is an electronic device that controls the intermittent on/off cycling of LEDs. Unlike traditional incandescent bulbs, which rely on a heated filament, LEDs are solid-state components that emit light through electroluminescence. This allows them to switch on and off almost instantlyfaster than 0.1 microsecondsmaking them ideal for rapid flashing applications.

### Key Components & Advantages:

**High Efficiency & Long Life:** LEDs consume far less power and can last up to 25,000 to 50,000+ hours.

**Superior Brightness:** Modern LEDs provide intense, focused light, improving visibility in diverse conditions.
**Durability:** They are highly resistant to shocks and vibrations, making them perfect for automotive environments.

### Common Applications of LED Blinkers

LED blinkers are widely used in various sectors where safety and attention-grabbing are paramount.

### Automotive Lighting

**Turn Signals & Indicators:** LED strips are commonly used for high-visibility turn signals and brake lights, featuring instant-on technology for better safety.
**Sequential Turn Signals:** Modern cars often use sequential LED blinkers that turn on in sequence for a stylish, high-tech look.
**Daytime Running Lights (DRLs):** Flexible LED strips are used for combined DRL and indicator functionality.

**Emergency & Safety Lighting**

**Emergency Vehicles:** Police cars, ambulances, and fire trucks use LED flashers (e.g., quad-flash, strobe, and alternating patterns) for maximum visibility.
**Warning Lights:** Roadside safety, strobe lights, and warning beacons often utilize flashing LEDs for their high intensity and low power consumption.

**Industrial and Electronic Indicators**
**Dashboard Indicators:** Used in electronics and machinery to show status (e.g., power, error, activity).
**Consumer Products:** Toys, decorative lights, and wearable gadgets frequently feature blinking LEDs.

**Technology Behind LED Blinking**
LEDs blinkers operate based on complex electronic principles to control the flashing rate, pattern, and synchronization.
**The "Hyper Flash" Issue**

When upgrading traditional halogen turn signals to LEDs, the lower current draw of LEDs can cause a "hyper flash" (fast blinking) issue. The car's computer interprets the low power consumption as a burnt-out bulb. This is resolved by installing:

**Load Resistors:** These mimic the higher power draw of halogen bulbs, slowing the flash rate to normal.
**LED Flasher Relays:** Replacing the vehicle's stock flasher relay with one designed for LED compatibility.
**Driving Circuits**

To make an LED blink, a circuit is required to toggle the power.
**555 Timer IC:** A common, reliable method for creating a stable blinking frequency (Astable mode).

**Transistor Circuits (Astable Multivibrator):** Uses two transistors to alternately blink two sets of LEDs.

**Microcontrollers:** Provide maximum flexibility, allowing for programmed, complex, or adjustable flash patterns.

**Pulse Width Modulation (PWM)**

PWM is used to control LED brightness and create flashing effects. By varying the duty cycle (percentage of time the light is "on"), the LED can be dimmed or pulsed without changing its color.

**Designing a Simple LED Blinker**

A basic LED blinker requires a few fundamental components:

**LEDs:** The light-emitting diodes.

**Power Source:** Usually 6V-12V DC.

**Resistors:** Current-limiting resistors (e.g., 220-ohm) are crucial to prevent the LED from burning out.

**Capacitors:** Used in astable multivibrator circuits to determine the timing of the flashes.

**Potential Issues and Solutions**

While LED blinkers offer many benefits, they can encounter issues:

**Flickering:** Poor quality drivers or voltage surges can cause unwanted flickering.

**Environmental Damage:** For automotive use, ensuring LED strips are waterproof (e.g., using silicone sealant) is essential for longevity.

**Heat Sensitivity:** Although LEDs run cooler than halogens, excessive heat can still damage them if they lack proper heat sinks.

**Future Trends in LED Signaling**

The future of LED blinkers involves smarter, more integrated systems.

**Adaptive Lighting:** LED blinkers that automatically adjust brightness based on ambient light conditions

**Smart Communication:** Using LEDs for Vehicle-to-Everything (V2X) communication, where blinkers convey data or, in specialized applications, used in Visible Light Communication (VLC).

**Higher Density Strips:** Increased LED density allows for more complex, high-resolution animations and patterns.

LED light blinkers are indispensable in modern life, providing safety, efficiency, and aesthetic appeal. As technology continues to evolve, these devices will become even more advanced, offering greater control and reliability for both consumer and industrial applications. Understanding their design and application ensures that they are utilized for maximum effectiveness.

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## 12. An Experience You've had with a Stranger.

Life is a tapestry woven with countless threads, some familiar and others completely unknown. While we often treasure the company of friends and family, it is the fleeting encounters with strangers that sometimes leave the most profound marks on our souls. These encounters, free from expectations or history, possess a unique honesty. I used to believe that strangers were merely background actors in my life's story, but an incident during a chaotic, rain-soaked evening in New Delhi completely altered my perspective, teaching me the value of human empathy

It was a Tuesday in July, right in the middle of the monsoon season. I had just finished an extra class at my coaching center near Connaught Place. As I stepped outside, the sky opened up. The streets were flooded, traffic was at a standstill, and finding an auto-rickshaw seemed impossible. I was standing under a cramped bus shed, soaking wet, clutching my bag containing a newly purchased, expensive physics textbook. I was feeling irritated, hungry, and anxious about getting home

I noticed an elderly man standing nearby. He was dressed in a simple, faded dhoti and kurta. His appearance was humble, perhaps suggesting he was a laborer or a street vendor. Unlike others who were complaining, he was watching the rain with a calm, almost meditative expression. He saw my distressI was frantically checking my phone and trying to cover my books.

He moved closer and said in a soft, kind voice, *"Beta, it will not stop for at least an hour. Don't worry about the books; they won't get wet here."*
Initially, my instinct was to be guarded, as we are taught not to talk to strangers. But his demeanor was disarming. I nodded and expressed my frustration about the traffic.

Instead of walking away, he started talking about the monsoon, how it was a blessing for the farmers in his village, and how the city's hurry was just a temporary phase. He shared that he was waiting to meet his daughter, who worked in a nearby office.

As we talked, I realized I was forgetting my hunger and annoyance. He was wise, speaking about life with a simplicity I hadn't encountered before. He didn't ask for money or anything in return; he was just offering company to a stressed student. He told me, *"The rain only clears the dirt, it does not create it. Similarly, hard times only show us our strength."*

When a small break in the rain came, he noticed a stray dog shivering under a nearby car. He took off his own towel, walked out into the rain, and covered the dog. He came back dripping wet, but smiling. That moment struck me profoundly. Here was someone with very little, yet he had the empathy to care for a creature in need, while I was worried about my own comfort.

A few minutes later, an auto-rickshaw finally arrived. The man waved it down for me. As I paid the driver, the old man simply said, *"Be kind, Beta. The world is kind to those who are kind."* I didn't even get his name.

That evening, I didn't just get home; I arrived with a new outlook. That stranger showed me that kindness is a universal language that bridges the gap between strangers. In our fast-paced lives, we often overlook the humanity of the people we pass by. That experience taught me that every stranger is a potential friend, and a simple act of empathy can change a person's day, or perhaps, their life. It was a lesson in compassion I never learned in a classroom.

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## 13. Success Mantra

A success mantra isn't a single secret but a blend of mindset, action, and resilience, emphasizing clear goals ,relentless hard work, discipline, and a positive outlook that views failure as a learning tool, not a dead end, all while maintaining focus, managing time, and consistently improving oneself to transform dreams into tangible achievements.

**The Foundation: Mindset & Vision**

**Define Your Success:** First, clarify what success means *to you*, whether it's wealth, personal growth, or helping others. Write it down to make it real.
**Dream & Visualize:** Dr. A.P.J Abdul Kalam said, "Dream, dream, dream. Dreams transform into thoughts, and thoughts result in action". Your vision guides your journey.
**Proactive Stance:** Take charge of your life, rather than waiting for things to happen.

**The Engine: Action & Discipline**

**Hard Work & Dedication:** Success is built on consistent, tireless effort, not luck. Thomas Edison's thousands of attempts prove this.
**SMART Goals:** Make goals Specific, Measurable, Achievable, Relevant, and Time-bound (e.g., "30 mins yoga daily" not "stay healthy").

**Small Steps & Planning:** Break big goals into manageable steps, creating a clear action plan.
**Focus & Routine:** Avoid multitasking, negative thoughts, irregular schedules, and excessive screen time. A fixed routine stabilizes your mind.
**Prioritize:** Put first things first by focusing on important tasks that move you forward.

**The Fuel: Resilience & Positivity**
**Embrace Failure:** View setbacks as temporary learning experiences, not definitions of self. Failure is part of the process.

**Positive Attitude:** Positive thinking attracts positive outcomes. Encourage yourself and celebrate small wins.

**Persistence:** Persist until you achieve your goals, even when it's difficult.
**Gratitude & Self-Belief:** Be thankful for daily progress and have faith in your ability to succeed.

**The Mantras Summarized**
**Action over Idleness:** Idle lives lead to failure; activity is nature's law.
**Internal over External:** Success comes from within your ability, courage, and integrity.

**Growth over Destination:** It's about becoming a better person and continuous self-improvement.

**Listen & Understand:** Build strong relationships by listening empathetically.

Ultimately, a success mantra is personal but universally relies on transforming clear visions and dreams into disciplined, focused, and persistent action, learning from every stumble, and cultivating the inner strength to reach your goals.

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## 14. SWARA SANGAM

"Swara Sangam" translates to the "confluence of musical notes" or a "gathering of melodies." It is a profound term deeply rooted in Indian classical music, representing the union of the seven fundamental swaras (notes) to create harmony, raga, and emotion.

This concept manifests in three main forms: as the philosophical, mythological, and structural basis of the notes themselves, as a musical event or festival, and as a metaphor for creative collaboration.

In Indian classical music (both Hindustani and Carnatic), *Swara* refers to the seven notes of the scale**Sa, Re, Ga, Ma, Pa, Dha, Ni**which together form the *Saptak*.
At its core, **Swara Sangam** refers to the harmonious meeting of the seven fundamental musical notes, known as the **Saptak**:

**Sa** (Shadja) The root note, often associated with the peacock.
**Re/Ri** (Rishabha) Derived from the sound of a bull or skylark.
**Ga** (Gandhara) Representing the bleat of a goat.
**Ma** (Madhyama) Linked to the heron or dove.
**Pa** (Panchama) The fixed fifth note, resembling the cuckoo.
**Dha** (Dhaivata) Reflecting the neighing of a horse.
**Ni** (Nishada) Mirroring the trumpeting of an elephant.

The *Sangam* (confluence) occurs when these notes transition into one another through Sargam exercises and melodic structures like Ragas. This meeting creates the "melodic framework" that distinguishes Indian Classical music from other global traditions

**The Philosophical Sangam:** Ancient Indian philosophy suggests these seven notes correspond to the seven chakras (energy centers) in the human body, creating a spiritual "sangam" (confluence) within the musician.

**Sargam:** The arrangement of these swaras in specific, melodic sequences forms the *Sargam* or *Raga*, which is the cornerstone of Indian music.

**Swar Sangam: The Musical Festival**
"Swar Sangam" is also widely used as the name for music festivals dedicated to celebrating and preserving Indian classical heritage.

**Dhanbad Swar Sangam:** A prominent two-day festival aimed at promoting classical music and providing a platform for budding artists. It usually features competitions in vocal music, instrumental tabla, and classical dance, often culminating in performances by young artists.

**Bhilwara Sur Sangam:** A notable example of a "musical meeting point" that brings together stalwarts of Hindustani music to honor musical traditions.

**Significance:** These festivals serve as a bridge between generations, offering a space where traditional ragas are rendered and new talent is showcased.

**Swara Sangam: Musical Education and Collaboration**

The term is frequently used in musical, educational, and artistic contexts to denote a coming together of different musical styles, instruments, or ideas.

**Swara Sangam Newsletter:** Musicians such as Shubhendra Rao and Saskia Rao-de Haas use "Swara Sangam" as a title for their publications, focusing on music education and cross-cultural collaborations.

**Musical Collaboration:** It describes a "sangam" or fusion of techniquessuch as combining the rigorous structure of Hindustani classical with the nuanced, microtonal aspects of Carnatic music.

**Swara in Mythology**

The origins of the seven swaras are also linked to a "sangam" of divine sounds. According to legend, the sage Narada created the seven swaras from the sounds of nature. Another legend suggests that the seven swaras originated from the five faces of Lord Shiva (Panchavaktra), representing a, divine confluence of sound. Whether it is the intimate, internal "sangam" of notes within a raga, or the physical gathering of artists and rasikas (listeners) at a concert, "Swara Sangam" represents a deeper, spiritual, and aesthetic pursuit of harmony in Indian classical music. It is a celebration of the profound impact of sound on the human experience. Swara Sangam is the heartbeat of Indian melody. It is where the rigid rules of Swarasthanam (pitch position) meet the fluid expression of the performer. Whether viewed as a technical musical term or a spiritual metaphor, it remains a celebration of the unity found within diversitywhere individual notes surrender their identity to create a singular, transcendent experience.

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## 15. Capacitors

Capacitors are fundamental passive electronic components that store electrical energy in an electric field, acting like tiny, fast-rechargeable batteries by holding charge between two conductive plates separated by a dielectric (insulator). They are crucial in almost all electronic circuits for filtering power (smoothing ripples), timing signals, coupling/decoupling AC/DC, and rapid energy bursts (like camera flashes). Key aspects include capacitance (storage ability, in Farads), voltage rating (max voltage), and type (ceramic, electrolytic, etc.), with different types offering specific performance for applications ranging from tiny mobile devices to large power systems.

**How Capacitors Work**

**Structure:** A basic capacitor has two metal plates (conductors) separated by an insulating material (dielectric), such as air, ceramic, paper, or plastic
.

**Charging:** When connected to a DC voltage source (like a battery), electrons are pulled from one plate (making it positive) and pushed onto the other (making it negative).

**Energy Storage:** This separation of charge creates an electric field, storing energy. The voltage across the capacitor builds up until it matches the source voltage.

**Discharging:** When disconnected from the source and connected to a load (like a light bulb), the stored electrons flow from the negative plate to the positive plate, powering the load until neutral.

**Key Characteristics**

**Capacitance (C):** Measured in Farads (F), but usually picofarads (pF), nanofarads (nF), or microfarads (μF). It's the measure of charge storage capacity.

**Voltage Rating:** The maximum voltage the dielectric can withstand before breaking down.

**Dielectric Material:** Determines the type (ceramic, film, electrolytic) and performance.

**Polarity:** Electrolytic/tantalum capacitors have positive (+) and negative (-) terminals and must be connected correctly.

**Equivalent Series Resistance (ESR):** Internal resistance that affects high-frequency performance.

**Types of Capacitors**
**Ceramic:** Small, rugged, non-polarized, good for high frequencies.
**Electrolytic (Aluminum/Tantalum):** High capacitance in small size, polarized, good for power filtering.

**Film (Plastic/Polyester):** Stable, low loss, good for audio/timing.
**Mica/Glass:** Very stable, low loss, for precision RF applications (expensive).
**Variable:** Adjustable capacitance, used in tuning circuits (e.g., old radios).

**Applications**
**Energy Storage:** Camera flashes, backup power, defibrillators.
**Filtering/Smoothing:** In power supplies to convert pulsating DC to stable DC (smoothing ripples).
**Coupling/Decoupling:** Blocking DC while passing AC signals in audio/RF circuits.
**Timing/Oscillation:** With resistors to create time delays (e.g., in timers, clocks).
**Power Factor Correction:** In large electrical systems to improve efficiency.
Capacitors are indispensable passive components, alongside resistors and inductors, forming the backbone of modern electronics, enabling everything from simple filters in your phone charger to complex signal processing in advanced communication systems. Their ability to store and release energy quickly makes them vital for power management, signal integrity, and device functionality.

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## 16. The Educated Illiterate

The "educated illiterate" is a paradox describing individuals with formal schooling but lacking fundamental wisdom, civic sense, or practical life skills, often seen in behaviors like littering despite knowing better, or making poor ethical choices despite high qualifications, highlighting a disconnect between academic knowledge (like reading/writing) and true literacy (understanding, applying knowledge for societal good), suggesting that true education involves discipline, values, and social responsibility, not just degrees.

**The Paradox of Formal Learning vs. Practical Wisdom**

The term "educated illiterate" challenges the traditional definition of literacy, which extends beyond mere decoding of text to include comprehension, critical thinking, and application in context, as defined by UNESCO. It points to a societal phenomenon where individuals acquire impressive academic credentialsdegrees, diplomas, even PhDsyet fail to demonstrate basic human decency, ethical conduct, or understanding of community responsibilities, making them functionally illiterate in the broader sense of living a responsible, contributing life.

**Manifestations in Society**

**Civic Neglect:** Despite attending schools that teach civic duty, many "educated" individuals engage in spitting, littering, or disrespecting public spaces, actions that reflect a profound lack of civic sense.

**Ethical Failures:** High-profile examples exist of leaders with stellar academic backgrounds making decisions driven by self-interest or luxury, demonstrating that financial knowledge or advanced degrees don't guarantee sound judgment or moral compass.

**Dependence & Lack of Initiative:** A person with advanced degrees might still struggle with basic tasks, relying on others for simple tasks like reading mail, showing how academic learning doesn't always translate to independence.

**Disregard for Rules:** In critical situations, like pandemics, educated individuals sometimes flout simple safety measures (masks, distancing) as readily as the uneducated, proving that education doesn't inherently instill discipline or respect for collective well-being.

**The Root Cause: A Deficiency in True Literacy**

The issue lies in education systems sometimes prioritizing rote learning and exam scores over character development, critical thinking, and the cultivation of empathy, values, and wisdom (as highlighted in this Medium article).

**Knowledge vs. Wisdom:** Formal education imparts knowledge (what to think), but true literacy cultivates wisdom (how to think and act).

**Discipline & Values:** True education fosters self-discipline and a strong value system, essential for translating knowledge into responsible action, something often missing.

**The Way Forward: Redefining Education**

**Holistic Approach:** Education must move beyond textbooks to instill a sense of responsibility, ethics, and community participation, making individuals not just learned, but truly literate and enlightened citizens.

**Leading by Example:** Simple acts of civic responsibility by educated individuals can set precedents, showing that being "educated" means being a better human, not just a knowledgeable one, as one Facebook post suggests.

**Focus on Application:** The goal should be to produce individuals who can use their learning to build society, understand their rights and duties, and contribute positively, transforming formal education into genuine societal progress.

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## 17. The Ragging Storm

The transition from school to college is one of the most anticipated phases in a student's life. It promises independence, intellectual growth, and the forging of new friendships. However, for thousands of young adults in various parts of the worldmost notably in Indiathis transition is overshadowed by a dark, looming storm: Ragging. Often misrepresented as "informal introduction" or a "rite of passage," ragging is, in reality, a form of systemic abuse, bullying, and intimidation. This "ragging storm" frequently destroys the physical, emotional, and mental well-being of freshers, turning places of learning into arenas of fear and, in extreme cases, taking innocent lives.

### What is Ragging?

Ragging is any conduct by senior students towards newcomers that causes physical, emotional, or psychological abuse, harm, or fear. It encompasses a wide spectrum of, but not limited to, verbal abuse, sexual harassment, humiliation, physical torture, and coercing freshers to perform acts they would not normally do. Proponents of this practice, often seniors who were once victims themselves, argue that it is a "rite of passage" that helps break the ice and builds camaraderie. However, this is a flawed narrative. The "tradition" is a perversion of mentorship, often rooted in a desire to assert power over the vulnerable. While the goal might ostensibly be to build confidence, the result is the destruction of self-esteem, with incidents often involving severe degradation.

### Effects on Victims

The impact of the ragging storm is multifaceted, disrupting not only the academic life of the student but also their long-term health.

**Psychological and Emotional Trauma:** The mental anguish caused by ragging can be severe, leading to depression, anxiety, post-traumatic stress disorder (PTSD), and in tragic scenarios, suicide. Victims often fear going to college, leading to a loss of interest in studies.

**Physical Abuse:** Ragging frequently involves physical assault, resulting in injuries, hospitalization, and, as statistics have painfully shown, death.

**Social Isolation and Academic Decline:** A student, who enters a new environment with high hopes, may become withdrawn, shy, and isolated, directly impacting their academic performance and future career prospects.

**Why the Storm Rages**

The persistence of ragging despite strict laws is due to a deeply rooted culture of impunity.

**The Cycle of Abuse:** Many perpetrators are victims who now wield the same power over juniors as a form of "revenge" or to feel empowered.

**Peer Pressure:** Often, senior students may not personally wish to participate in ragging but succumb to pressure from their peers or seniors.

**Normalization of Violence:** In some institutions, especially in hostel settings, such behavior is overlooked by authorities, thereby normalizing abuse.

**Legal Frameworks and Institutional Responsibility**

Given the severity of this issue, the legal system has taken a stern stand. The Supreme Court of India has upheld strict anti-ragging guidelines, defining it as a punishable offence.

**Legal Consequences:** According to the Prohibition of Ragging Act, perpetrators can face imprisonment, heavy fines, and expulsion from the institution.

**Institutional Accountability:** Colleges are responsible for ensuring a safe environment. This includes installing CCTV cameras, surprise visits to hostels by anti-ragging squads, and strict implementation of anti-ragging regulations, including the filling of affidavits by students and parents.

**To stop the storm of ragging, a collective effort is needed:**

**Strict Enforcement:** Laws must be implemented strictly, with zero tolerance for perpetrators.

**Counseling and Support:** Colleges must offer robust counseling services for victims to help them cope with trauma.

**Awareness Campaigns:** Promoting a culture of empathy and equality from day one.

**Reporting Mechanisms:** Anonymized and secure platforms for students to report incidents without fear of retaliation.

The ragging storm is a blot on the educational system, transforming potential leaders into broken individuals. It is an archaic practice that has no place in a civilized society. A college campus should be a safe haven for intellectual, social, and emotional growth, not a theater of humiliation. The eradication of ragging requires a shift in mindset, where seniors treat juniors with respect, and authorities hold violators strictly accountable. Only then can we truly foster an atmosphere of dignity and learning, allowing the storm to dissipate and making way for a brighter, safer future for all students.

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## 18. DTMF based remote

Dual-Tone Multi-Frequency (DTMF) based remote control systems represent a significant intersection of telecommunication and embedded system technology. In an era where automation is no longer a luxury but a necessity, DTMF technology provides a cost-effective, reliable, and accessible method for controlling devices from a distance. The technology, which drives the familiar touch-tones produced when pressing telephone keypad buttons, is utilized to send commands to a receiver, allowing users to control home appliances, industrial machinery, or even robotic vehicles.

DTMF is a signaling system that uses pairs of pure sine waves to represent specific numbers, symbols, or letters on a telephone keypad. Each key press generates a combination of two frequenciesa low-frequency group (697941 Hz) and a high-frequency group (12091633 Hz).

**Working Mechanism**

A typical DTMF-based remote control system consists of two main parts: the transmitter (mobile phone) and the receiver (the control circuit).

**Transmitter**

The transmitter is a simple mobile phone with a keypad, acting as a remote controller. When the user dials the phone number attached to the receiver unit, the call is established. The user then presses the number keys to send corresponding DTMF tones.

**Receiver Unit**

The receiver unit consists of the following key components:

**Receiving Phone:** A mobile phone set to auto-answer mode, which receives the incoming call and outputs the audio signal.

**DTMF Decoder (MT8870):** This IC receives the audio signal from the phone's earphone jack and converts it into a 4-bit binary, or parallel, digital output.

**Microcontroller (e.g., Arduino, 8051):** The microcontroller acts as the brain, processing the binary output from the MT8870. It reads the code and determines which command to perform (e.g., if code equals 'X', turn on Lamp 1).

**Relay Driver & Relay Module:** Since the microcontroller cannot directly control high-voltage appliances (like AC bulbs or fans), it uses a relay driver (like ULN2003) to trigger a relay, which serves as a switch for the 220V AC load.

**Working Principle**

The user calls the receiver phone, which auto-answers. The user presses a key (e.g., '1'), which produces a tone. The MT8870 converts this tone into a digital signal (e.g., 0001). The microcontroller reads this 0001 and triggers the relay connected to pin 1, switching the appliance ON or OFF.

**Applications of DTMF Technology**

DTMF remote control technology has a wide array of applications due to its simplicity and long range:

**Home Automation:** Controlling appliances like fans, lights, or water pumps remotely, aiding elderly or physically challenged individuals.

**Remote Security:** Allowing homeowners to turn on lamps or initiate security procedures from a remote location.

**Industrial Automation:** Controlling machinery in hazardous environments where manual access is dangerous.

**Robotics:** Controlling the movement of robotic vehicles (forward, backward, left, right) using a mobile phone as a joystick.

**Agricultural Irrigation:** Switching agricultural water pumps on or off from a distance to save energy and time.

**Future Scope**

The DTMF-based remote control system is a robust and efficient solution for modern automation needs. By leveraging the ubiquity of cellular networks and the simplicity of DTMF tones, it provides a practical method to bridge the gap between human intent and machine action.

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## 19. Brain Teasers

Brain teasers are more than just simple puzzles; they are mental exercises that challenge the mind to think unconventional ways, often requiring lateral thinking and creative problem-solving. These "rich protein diets" for the brain range from simple riddles to complex logic puzzles, all serving to sharpen cognitive abilities and provide a sense of gratification upon finding the solution.

A brain teaser is a type of mystery that requires focused intellectual action rather than just straightforward calculation. Historically, the fascination with these challenges is ancient:

Brain teasers are intellectual challenges presented as riddles, logic puzzles, or wordplay, demanding more than simple recall; they require imaginative, non-linear thinking. Their roots stretch back to antiquity, with early examples like the intricate Chinese knot puzzles from around 200 BC testing patience and problem-solving. Over centuries, they evolved from oral traditions into diverse forms like crosswords, Sudoku, and rebus puzzles, becoming ingrained in cultures worldwide as both entertainment and educational tools.

Engaging with brain teasers offers significant cognitive advantages:

**Boosts Critical Thinking & Problem Solving:** They train the mind to analyze information, identify patterns, and consider multiple perspectives, essential skills for navigating complex situations.
**Enhances Creativity:** By forcing "out-of-the-box" thinking, they foster innovation and new ways of approaching problems.

**Improves Memory & Focus:** Activities like solving puzzles strengthen neural pathways, improving concentration and short-term memory.

**Engages Both Brain Hemispheres:** Many teasers utilize both logical (left) and creative (right) sides of the brain, offering a holistic mental workout.

## Educational & Professional Applications

**In Education:** Brain teasers make learning fun, motivate students, and help develop crucial skills beyond rote memorization, leading to greater academic success.

**In Recruitment:** Companies use them to assess a candidate's logical reasoning, troubleshooting, and adaptability under pressure, notes GeeksforGeeks.

## Types of Brain Teasers

From simple riddles to complex logical sequences, brain teasers take many forms:

**Riddles:** "What has an eye but cannot see?" (A needle).

**Logic Puzzles:** Sudoku, KenKen, or scenarios requiring deductive reasoning.

**Lateral Thinking Puzzles:** Puzzles requiring unconventional insights, like the man by the river scenario.

**Word & Number Puzzles:** Crosswords, rebus puzzles (picture-based phrases), or sequence problems.

Beyond their practical benefits, brain teasers provide a unique form of relaxation and satisfaction, offering a temporary escape from worries while stimulating the brain in a positive way. The "aha!" moment when a solution clicks provides an adrenaline rush, encouraging continued engagement and a lifelong love of learning. In essence, brain teasers are more than just games; they are vital tools for mental fitness, unlocking potential and fostering sharper, more agile minds for challenges both big and small.

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## 20. What is Life

Life is a profound, multifaceted journey of existence, experience, and meaning, characterized by unpredictable challenges, simple joys, growth through learning and relationships, and the continuous search for purpose, defined uniquely by each individual's choices, resilience, and perspective, from the biological fact of being alive to the spiritual quest for significance and legacy, making it both a precious gift and a demanding adventure.

Here's a comprehensive essay exploring 'What is Life':

Life, a singular yet infinitely complex word, encapsulates the breathtaking phenomenon of being, the dynamic flow of experiences, and the unending quest for purpose that defines our conscious existence. It is more than mere biological function; it's a precious journey, a challenging adventure, and a profound mystery that philosophers, poets, and everyday individuals have sought to unravel for millennia, recognizing it as a canvas painted with joy, sorrow, struggle, and triumph.

**The Biological & Experiential Core**

At its most fundamental level, life is biological existencethe state of being alive, a precious spark that distinguishes us from the inanimate world, marked by growth, reproduction, and adaptation. Yet, life truly begins with experience: the warmth of the sun, the sound of laughter, the taste of food, the sting of failure, the solace of love. These moments, both grand and mundane, weave the fabric of our personal reality, shaping our character and understanding. Life is a constant stream of events, a river flowing through valleys of hardship and peaks of happiness, demanding we learn to navigate its currents, as this Brainly.in snippet explains.

A crucial dimension of life is the innate human drive to find meaning within it, a concept explored deeply by thinkers like Viktor Frankl, who emphasized a universal desire for purpose beyond mere survival or pleasure. Meaning isn't bestowed; it's discovered or created through our actions, goals, relationships, and contributions. For some, meaning lies in family, service, or faith; for others, in knowledge, art, or innovation. This search for purpose provides stability and direction, transforming a random existence into a directed, significant journey, notes this Aeon Essays article.

Our lives are sculpted by the choices we make, turning potential into reality, according to this Brainly.in answer. Taking responsibility for these choices, embracing challenges, and learning from setbacks are vital for growth, as suggested in this Scribd essay. Life isn't a bed of roses; it's a struggle demanding patience, resilience, and the cultivation of virtues like honesty, fairness, and care, which form the bedrock of a successful and respected life, as described in this Bartleby essay.

The definition of a "good" or "meaningful" life varies immensely. For some, it's about personal fulfillment; for others, it's about spiritual liberation or making a positive impact on the world. Even in adversity, hope serves as a powerful catalyst for survival, demonstrating life's inherent tenacity. Furthermore, the concept of life extends beyond our physical presence, with many beliefs pointing to spiritual continuity, where life's essence transcends the body, continuing in legacies or other realms, as noted in this YouTube video transcript.

In conclusion, life is a dynamic interplay of biology, experience, choice, and meaning. It is a precious, finite opportunity to live fully, learn continuously, connect deeply, and contribute meaningfully. Embracing its inherent unpredictability, taking ownership of our path, and finding purpose in our unique experiencesthese are the threads that weave a rich and fulfilling tapestry, making each individual life a singular, invaluable story.

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## 21. 5G Tehnology

5G technology is the fifth generation of cellular networks, offering revolutionary leaps in speed, capacity, and low latency, enabling a truly connected world for people, devices (IoT), and industries, powering innovations like smart cities, autonomous vehicles, advanced healthcare (remote surgery), and immersive AR/VR, moving beyond just faster phones to a fundamental infrastructure for digital transformation across all sectors with immense economic potential. It uses diverse frequency bands (low, mid, high/mmWave) and advanced technologies for improved efficiency, reliability, and massive connectivity, creating new possibilities and disrupting traditional models.

**The Next Generation:** 5G succeeds 4G LTE, representing a significant evolution in mobile communication standards, focusing not just on people but on connecting everything.

**Core Capabilities:** It provides ultra-fast speeds (Gbps), significantly lower latency (near real-time response), and massive capacity to handle numerous connected devices simultaneously.

### Key Features & Technologies

**Frequency Bands:** Operates across low (coverage), mid (balance), and high-band (mmWave for extreme speed/capacity) spectrums, each suited for different use cases.

**Network Slicing:** Allows creation of isolated, customized virtual networks on a shared physical infrastructure, tailoring security and performance for specific applications (e.g., critical healthcare vs. general browsing).

**Massive IoT (mMTC):** Designed to support billions of connected devices, from smart home sensors to industrial equipment, enabling large-scale machine-to-machine communication.

**Edge Computing:** Combines with 5G's low latency to process data closer to the source, crucial for real-time applications like autonomous driving.

## Transforming Industries & Society

**Smart Cities:** Powers smart lighting, waste management, energy grids, and emergency services for efficient urban living.

**Healthcare:** Enables remote patient monitoring, robotic surgery (telesurgery), and faster data transfer for better diagnostics.

**Automotive:** Essential for Vehicle-to-Everything (V2X) communication, making autonomous vehicles safer and more responsive.

**Manufacturing (Industry 4.0):** Facilitates large-scale automation, predictive maintenance, and increased production efficiency.

**Entertainment:** Delivers seamless cloud gaming, immersive AR/VR experiences, and higher quality streaming.

**Agriculture (Precision Farming):** Optimizes water, fertilizer, and pesticide use through sensor data from fields and drones.

## Benefits & Impact

**Enhanced User Experience:** Instant downloads, lag-free streaming, and more responsive apps.

**Economic Growth:** Expected to boost global GDP significantly by creating new business models and industries.

**New Opportunities:** Opens doors for innovation in remote work, e-health, and digital services, bridging gaps in access.

### Security & Challenges

**Security:** Incorporates advanced encryption (256-bit), subscriber identity concealment, andmutual authentication (5G AKA).

**Challenges:** Requires massive infrastructure build-out (small cells, fiber), spectrum allocation, and addressing health concerns, though current evidence suggests manageable risks.
In essence, 5G is more than just faster internet; it's a foundational technology for the next wave of digital innovation, promising to reshape industries and daily life by connecting the physical and digital worlds more deeply than ever before.

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## 22. Youth Unrest

Youth unrest signifies widespread frustration, disillusionment, and dissatisfaction among young people, stemming from deep-seated socio-economic issues like unemployment, flawed education systems, political disconnect, and cultural clashes, manifesting in protests, strikes, and activism that challenge societal norms and established authorities, highlighting systemic failures in governance and resource distribution, and demanding systemic change for better opportunities and recognition, making it a global phenomenon reflecting the gap between youth aspirations and reality, as seen in movements from anti-reservation protests in India to global climate strikes.

### Causes

**Economic Disparity & Unemployment**: A major driver is the lack of viable job prospects despite higher education, leading to frustration, mental health issues, and agitation, as millions of educated youth struggle to find work, notes

**Flawed Education System**: Inadequate facilities, lack of practical relevance, political interference, and a mismatch between curriculum and job market needs alienate students, causing them to question the system's goals.

**Political Disillusionment**: Youth often perceive corruption and hypocrisy in established political forces, fostering radical attitudes and a desire to oppose the status quo, notes

**Social & Cultural Shifts**: Rapid modernization, Western influences, exposure through media, and a desire for autonomy clash with traditional values, creating identity crises and challenging existing norms.

**Government Policies**: Policies on education, reservations (like in India), or resource allocation that are perceived as unjust or detrimental directly trigger youth movements, as seen with the anti-reservation agitations.

**Manifestations of Youth Unrest**

**Student Activism**: Protests, strikes, and demonstrations over educational policies, fee hikes, or academic freedom, as seen in India's higher education, note Prime Open Access and Preprints.org.

**Social Movements**: Youth-led movements addressing broader issues like cultural identity (Jallikattu protests in India) or political corruption, involving large-scale mobilization, report.

**Radicalism**: Can manifest as right-wing (religious/ethnic) or left-wing (anti-exploitation) ideologies, driven by critical thinking and disillusionmen.

**Digital Activism**: Increased connectivity allows for faster mobilization, broader reach, and new forms of challenging authority through social media.

Youth unrest is a powerful, double-edged sword; it signifies deep societal cracks but also holds immense potential for positive transformation. By understanding its root causesfrom economic despair to institutional failuresocieties can move beyond viewing youth as a problem to recognizing them as agents of change, fostering an environment where their energy builds rather than breaks the social fabric.

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## 23. Thought

Thought is the foundational human experience, an unseen force that defines our existence, shapes our reality, and dictates our actions. It is a constantly flowing stream, with some studies suggesting we have between 12,000 to 60,000 thoughts per day. Yet, for something so constant, defining exactly what a thought isand where it comes fromremains one of science and philosophy's greatest mysteries.

This article explores the nature, power, and mechanics of thought, drawing from neuroscience, psychology, and philosophy.

At its core, thought (or thinking) refers to mental processes that occur independently of direct, immediate sensory stimulation. It is the cognitive activity of manipulating information, forming representations, and generating new ideas.

**The Neuroscience of Thinking**

Where do thoughts live? They do not reside in one specific place but emerge from the synchronization of brain cells communicating.

**Brain Networks:** Thoughts are likely "trajectories of population activity" on neural manifolds, which are stable patterns in the collective behavior of many neurons.

**Brain Decoding:** Researchers are using functional MRI (fMRI) to observe blood flow, indicating areas of maximum brain activity during thought generation. Advancements in "brain decoding" are allowing researchers to determine what a person is thinking (e.g., distinguishing between "add" or "subtract") based on brain activity with up to 70% accuracy.

**The Default Network:** When not focused on a specific task, our brain defaults to mind-wandering, a state which involves different, often creative, neural activity.

**The Power of Thought: Shaping Reality**

The saying "what you think, you become" is more than just a motivational quote; it represents a psychological reality. Thoughts are the seeds of our emotions, decisions, and ultimately, our actions.

**The Thought-Emotion Link**

**CBT Model:** According to Cognitive Behavioral Therapy (CBT), it is not events themselves that dictate how we feel, but our *thoughts* about those events.

**Actionable Impact:** Because thoughts generate feelings, and feelings drive behavior, changing one's thought process is the most direct way to change one's life.

**Negative and Repetitive Thoughts**

**The Negative Default:** A significant portion of human thought is, by default, negative. This is largely driven by the brain's survival mechanisms, which focus on identifying potential threats (physical or emotional).

**Repetition:** Approximately 95% of our daily thoughts are repetitive. This repetition is what creates habits and, in the long run, beliefs.

Thought is both an incredibly common, daily occurrence and the most remarkable, mysterious process the human mind performs. By understanding that thoughts are not necessarily "truth"but rather,, interpretations that can be managedwe can harness their power to create a more purposeful, happy, and fulfilling life. As Viktor Frankl noted, "Everything can be taken from a man but... the last of the human freedomsto choose one's attitude in any given set of circumstances".

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**Ramjee Tiwari,B.Tech 4th Year CE**

## 24. Embedded System

Embedded systems are the "invisible brains" behind modern technology. Unlike general-purpose computers like your laptop or smartphone, which are designed to do many different things, an **embedded system** is a dedicated combination of hardware and software built to perform a specific, single task within a larger machine.
Whether it's the microcontroller that times your microwave or the complex avionics steering a jet, these systems are everywhere.

**Characteristics**
The design of an embedded system is defined by its limitations and specialized focus:

**Dedicated Functionality:** They are built for one purpose, leading to high efficiency and reliability.

**Real-Time Operation:** Many must respond to inputs within strictly defined time limits. In an airbag system, a millisecond delay could be fatal.

**Resource Constraints:** Unlike a PC with gigabytes of RAM, an embedded system might operate on just a few kilobytes of memory and very low power.

**High Reliability:** They are often required to run 24/7 for years without crashing, even in harsh environments.

**Components**
A typical system consists of three main layers:

**Hardware:** The physical foundation, usually built around a Microcontroller (MCU) or a Microprocessor (MPU). It also includes sensors to "feel" the world and actuators to "act" on it (like motors or displays).

**Software (Firmware):** The code that tells the hardware what to do. It is usually "burnt" into the chip's memory and is not meant to be changed by the end-user.
**Real-Time Operating System (RTOS):** In more complex systems, an RTOS manages tasks and ensures time-sensitive processes are executed exactly when needed.

**Classification of Systems**

Embedded systems are often categorized by their complexity and connectivity:
**Standalone:** Operates independently without a host computer (e.g., digital camera, calculator).
**Networked:** Connected to a network to share data (e.g., home security systems, ATMs).
**Mobile:** Small, portable devices with limited memory (e.g., smartwatches, fitness trackers).
**Real-Time:** Systems where timing is the priority. These are further split into **Hard Real-Time** (missing a deadline is a failure, like aircraft controls) and **Soft Real-Time** (missing a deadline is undesirable but not catastrophic, like a video player).

**Future Trends: AI and IoT**

The field is currently undergoing a massive shift:
**Embedded AI (Edge AI):** Instead of sending data to the cloud, devices like smart cameras are now processing AI locally on the chip to save power and improve speed.
**Internet of Things (IoT):** Billion of devices are being interconnected, allowing your smart refrigerator to talk to your grocery app.
**Security Focus:** As more devices connect to the internet, features like secure boot and encryption are becoming standard to prevent hacking.

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# 25. Puzzles

Puzzles are far more than mere pastimes; they are a fundamental part of the human experience, spanning millennia and cultures. From ancient riddles to modern digital brain-teasers, these "quests for understanding" engage our brains in unique ways, offering significant cognitive, psychological, and social benefits.

**The Origins and Evolution of Puzzling**

**Ancient Roots:** The history of puzzles dates back to the dawn of civilization. Around 2300 BC, the ancient Greeks and Egyptians created labyrinth and maze drawings. Sumerians used clay tablets featuring complex riddles to train scribes in Mesopotamia around 3500 BC.

**The Birth of the Jigsaw:** In 1766, British cartographer **John Spilsbury** invented the first modern jigsaw puzzle by mounting a map on wood and cutting it along national boundaries. These "dissected maps" were initially educational tools for teaching geography to the children of King George III.

**Democratisation of Play:** Puzzles were originally handcrafted from wood, making them a luxury for the wealthy. During the Great Depression, the shift to die-cut cardboard allowed for mass production, making them an affordable and popular form of entertainment during hard times.

**Modern Resurgence:** Jigsaw puzzles saw a massive surge in popularity during the COVID-19 pandemic as people sought screen-free, mindful ways to pass the time at home.

**Cognitive and Mental Health Benefits**

**Memory and Sharpness:** Working on puzzles reinforces connections between brain cells, improving both short-term and long-term memory. Studies published on PubMed Central suggest that regular puzzling can delay cognitive decline by up to two to three years.

**Stress Relief:** The repetitive action of sorting and matching pieces acts as a natural stress reliever, shifting the brain into a meditative state. Each successful placement triggers a small dopamine release, boosting mood and providing a sense of accomplishment.

**Spatial Reasoning:** Puzzles naturally improve "spatial transformation" skillsthe ability to mentalise how objects fit togetherwhich is crucial for tasks like packing a suitcase or parallel parking.

**Academic Impact:** Research in NEJM Evidence indicates that active learning through puzzles helps students understand complex subjects, such as mathematics and medicine, by breaking problems into manageable components.

**The Puzzler's Mindset**

True "puzzlers" often exhibit **cognitive flexibility**, remaining open to new evidence and willing to abandon failed strategies. Whether it's solving a 1,000-piece landscape or a cryptic crossword, the process teaches patience and the value of small, persistent steps toward a larger goal.

Would you like recommendations for specific types of puzzlessuch as logic, jigsaw, or word gamesbased on your interests?

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## 26. Think Twice

"Think Twice" is a profound call for prudence, urging careful consideration before speaking or acting, recognizing words' power to build or destroy, actions' lasting consequences, and the prevention of regret through pause and reflection, fostering stronger relationships, clearer communication, and wiser choices by choosing patience, truth, and peace over impulsive reactions, turning a simple pause into a habit of deliberate, responsible, and thoughtful engagement with the world.

**Think Before You Speak**

**Impact on Others:** Words hold immense power; they can uplift or crush spirits, build bridges or burn them. Thinking before speaking means choosing kindness and respect, ensuring our messages are clear and not hurtful, especially when guiding friends or correcting mistakes.

**Self-Control & Responsibility:** Speaking without thinking often stems from emotional reactions, not conscious choice. Taking control means closing your mouth to create space for thought, allowing you to consciously select words and stand behind them, rather than blurting out apologies later.

**Building Relationships:** Hasty words damage personal, professional, and even family ties. A moment's pause to consider impact preserves relationships, fostering trust and understanding.

**Think Before You Act**

**"Measure Twice, Cut Once":** This adage perfectly illustrates the principle of thinking before acting. It ensures thoroughness and reduces errors, doubling the chance of success by confirming satisfaction before proceeding.

**Consequences & Regret:** Actions have irreversible consequences; you can't reclaim lost time or undo a destructive act. Thinking twice helps choose peace over pride, patience over impulse, preventing deep regret when the moment has passed.

**Distinguishing Reflection from Hesitation:** Thinking twice isn't about paralysis; it's about purposeful consideration, not letting contemplation stop you from achieving goals, but rather guiding you to the right path.

**Cultivating the Habit**

**Create a Pause:** Consciously break the pattern of automatic response by simply closing your mouth after opening it, creating a mental space for reflection.

**Ask Key Questions:** Before speaking or acting, ask: Is it true? Is it kind? Is it necessary? Will it build up or tear down?.
Accept you are accountable for your words and actions; this acceptance fuels the effort to think deliberately. It's about recognizing that the gap between stimulus and response is where our humanity resides. By choosing to pause, reflect, and consider the potential ripples of our words and deeds, we become more compassionate, effective, and wise individuals, navigating life's complexities with greater clarity and less regret, ensuring our actions align with our best selves.

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## 27. Radio-frequency identification (RFID)

Radio-Frequency Identification (RFID) is a transformative wireless technology using radio waves to automatically identify and track tags attached to objects, animals, or people, revolutionizing industries from supply chain and logistics to healthcare and security, by offering superior data capture to barcodes through its ability to read multiple items without line-of-sight, though facing challenges like cost and interference from metal/liquids. An RFID system comprises a tag (microchip + antenna), a reader (interrogator), and an antenna, enabling non-contact identification and tracking of unique data, offering efficiency, accuracy, and enhanced visibility across diverse applications by storing information in a chip rather than just ink.

**Mechanism**
At its heart, an RFID system functions as a wireless communication system that exchanges data between a tag and a reader using radio frequencies.
**RFID Tag (Transponder):** This tiny component, attached to an item, contains an integrated circuit (microchip) for storing data and an antenna to receive and transmit signals.

**RFID Reader (Interrogator):** This device sends out radio waves to activate the tag and receives the tag's unique ID and stored data.
**Antenna:** Connects the tag and reader, facilitating the transfer of energy and information.
When activated by the reader's radio signal, the tag's antenna captures energy, powering the microchip, which then modulates and transmits its stored data back to the reader. This process allows for identification from distances of several meters, even through packaging, unlike barcodes.

**Types of RFID Tags**
RFID tags are categorized primarily by their power source:
**Passive Tags:** No internal battery; they draw power from the reader's radio waves, making them cheaper and common in inventory, but with shorter read ranges.
**Active Tags:** Contain their own battery, allowing for longer read ranges and more data transmission, used for high-value assets or real-time location systems.

**Key Applications Across Industries**
RFID's unique capabilities have led to widespread adoption:
**Supply Chain & Logistics:** Tracking pallets, cartons, and individual items from origin to destination, improving inventory management, visibility, and distribution.
**Retail:** Inventory control, loss prevention (security), and automated checkout.
**Healthcare:** Tracking medical equipment, managing pharmaceutical inventory, and patient identification.
**Access Control:** Key fobs and security badges for buildings and vehicles.
**Pet & Livestock Tracking:** Microchipping animals for identification.
**Advantages Over Barcodes**
RFID offers significant improvements over traditional barcoding:

**Non-Line-of-Sight Reading:** No direct scan needed, even through packaging.

**Bulk Reading:** Multiple tags read simultaneously (e.g., an entire pallet).

**Increased Data Capacity:** Stores more information than a barcode.
**Durability & Versatility:** Tags can be embedded or attached in harsh environments.

**Challenges & Limitations**

Despite its benefits, RFID isn't without drawbacks:

**Cost:** Tags and readers are generally more expensive than barcode solutions.

**Interference:** Metal and liquids can interfere with radio signals, affecting read accuracy.

**Privacy Concerns:** Potential for unauthorized data access if not properly secured, although this is managed through encryption.

**Conclusion**

RFID technology represents a significant leap in automated data capture, moving beyond traditional methods to offer unparalleled efficiency in tracking and managing physical items. By leveraging radio waves for wireless, non-line-of-sight communication, it streamlines operations, enhances security, and provides deep insights into product movement, fundamentally transforming business processes and creating a more connected, automated world

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## 28. The Role of Time Management in Academic Success

Students have many things to do every day, going to school, finishing homework, attending tuition or extra classes, playing, and spending time with family. Sometimes, it feels like there is too much to do and not enough time. This can make students feel tired, confused, or even worried.

That's why time management is very important. It means smartly using your time so that you can do everything without stress. When students learn how to manage their time, they can finish their studies, enjoy their hobbies, get enough rest, and still have fun with friends and family.

Learning how to manage time is not just good for school, it is also a habit that helps in daily life. When students plan their day properly, they feel more confident, stay organised, and become more responsible. Good time management helps in becoming successful in both studies and life.

## Time Management

Time management means planning your time in a smart and organised way so that you can complete all your tasks without feeling stressed. For students, it helps in managing schoolwork, homework, tuition, hobbies, rest, and other daily activities. When you use your time wisely, you can focus on each task properly and complete your work on time. This helps reduce last-minute pressure and keeps you calm and focused throughout the day.

Good time management includes creating a timetable, **setting clear goals**, completing important tasks first, and avoiding distractions like mobile phones or television. It also means taking short breaks to stay fresh and focused. When students manage their time well, they become more confident, organised, and better prepared for exams and schoolwork. It builds healthy habits that are useful not only in school but also in everyday life.

### Benefits of Good Time Management in Academics

**Reduces Stress and Anxiety**

Proper time management helps students avoid the stress of last-minute work. By planning their tasks, students can spread out their workload, giving them time to complete each task without feeling rushed.

**Improves Academic Performance**

With time management, students can set aside dedicated time for studying and revision. This consistent approach leads to better academic results as they stay on top of their studies.

**Balances Studies and Personal Life**

Managing time effectively allows students to allocate time for both schoolwork and personal activities, such as hobbies, sports, or family time. This balance is key to maintaining a healthy lifestyle.

**Builds Discipline and Responsibility**

When students follow a schedule and stick to their plans, they develop self-discipline. This helps them be more responsible in both their academic and personal life.

**Increases Productivity**

Time management helps students prioritise their tasks. By focusing on one task at a time and avoiding distractions, they can complete more work in less time, which improves overall productivity.

**Boosts Confidence**

Completing tasks on time and achieving set goals boosts students' confidence. Knowing that they can manage their time well encourages them to take on new challenges.

**Encourages Healthy Habits**

With a proper time management plan, students can ensure they get enough rest, eat well, and take breaks, which are essential for mental and physical health.

**Time Management Tips for Students**

**Prioritise Tasks**

Start by identifying the most important tasks and completing them first. Use a to-do list or a planner to write down tasks in order of priority. Tackling the toughest tasks first can give you a sense of accomplishment and motivate you to keep going.

**Break Tasks Into Smaller Chunks**

Large tasks can seem overwhelming, which often leads to procrastination. Break them down into smaller, more manageable steps. This makes it easier to stay focused and track progress without feeling overwhelmed.

**Use a Planner or Calendar**

A planner or digital calendar helps you stay organised. Write down deadlines, exam dates, and other important events to ensure you don't forget anything. Having a visual representation of your schedule will make it easier to manage time effectively.

**Stick to a Consistent Routine**

Develop a daily routine and stick to it. Having a set time for studying, breaks, meals, and sleep ensures that you stay on track and make the most of each day. Consistency helps you build habits that improve productivity over time.

**Avoid Multitasking**

It may seem efficient, but multitasking can reduce your focus and lead to mistakes. Instead, concentrate on completing one task at a time. This improves the quality of your work and helps you stay organised.

Time management is an essential skill for students aiming for academic success. By effectively managing their time, students can balance their academic, personal, and extracurricular activities, reducing stress and improving productivity. It empowers them to meet deadlines, enhance their focus, and achieve their goals with greater efficiency.

**Piyush Tripathi**
**B.Tech 2nd year CS**

## 29. Transformation from School life to college life

The transition from school life to college life is one of the most significant, transformative phases in a person's journey, marking the dramatic shift from protected adolescence to independent adulthood. For over a decade, school provides a structured, familiar, and nurturing environment where teachers and parents guide almost every step. Conversely, college offers a vast, open landscape filled with freedom, responsibility, and the opportunity for profound self-discovery. This transformation is not merely academic; it is a holistic evolution affecting personal habits, social dynamics, and career outlook

.

School life is characterized by a high degree of structure and familiarity. Days are spent in a fixed routineuniforms, scheduled classes, and close supervision by teachers who ensure that assignments are completed and attendance is maintained. This environment is highly protective, with limited freedom, which allows students to develop foundational knowledge and discipline. Socially, school is often a tight-knit community, where one is surrounded by familiar faces, nurturing lifelong friendships based on shared experiences over many years. Teachers play a mentorship role, and academic pressure is managed through continuous, closely monitored evaluation.

**Stepping Into College**

Stepping into college feels like stepping onto a different planet. The first major change is the environment; one moves from a small, local school to a larger, more diverse campus, often in a new city. The familiar faces are replaced by strangers, which can initially feel intimidating. However, this shift is the catalyst for growth. The freedom of college is immediateno uniforms, more flexible schedules, and a lack of daily monitoring. The responsibility for learning shifts entirely to the student.

**Differences**

Academically, the transition is from spoon-feeding to self-learning. In school, teachers present information directly from textbooks, whereas college professors assume that students have read the material and use lectures for deeper analysis, discussion, or research. The workload is more demanding, with a focus on in-depth research, assignments, and presentations rather than mere memorization. Exams are fewer but heavier in weight, requiring consistent, self-motivated study rather than just last-minute preparation.

**Personal Growth and Independence**

The most significant transformation is the development of independence and maturity. College life requires students to make their own decisions regarding their studies, career paths, and daily life. This includes managing time, dealing with finances, and handling chores, particularly for those living in hostels or away from home. This "adulting" phase teaches valuable lessons about accountability. Students learn to fight their own battles, making them more resilient, confident, and prepared for the real world.

**Social Dynamics and Networking**

Socially, college is a melting pot of cultures, backgrounds, and perspectives, offering a much broader, more dynamic, and diverse social circle than school. The focus shifts from just having fun with close friends to building a network of peers, mentors, and professional connections. While the close friendships from school are often missed, college introduces, in many cases, friendships that are based on shared professional interests and career goals. The camaraderie experienced in college fests, group projects, and clubs creates some of the most memorable moments of a student's life.

**Challenges and Adaptation**

The transition is not without hurdles. Many students feel overwhelmed by the newfound freedom, leading to time management issues and potential stress. Feelings of homesickness and the pressure to excel academically can be challenging. The first semester is often a "culture shock" where one must quickly adapt to a faster, less guided lifestyle. However, these challenges, when tackled with a positive, proactive mindset, act as catalysts for building resilience and maturity.

The transformation from school life to college life is a bridge between being a dependent student and becoming a responsible, mature adult. It is a unique journey that combines rigorous academic learning with personal exploration. While school lays the foundation, college builds the structure for a future career and personality. Embracing this change, with all its challenges and opportunities, allows students to become self-reliant, confident individuals ready to face the complexities of the world.

**Prashant Tiwari**
**B.Tech 2nd year CS**

## 30. Still gonna shine

At 13-years-old, Apphia has quickly learned the value of hard work and continues to motivate herself even in the most challenging times. Her tenacity shines through on anything she puts her mind to. As a first-degree black belt in taekwondo and an accomplished cello player, Apphia continues to take pride in her extra-curricular activities.

At the end of the day, it's not just about the accolades for Apphia. Her true nature and spirit are giving back to others in any way she can.

Apphia's parents enrolled her in Kumon when she was only five years old. At an early age, she gained an academic edge over her peers and credits Kumon for shaping her into becoming an altruistic individual.

“I feel proud when I'm a helpful person. Kumon has shaped me into the person I am today,” said Apphia.

"I like helping people and I think it's a part of my nature. I help in many ways from just simply holding a door to taking care of babies. In taekwondo, I help younger kids learn and review new techniques. In church, I help by taking care of the infants while the parents are attending service. In school, I usually help people with their work. At Kumon, I put homework in the students' folders. Those are the many ways I help, and I am proud of it. Without helping others, the world would be a bad place."

Throughout the years, Apphia has become passionate about learning biology, anatomy, and genetics. Although she's unsure of what the future holds for her career, she believes a future in the medical field is the perfect fit for her. Apphia envisions herself continuing to help others throughout her life.

Apphia's accomplishments were recognized as she was one of 56 students selected for Kumon's 3rd Annual Student Conference in Chicago, Illinois.

"I was so ecstatic when I found out I was selected," said Apphia. "I didn't believe it at first and read the email several times. It didn't seem real, but I was really happy that I got selected to attend the Student Conference."

Apphia and the rest of the attendees were celebrated for their accomplishments and encouraged to aspire to become individuals who tackle some of the world's challenges.

"I really enjoyed my time at the Student Conference. If I had to choose my favorite part, it would be the escape room activity," said Apphia. "It was so nice to solve puzzles with my fellow peers that I had so much in common with! It was nice to challenge each other, and I really liked meeting Mino Tanabe, the President of Kumon North America, Inc."

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Apphia shares advice to Kumon Students around the world and what she enjoys most about Kumon.

**Vikas Kumar,B.Tech 3rd year CE,**

## 31. Cloud gaming: The future of entertainment?

The rapid development of cloud gaming is hard to keep up with. The numbers we present in the article below speak for themselves. Cloud gaming is the future. Will it be able to compete with 'stationary' players such as Microsoft's Xbox, which is enjoying unflagging popularity? Or maybe cloud gaming does not mean displacing traditional consoles or gaming PCs? Maybe these two types of gaming experiences can complement each other or reach completely different end users? We will try to answer these and many other questions in this article.

Cloud gaming vs traditional experience

Many sources claim that cloud gaming will completely change the way we play. However, David Pavón, Global Commercial & Content Director at Ludium Lab, ALSO's online gaming provider, says that cloud gaming does not mean that in a few years gamers will stop using PlayStation or Xbox. He looks at the cloud solution rather as a complement to traditional gaming although it should be a standard on gaming consumption in the near future:

The experience we deliver to gamers on Sora Stream is similar, in terms of graphics or latency, to that offered by consoles. Although the current gamer profile looks a bit different, as cloud gaming is primarily interested in casual or family gamers, I am sure that this will change significantly in a few years. More and more gamers will be using cloud gaming. However, this does not mean that they will abandon PCs or consoles. The two experiences will complement each other.

This can be compared to a situation in which a coffee connoisseur has an incredibly good coffee machine at home. However, they still occasionally buy coffee from the bar that is located near their office. Both experiences are different and make sense in different situations. Even when a gamer has a console, they can continue playing on a smartphone while away from home.
Cloud games are in other words games on demand or games as a service (GaaS). Users do not (as is the case with classic games) have to install files; instead, all game content is streamed to the device. So after the huge success of e-books, podcasts, music and movies on demand, is it high time for games?

Main advantages of cloud gaming are that users can play AAA games from anywhere and on any device (Mobile, TV, PC..) without the need to invest in expensive hardware. That means an important democratization of gaming.

Cloud gaming market

Newzoo, a game market research firm, predicts that the cloud gaming market will be worth billions of dollars. Interestingly, back in 2020, the value was $633 million, and in 2023 it is expected to exceed $5 billion and close to $6,5 in 2024 with 60 M users in the world.

Important technologies whose development has a positive impact on the future of cloud gaming are edge computing and 5G, which will help avoid latency and disruption. Also, the pandemic period has proven to bring many benefits to the development of the cloud gaming market. This is because gamers appreciated the possibility of instant access to interesting and new titles, without having to leave home.

Many sources also argue that the continued growth of cloud gaming and the global success of the industry will be determined by the availability of games to the end user and the ability of companies to attract new players. Fortunately, more and more internet providers, communication services and even hotels are appreciating the benefits of cloud gaming.

Cloud gaming: Big opportunities for businesses of all sizes

Cloud gaming is not only a great and relatively cheap form of entertainment for gamers. It is also a sea of advantages and new opportunities for companies in various industries. We can include telcos, hospitality industry, entertainment platforms and much more.

Telecom operators need to recognize the advantages of cloud gaming as soon as possible and exploit its potential to remain competitive. Offering a cloud gaming service along with 5G is a great way to attract gamers and new generations. It is also worth remembering that cloud gaming is one of the best ways to leverage 5G capabilities and present them to end users.

Last but not least, cloud-based gaming platforms provide a great opportunity for video game publishers to bring back their vintage, seemingly "forgotten" titles.

ALSO cloud-gaming platform: Sora Stream

ALSO is offering a cloud gaming platform, flexible and adaptable for vendors, resellers, retailers, e-tailers and service providers.

Sora Stream, as the platform is called, offers many different types of games in an all-you-can-play package (no hidden costs). Resellers or service providers can customise the platform with their own logo, colours etc. and then offer it to their customers. All they have to do is take care of the communication and customer base, and Sora Stream will do the rest!

**Riyaz Ahmad**
**B.Tech 3rd year CE**

## 32. Scolding in unique style

Unique styles of scolding range from theatrical, humorous, and artistic approaches to sarcastic, "calm-yet-terrifying" methods. Examples of unique, non-traditional scolding include using sarcasm, playful metaphors, or even dramatic silence, often found in personal relationships or comedic performances.
Here are several unique styles of scolding:

**The "Sarcastic Intellectual"**
Instead of yelling, you treat the mistake as a complex, fascinating, and utterly stupid experiment.
**Example:** "I am genuinely impressed. I didn't think it was possible to take a simple task and create such a breathtaking masterpiece of incompetence. Do you teach classes on this, or is it just natural talent?"

**The "Passive-Aggressive Polite"**
This style uses over-the-top politeness to make the person feel guilty.

**Example:** "Oh, no, please, don't worry about cleaning that up. I absolutely love spending my Friday night scrubbing the floor. Your convenience is my top priority."

**The "Theatrical Disappointment"**
This involves a dramatic, slow-burn reaction rather than an immediate explosion of anger.

**Example:** *Slowly puts down coffee, stares deeply, shakes head, sighs heavily, and walks away without saying a word.*

**The "Metaphorical Scold"**
Using an absurd analogy to highlight the absurdity of the action.
**Example:** "Trying to get you to finish this project is like trying to convince a cat to do taxes. Completely pointless and making me lose my mind."

**The "Reverse Psychology"**
Telling them to do the wrong thing even more, highlighting their bad behavior.
**Example:** "No, no, keep texting while walking. Why stop now? Let's see how many things you can bump into today. It's like watching a real-life video game."

**The "Calm-Yet-Terrifying" (The "Teacher" Voice)**
Speaking in a very quiet, slow, and precise voice.
**Example:** (Whispering) "I'm going to go to the other room for two minutes. When I come back, this area better look like nothing ever happened, or I will start questioning all our life choices."

**The "Unexpected Calm"**
After a major mistake, you react with total calmness.
**Example:** "You broke the vase? Okay. Good to know. I guess we didn't need that."

**The "Pop-Culture Reference"**
Using a movie or show to make the scold humorous.
**Example:** "Honestly, you're acting like the villain who explains their entire plan just before the hero escapes. Just stop talking and do it right."

**The "Immediate Apology"**
Apologizing for ever thinking they could handle the task.
**Example:** "I am so sorry. That's my fault. I forgot that I have to micromanage every single thing. My mistake, carry on."

**The "Punisher"**
Using a stern, formal approach, almost like a court trial.

**Example:** "The evidence shows that you knew this was due, yet you failed to act. The jury (me) has found you guilty of negligence. Punishment: you do it again."

**11. The "Childish Mimic"**
Repeating what they said back to them in a silly voice to show how dumb it sounds.
**Example:** "'I thought it was fine.' Oh, I thought it was fine, just like I thought the stove was off."

**The "Surprise Compliment"**
Complimenting a completely different, irrelevant, and trivial thing to highlight their failure.

**Example:** "Wow, you did a terrible job on this report! But hey, that's a nice pen you're using! Too bad you didn't use it to write the correct numbers."

**Shakeel Ahmad**
**B.Tech 3rd year CE**

## 33. Life

Life is a profound, multifaceted journey from birth to death, characterized by constant learning, growth, unique experiences, and the quest for meaning, purpose, and connection, encompassing joys, struggles, and the development of character through relationships and contributions, ultimately a precious opportunity to be cherished and lived fully.

**The Tapestry of Existence: A Journey of Moments**

Life begins as a blank canvas, painted with the colors of our first breath and shaped by every subsequent moment. It's a continuous stream of experiences, from fleeting joys to profound sorrows, each adding a thread to the rich tapestry of our existence. This journey teaches resilience, showing us strength in adversity and fostering gratitude during times of happiness.

**Learning and Growth: The Ever-Evolving Self**

At its core, life is a school. Every encounter, every challenge, and every success serves as a lesson. We learn to navigate relationships, understand ourselves better, and adapt to an ever-changing world. This ongoing process of learning and self-discovery shapes our personality, builds our character, and helps us evolve from who we were to who we are becoming.

**Purpose and Meaning: The Quest for a Goal**

A life without purpose can feel adrift. Setting goals, whether grand ambitions like becoming a doctor or teacher, or smaller daily objectives, provides direction and motivation, turning existence into a meaningful pursuit. These aims help us focus, manage challenges, and find fulfillment, transforming aimless wandering into a purposeful stride.

**Relationships and Connection: The Heart of Life**

We are not islands. Life's deepest meanings often come from the connections we forge. Friends, family, and even fleeting acquaintances leave indelible marks, teaching us love, empathy, and belonging. These bonds enrich our lives, provide support, and offer shared memories, reminding us we are part of something larger than ourselves.

**Embracing the Full Spectrum: Joy and Struggle**

Life isn't just about the highs; it's about embracing the lows too. The unexpected turns, the disappointments, and the hardships are as vital as the successes. They build character, deepen understanding, and allow us to truly appreciate the good times, proving that even struggles contribute to a richer, more complete life.

Ultimately, life is a finite, precious gift. Recognizing its temporary nature encourages us to live more intentionally, to cherish the present, and to make a positive impact, however small. It's an adventure to be lived fully, with courage, compassion, and a deep appreciation for the extraordinary gift of being alive.

**Vijay Kumar Mishra**
**B.Tech 3rd Year**
**CE**

## 34. The processing of mind

Thoughts are the mind's internal representations of the world, complex electrochemical processes in the brain that allow us to process information, form ideas, plan, and create, acting as powerful drivers of our emotions and actions, yet they arise involuntarily, and while we can't stop them, we can learn to manage our reactions to them through mindfulness and awareness, distinguishing fleeting mental events from deeper beliefs. They are often described as maps, projections, or mental symbols, drawing from experiences, emotions, and external influences, existing in a dynamic interplay between the brain's physical structure and the intangible realm of consciousness.

**What Thoughts Are**

**Representations:** Thoughts are likenesses or maps of things, people, or concepts, formed from sensory input, feelings, or plans.

**Electro-chemical:** They are physical events in the brain, involving electrical and chemical signals.

**Symbolic:** Thinking involves working with mental symbols, a process that is both innate and learned.

**Dynamic:** Thoughts are transient, arising and dissolving, not always fixed aspects of identity.

**The Process of Thinking**

**Core Function:** Thinking helps us organize experiences, learn, reflect, and create.

**Beyond Thoughts:** The act of *thinking* (the narrative *about* a thought) is distinct from the initial *thought* itself; we can't always stop the first but can choose not to engage with the second (the "second arrow").

**Influences:** Our thoughts are shaped by culture, society, fears, and desires, creating a subjective filter.

**Managing Thoughts**

**Awareness is Key:** You cannot simply command thoughts away, but mindfulness helps you observe them without judgment.

**Challenge & Reframe:** You can change patterns by questioning conclusions and practicing self-affirmation.

**Emotions & Actions:** Thoughts generate feelings, which then drive actions, highlighting their immense power to shape your life.

**Philosophical Views**

**Physicalism:** Thoughts are purely physical phenomena, part of the material universe.

**Dualism:** Thoughts are non-physical, existing in a separate mental realm from the physical brain.

**Pragya Srivastava,B.Tech 2nd Year CSE**

## 35. Performance using fluorescent light.

A new generation of high brightness light-emitting diodes forms the core part of light fidelity technology. The logic is very simple. If the LED is on, digital 1 is transmitted. If the LED is off, a digital 0 is transmitted. These high brightness LEDs can be switched on and off very quickly which give us a very nice opportunities for transmitting data through light. The working of Li-Fi is very simple. There is a light emitter on one end, for example, an LED, and a photo detector (light sensor) on the other. The photo detector registers a binary one when the LED is on; and a binary zero if the LED is off, to build up a message, flash the LED numerous times or use an array of LEDs of perhaps a few different colours, to obtain data rates in the range of hundreds megabits per second. The block diagram of Li-Fi data rates in the range of hundreds megabits per second.

The block diagram of Li-Fi system is shown in Fig. The data can be encoded in the light by varying the flickering rate at which the LEDs flicker on and off to generate different strings of 1s and Os. The LED intensity is modulated so rapidly that human eye cannot notice, so the light of the LED appears constant to humans. Using a standard white-light LED, researchers at the Heinrich Hertz Institute in Berlin, Germany, have reached data rates of over 500 megabytes per second. Using a pair of Casio smart phones, the technology was demonstrated at the 2012 Consumer Electronics Show in Las Vegas to exchange data using light of varying intensity given off from their screens, detectable at a distance of up to ten meters. A consortium called to promote high-speed optical wireless systems and overcome the limited amount of radio based wireless spectrum. There are basic issues with radio waves that wireless data is transmitted through radio waves which are limited and expensive.

It has a limited band width. With the rapidly growing world and development of technologies like 3G, 4G and so on. We are running out spectrum. Availability of radio waves is a big concern. It is not advisable to use mobile phone in aero planes and at places like petrochemical plants and petrol pumps. Radio waves can penetrate through walls. They can be intercepted.

If someone has knowledge and bad intentions, they may misuse it. This causes a major security concern for Wifi. Light has 10000 times wider bandwidth than radio waves. Also, light sources are already installed. So, Li-Fi has got better capacity and also the equipments are already available. Data transmission using Li-Fi is very cheap. LED lights consume less energy and are highly efficient. Availability is not an issue as light sources are presents everywhere. There are billions of light bulbs worldwide; they just need to be replaced with LEDs for proper transmission of data. Light waves do not penetrate through walls. So, they can't be intercepted and misused. Some of the future applications of Li-Fi are as follows: Li-Fi is the latest technology that can provide fastest speed internet access. So, it can replace Wi-Fi at educational institutions and at companies so that all the people can make use of Li-Fi with the same speed intended in a particular area. Li-Fi can be used to accessing internet and to control medical equipments. This can even be beneficial for robotic surgeries and other automated procedures. Li-Fi can easily provide high speed internet via every light source such as overhead reading bulb, etc.

Present inside the airplane. Underwater ROVS (Remotely Operated Vehicles) operate from large cables that supply their power and allow them to receive signals from their pilots above. Li-Fi can even work underwater where Wi-Fi fails completely, thereby throwing open endless opportunities for military operations. Li-Fi can be used as a powerful means of communication in times of disaster such as earthquake or hurricanes. Power plants need fast, inter-connected data systems so that demand, grid integrity and core temperature (in case of nuclear power plants) can be monitored.

Wi-Fi and many other radiation types are bad for sensitive areas surrounding the power plants. Li-Fi could offer safe, abundant connectivity for all areas of these sensitive locations. In traffic signals Li-Fi can be used which will communicate with the LED lights of the cars which can help in managing the traffic in a better manner and the accident numbers can be decreased. Li-Fi doesn't work using radio waves. So, it can be easily used in the places where Bluetooth, Infrared, Wi-Fi, etc. are banned.

**Piyush Tripathi**
**B.Tech 2nd year CSE**

## 36. IEC Contactors

IEC (International Electro technical Commission - mainly Europe) publishes recommendations for certain product design parameters and laboratory test procedures. In general, IEC standards allow the contactor to have smaller creepage path and a higher temperature rise than NEMA, which results in a smaller physical size. Also, when sizing an IEC contactor, knowing an application's duty cycle, jogging, and reversing characteristics become important.

Definite Purpose Contactor

Similar in function to a general purpose NEMA contactor. However, they are lighter duty and often considered a throw away when compared to an equivalent NEMA or IEC contactor. Used in HVAC systems. refrigeration, food processing systems, pumps and compressors.

Motor-Starters

Motor-Starters are action devices that start and stop motors and provide over-load protection. While the core of a motor starter is a contactor, its ability to provide over-load protection is the trait which makes these items different than a simple contactor.

Standard starters do not include a disconnection means or short circuit protection. Over-load relays and accompanying thermal units (“heaters" or "heater elements") sense excessive current flowing to a motor and protect the motor from overloads. If more current is flowing than the motor is designed to handle, the overload relay causes the motor to shut down by disengaging the contactor's coil voltage.

The National Electric Code (NEC) requires that motor circuit protection must protect the branch circuit conductors, the motor starter, and the motor itself against over-current caused by short circuits or grounds. The NEC also requires that if the motor starter is mounted out of sight of the motor, or the motor is more than 50 feet from the motor, some means of disconnecting the motor from the power source must be provided The Code does not specify how this is to be accomplished. One method is to use an individual starter with a separate fusible disconnect switch or circuit breaker.

A more economical means of satisfying the NEC requirements for disconnecting the motor is to use a Combination Motor-Starter.

Definite Purpose Motor-Starters
Use Definite Purpose Contactors as the main relay portion of the motor-starter.

NEMA Magnetic Motor-Starters
Use NEMA Magnetic Contactors as the main relay portion of the motor-starter.

Combination Motor-Starters
Built around a NEMA Magnetic Motor-Starter, this also uses a fused (or un-fused) switch or a circuit breaker contained in the same enclosure. Because the devices are contained in the same enclosure, there are many advantages and cost savings to be realized.

NEMA Manual Motor-Starters

Is a NEMA recognized motor starter that requires a person to manually start or stop by hand. It provides overload protection, but has no coil. Good for HVAC systems and applications where there is minimal risk of an injury to people or damage to equipment if power-feed to starter were to be stopped and then suddenly started again (example a power outage and sudden restoration.)

IEC Manual Motor-Starters

Is an IEC recognized motor starter that requires a person to manually start or stop. It provides overload protection, but has no coil. Good for HVAC systems and applications where there is minimal risk of an injury to people or damage to equipment if power-feed to starter were to be stopped and then suddenly started again (example a power outage and sudden restoration.

**Manish Kumar**
**B.Tech CE 3rd year**

## 37. Role Of Modern Engineer

In the rapidly changing world of science and technology, the role of an engineer has expanded far beyond traditional boundaries. A modern engineer is not only a technical expert but also an innovator, problem-solver, leader, and socially responsible professional. Engineers today play a crucial role in shaping a sustainable, digital, and inclusive future.

First and foremost, a modern engineer applies scientific knowledge and technical skills to solve real-life problems. From designing smart infrastructure and renewable energy systems to developing advanced software and medical devices, engineers contribute directly to improving the quality of human life. Their work ensures efficiency, safety, and progress in every sector of society.

A modern engineer also plays a vital role in sustainable development. Environmental protection, energy conservation, and eco-friendly technologies are major concerns today. Engineers design green buildings, develop clean energy solutions, and work towards reducing pollution and carbon footprints, thereby contributing to a healthier planet.

In addition to technical expertise, soft skills are equally important for modern engineers. Effective communication, teamwork, leadership, and ethical decision-making are essential in professional life. Engineers often work in multidisciplinary teams and must communicate ideas clearly to colleagues, clients, and society.

Furthermore, modern engineers have social responsibilities. They must ensure that technology is used ethically and for the welfare of humanity. By addressing issues such as digital inclusion, public safety, and community development, engineers contribute to national growth and global well-being.

In conclusion, the role of a modern engineer is dynamic and multidimensional. By combining technical knowledge, innovation, ethical values, and social responsibility, modern engineers act as the backbone of technological and economic development. Their contributions are essential for building a smart, sustainable, and progressive society.

**Prashant Tiwari**
**B.Tech CSE 2nd Year**

# 38. Glimpse of events

Vishwakarma Puja

Anugam 2021

Service for old people

International Women's Day

Tablet Distribution

International Women's Day

# Tech Vista

Annual Magazine 2021-22
Volume 1

Yoga Day

www.knmt.org.in

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To be globally acclaimed technical institution producing competent engineering professionals with human values and societal concern.

## Institute Mission

M1: Providing contemporary knowledge of Science & Engineering in coordinated and integrated manner.

M2: Promoting culture of excellence in teaching learning practices supported by modern educational tools and techniques.

M3: Enhancing design and research culture to produce industry relevant professionals.

M4: Inculcating ethics, human values and societal responsibility

# Kamla Nehru Institute of Physical & Social Sciences

Faridipur, Sultanpur, U.P.

# Engineering Institute

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www.knmt.org.in

Since 2008

**Late Babu Kedar Nath Singh**
1928-1999

Swargiya Babu Kedar Nath Singh belongs to a farmer family of a remote village 'Balua' in Sultanpur, about 65 km from District Head Quarter. Babu Ji conceived the need for establishing educational institutions, from primary level up to post graduate level with excellence and high academic standards as motto of his life to uplift the economical & educational status of the people of eastern up especially in the Awadh region, which was lagging behind in the race of development.

# Kamla Nehru Institute of Physical & Social Sciences

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