



Technology Informatica

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A Technical Newsletter by Techno India NJR Institute of Technology, Udaipur

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Techno India NJR Institute of Technology, Udaipur

Welcomes
Maj. Gen. G.D. Bakshi
(SM, VSM)
&
Mrs. Sunita Bakshi

Date: 20 Nov. 2023 | Venue: Techno NJR Knowledge Campus

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Honored to host the Maj. Gen G.D. Bakshi and Mrs. Sunita Bakshi for gracing us with their inspiring presence on 20th November 2023. Their motivational speeches on discipline, leadership, and family support left a lasting impact on NCC cadets, students, and faculty members. A heartfelt thank you to Mr. R. S Vyas for acknowledging their invaluable contribution.

Cheers to the 11 Bright Minds from Techno India NJR's Batch 2021-25 for Selection as Interns at SECURE Meters! Here's to unlocking new opportunities and paving the way for innovation. Congratulations to the Selected Students.

Congratulations **BATCH-2025**

SELECTION AT SECURE

Himanshi Soni (ECE)	Durga Shankar Dangi (CSE)
Dhawal Purohit (ECE)	Manav Kumawat (ECE)
Harsh Soni (CSE)	Garvita Jain (CSE)
Mohit Gour (ECE)	Snehl Sharma (ECE)
Deepak Prajapat (ME)	Jahnvi Joshi (CSE)
Jaydeep Dangi (CSE)	

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Smart India Hackathon 2023 SOFTWARE EDITION

World's Biggest Open Innovation Model
DECEMBER 19-20, 2023

1 DAY LEFT

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[#TechnoIndiaNJR](#) [#SIH2023](#)

Organizing Partners: Ministry of Education, MoE's INNOVATION CELL (GOVERNMENT OF INDIA)
Official Partner: Hero, AWS
Official Media Partner: H2S
Knowledge Partner: H2S

Meet the visionary teams ready to reshape the future! Join us at SIH 2023, where innovation takes center stage. From December 19th to 20th, be part of the revolution at SIH 2023 – it's where possibilities become realities.



Vision

Empowering student with recent and emerging technologies to create innovative technical leaders capable of contributing to industrial and societal needs for betterment of mankind across the globe.

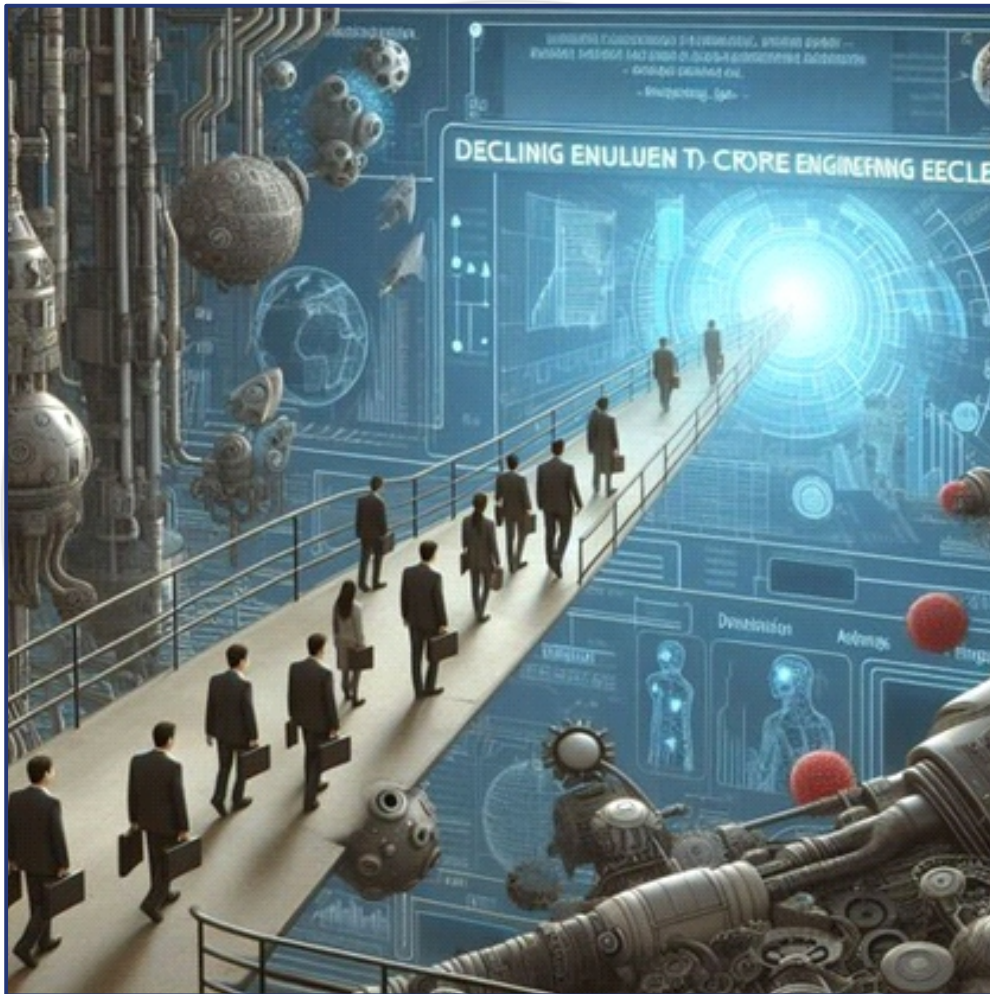


Mission

To provide dynamic learning environment to students by providing constant exposure to latest technologies by linking closely with the industries.

Declining Enrolment in Core Engineering Disciplines: A Future Perspective

The declining enrolment in core engineering disciplines can be attributed to several factors. Firstly, there has been a changing perception among students regarding the value and relevance of traditional engineering careers in the face of emerging fields like data science, artificial intelligence, and renewable energy. These fields often promise lucrative opportunities and societal impact, attracting students who seek innovative and dynamic career paths. Additionally, the rapid pace of technological advancement has led to the emergence of interdisciplinary solutions, blurring the boundaries between traditional engineering disciplines and other fields like computer science and biology. As a result, students may opt for specialized programs that offer a more holistic approach to problem-solving and innovation. Moreover, societal and environmental concerns have fuelled a growing interest in fields related to sustainability and renewable energy, drawing students away from traditional engineering disciplines focused on conventional industries. Finally, there may be perceived barriers to entry in core engineering disciplines, such as rigorous academic requirements or a lack of diversity and inclusivity within the field, which could deter potential students from pursuing careers in these areas. Overall, the declining enrolment in core engineering disciplines reflects a combination of evolving market demands, technological advancements, and shifting student preferences.



In upcoming years if there are fewer civil, mechanical, and electrical engineers but an increase in job opportunities, several scenarios might unfold. Industries may seek professionals with diverse skill sets who can bridge the gap between traditional engineering disciplines. Individuals with expertise in areas such as systems engineering, project management, and interdisciplinary collaboration may be in high demand to fill the roles left vacant by the shortage of specialized engineers. Recognizing the need to address the shortage of core engineers, companies and educational institutions may invest in upskilling and retraining programs to equip existing professionals with the necessary skills to fill vacant positions. This could lead to a surge in demand for continuing education programs, certifications, and vocational training in specialized areas of engineering.

By - Dr. Kuldeep Swarnkar (Assistant Professor, CE)

The Intersection of Quantum Mechanics and Artificial Intelligence

Quantum Mechanics: The Science of the Small

At the heart of quantum mechanics lies a profound revelation – the world at its most fundamental level behaves in ways that defy classical intuition. From the bizarre phenomena of superposition and entanglement to the probabilistic nature of particle behavior, quantum mechanics challenges our understanding of reality and offers a tantalizing glimpse into the underlying fabric of the universe.

Artificial Intelligence: Unleashing the Power of Data

In parallel, artificial intelligence has emerged as a transformative force, empowering machines to learn, reason, and make decisions with human-like intelligence. From image recognition and natural language processing to autonomous vehicles and predictive analytics, AI algorithms sift through vast troves of data, extracting patterns and insights that elude conventional methods.



The Quantum Advantage:

By harnessing the principles of quantum mechanics, researchers seek to unlock a new paradigm of computing – quantum computing. Unlike classical computers, which encode information in binary bits (0s and 1s), quantum computers utilize quantum bits or qubits, which can exist in superposition states, representing both 0 and 1 simultaneously. This inherent parallelism enables quantum computers to solve certain classes of problems exponentially faster than their classical counterparts.

Applications of Quantum AI:

The interaction of quantum mechanics and artificial intelligence holds immense promise across a spectrum of applications, revolutionizing industries and unlocking new frontiers of scientific discovery.

Optimization and Machine Learning: Quantum algorithms, such as the quantum variational algorithms and quantum Boltzmann machines, promise to enhance optimization tasks and accelerate machine learning processes, leading to more efficient resource allocation, personalized recommendations, and predictive modeling.

Drug Discovery and Material Science: Quantum AI algorithms can simulate molecular structures and interactions with unprecedented accuracy, accelerating the drug discovery process, and facilitating the design of novel materials with tailored properties for various applications, from renewable energy to quantum computing hardware.

Cryptography and Security: Quantum AI techniques, such as quantum key distribution and quantum-resistant cryptography, offer enhanced security measures against quantum attacks, safeguarding sensitive data and communication channels in an increasingly interconnected world.

Conclusion:

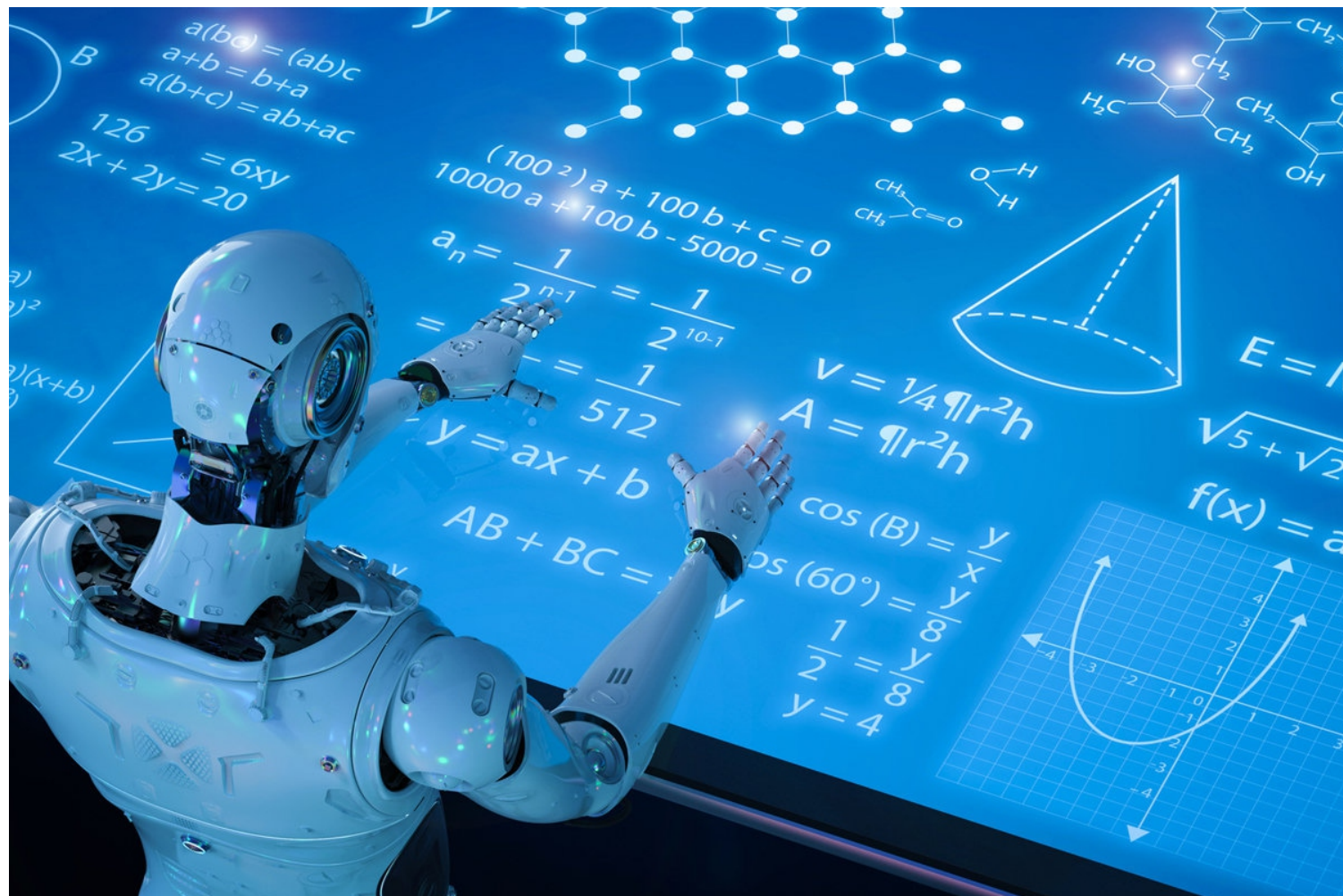
As we stand at the confluence of quantum mechanics and artificial intelligence, poised on the brink of a technological renaissance, the possibilities are as boundless as the quantum realm itself. By harnessing the power of quantum computing to augment AI capabilities, we embark on a transformative journey towards solving some of the most pressing challenges facing humanity, from healthcare and sustainability to economic prosperity and beyond. In this synergy of science and innovation, we glimpse a future where the boundaries of possibility dissolve, and the potential for discovery knows no limits.

By - Dr. Nidhi Jain (Professor, Basic Science)

Mathematics and Artificial Intelligence

Mathematics plays a foundational role in the development and advancement of artificial intelligence (AI). AI encompasses a broad range of techniques and technologies that enable machines to mimic human cognitive functions, such as learning, reasoning, and problem-solving. Mathematics provides the theoretical framework and tools necessary to understand, model, and optimize these processes. Here's a look at how mathematics is intertwined with AI:

Statistics and Probability Theory: Probability theory is fundamental to many AI algorithms, particularly in the field of machine learning. Techniques such as Bayesian inference, probabilistic graphical models, and Markov chains are used to model uncertainty and make predictions based on incomplete or noisy data. Statistical methods are also employed to analyze data, extract meaningful patterns, and infer relationships between variables.



Linear Algebra: Linear algebra forms the basis of many AI algorithms, especially those involving large-scale data processing and optimization. Matrices and vectors are used to represent data, and operations such as matrix multiplication, eigenvalue decomposition, and singular value decomposition are central to algorithms for dimensionality reduction, feature extraction, and matrix factorization.

Calculus and Optimization: Calculus is essential for optimizing AI models and algorithms. Techniques such as gradient descent and its variants are used to iteratively adjust model parameters in order to minimize a loss function and improve performance. Calculus also underpins optimization methods for training neural networks and other complex AI models.

Information Theory: Information theory provides a framework for quantifying and analyzing the information content of data. Concepts such as entropy, mutual information, and compression algorithms are used in various AI applications, including data compression, feature selection, and anomaly detection.

Graph Theory: Graph theory is employed in AI for modeling complex relationships and structures. Graph-based algorithms are used in tasks such as social network analysis, recommendation systems, and natural language processing. Graph theory also underpins the design and analysis of neural network architectures, which can be conceptualized as computational graphs.

Logic and Set Theory: Logic and set theory are foundational to symbolic AI approaches, which represent knowledge and reasoning using formal logical systems. Propositional and predicate logic are used to represent facts and rules, while set theory is employed to define relationships between objects and concepts.

In summary, mathematics provides the theoretical underpinnings and computational tools necessary for the development and application of AI. By leveraging mathematical concepts and techniques, researchers and engineers are able to design increasingly sophisticated AI systems that can learn from data, make intelligent decisions, and interact with the world in complex ways.

Navigating the Sea of Online Content: The Importance of Mentorship in the Digital Age

In today's digital era, the internet offers an abundance of educational resources and content at our fingertips. From YouTube tutorials and online courses to informative blogs and podcasts, there is no shortage of material available to students seeking to expand their knowledge and skills. However, with this vast array of content comes a significant challenge – the overwhelming task of navigating through it all and finding the right resources.

Many students find themselves falling into the trap of endless scrolling and clicking, moving from one YouTube channel to another, in search of the perfect video or tutorial. While the intention may be to learn and acquire new information, the reality is often quite different. Hours can be wasted in the pursuit of the ideal content, leaving students feeling frustrated, overwhelmed, and no closer to their educational goals.



One of the primary reasons for this struggle is the lack of guidance and mentorship in the digital realm. Unlike traditional educational settings where students have access to teachers, professors, and mentors who can provide direction and support, the online world can feel like a vast and lonely place. Without someone to steer them in the right direction, students may find themselves lost amidst the sea of online content, unsure of where to begin or how to discern quality resources from those of lesser value.

This is where the role of mentors becomes invaluable. A good mentor can serve as a compass, helping students navigate through the vast expanse of online content and guiding them towards resources that are relevant, reliable, and aligned with their educational objectives. Mentors can offer personalized recommendations based on their knowledge and expertise, saving students time and energy that would otherwise be spent on fruitless searches.

Furthermore, mentors can provide valuable insights and perspectives that go beyond simply recommending content. They can help students develop critical thinking skills, teach them how to evaluate the credibility of online sources, and offer advice on effective study strategies and learning techniques. By sharing their own experiences and expertise, mentors can empower students to make informed decisions and take control of their own learning journey.

Ultimately, in a world where the availability of online content is both a blessing and a curse, the role of mentors cannot be overstated. By providing guidance, support, and encouragement, mentors empower students to make the most of the wealth of educational resources available to them and navigate the digital landscape with confidence and purpose.

By - Dr. RimpY Bishnoi (Professor, CSE)

Mechanical Engineering and Mechanical Engineer

Mechanical Engineering

It is a broad field that encompasses industry, business, medicine and even law. Planning and designing of mechanical objects is the primary focus of mechanical engineers, whether they are producing engine and motor components or complete devices like refrigerators and robots. Design programs like AutoCAD help mechanical engineers do their jobs by helping them create preliminary designs and spot flaws before production, saving time and resources.

Mechanical engineering is the profession related to the study and use of machines. Machine transforms, transmits or uses energy, force or motion for a specific purpose. Machines range from mechanical pencils to automobiles to the human body. Every subject related to the branch has its own importance as described below

- Machines are designed to fulfill some functions (DESIGN)
- Machine require power (THERMODYNAMICS, COMBUSTION)
- Machines pollute (Air Pollution Control)
- Machines make heat that has to be removed (HEAT TRANSFER and FLUID MECHANICS)
- Machines move, so their motion must be understood (KINEMATICS, DYNAMICS)
And controlled (CONTROLS)
- Motions are resisted by surrounding air or fluid (FLUIDS)
- Machines must be constructed (MANUFACTURING)
- Machines have to be made from something (MATERIALS SCEINCE)



Mechanical Engineering

A mechanical engineer might design any types of products, build the prototype or model or perform rigorous testing. Due to the range of items falling under mechanical engineering, an engineer needs a variety of tools. Some are widely used by engineers in other disciplines, and some are seldom employed by any other type of engineer.

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Role of Computers for a Mechanical Engineer

Mechanical engineers make extensive use of computers in the performance of their job duties. Computer-aided design and drafting programs help engineers produce diagrams, create models and perform virtual tests. Relational databases enable engineers to store information in files that can be easily accessed without the need for repetitive data entry. Engineers use spreadsheet and word processing software to prepare reports, create graphs and communicate with supervisors and clients.

Where do mechanical engineers work ?

The scope of mechanical engineering is quite broad. There are some important fields for mechanical engineers.

- Automotive industry
- Power generation industry
- Manufacturing
- Robotics
- Air pollution control
- Oil industry
- Consulting firms

What would a Mechanical Engineer study ?

The following are the subjects which helps him to become an Engineer

- Calculus and differential equations
- Physics and chemistry
- Humanities and Social science
- Engineering fundamental (Statics, Fluid mechanics, Dynamics, Thermodynamics, heat transfer, circuits, materials, Strengths, kinematics, Controls, Vibrations).
- Technical electives (Engineering Economics, Combustion, Robotics, air pollution control, Mechatronics)
- Communication
- Design

Characteristics of a Mechanical Engineer

true engineer has following characteristics

- Capable Communicator
- Strong interest in math and science
- Willing to do hands –on work
- Innovative problem solver
- Affinity for machines

By - Mr. Naresh Kumar (Assistant Professor, ME)

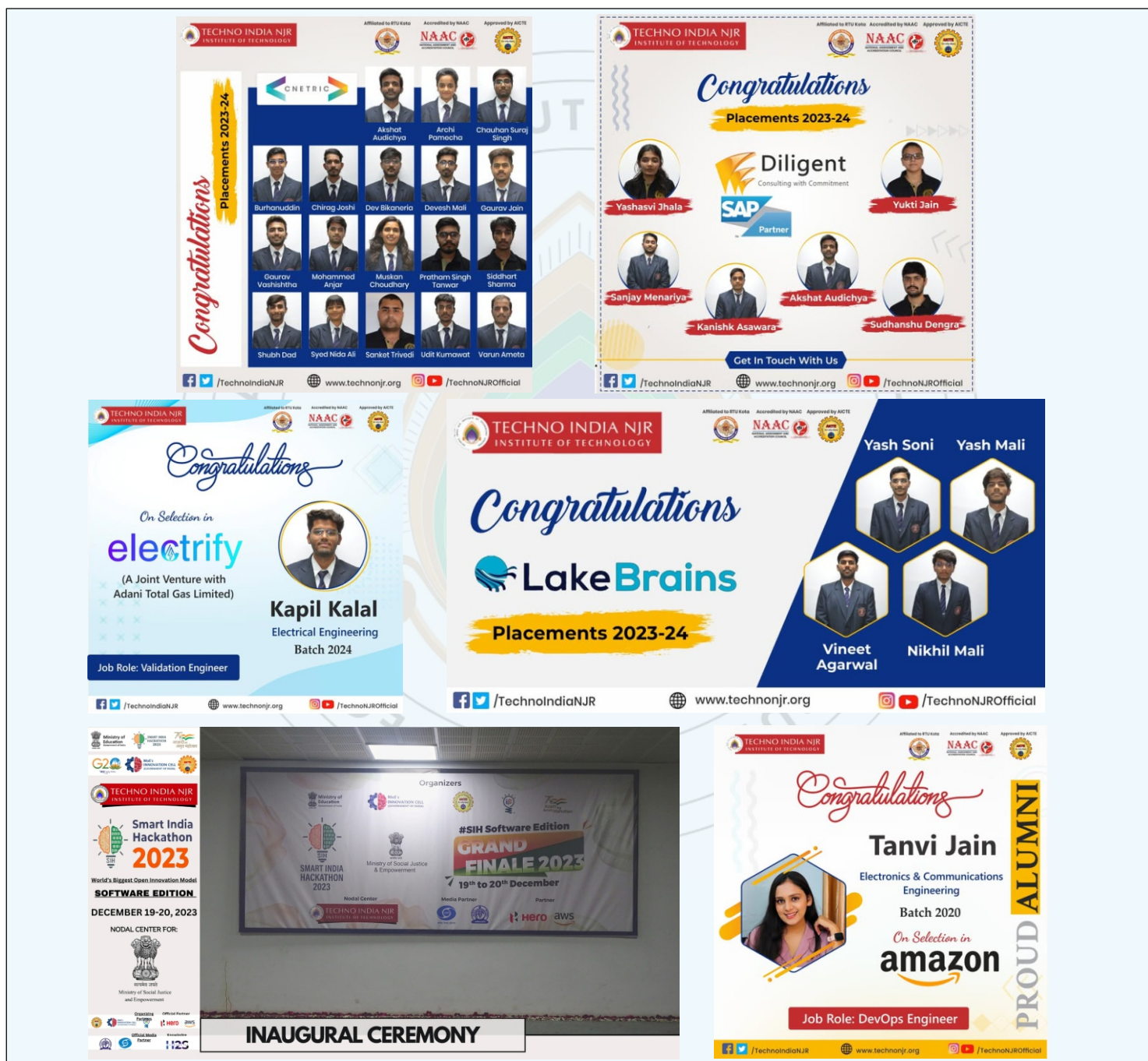
Cloud Computing Sustainability and The Green Cloud

The IT sector has been revolutionized by the rapid rise of cloud computing in recent years, providing organizations and people with unmatched scalability, cost-effectiveness, and flexibility. Nevertheless, the increase in the popularity of cloud computing has sparked worries over its ecological consequences. This is due to the substantial energy consumption and substantial carbon emissions produced by data centers, which serve as the foundation of cloud infrastructure.



In response to this difficulty, the notion of the "Green Cloud" has arisen as a possible way to offset the environmental imprint of cloud computing. We give a complete analysis of the environmental repercussions of data centers, emphasizing the urgent need for eco-friendly alternatives. Utilizing up-to-date research findings and advancements in the industry, we explore cutting-edge methods such as incorporating renewable energy, designing energy-efficient data centers, and implementing techniques to optimize resources. The results of our study indicate that a focused endeavor to achieve sustainability can result in significant decreases in carbon emissions, energy usage, and operating expenses, while also improving the effectiveness and dependability of cloud services. Ultimately, this paper argues for a fundamental change in perspective towards the Green Cloud, highlighting the crucial responsibility of cloud providers, enterprises, and policymakers in advancing sustainability within the digital ecosystem. By adopting environmentally sustainable practices, we can fully harness the capabilities of cloud computing while safeguarding our world for future generations.

By - Mr. Naresh Mali (Assistant Professor, CSE)



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