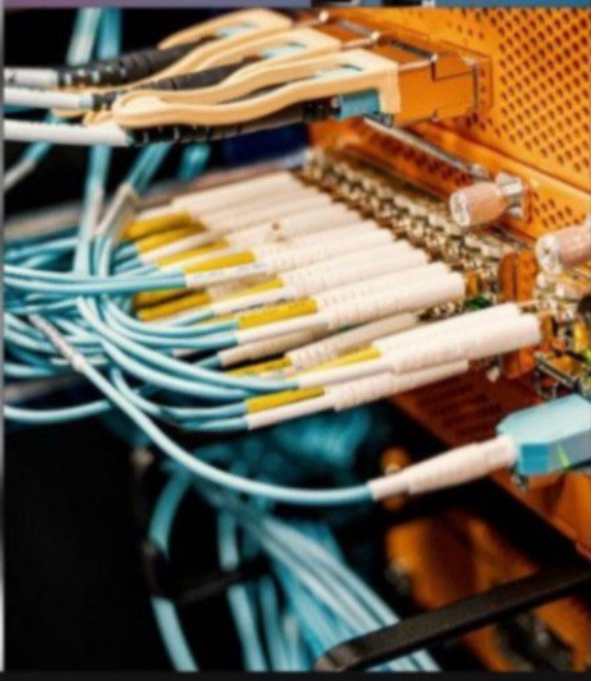


ACADEMIC YEAR 24-25

MAGIC CIRCUITS

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SRI SAIRAM COLLEGE OF ENGINEERING

STAFF COORDINATORS

1. HEMA SHUBRAJA J| AP| ECE
2. MOHANTHI KAKARLA K | AP | ECE

STUDENT COORDINATORS

1. BASKER S | IV YEAR A SEC
2. RAKSHITHA G | IV YEAR B SEC
3. ADITYA TS | III YEAR A SEC

AEROSPACE MATERIALS

ABSTRACT: Aerospace Materials play a crucial role in modern aerospace technology. This paper is mainly a comprehensive overview of Implementation of aerospace materials .In Aerospace, Materials include refractory metals and specialty alloys with high melting point, typically Titanium, Vanadium, Aluminum and Steels are used because of some core properties. In Aerospace, the Plastic, Thermoplastic Composites and Carbon Nanotubes can be used because of several advantages when compared to traditional metal alloy. The plastic materials handle far better than metals in chemically harsh environments (Corrosion resistance). This increases the lifespan of the aircraft and avoids costly repairs, weight savings, higher specific strength, stiffness, performance, efficiency and many more comparatively. The carbon nanotubes are considered as a promising nanomaterial in aerospace. Adding tiny carbon nanotubes to plastic can make the material stronger and lighter than metal. Implementation of plastic, Thermoplastic and nanocarbon tubes are beneficial and efficient compared to the traditional metal alloys. Hence replacing metal is advantageous in aerospace structuring.

Keywords : Metal, Plastic, Thermoplastic, nanocarbon tubes.

1. Introduction

The metals like Aluminum, Titanium and Tungsten are used Commonly in the Aerospace System [1]. Nickel, Cobalt, and iron based Super alloys provide high strength and corrosion resistance at elevated temperatures, making them ideal for hot applications in jet engines[2].Titanium is generally harder than aluminum, but some alloys of aluminum show higher hardness than Titanium but plastic have several advantages when compared to the traditional metal alloys because plastics can generally be fabricated economically, they are lightweight, they are not prone to corrosion, transparent plastics are more impact resistance than glass. [3,4]Thermoplastic composites have the replacement of metals such as aluminum, titanium and steel in their crosshairs because of weight savings ,higher specific strength, higher specific stiffness, higher fatigue performance, Highly-efficient out-of-autoclave processing, Freedom to consolidate parts and optimize designs[5]. Carbon nanotubes can provide multifunctional capabilities, such as sensing, actuation, energy harvesting, and self-healing. These functions can enhance the performance and safety of aerospace systems, reduce the maintenance costs and lessen the environmental impact. Implementation of plastic, Thermoplastic and nanocarbon tubes are beneficial compared to the traditional metal alloys.

2. Plastics

In the airline manufacturing industry, a balance between reducing weight and ensuring aircraft durability is necessary. Plastics has been essential in creating durable, yet lightweight, industrial plastic materials to help modern aircraft stay efficient and effective while still ensuring a quality light experience for crew and passengers alike. Plastics and thermoplastics especially are uniquely suited for many applications on aircraft due to both their lightweight nature and their durability.

. Plastics have several advantages when compared to the metal alloys traditionally employed in the aerospace industry: ● 1) They are lightweight. Some plastic components can be as much as ten times lighter than their metal counterparts. For each pound of weight reduced on a plane, $1,000 is saved in fuel over the life of the airplane. ● 2) Plastics can generally be fabricated economically. ● 3) They are not prone to corrosion. Many plastics do well in very chemically harsh environments. ● 4) Transparent plastics are more impact resistance than glass, which increases safety.

2.1 Acrylonitrile Butadiene Styrene (ABS) One place in which plastics play a key role in the development and manufacturing of modern aircraft is in the overhead luggage storage compartment. These compartments require durable materials because they are subjected to quite a bit of strain in normal use. Yet, they also need to be lightweight, because their presence does not add to the aerodynamics or operation of the aircraft. Plastics like Acrylonitrile Butadiene Styrene (ABS) are excellent materials for these bins. This ABS thermoplastics are mostly used in interior design parts, due to its high mechanical strength, durability, lightweight, cost-effective, easy installation and boldness for customer's eyes. It reduces weight and increases.

Content : **M S Sreehitha** | IIIYear | ECE

2.2 Polyetheretherketone (PEEK)

Polyetheretherketone is a semi-crystalline organic polymer. It exhibits superior mechanical performance and thermal properties, including creep resistance and low flammability. PEEK can also withstand large doses of radiation. It has excellent hydrolysis resistance, meaning that it can be exposed to high-pressure water and steam without degrading. PEEK"s operating temperature goes up to 450 °F. The combination of properties and large temperature operating range make it a preferred product in the aerospace industry, especially in conditions where it may be exposed to low temperatures and atmospheric particles. Common applications include valve seats and pump gears.

2.3 Thermosetting Polyimide One class of thermo-setting polyimide's (PI) has excellent mechanical properties and high resistance to chemicals. With a higher ductility than ceramics and lower weight than metal alloys, it is a great choice for various structural applications in the aerospace industry. Examples of potential applications include electrical standoffs (spacers) and insulators for threaded nuts and other components.

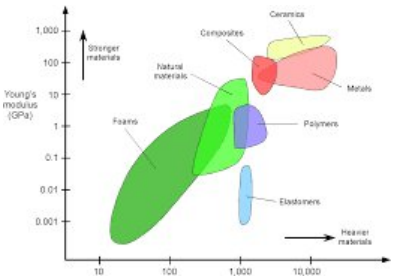
2.4 Polyamide-imide (PAI) PAI has a high mechanical strength which it retains up to 500 °F. PAI is resistant to radiation and most chemicals at room temperature is flame retardant, and doesn't give off smoke when burning. Due to all these properties, PAI is often used as a substitute for many metal components in the aerospace industry. Due to these properties, it has been using an electrical/electronic connector or many more applications in the aerospace industry.

2.5 Polychlorotrifluoroethylene (PCTFE) PCTFE is a fluorochemical plastic with an optimal blend of physical properties, mechanical properties, fire and chemical resistance, and very low moisture absorption. It also has great electrical properties and a wide range of temperature application from -400 °F to +400 °F. These properties make PCTFE great material for components that are used outside or in corrosive environments. Mainly it has been using in wings of airplane or jets.

2.6 Polytetrafluoroethylene (PTFE) PTFE, or Teflon, is a fluorocarbon polymer. It is an electrical insulator, has low flammability, high tear resistance, and retains its properties in aerospace conditions. PTFE makes a great material for insulating the myriad wires and cables in an aircraft.

Benefits at a Glance:

- Weight savings of up to 60% compared to aluminum reduce energy consumptions,
- Plastics can be processed well than other materials,
- Greater freedom in component design results in reduced production and installation costs,
- Good chemical resistance.
- Inherent flame-resistance.
- High-performance plastics meet the requirements of UL 94-V0 and fire behavior standards in accordance with FAR 25.853.
- Fire behavior with regard to smoke gas density, smoke gas density, smoke gas toxicity, heat release.
- High specific strength due to fiber-reinforced plastics.
- Convincing gliding properties with outstanding dry-running characteristics and freedom from maintenance in the application.
- Low outgassing in a vacuum.
- Good radiation resistance[7].



3. Thermoplastic Composites

a composite can be defined as a combination of two or more materials to create a high-performance material that is greater than the sum of its parts. The benefits are plentiful, such as weight savings and excellent mechanical properties, as well as reduced costs and improved processing efficiencies. In our case, we are speaking about thermoplastic composites which for us are a combination of PEEK and closely related polymers of the PAEK family. These are used as the polymer matrix material, together with a high volume fraction of continuous carbon, or glass fibres, that provide the required performance properties. VICTREX™ PAEK and PEEK composites are available in the market in various forms such as unidirectional (UD) prepreg tape, fabric and rods. Thermoplastic composites have the replacement of metals such as aluminum, titanium and steel in their crosshairs. This is because they can deliver a number of benefits:

- Up to 60% weight savings
- Up to 5x higher specific strength
- Up to 2x higher specific stiffness
- Up to 4x higher fatigue performance
- Highly-efficient out-of-autoclave processing
- Freedom to consolidate parts and optimise designs With outstanding mechanical properties, VICTREX PAEK composites components offer alternative solutions with weight reductions compared to traditional metal and metal alloy parts, based on higher specific strength and stiffness. The benefits are so attractive to the entire supply chain as follows,
- It’s the ability to take cost out. The true value of thermoplastic composites can be appreciated from the start through faster process cycles, out of the autoclave.
- The ability to combine laminated composites with injection moulded compounds to make hybrid parts for faster manufacture at lower cost than machining metals.
- Design optimisations help with ease of installation.
- Weight is taken out of the aircraft using polymer composites, meaning greater fuel efficiency and reduced operating costs.
- Long-term mechanical properties and improved toughness help to reduce maintenance costs.

All of these benefits add up to performance that is difficult to achieve, and provide some of the key reasons for the adoption of thermoplastic VICTREX PAEK composites to meet the increasing needs of the aerospace industry[8].

4. **Carbon nanotubes** composition in aerospace materials Adding little amount of carbon nanotubes to plastic is having more stability than a metal

4.1 Reinforcements One of the main applications of CNTs in aerospace materials is as reinforcements for polymer matrices. Polymer composites are widely used in aircraft structures, such as wings, fuselage, and engine components, because they offer high strength-to-weight ratios, corrosion resistance, and design flexibility. However, they also have some limitations, such as low thermal conductivity, high moisture absorption, and poor fracture toughness.Adding CNTs to the polymer matrix can increase the stiffness, strength, and fracture toughness of polymer composites by forming strong bonds with the matrix and transferring stress across the interface. They can also enhance the thermal and electrical conductivity of polymer composites by creating percolating networks of nanofibers.

4.2 Interfacial modifiers CNTs can also act as interfacial modifiers for fiber-reinforced composites. Fiber-reinforced composites are composed of continuous or discontinuous fibers embedded in a matrix, usually a polymer or a metal. They are widely used in aerospace applications because they offer high specific strength and stiffness, as well as good fatigue and impact resistance. However, one of the main challenges in designing fiber-reinforced composites is ensuring a good adhesion between the fibers and the matrix, which affects the load transfer and the stress distribution in the composite. By coating the fibers with CNTs, the interfacial properties can be improved, resulting in higher interfacial and shear strength. CNTs can also act as bridges between the fibers and the matrix, reducing the stress concentration and enhancing the damage tolerance of the composite.

4.3 Multifunctional materials CNTs can provide multifunctional capabilities, such as sensing, actuation, energy harvesting, and self-healing. These functions can enhance the performance and safety of aerospace systems, reduce the maintenance costs and lessen the environmental impact. For example, CNTs can be used as sensors to monitor the strain, temperature, pressure, and damage in aerospace structures. CNTs can also be used as energy harvesters to convert mechanical, thermal, or electromagnetic energy into electrical energy. Finally, CNTs can be used as self-healing agents to repair cracks or defects in aerospace materials[9].

5. Conclusion

In today's economy, the high cost of fuel and the push for lower ticket prices drive airlines to purchase aircraft that are as light as possible. With their light weight and resistance to high temperatures and corrosive materials, plastic materials are a great choice to replace components historically made of metal alloys. In the next decades, aircraft with plastic wings and tails are foreseeable. plastics provide a number of benefits for aerospace applications, and modern aircraft make extensive use of plastics to achieve high levels of performance. That being said, there is some complexity involved with selecting the correct plastic for an application and designing the parts with the appropriate part geometry and tolerances to ensure performance throughout the service life of the device.Finally, it is important to consider the flammability requirements for the plastics to be used in an aerospace design. Some plastics will resist burning and others will burn very readily under certain conditions. Civilian aircraft, military aircraft, and spacecraft will generally have flammability requirements for the materials of construction, and it is important to consider the flammability performance requirements for a given material prior to specifying it in an aircraft. Already plastic is playing an important role in Aerospace Materials but more and more implementation of plastic in aerospace materials can enhance the aerospace field.

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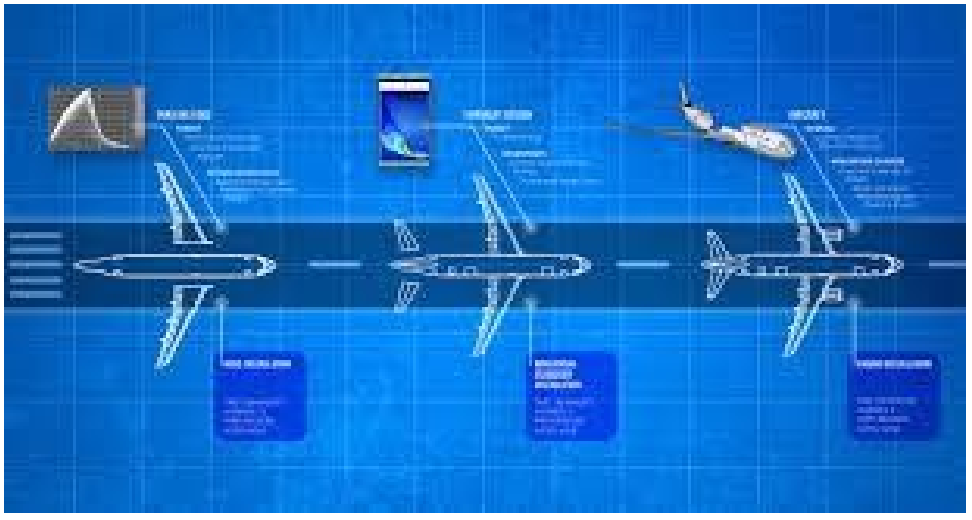


SUSTAINABLE DEVELOPMENT: TOWARD A BETTER FUTURE

In a world shaped by rapid change and growing complexity, sustainable development is no longer a distant ideal—it is our shared responsibility and creative challenge. It asks us not just to build, but to build with care. Not just to grow, but to grow with intention.

"Focus on graceful movement, paired with meaningful outcomes. Let your foundation be strong, even if subtle. Let your impact be elegant, even if quiet."

"Let intention guide every word, and grace shape every form. Strength lies not in boldness alone, but in the quiet harmony of purpose and design."

"Move with quiet confidence, where endings meet grace and beginnings bloom. Let your strength be shaped not by force, but by the rhythm of thoughtful intention."

Sustainability is not only about preserving nature—it's about nurturing balance. Between progress and preservation. Between innovation and empathy. Between what we take and what we give back.Let us design systems that breathe. Cities that coexist with green spaces. Communities that thrive on kindness, not just commerce.

"Stay inspired. Never stop creating."

Every small act of care—every mindful choice, every creative spark—shapes the world we share. Whether you're planting ideas or actual seeds, designing with purpose or dreaming with heart, your voice adds to the rhythm of change.

True sustainability is collective. It's found in shared values, brave conversations, and the courage to reimagine what's possible. When we speak with clarity and compassion, we shape futures worth living.

Keep imagining. Keep building. Keep believing in the quiet power of thoughtful action.

Content : Deeksha A | IIIYear | ECE

Title: Technology with Balance: Serving Humanity, Preserving Nature

Technology is needed, but it should not rule humankind.
Technology is needed, but it should not destroy nature.
Technology is very important in all fields, but it should not destroy the origin.

At the same time, we must admit a fact clearly—technology, innovation, development, and growth, growth, growth are very, very important. They drive nations forward, open new opportunities, and improve the quality of life for every individual. But this importance must not blind us to responsibility.

Technology has become the heartbeat of our generation. From medical breakthroughs to communication networks, from space exploration to artificial intelligence, every field today is strengthened by innovation. It is impossible to imagine modern life without it. Yet, an important truth must be remembered: technology should serve humankind, not rule over it.

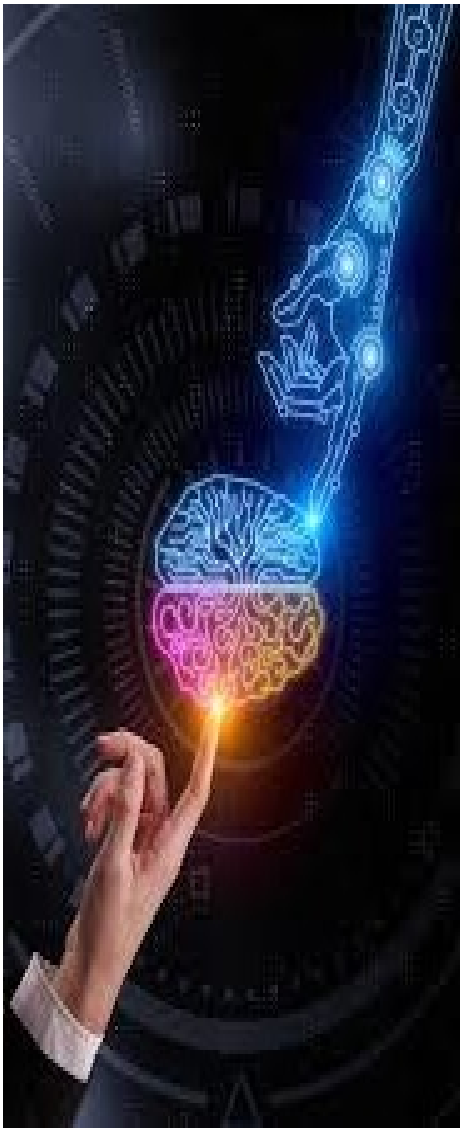
Human progress cannot come at the cost of human values. For instance, smartphones connect us across continents, but they should not disconnect us from the people sitting beside us. Machines can process data faster than our brains, but they should never replace human empathy, kindness, or decision-making.

Equally important is our relationship with nature. Technology has improved agriculture, healthcare, and industries, but if its growth destroys forests, pollutes rivers, or increases carbon footprints, then progress becomes meaningless. True innovation lies in building solutions that respect the origin of life—our environment.

Sustainable technology is the way forward. Renewable energy, green electronics, and eco-friendly materials are not just trends, they are necessities. As students and future engineers, we must understand that invention without responsibility is incomplete.

Yes, technology is very important in every field—from education to defense, from transportation to healthcare. But it must always walk hand in hand with ethics, humanity, and nature. Only then can it remain a tool of empowerment rather than a force of destruction.

In the end, the challenge before us is simple yet profound: to ensure that while technology advances, the essence of life—human values and natural balance—remains untouched. Progress should not erase the origin; it should preserve it.



Content : M S Sreehitha | IIIYear | ECE

From Paper Sheets to Smart Circuits: The Green Revolution in Electronics.

Introduction
Think of a sheet of paper. You write on it, fold it, may be even recycle it. Now imagine that same paper powering a small gadget, monitoring your health, or detecting pollution in the environment. It sounds like science fiction, but this is exactly what paper-based electronics are making possible. By blending everyday paper with cutting-edge technology, researchers are creating devices that are flexible, cheap, and eco-friendly — turning the ordinary into the extraordinary

What Are Paper-Based Electronics?
Paper-based electronics are electronic circuits, sensors, and even batteries built directly on paper. Using conductive inks, flexible materials, and innovative designs, researchers have turned ordinary paper into a platform for functional electronics. The result is lightweight, flexible, and low-cost devices that could revolutionize the way we think about electronics.

Advantages of Paper-Based Electronics
- Flexibility: Unlike rigid silicon-based devices, paper circuits can bend, fold, and twist without damage.
- Biodegradability: Once discarded, paper-based electronics naturally decompose, reducing electronic waste.
- Cost-effectiveness: Paper is inexpensive and widely available, making these devices accessible for communities around the world.

Applications
- Wearable Devices: Sensors printed on paper can be embedded in clothing or accessories to monitor health, motion, or fitness.
- Disposable Medical Testing Kits: Single-use diagnostic tools on paper can provide rapid and affordable disease detection.
- Environmental Monitoring: Paper-based sensors can track air quality, temperature, or humidity, making real-time monitoring simpler and greener.

Research and Development globally, laboratories are exploring creative ways to expand the potential of paper electronics. Scientists are developing paper batteries, foldable circuits, and even paper-based displays. Each innovation brings us closer to a future where electronics are lightweight, cheap, and eco-friendly.

Conclusion
Paper-based electronics could transform how we design and use technology. By turning something as simple as paper into powerful devices, this innovation makes electronics more sustainable, affordable, and widely accessible. The future may be flexible, biodegradable, and, most importantly, smart — all thanks to the power of paper.

Content : Janashruti D | IIIYear | ECE

Title: India's Semiconductor Leap: A New Chapter for Engineers

For decades, India depended on other countries for the smallest but most powerful component in technology—the semiconductor chip. These tiny devices are the brains behind mobiles, cars, satellites, and even medical devices. Without them, the digital world would simply stop.

Now, India is taking a bold step to build its own semiconductor ecosystem. This is not just about factories and machines; it is about independence. When a nation produces its own chips, it controls its own future in defense, healthcare, communication, and every field touched by electronics.

For students like us in Electronics and Communication Engineering, this initiative opens doors to opportunities we never imagined. Research, innovation, and industries will grow in our own country. Startups will design chips for agriculture, healthcare, and education. The skills we are learning today will find direct relevance tomorrow.

But the journey is not simple. Manufacturing semiconductors needs advanced technology, precision, and sustainability. It also requires engineers with strong skills and innovative thinking. That is where the responsibility comes to us—the future workforce.

India's semiconductor leap is not just a policy—it is an invitation. An invitation for young engineers to dream bigger, innovate locally, and contribute globally. And in this leap, lies a message: the chips may be small, but their impact on India's future is infinite.

Title: Electronics Beyond Circuits: Shaping a Responsible Future

When we think of Electronics and Communication Engineering (ECE), the first images that come to mind are microchips, circuit boards, and communication towers. But the reality is much deeper—ECE is silently shaping every layer of society.

From the mobile phones in our hands to the satellites orbiting above us, electronics define the rhythm of modern life. Yet, as third-year students stepping into this vast field, a question arises: Are we building technology only for comfort, or also for responsibility?

Take for example smart healthcare devices. Wearable sensors now monitor heart rates, oxygen levels, and even detect early signs of illness. For an aging population and rural communities with limited access to doctors, this is not just technology—it is life-saving hope.

In agriculture too, IoT-based soil sensors and drone-based monitoring are transforming age-old practices into efficient, sustainable solutions. Farmers can now make informed decisions about irrigation and fertilizers, reducing waste and increasing yield.

But every innovation carries a responsibility. E-waste is growing rapidly, and as engineers, we must ask ourselves how we can design devices that are not only smart but also sustainable. The next generation of electronics must prioritize recyclability and energy efficiency as much as performance.

Content : **M S Sreehitha** | IIIYear | ECE

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Title: From Ideas to Impact: The Engineer as an Entrepreneur

Engineering is often seen as the art of solving problems—designing circuits, building software, or creating machines. Entrepreneurship, on the other hand, is about turning ideas into real-world impact. When these two worlds meet, something powerful happens: innovation meets opportunity.

Engineers have the skills to design solutions that work efficiently and effectively. Entrepreneurs have the vision to bring those solutions to people who need them. When an engineer thinks like an entrepreneur, a simple prototype can become a startup, a lab experiment can become a product, and an idea can transform communities.

This connection is more than just business. It encourages creativity, risk-taking, and practical problem-solving. For example, a student designing a low-cost water purifier is not just doing engineering—they are stepping into entrepreneurship by identifying a need, creating a solution, and thinking about how it reaches people.

Moreover, combining engineering with entrepreneurship allows us to address societal challenges. Technology alone is not enough; it must reach the right hands in the right way. Engineers who embrace entrepreneurial thinking help ensure that innovations make a real difference in education, healthcare, environment, and beyond.

In the end, the future belongs to those who can build and deliver, who can design solutions and ensure they matter. Engineering provides the tools; entrepreneurship provides the path. Together, they empower change.

Content : **M S Sreehitha** | IIIYear | ECE

Collaborative Sensing: Smarter Networks for Smarter Cities

Introduction

We all dream of cities that are safer, cleaner, and smarter. Imagine your car warning you about an accident before you even reach it, or streetlights that brighten only when someone walks nearby, saving electricity the rest of the time. Sounds exciting, right? This is possible because of collaborative sensing.

"Smart cities are not just about sensors and gadgets—they're about people and ideas working together to make life better."

What is Collaborative Sensing? In simple words, collaborative sensing is when different devices and sensors work together by sharing information. Instead of one sensor trying to figure out everything on its own, many sensors—like traffic cameras, pollution monitors, weather stations, and even smartphones—team up to create a clearer picture.

- One pollution sensor can only tell you about its street. But hundreds connected together? You get a live citywide air-quality map.
- A car's radar might notice an obstacle, but when nearby cars and road cameras confirm it, the warning becomes much more accurate.

It's like group work in college—the results are always better when everyone contributes!

Why Should Students Care?

As engineering students, this field is exciting because it combines electronics, communication, AI, and IoT. Collaborative sensing shows us how devices "talk" to each other, share data, and make decisions.

Applications already include:

- Self-driving cars
- Smart healthcare monitoring
- Disaster management
- Renewable energy grids

"Innovation happens when curiosity meets opportunity—collaborative sensing is the perfect playground for both."

Recent Innovations (2024–2025)

- AI-Enabled Sensor Networks: Using AI, researchers can reduce the number of sensors needed while keeping results accurate. This saves cost and energy.
- 6G-Ready Smart Cities: Millions of devices can now connect faster and more securely. Faster networks, smarter data, bigger possibilities!
- Digital Twin Cities: Virtual replicas of cities use live data from sensors to predict traffic, pollution, or even floods.
- Sensor Network Security: Deep learning is helping protect these networks from cyber-attacks because data safety is critical.
- India's Heat Maps: Delhi is using AI + satellites to create building-level heat maps. These maps identify vulnerable areas during heat waves and literally save lives.

Conclusion

Collaborative sensing is basically the nervous system of future cities. It connects everything, helps cities "think," and makes life safer and smarter. For us students, it's not just a topic—it's a chance to experiment, learn, and make an impact. Smart cities need smart minds—and the next big breakthrough could come from your project.

Content : Janashruti D | IIIYear | ECE

The Chipmakers: How India's Semiconductor Mission is Reclaiming ECE

Walk into any ECE classroom and the question hangs in the air: “Which IT company are you prepping for?” For years, our destiny seemed pre-written: abandon the core, embrace the code. Our passion for hardware was often sidelined, treated as a theoretical hurdle rather than a career launchpad. But a powerful shift is underway, one that’s changing the game for every ECE student in the country.

The change is being powered by India's ambitious semiconductor mission. This isn't just policy jargon; it's a ₹76,000 crore (over $10 billion) statement of intent from the government through the India Semiconductor Mission (ISM) and a series of Production Linked Incentive (PLI) schemes. The goal? To make India a global powerhouse in chip design and manufacturing. And it’s already moving from blueprint to reality.

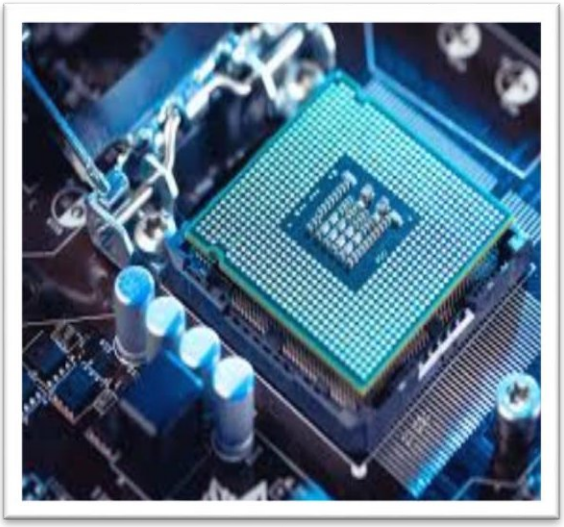
We’ve all seen the headlines. Micron is investing $2.75 billion in a state-of-the-art semiconductor assembly and testing facility in Gujarat. The Tata Group is making a massive leap, building one of India's first commercial semiconductor foundries in Dholera and another assembly plant in Assam. Beyond these giants, a flurry of proposals—from companies like CG Power and Renesas—have been approved, creating an entire ecosystem right here at home.

This changes everything for us. This booming industry isn't just for computer science graduates; it’s built on the very foundation of our ECE curriculum. While the IT sector, for all its perks, often faces saturation and market-driven volatility, the semiconductor field offers something more profound: depth and stability. The world will always need more chips—for AI, for electric vehicles, for everything smart. This demand is evergreen, making it a field resilient to the hype cycles that often plague pure software.

The roles emerging are exactly what we’ve been trained for. This surge means careers in Very Large-Scale Integration (VLSI) design, where we can architect the next generation of microchips. It means opportunities in verification, physical design, and embedded systems—roles that demand a deep understanding of electronics, not just coding skills from a crash course.

The message is clear: the future isn't just about using technology; it's about building its very core. Our ECE degree is no longer a detour to an IT job; it’s a direct passport to the heart of India's next tech revolution. The initiatives have been launched, the investments are flowing, and the factories are being built. Now, it's our turn to step up.

Let's not just follow the software trend. Let's power it from the ground up.



Content : Babitha ,A fellow ECE student.

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Take for example smart healthcare devices. Wearable sensors now monitor heart rates, oxygen levels, and even detect early signs of illness. For an aging population and rural communities with limited access to doctors, this is not just technology—it is life-saving hope.

In agriculture too, IoT-based soil sensors and drone-based monitoring are transforming age-old practices into efficient, sustainable solutions. Farmers can now make informed decisions about irrigation and fertilizers, reducing waste and increasing yield.

But every innovation carries a responsibility. E-waste is growing rapidly, and as engineers, we must ask ourselves how we can design devices that are not only smart but also sustainable. The next generation of electronics must prioritize recyclability and energy efficiency as much as performance.

With drones expected to play a major role in delivery, agriculture, and defense, and with India investing heavily in semiconductor manufacturing, the future of ECE holds exciting opportunities.

Content: **M S Sreehitha** | IIIYear | ECE

Biodegradable Sensors: Green Tech for a Sustainable Future

Introduction

Every day, electronics like smartphones, wearables, and medical devices make life smarter— but they also create a hidden problem: **e-waste**. Discarded gadgets pollute soil and water, threatening wildlife and humans alike.

Biodegradable sensors (BD-SENs) offer a solution. These devices perform their function and then safely disappear, combining **cutting-edge technology with eco-friendliness**. From healthcare to agriculture, BD-SENs are shaping a future where electronics and nature can coexist.

What Are Biodegradable Sensors?

Biodegradable sensors are built from **natural and eco-friendly materials**:

- **Silk** – flexible, strong, and dissolves naturally
- **Cellulose** – plant-based and biodegradable
- **Magnesium** – safe metal that dissolves in water or bodily fluids
- **Corn protein** – used in edible sensors

Key Feature: They naturally degrade without leaving toxic waste. Factors like moisture, temperature, and microbial activity determine how quickly this happens.

Healthcare Applications

BD-SENs are **revolutionizing medicine**:

- **Implantable sensors:** Monitor brain pressure, blood flow, or glucose and dissolve safely after use.
- **Wearable devices:** Track oxygen, heart rate, or physical activity continuously and safely.
- **Smart bandages:** Measure wound healing or infection, disappearing once recovery is complete.
- **Edible sensors:** Pills that monitor gut health before dissolving inside the body.

Impact: Safer treatments, fewer surgeries, and reduced electronic waste.

Environmental & Agricultural Applications

- **Air and water monitoring:** Detect toxic gases or pollutants, then safely degrade.
- **Soil and crop monitoring:** Measure moisture, pH, and nutrients, leaving the soil clean after harvest.
- **Smart farming:** Enables better crop management without polluting the land.

The Future: Internet of Biodegradable Things (IoBT)

Imagine tiny networks of sensors monitoring **cities, oceans, farms, or human health**, then disappearing safely once their task is complete.

The **Internet of Biodegradable Things** promises:

- **Smart monitoring** with zero environmental footprint
- **Sustainable technology** for everyday life
- **Innovation that protects nature** while improving quality of life

Conclusion

With global e-waste expected to reach **74 million tons by 2030**, biodegradable sensors are more than a trend—they are a necessity. By combining innovation, practicality, and environmental responsibility, these devices show that **technology and nature can thrive together**.

“True innovation is not just about creating something new—it’s about leaving the world better than we found it.”

Chiplets: The Future of Semiconductor Design

Introduction

As technology advances at lightning speed, our gadgets are becoming smarter, faster, and more powerful. But behind every breakthrough lies a challenge: how do we make processors that can handle enormous workloads without becoming too big, too expensive, or too inefficient? The answer is **chiplets**—small, modular building blocks that are changing the way chips are designed.

What Are Chiplets?

Traditionally, a processor is made as a single, monolithic chip, where every component—CPU cores, memory controllers, and input/output circuits—is integrated into one giant piece of silicon. But as chips grew larger, production became more complicated, expensive, and prone to defects.

Chiplets solve this problem by breaking the processor into **smaller, specialized chips**. Each chiplet is designed for a specific task, such as computing, memory handling, or connectivity, and all the chiplets are connected together to form a complete system. Think of it like building with LEGO blocks: you can mix and match pieces to create exactly what you need.

Why the Industry Loves Chiplets

The semiconductor industry is embracing chiplets because they offer **flexibility, efficiency, and faster innovation**:

- **Flexible Design:** Companies can combine different chiplets to create processors tailored for gaming, AI, or high-performance computing.
- **Lower Costs:** Smaller chips are easier to manufacture, and a defect in one chiplet doesn't ruin the whole processor.
- **Faster Development:** Engineers can upgrade or replace individual chiplets without redesigning the entire processor.

Major players like AMD, Intel, and NVIDIA are already using chiplets in their latest CPUs and GPUs. The approach is helping them push performance higher while keeping costs and complexity under control.

How Chiplets Power AI and Advanced Computing

Artificial intelligence demands extreme processing power and massive data throughput. Chiplets are ideal for this because they allow specialized cores to work together efficiently:

- One chiplet can focus on AI computations.
- Another can handle memory and data flow.
- Additional chiplets manage I/O tasks or communication between cores.

By combining these focused blocks through high-speed connections, chiplet-based processors can deliver top-tier performance while being more energy-efficient than traditional monolithic chips.

A Look Ahead

Chiplets are more than just a design trend—they represent a **new era of semiconductor innovation**. With modular, specialized designs, they overcome the physical limits of traditional chips and open the door to faster, smarter, and more efficient electronics. From AI accelerators to supercomputers, chiplets are shaping the future of technology.

Content : Janashruti D | IIIYear | ECE

FUN FACTS

Top 5 Fun Tech Facts

1. The Firefox Logo Isn't a Fox
Despite the name, the Firefox logo is actually a red panda! A common misbelief, but true.
2. Nintendo Made Playing Cards Before Games
Founded in 1889, Nintendo originally made playing cards, and only entered the video game world in the 1970s.
3. Dial-Up Still Exists
As of 2017, about 2.1 million people (mostly in rural America) were still using dial-up internet. That screechy connection sound never truly died.
4. Google Handles 3.5 Billion Searches Daily
Every single day, around 3.5 billion searches are made on Google. Strangely, 7% of them are people Googling "Google."
5. Google's First Tweet Was in Binary
In 2009, Google's first-ever tweet was just a string of 0s and 1s. Translated, it said: "I'm feeling lucky."

Fun Tech Facts

Apple's First Phone Was… an Apple!
Before the iPhone, Apple once designed a flip phone shaped like their logo. Imagine answering calls with a fruit!

You're Always a Bit Late
Your brain processes reality about 80 milliseconds behind. So technically, you're always living in the past.

YouTube Never Sleeps
More than 500 hours of video are uploaded every minute. Forget binge-watching—you'll never catch up!

Google Was Born From a Typo
The plan was to name it "Googol," but a typo gave us "Google." One mistake changed the internet forever.

Why Facebook Is Blue
Mark Zuckerberg is red-green colorblind, so he made Facebook blue. A simple choice that colored our digital lives.

Jeeva Kiruba S
1SB23EC037

- Bananas are real berries, but strawberries aren't. Surprising, right? Just like when the cafeteria suddenly adds a new dish we didn't expect!
- Our brain is tiny compared to the body, but it uses a big chunk of energy—like a small bulb that shines really bright.
- A group of flamingos is called a "flamboyance." Same vibe as our college fest! ▫✧
- Clouds may look light, but one big cloud can weigh more than a million kilograms.☁⚖
- Avocados ripen faster when placed next to bananas—teamwork in fruits! ▫🍌
- Bees can recognize human faces, just like we do.🐝☺
- The Eiffel Tower grows about 15 cm taller in summer because metal expands in heat. 🗼☼
- Your stomach gets a new lining every 3-4 days so you don't digest yourself. Basically, our body is its own repair workshop. 🔧
- The moon has moonquakes, just like we have earthquakes—space gets shaky too!◯
- Koalas have human-like fingerprints—tiny paw detectives in disguise!🫆🕵♂
- Some frogs can freeze completely in winter and come back to life in spring—just like our friends after a long nap or a sudden mood swing!

M S Sreehitha
3rd year

SKETCHES OF ECE

Akshay M

Gayathri A 1sb23ec027

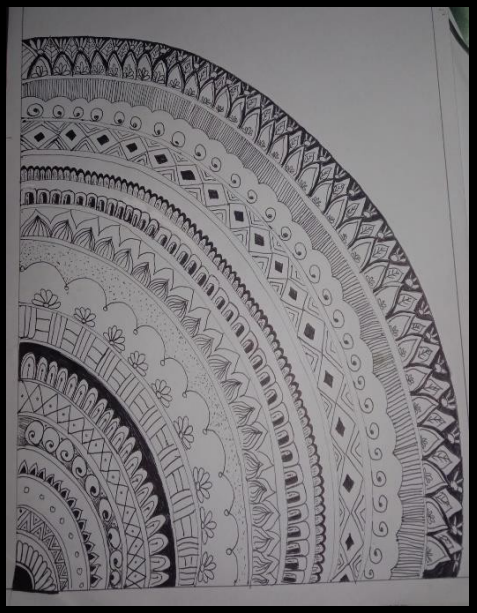
Gayathri P 1SB23EC028

SKETCHES OF ECE

Varshitha. V
[1SB23EC116]

Rekha T
3rd year

Manasa SM
1SB23EC404



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4th year,

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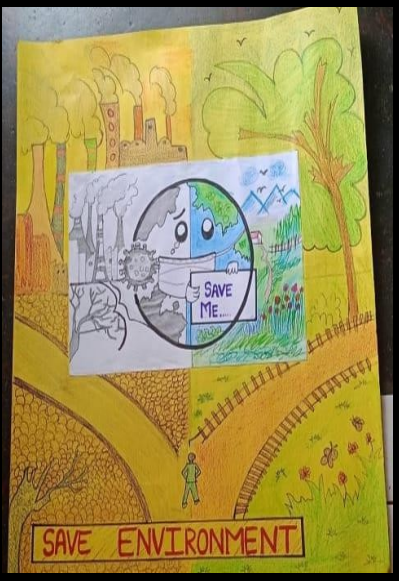

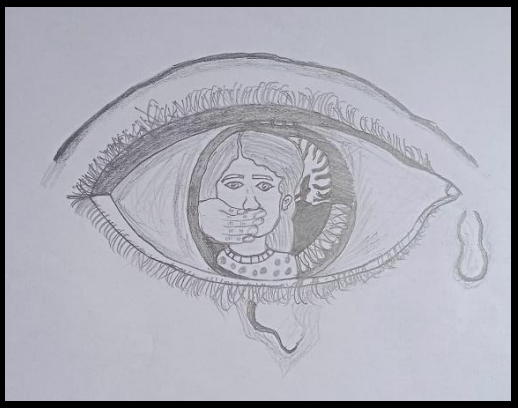

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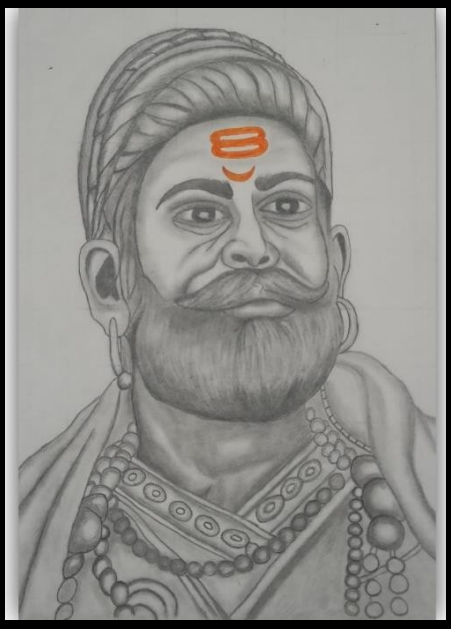
1SB23EC065
III year



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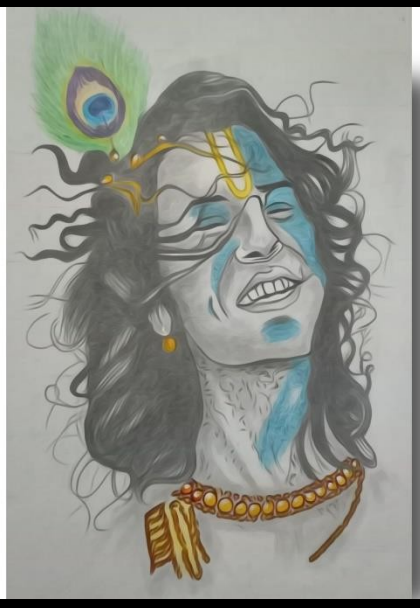
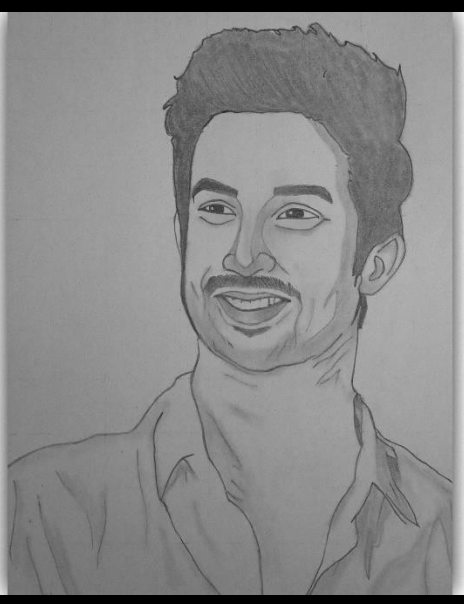
III YEAR ECE





SATHISH N
1SB22EC095

POEM

ME WITHIN ME!

The portraits of me through my eyes
seems likely to be the weirdest poetry that I read
oftentimes without any words — dryness over lips,

the brightness of faded shades of colours over me,
the soul finding the original part
in the place where I never went through,

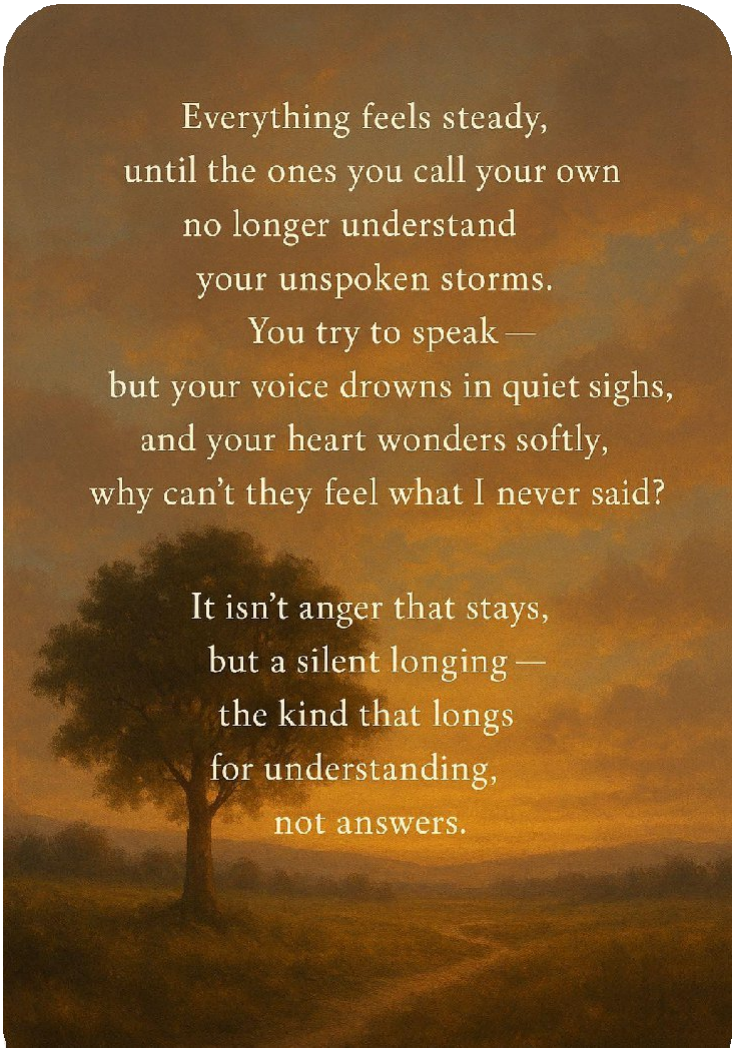
the smile always loses its self-respect
by visiting me once a day,

the bleeding of the healed wound,
the optimistic character of choosing negative
in the positive things...

the beautiful description of me
leads like unfinished
and never finished lines of poem! 🤍

~ நா.தமிழ்ச்செல்வி ~

2025-09-05



- **Akshitha shree III YEAR ECE ECE**

Beyond the Horizon

The sun may set, the night may fall,
Yet dreams will rise, outshining all.
A spark within, a voice so clear,
That whispers hope when doubts appear.

The path is long, the climb is steep,
But seeds of courage, we must keep.
For every star that lights the sky,
Reminds us all: we, too, can fly.

- kudum yashwanth

The Soul of Student Life

We walked in as names on a list, Unfamiliar faces in morning mist.

From awkward hellos to inside jokes, From borrowed notes to midnight talks.

College is not just a lecture hall, It's where we rise, and sometimes fall.

Where lessons go beyond the page, And friendships grow with every stage.

The chai breaks under the morning sun, Last-minute runs when classes begun.

The group studies that turn to chats, hostel nights with endless laughs.

We learn that marks don't shape our worth, But kindness does, and heartfelt mirth.

We learn that failures teach us more, Than any grade we've hoped before.

Campus life is a gentle song, That carries us as we move along

When time has passed and we look behind, These golden days will fill our mind.

The classrooms fade, but what remains, Are bonds of love, joy, and pains. A diary written not with ink, But with the moments that made us think.

For student life is more than days— It's the soul of student life.

DEEKSHA.A
1SB23EC017

One Roof, Many Hearts

A joint family is truly valuable,
Even if poor, their dreams are achievable.

The bond they share, no one can break,
In the future, it blossoms like a sweet cake.

Living together with love and affection,
There will always be a deep connection.

In this journey, every stage is precious,
For the value of love is truly delicious.

Her loving legacy

My Grandma is so very sweet,
Each day she gives me a loving treat.
She shows me care, she shows me love,
Her heart is pure, a gift from above.

She cooks our meals with gentle grace,
No junk food ever takes its place.
Above the sky, the clouds drift by,
Her kindest words are forever in my mind.

I meet my grandma and say "Hi,"
When I leave, I wave "Goodbye."
Who is the one I call "great ma"?
That's only my dearest Grandma.

Content: Chandana M | 1SB23EC010 | ECE department

-Chandan M

THE NIGHT BLOOM

The bud commence to grow
on the leaf margin,
which steadily glows
to charm brief.

The rarest beauty flutters;
in the night breeze,
Where all the bees mutters;
in the cluster of trees.

The twinkling stars above;
in the dark
and adorable flower below;
in the nature's park
are undoubtedly terrific..

The rising fragrance
from felicitous bloom;
touches heart at a glance,
which depart all the gloom.

when the gleam of moon falls,
the blissful humour calls.
If the flower get shower;
the droplet glint on flower
with mud enhance power.

Each part of Brahma kamal is peculiar
which is certainly greater.
Worship the pearly elegance
of the king of Himalayan flower.
await for one more chance
to see the night bloom.

M S SREEHITHA

SATURDAY MARKET

People blitz in the market with loud and loud and aloud !
What do you cry, oh you fruitmen?
Banana, apple and mango.

What do you weave, oh you flowers-girl,
with lusterless thread for prospective buyers!
What do you say, oh you Pedlar?
Vibrant balls and whistle noise makers.

What do you weigh, oh you Vendor?
Veggies and green fresh!
What do you sell, oh you seller?
Brightly your wares are displayed.

What do you call, oh you Bangle seller,
who will buy these lustrous and tinkling circles!
What do you shout, oh you candies pedlar?
Sweet bites and cotton candies.

There are many and many in crowd, who sells loud and loud and aloud!

-M S SREEHITHA

WOW!

TITLE?!

YOU WILL FIND

IN THE END

THE HUNT BEGINS

here,
i come

Hey bro! You know what is the other form of monkey?!

Haha, you are asking me?

Exactly... it's YOU! Hahaahaha!

Real fun bro... real huh.

WHOOSH

-CLANG!

Ouch!!! What is that...?

Hey... looks like an advanced watch. And Look-a poster!

This looks stunning... I think it's a time watch.

NO! Don't do it...

Wh... who... was that? Did you hear it?!

NO!
DON'T LISTEN TO HIM HIM!

Wait... did you hear that .....again... it's... it's...

It's no one... just try it.

How do you know...?

I just think... anyway, let's try it out.

Ok... which date shall we hop to?

Try some day in October month.


ZAAPPP!


WOW... WHAT DAY IS THIS??! LOOKS LIKE A BIG EVENT!

Let's get back home.

You can't.

What do you mean... you can't Rudra?

Not Rudra...

I... AM... TIME!

YOU MESS WITH TIME... IT TENDS TO MESS BACK!

VRRRMMM!

WAIT-THEN WHO..... WHO ARE YOU... WHAT HAPPENEND TO RUDRA?

IF YOU WANT TO TO GET BACK TO YOUR HOME, YOU MUST DO AS I SAY.

I'LL TAKE YOU... 10 MINUTES BEFORE YOU TOOK THE WATCH & THE POSTER... SO IT'S YOU... WHO IS GOING TO THROW THE WATCH ON YOURSELF.

What is it?


WHAT? WHY SHOULD I DO THIS?


YOU'VE NOWHERE ELSE TO GO... YOU AND YOUR FRIEND MESSED WITH ME ON THE DAY OF THE EVENT... SO IT'S YOU WHO MUST MAKE IT RIGHT.

Ok... I'll do it.

ZAAAP


WHOOSH
-CLANG!
Ouch!!!
What is that...?

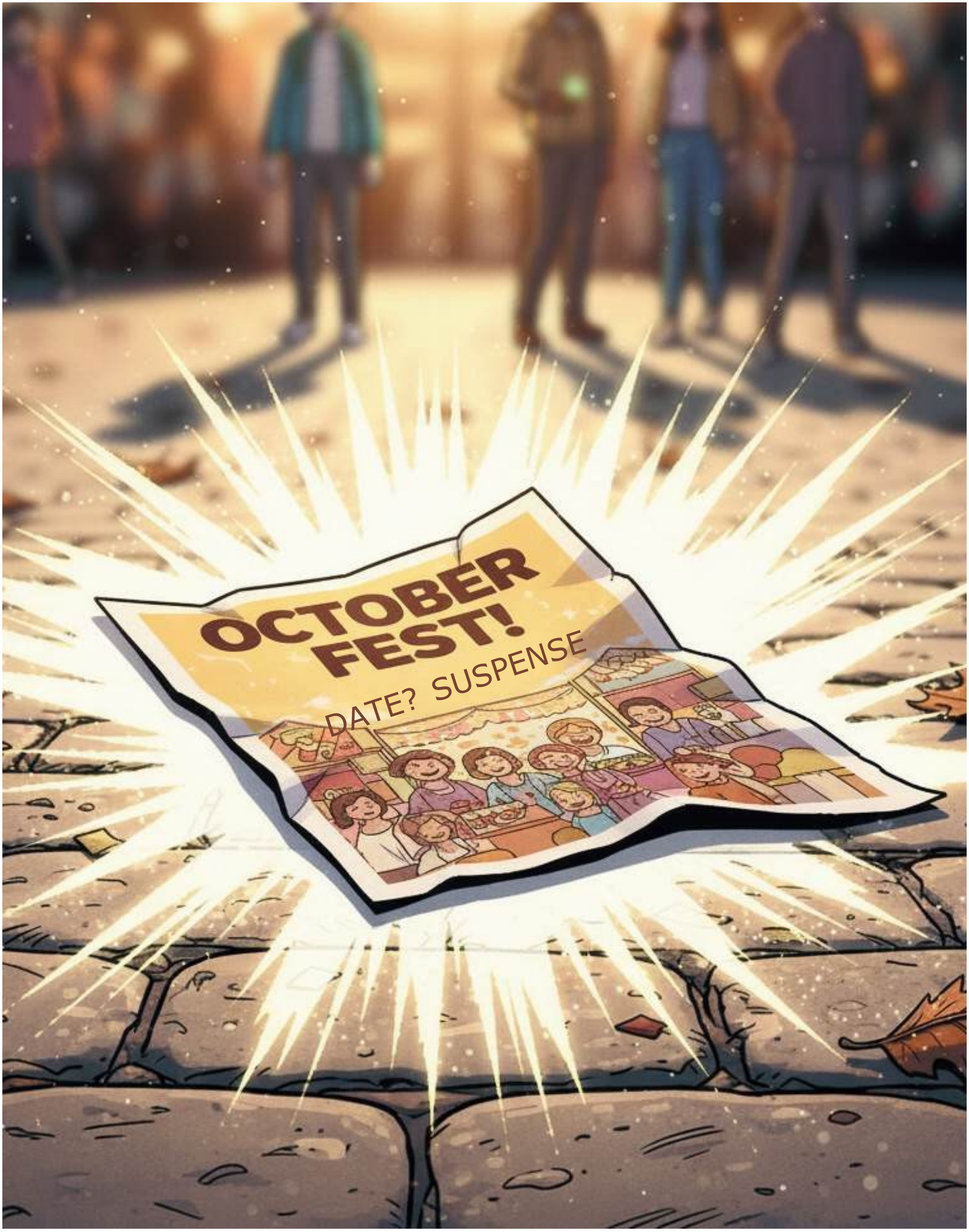
I DID AS YOU INSTRUCTED... NOW LET ME GO HOME. LET ME TAKE RUDRA TOO.

HMMMMM... I CHANGED MY MIND. NOT ONLY YOU... WHOEVER READING THIS SHOULD PARTICIPATE IN THIS THIS EVENT.

WHAT???! THIS WASN'T OUR OUR DEAL... WHAT HAPPENED TO MY FRIEND RUDRA??


YOU WANNA KNOW??...


FIND THE POSTER THAT YOU THREW ON YOURSELF... YOU'LL FINR ANSWERS IN THAT POSTER.


OCTOBER
FEST!
DATE? SUSPENSE

WOW!

IEEE

SRI SAIRAM COLLEGE OF ENGINEERING

PRADYUT PARVA 2

here,
i come

COMING SOON!

"Time has chosen its players... & you are one of them. Step into the story at Sri Sairam College of Engineering, and help uncover the mystery of "how did they mess with time" & Rudra's fate . The hunt begins in PRADYUT PARVA 2!"

~ TO BE CONTINUED

Name : Srinivas N
USN : 1SB22EC112