



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(AN AUTONOMOUS INSTITUTION)



**DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING**

ECHOES
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ABOUT OUR COLLEGE

Sri Manakula Vinayaga Educational Trust was founded to provide quality and affordable education to the weaker sections of society. The trust established Sri Manakula Vinayagar Engineering College (SMVEC) in 1999. SMVEC is an autonomous institution affiliated to Pondicherry University. It offers a variety of undergraduate, postgraduate, and research programs in Engineering, Arts and Science, Allied Health sciences, School of Agriculture, Centre of Legal Education, School of Physiotherapy and School of Pharmacy.

VISION:

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

MISSION:

M1: Quality Education: To provide a comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation: To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship: To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values: To instill a deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

ABOUT OUR DEPARTMENT

The Electronics and Communication Engineering (ECE) Department, founded in 1999, is dedicated to achieving excellence in learning, teaching, and research. Initially sanctioned with a 180-person intake in 2012, and increased to 240 in 2013. In 2006, the department established a PG programme with an 18-person intake. The B.Tech programme is NBA-accredited till 2025, and the college obtained an “A” from NAAC and Autonomous status in 2019. Our modern laboratories support Electronics, Communication, VLSI, Embedded Technology, and IoT, demonstrating our commitment to offering high-quality education and encouraging intellectual and professional development.

VISION:

Encourage academic excellence and ethical professionalism in Electronics and Communication Engineering to satisfy global needs.

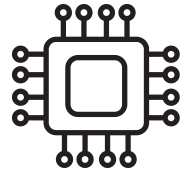
MISSION:

- M1: Prepare students for global issues in ECE.
- M2: Promote research and innovation excellence.
- M3: Increase employability and entrepreneurial abilities.
- M4: Teach human values and professional ethics.



EMPHERICAL STUDY

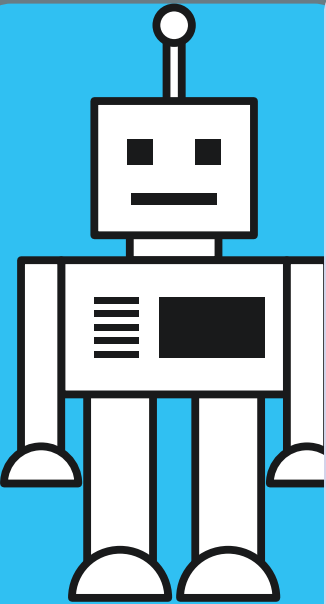
*It might shake you but
you cannot let it break you.*



CHIPLET-BASED ARCHITECTURE

INTRODUCTION:

Chiplet-based architecture is a cutting-edge design approach in semiconductors where a single processor is built using multiple smaller chips ("chiplets") rather than one large monolithic die. Each chiplet performs a specific function (e.g., CPU cores, GPU, memory controller) and they are connected using high-speed interconnects.



1.IMPROVED MANUFACTURING YIELDS:

Smaller chiplets are easier to fabricate without defects compared to large monolithic dies.

2.COST EFFICIENCY:

Reusing standardized chiplets across multiple products reduces development and fabrication costs.

3.IMPROVED MANUFACTURING YIELD:

Smaller chiplets are easier to fabricate without defects compared to large monolithic dies.

4.COST EFFICIENCY:

Reusing standardized chiplets across multiple products reduces development and fabrication costs.

5.PATHWAY TO 3D INTEGRATION:

Chiplet architecture is a stepping stone toward vertical stacking and full 3D ICs for even higher density computing.

6.HETROGENEOUS INTEGERATION:

Allows combining different types of processing units (CPU, GPU, AI, memory) made with different process nodes.

7.FASTER TIME TO MARKET:

Parallel development of chiplets shortens design cycles and accelerates product launch timelines.

8.ENHANCED SYSTEM PERFORMANCE:

Advanced interconnects (like AMD's Infinity Fabric or Intel's EMIB/Foveros) reduce communication bottlenecks.

CONCLUSION:

Chiplet-based architecture is a modular design approach in semiconductor manufacturing where a system is built using multiple smaller functional chips (called chiplets) rather than a single large monolithic chip. These chiplets are then integrated together—typically on a package substrate—using high-speed interconnects to function as a single cohesive system.



AI-CHIPS

Artificial Intelligence (AI) chips are a new generation of specialized hardware accelerators engineered specifically to handle the complex and resource-intensive tasks involved in AI workloads, including machine learning, deep learning, and neural network processing. Unlike general-purpose processors, these chips are optimized to perform massive parallel computations, matrix multiplications, and data throughput with significantly greater speed and energy efficiency. This optimization allows AI chips to accelerate the training and inference phases of AI models, enabling faster development cycles and real-time decision-making capabilities in a wide range of applications.



1. UNDERSTANDING AI CHIP ARCHITURES:

I have gained knowledge about different AI chip architectures such as GPUs (Graphics Processing Units), TPUs (Tensor Processing Units), FPGAs (Field Programmable Gate Arrays), and custom AI ASICs (Application-Specific Integrated Circuits).

2. AI PROCESSING CAPABILITIES:

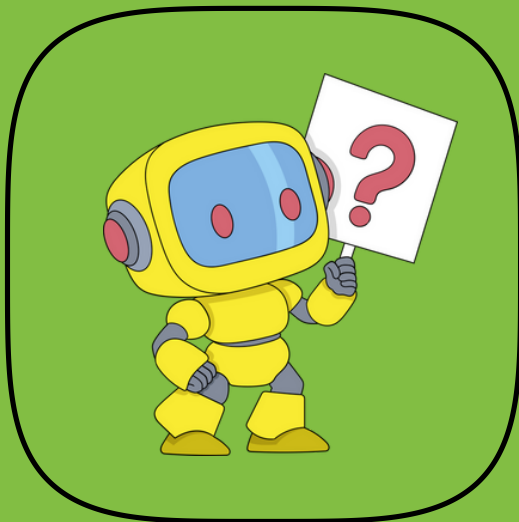
I understood how AI chips accelerate neural network computations, particularly matrix multiplications and parallel data processing, which are vital for deep learning.

3. REAL-TIME AI APPLICATION:

Learned how AI chips enable real-time AI tasks such as speech recognition, object detection, and natural language processing in devices ranging from smartphones to autonomous vehicles.

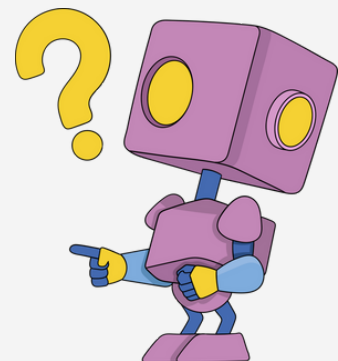
4. POWER EFFICIENCY AND PERFORMANCE TRADE-OFF:

Explored how AI chip designers address the balance between high computational performance and low power consumption, especially in edge devices.



CONCLUSION:

Studying AI chips has broadened my understanding of the critical role hardware plays in accelerating AI. With the knowledge gained, I am more equipped to contribute to AI-based system development and explore advanced areas such as embedded AI, edge intelligence, and next-generation processor design.



P S SATHISH KUMAR
IV-YR/VII-SEM

SOLID-STATE BATTERIES(SSBs)

INTRODUCTION:

Solid-state batteries (SSBs) are an advanced type of battery that use a solid electrolyte instead of the liquid or gel electrolytes found in traditional lithium-ion batteries.

1.ENHANCED SAFETY: Eliminates flammable liquid electrolytes, reducing the risk of fires and thermal runaway.

2.HIGHER ENERGY DENSITY: Can store more energy in a smaller space, increasing EV range and device runtime.

3.USE OF LITHIUM METAL ANODES: Solid electrolytes support lithium metal anodes, further increasing capacity and reducing weight.

4.COMPATIBILITY WITH RENEWABLE ENERGY SYSTEMS: High cycle life and stability make them ideal for solar and wind energy storage solutions.

5.LONGER LIFESPAN: SSBs degrade more slowly than lithium-ion batteries, offering thousands of charge cycles.

6.FASTER CHARGING CAPABILITIES: Improved ion mobility and heat resistance allow for quicker and safer charging.

7.WIDER OPERATING TEMPRATURE RANGE: Suitable for extreme environments such as aerospace, military, and space applications.

CONCLUSION:

Solid-state batteries are poised to revolutionize the energy storage landscape, marking a significant leap forward beyond conventional lithium-ion technology. By replacing the liquid or gel electrolytes found in traditional batteries with solid materials, these batteries promise enhanced safety due to their reduced risk of leakage and flammability. Additionally, they offer improved energy density, enabling longer-lasting power supplies in a more compact form factor, which is particularly advantageous for electric vehicles, portable electronics, and grid storage solutions.



Beyond safety and capacity, solid-state batteries also exhibit superior efficiency and faster charging capabilities, addressing two critical pain points that limit the performance of current battery systems. Their potential for greater thermal stability and extended lifecycle further contribute to reducing maintenance needs and environmental impact over time.

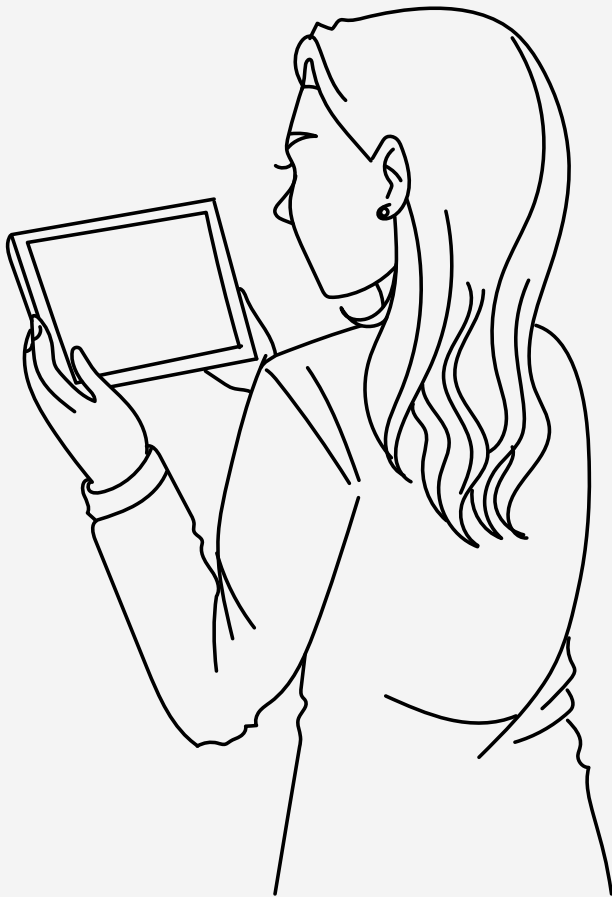
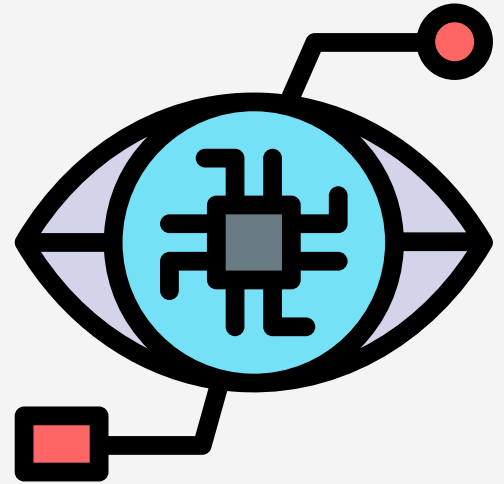
However, despite these promising benefits, several hurdles must be overcome before solid-state batteries can be widely adopted. Key challenges include the scalability of production techniques and the high manufacturing costs associated with sourcing and processing solid electrolyte materials. Moreover, technical issues such as interface stability, dendrite formation, and material compatibility still require innovative engineering solutions.

In summary, while the journey to mainstream deployment of solid-state batteries is complex, the technology's transformative potential to deliver safer, more efficient, and higher-performing energy storage solutions ensures it remains a focal point of innovation and investment in the energy sector.

SOFT ROBOTICS & PRINTED ELECTRONICS

INTRODUCTION:

Soft Robotics and Printed Electronics are two fast-emerging fields transforming how electronic systems interact with the real world. Soft robotics focuses on designing robots using flexible, deformable materials, inspired by biology, allowing safe interaction with humans and delicate environments. Printed electronics uses printing technologies (like inkjet or screen printing) to create flexible, lightweight circuits on various substrates such as plastic, paper, or fabric.



1.CUSTOMISED ON-DEMAND MANUFACTURING:

Printed electronics allow rapid prototyping and personalized device fabrication, even in low-resource settings.

2.BIO-INSPIERED ACTUTORS:

Soft robots mimic natural movements of animals (e.g., octopuses, worms), enabling gentle manipulation.

3.LOWER MANUFACTURING COSTS:

Printed electronics reduce the need for expensive cleanroom facilities and traditional PCB processes.

4.SAFE HUMAN-ROBOT INTERACTION:

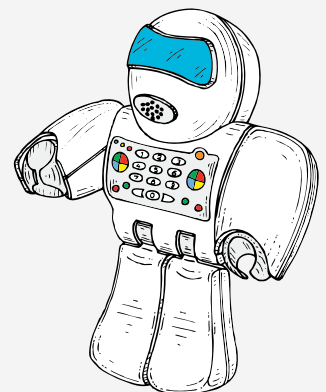
Soft robots are ideal for medical, rehabilitation, and caregiving use due to their compliance and safety.

5.INTEGRATION WITH IOT & AI:

Soft and printed devices with embedded sensors and wireless communication are powering edge AI applications.

CONCLUSION:

Soft robotics and printed electronics are reshaping the boundaries of traditional electronics and robotics. Their convergence leads to safer, more adaptable, and more personalized technologies that interact more naturally with humans and their environments. As materials science, AI, and fabrication techniques continue to evolve, we can expect soft, flexible, and intelligent machines to become central to healthcare, wearable tech, automation, and more—bridging the gap between biology and engineering.

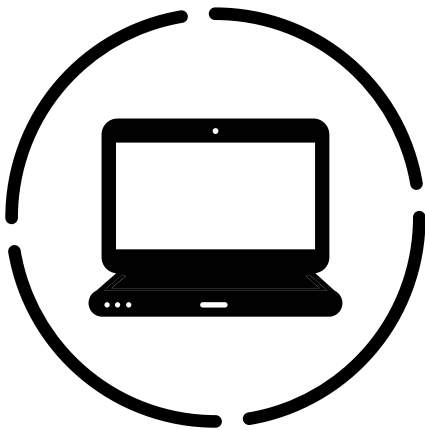


SANTHOSH S
IV-YR/VII-SEM

NEUROMORPHIC COMPUTING

INTRODUCTION :

Neuromorphic computing is a brain-inspired approach to designing computer systems that mimic the structure and function of biological neural networks. Instead of the traditional von Neumann architecture, neuromorphic systems are built using spiking neural networks (SNNs), which process data the way human brains do — in an event-driven, parallel, and energy-efficient manner.



1. ULTRA-LOW POWER CONSUMPTION:

Mimics the brain's energy efficiency, consuming far less power than GPUs or CPUs for AI tasks.

2. REAL-TIME LEARNING & ADAPTIVE:

Supports online, unsupervised learning — useful for dynamic, changing environments like robotics.

3. MASSIVE PARALLEL PROCESSING:

Neuromorphic chips can process information from millions of neurons and synapses simultaneously.

4. SPIKE-BASED COMMUNICATIONS:

Uses "spikes" (discrete events) instead of continuous signals, reducing data flow and improving efficiency.

5. BETTER EDGE AI PERFORMANCE:

Ideal for smart sensors and low-power devices in IoT, autonomous vehicles, and wearable tech.

6. BRAIN-MACHINE INTERFACE PROGRAM:

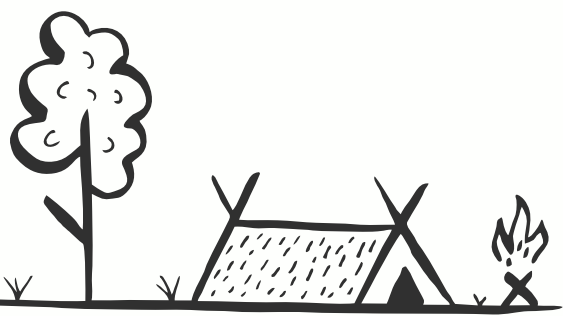
Compatible with neural signal processing, enabling real-time interaction with prosthetics and BCI devices.

CONCLUSION:

As hardware, neuroscience, and algorithms converge, neuromorphic computing may become the foundation for next-generation smart devices, brain-machine interfaces, and even general-purpose thinking machines, reshaping the future of both artificial intelligence and human-machine interaction. Neuromorphic systems hold tremendous potential to serve as the foundational technology for a new generation of smart devices that are capable of contextual understanding, autonomous adaptation, and seamless interaction with their environments.

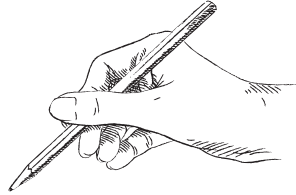


VIJAYA KISHORE G
IV-YR/VII-SEM



SKETCHING

Everything you can
imagine is real..





HEMAVARTHINI
II -YR/A-SEC



HEMAVARTHINI
II-YR/A-SEC



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II-YR/C-SEC



AARTHI.S
II-YR/C-SEC



ABINAYA.R
II-YR/C-SEC



ABINAYA.R
II-YR/C-SEC



MOMENTS OF GLORY



*"Our greatest glory is not in never falling,
but in rising every time we fall."*

PI DAY CELEBRATION - MODEL PRESENTATION



In alignment with our department's mission to foster innovation and hands-on learning, our students actively participated in the Pi Model Celebration, a prestigious academic event celebrating creativity, mathematics, and engineering integration. Among the key attractions of the celebration was the Model Presentation, where students from various departments showcased working models and prototypes reflecting practical solutions to modern-day problems. Our team entered the competition with passion and purpose, investing countless hours in designing, developing, and refining their model. Their participation reflected not only technical proficiency but also strong communication, teamwork, and presentation skills. The event served as an incredible platform for experiential learning, peer interaction, and real-time feedback from faculty and experts.

The achievement represents a significant milestone, serving as powerful validation of the students' exceptional abilities to think critically and apply interdisciplinary knowledge in innovative ways. It demonstrates their capacity not only to master complex technical concepts but also to develop practical solutions that effectively address pressing real-world challenges. This accomplishment goes far beyond a mere technical victory; it has profoundly contributed to the holistic development of the students by honing essential soft skills such as leadership, effective time management, and confident public speaking. These competencies are increasingly vital in today's fast-paced and ever-evolving professional environment, where collaboration, communication, and adaptability are just as important as technical expertise. Furthermore, the success of the team has sparked a wave of inspiration and motivation throughout the entire department. It has encouraged other budding innovators to step forward, take initiative, and confront challenges head-on, fostering a culture of creativity, resilience, and ambition.

M. RAVIKIRAN & C. LOTHIKA
II YR / C SEC

UNISYS INNOVATION PROGRAM

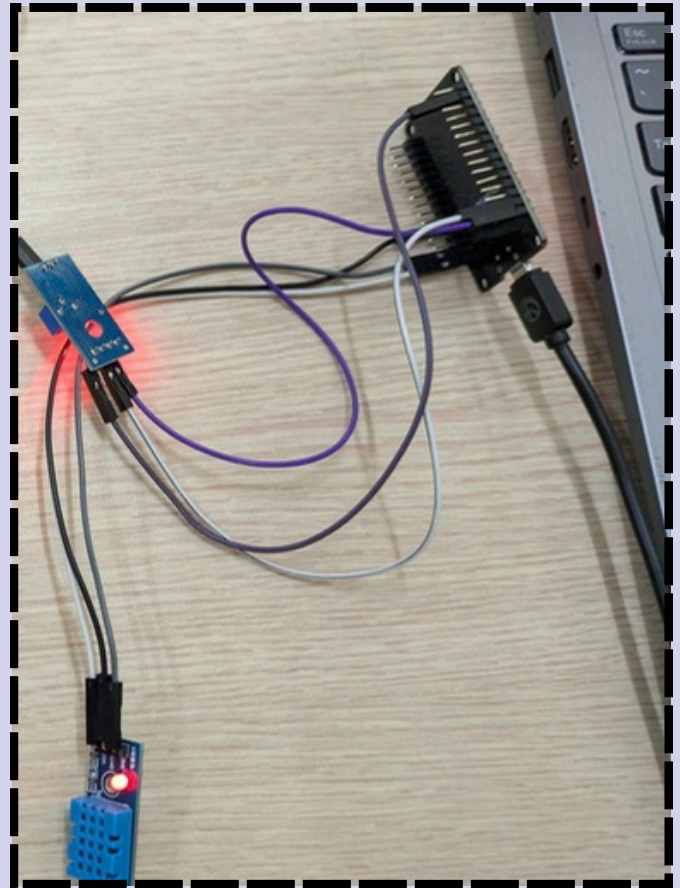


With a spirit of curiosity and a drive for excellence, our department enthusiastically participated in the prestigious Unisys Innovation Day—a national-level platform known for recognizing forward-thinking solutions and cutting-edge technological innovations. Our students embraced the challenge with passion, immersing themselves in months of preparation, ideation, and development. They collaborated across domains, explored real-world issues, and applied theoretical knowledge to build innovative solutions that could make a genuine impact. Participating in such a renowned competition offered our students invaluable exposure to industry expectations, presentation skills, and teamwork under pressure. After a journey marked by innovation, perseverance, and technical excellence, our department emerged victorious at Unisys Innovation Day, winning the coveted top prize of ₹1,50,000. This achievement reflects not only the brilliance of the project but also the dedication and synergy of the team behind it.

Competing against numerous elite institutions, our students impressed the judges with a solution that was not only technically sound but also socially impactful and practically scalable. Their work stood out for its originality, clarity of thought, and polished execution. The grand victory brought immense recognition to our department at the national level and set a new benchmark for student-led innovation. More than just a cash prize, this triumph symbolizes the power of creative thinking, collaborative effort, and the pursuit of excellence core values that define our department's vision for the future. More than a mere cash prize, this triumph embodies the very essence of our department's core values—creative thinking, collaborative spirit, and relentless pursuit of excellence. It serves as a powerful testament to what can be achieved when passion meets perseverance and teamwork. This victory inspires us all and reinforces our vision for the future: nurturing a community where innovation thrives, challenges are met with courage, and the next generation of leaders is empowered to make a lasting impact on society.

TECH FUSION

As part of our department's unwavering commitment to nurturing innovation and excellence, our students actively participated in TechFusion, the premier intra-departmental technical competition designed to challenge young minds and bring out their full potential. From the moment the event was announced, our team plunged into rigorous brainstorming, project development, and hands-on experimentation, demonstrating outstanding teamwork, time management, and critical thinking skills. TechFusion was not just a contest, but a celebration of creativity, collaboration, and engineering spirit. Each stage of the competition pushed participants to think beyond conventional boundaries and apply classroom knowledge in solving real-world problems. The event also created a collaborative environment where ideas flourished, talents were honed, and students had the chance to present their innovative solutions to peers, mentors, and faculty.



After weeks of tireless preparation, late-night coding, strategic planning, and testing of innovative ideas, our team achieved a remarkable milestone by securing the First Prize in the highly competitive TechFusion intra-departmental competition. Competing against several exceptional teams, our students stood out with their unique concept, flawless execution, and impactful presentation. The solution presented was not only technically sound but also socially relevant, earning high praise from the panel of judges and overwhelming appreciation from the audience. As a mark of this incredible achievement, our team was honored with a memento, symbolizing their innovation, commitment, and excellence. This victory is more than just an award—it is a reflection of our department's dedication to empowering future engineers and thinkers.

MUSIC COMPETITION

During the vibrant college cultural fest, we stood backstage, hearts pounding with a mix of nerves and excitement. Dressed in matching outfits that reflected both grace and confidence, we exchanged a reassuring glance before stepping onto the stage. The crowd's energy pulsed through the auditorium as their names were announced. As the music began, the atmosphere transformed their voices blended in perfect harmony, delivering a soulful medley that combined classical elegance with modern flair. Our performance wasn't just technically perfect; it was emotionally powerful, captivating the audience from the first note to the last. Every glance, every movement reflected the deep bond we shared and the countless hours of practice we had put in. The applause that followed was thunderous, a clear sign that they had touched the hearts of many.



When the winners were about to be announced, tension filled the air. we held hands tightly, we expressions a mix of hope and anxiety. And then came the moment: "First place goes to... Jeeviga and Pritika!" For a few seconds, we stood frozen in disbelief before bursting into joyful tears. As we walked up to the stage amidst roaring cheers, we embraced each other tightly, overwhelmed by emotion. The trophy placed in our hands felt heavier than expected not just in weight, but in meaning. Flashbulbs popped as we posed for photos, medals shining under the lights. our heartfelt thank-you speech. Surrounded by our cheering squad, we basked in the warmth of a well-earned victory.

INTER DEPARTMENT YOGA COMPETITION



A shining display of collective discipline, mindfulness, and unwavering enthusiasm, our department stepped forward to actively participate in the much-anticipated inter-departmental yoga competition. Far beyond a mere contest, this event served as a platform for our students to embrace and embody the essence of yoga balance, harmony, and inner strength. In the journey toward the competition was filled with early morning practices, shared moments of perseverance, and a deep sense of camaraderie that brought our team closer than ever.

Each participant reflected the department's deep-rooted commitment to personal growth, wellness, and the celebration of cultural traditions. By uniting physical fitness with mental clarity, our team truly honored the spirit of yoga, leaving a lasting impression on judges, fellow participants, and spectators alike.

After weeks of disciplined preparation, rigorous training, and an unyielding pursuit of excellence, our department emerged triumphant, securing the coveted overall championship trophy in the inter-departmental yoga competition. This extraordinary achievement stands as a testament to the collective spirit, resilience, and heartfelt dedication of every participant who gave their all—on and off the mat. From mastering intricate postures to maintaining composure under pressure, our team delivered a performance that blended grace, strength, and synchronization in perfect harmony. The resounding applause and unanimous praise we received were not just for technical excellence, but for the unwavering unity and sportsmanship we displayed throughout the event.



INTER DEPARTMENT MARCH-PAST COMPETITION



Our performance was applauded for its flawless coordination, sharp commands, and the powerful energy carried by every participant. This achievement stands as a proud testament to our students' unity, commitment, and ability to rise to any challenge with dignity and excellence. Synchronized movements, commanding presence, and exemplary teamwork, our department earned the Second Prize in the inter-department Marchpast competition, a testament to the hard work, precision, and determination of every member involved in this proud display of discipline and strength.

With great zeal, discipline, and unity, our department proudly participated in the inter-departmental march-past competition, showcasing synchronized formations, coordinated movements, and a strong sense of team spirit. The event served as a platform for our students to exhibit their dedication, physical endurance, and respect for discipline hallmarks of our department's culture and character. The preparation journey itself fostered teamwork and leadership, making the experience both memorable and enriching. Impeccable discipline, unity, and spirited coordination, our department proudly participated in the inter-department Marchpast competition, showcasing unwavering commitment and pride in representing our collective identity on a prestigious platform.

Through weeks of rigorous practice, unshakable determination, and sheer discipline, our department marched its way to glory by securing the Second prize in the inter-departmental march-past competition.

SUJITH S
III YR / D SEC

INTER-COLLEGE BASKET BALL TOURNAMENT



Participating in the inter-college basketball tournament was a truly unforgettable experience. Representing my college in a sport I'm passionate about gave me a sense of pride and responsibility. From the very beginning, our team trained hard, focused on improving coordination, strategy, and fitness. Every practice session brought us closer together, not just as teammates but as a family working toward a common goal. Facing teams from other colleges was both challenging and inspiring it helped us test our limits and learn from every match, win or lose. The competition was fierce, but our passion, unity, and determination kept us pushing forward. Just being a part of this journey taught me discipline, sportsmanship, and how to handle pressure while staying focused. When the tournament started, the atmosphere was electrifying. Colleges from various parts participated, and the level of competition was intense learning experience.

Reaching the finals itself was a huge achievement for us. The final match was intense, with both teams playing their best. We gave everything we had on the court. Though we couldn't secure the first place, winning second prize felt incredibly rewarding. That moment, standing with my teammates, medal around my neck, and hearing the applause it was a mix of joy, relief, and pride. Winning second place in the tournament was a moment of pure pride and joy. Though we missed the championship title by a narrow margin, standing on the podium with a medal around my neck felt like a dream come true. It was more than just an award it was a reward for all the effort, sacrifice, and commitment we had poured into this journey. The experience of playing in the finals, fighting for every point, and giving our all was worth more than words can express. That silver medal symbolized growth, teamwork, and the spirit of never giving up. It made me realize that success is not just about winning first place it's about how far you've come, the lessons you've learned, and the people who stood by you throughout the journey.

VIJAYA KISHORE G
IV YR/D SEC

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