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In This Issue

Tributes to Krishnaswamy Kasturirangan: Architect of Indian Education and Space Exploration for *Viksit Bharat*@2047—Part-II[#]

Sreelogna Dutta Banerjee* and Jayanta Mete**

Views of Dr. Kasturirangan about Teacher in the Context of NEP—2020

Teachers have always been regarded as the backbone of an educational system. In the vision of Dr. K Kasturirangan, the National Education Policy (NEP) 2020 architect, teachers occupy a central, transformative role. NEP 2020 redefines the role, training, empowerment, and status of teachers in India, in direct alignment with Kasturirangan's belief that the success of any education reform is intrinsically tied to the quality, dignity, and empowerment of its teachers (Ministry of Education, 2020). From his perspective, teachers are not just transmitters of knowledge but nurturers of creativity, ethics, innovation, and national development.

One of the most important aspects of Kasturirangan's view on teachers is the emphasis on professional autonomy and respect. He advocated that teachers should be treated as knowledge creators, not just passive implementers of curriculum (Sahasrabudhe, 2020). NEP—2020 addresses this by proposing a significant reduction of bureaucratic constraints on teachers, allowing them greater autonomy in choosing pedagogical approaches, adapting curricula to local contexts, and innovating inside the classroom. Teachers are envisioned as intellectual leaders who inspire critical thinking, creativity, empathy, and ethical reasoning in students.

Kasturirangan's framework also gives unprecedented attention to the quality of teacher education. He identified that poor-quality teacher preparation programs had led to underprepared and demotivated teachers. NEP—2020 proposes a complete overhaul of teacher education through the establishment of an integrated four-year B.Ed. programs combining subject knowledge, pedagogy, and practical training (Ministry of Education, 2020). This model ensures that teachers are not just trained in teaching techniques but are well-versed in their disciplines, ready to lead inquiry-driven classrooms. According to Kasturirangan, teacher education must itself be of the highest academic rigor, equivalent to other professional degrees like engineering or medicine (Chaturvedi, 2020).

[#]The Article is in two parts. Part -1 has been published in Issue Vol 63(19) May 12-18, 2025.

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Moreover, NEP—2020 stresses Continuous Professional Development (CPD), reflecting Kasturirangan's belief that learning should never stop for teachers (Ramesh, 2021). The policy envisions regular workshops, mentoring opportunities, leadership training, and incentives for teachers to constantly update their skills and knowledge. Annual CPD hours are proposed to ensure that teachers stay connected with the latest pedagogical, technological, and disciplinary advancements. This emphasis resonates with Kasturirangan's philosophy that an education system can only remain relevant if its teachers are dynamic learners themselves.

Another major highlight of Kasturirangan's vision is the creation of a robust teacher career path. NEP—2020 proposes merit-based promotion, leadership tracks, and the institution of National Professional Standards for Teachers (NPST) to ensure that outstanding teachers are recognized, rewarded, and given opportunities to assume mentorship and administrative roles (Ministry of Education, 2020). This breaks away from the seniority-based stagnation that had previously demotivated many educators. According to Kasturirangan, if teachers are to transform students, the system must first transform the professional environment for teachers (Sridhar, 2020).

In addition, NEP—2020 recognises the critical role of school leadership in shaping teaching quality. Kasturirangan emphasised that school principals should be excellent teachers and academic leaders rather than administrators focused only on compliance (Sahasrabudhe, 2020). Consequently, the policy mandates special training for school heads to lead schools as learning organisations, focusing on pedagogy, mentoring, innovation, and collaboration.

Kasturirangan's views on teacher-student relationships also find direct expression in NEP—2020. He stressed the importance of building caring, trustful, and respectful relationships where teachers become mentors and guides, not just authority figures (Chaturvedi, 2020). NEP–2020 encourages the creation of smaller class sizes, ensuring individualised attention and formative assessments that support learning rather than merely evaluating it. Teachers are expected to nurture the full range of students' capabilities, including emotional well-being, ethical reasoning, and social responsibility, reflecting the broader goals of holistic education.

Importantly, Kasturirangan viewed technology as an enabler, not a replacement for teachers. NEP 2020 emphasises that while digital tools can supplement learning, teachers remain irreplaceable as motivators, facilitators, and ethical guides (Ramesh, 2021). The policy promotes the use of technology for professional development, content creation, and classroom innovation, but insists that the human connection between teacher and learner must remain at the core of education.

Equity in teaching opportunities was another focus area for Kasturirangan. He envisioned special training and support for teachers working in rural, tribal, and disadvantaged areas, where educational challenges are compounded by socio-economic barriers (Sridhar, 2020). NEP 2020 reflects this by proposing special incentives, housing provisions, and career advancement programs for teachers willing to serve in such areas. In his view, an inclusive and equitable education system is possible only when we ensure excellence and motivation among teachers everywhere, not just in urban elite schools.

Lastly, Kasturirangan's view on teachers extends to redefining assessment systems. He believed that teachers should be empowered to use formative, diagnostic, and competency-based assessments to support student learning, rather than being driven by high-stakes summative exams (Ministry of Education, 2020). NEP—2020 integrates this vision by promoting flexible, multi-dimensional assessments that capture learning progress in a supportive, low-pressure environment.

In conclusion, the vision of Dr. K Kasturirangan and NEP—2020 places teachers at the very heart of educational transformation. They are no longer seen merely as implementers of externally decided curricula but as nation builders, intellectual leaders, researchers, counsellors, and innovators. The policy recognizes that unless teachers are well-prepared, well-respected, well-supported, and continuously evolving, no amount of curricular reform will succeed. By empowering teachers with autonomy, professional rigor, leadership opportunities, and ethical responsibilities, Kasturirangan offers a powerful blueprint for an education system where teachers inspire, innovate, and transform. Through NEP 2020, the role of the teacher is reimagined not just for today but for the future — ensuring that

India's demographic dividend is nurtured by the best minds and the most compassionate hearts.

Relevance of Dr. Kasturirangan's Thought in the Context of NEP—2020

The educational philosophy of Dr. K Kasturirangan, as articulated through the National Education Policy (NEP) 2020, holds profound relevance in the modern context. In a world marked by rapid technological advancement, globalisation, climate change, and socio-economic transformations, his vision offers a blueprint for creating an education system that is flexible, inclusive, multidisciplinary, value-driven, and future-ready (Ministry of Education, 2020). His thoughts address not only the structural weaknesses of India's past education models but also align Indian education with emerging global trends, thus ensuring that the nation's youth are prepared for the complex challenges of the 21st century.

One of the most significant aspects of Kasturirangan's thought is his emphasis on holistic and multidisciplinary education, which is critical in today's interconnected world. Traditional education systems based on narrow specialisation no longer suffice in a reality where solutions to complex problems require integrated knowledge across fields (Sridhar, 2020). NEP—2020, reflecting Kasturirangan's vision, dismantles the rigid separation between arts, sciences, and vocational streams, encouraging students to pursue diverse combinations of subjects. This flexibility promotes creativity, critical thinking, and adaptability—skills increasingly valued in modern workplaces and societies. Thus, his advocacy for multidisciplinary curricula is not merely progressive but urgently necessary for future-readiness.

Kasturirangan's insistence on competency-based learning also demonstrates his foresight regarding the skills needed in the 21st century. Rather than focusing solely on rote memorization, NEP 2020 stresses conceptual understanding, analytical abilities, problem-solving, and innovation (Ministry of Education, 2020). In a global economy driven by knowledge and creativity, such competencies are far more valuable than factual recall. His vision ensures that education becomes a tool for lifelong learning rather than a short-term examination pursuit, aligning Indian education with global best practices.

In terms of early childhood education, Kasturirangan's thought finds contemporary relevance through his advocacy for universal and high-quality Early Childhood Care and Education (ECCE). Modern research in neuroscience confirms that the first six years are critical for brain development (Chaturvedi, 2020). NEP 2020, by focusing on ECCE as the foundation of the education system, reflects its commitment to building strong cognitive, emotional, and social foundations, ensuring equity and quality from the very beginning of a child's learning journey.

Another vital component of Kasturirangan's educational philosophy is his focus on teacher empowerment, which has immense modern relevance. With rapid pedagogical shifts due to technology and global interconnectivity, teachers today need continuous professional development and greater autonomy (Sahasrabudhe, 2020). NEP 2020 embodies this vision by proposing rigorous teacher education programs, establishing National Professional Standards for Teachers (NPST), and emphasising continuous training and leadership opportunities. Kasturirangan's emphasis on the teacher as a mentor and guide rather than a mere transmitter of knowledge resonates strongly with the modern pedagogical shift toward learner-centred education.

The relevance of technology integration in education, as envisioned by Kasturirangan, is even more pronounced in the post-pandemic world. NEP 2020 proposes extensive use of technology for teaching, learning, assessment, and teacher training (Ministry of Education, 2020). Kasturirangan understood that digital literacy, coding, AI awareness, and blended learning models are no longer optional but essential for preparing students for the digital economy. At the same time, he carefully warned against technology replacing teachers, stressing that the human connection in learning must be preserved (Ramesh, 2021). This balanced approach is critical in ensuring that technology remains a tool for the democratisation of education without dehumanising the learning process.

Kasturirangan's thought also finds modern relevance in his approach to vocational education and skill development. With changing employment landscapes driven by automation and AI, traditional academic degrees alone are insufficient for employability. NEP–2020's target of exposing 50% of learners to vocational education by 2025 reflects its belief in mainstreaming practical skills and

entrepreneurship education (Sridhar, 2020). This aligns India's education system with global movements that emphasise skill acquisition, adaptability, and lifelong learning to navigate uncertain job markets.

Another enduringly relevant theme in Kasturirangan's thought is his focus on equity and inclusion. Modern India, with its socio-economic diversities, cannot progress without ensuring that education reaches marginalised and underrepresented communities. NEP 2020, in accordance with Kasturirangan's vision, introduces measures like Special Education Zones, gender inclusion funds, scholarship schemes, and provisions for disabilities to ensure that no child is left behind (Ministry of Education, 2020). His belief that true national development is impossible without educational inclusion remains a cornerstone of progressive policy-making today.

The internationalisation of education, another idea Kasturirangan strongly supported, is crucial in a globalised world. NEP 2020 proposes facilitating international collaborations, allowing foreign universities to set up campuses in India, and promoting Indian institutions abroad (Ramesh, 2021). This global outlook ensures that Indian students are not just locally competent but also globally competitive, aligning education with contemporary mobility, cooperation, and innovation trends.

Lastly, Kasturirangan's insistence on ethical and value-based education addresses a critical modern need. In a world grappling with environmental crises, rising inequality, and ethical dilemmas driven by technological disruption, mere technical proficiency is insufficient (Chaturvedi, 2020). NEP 2020 emphasises building character, empathy, constitutional values, and environmental consciousness—essential attributes for responsible global citizens. His holistic view of education ensures that economic progress is balanced with social responsibility and sustainable development. Overview of the National Education Policy –2020 is given in Figure 2.

Kasturirangan's thought lies in its ability to address the demands of the 21st century while remaining rooted in timeless educational ideals. His ideas on multidisciplinary, early education, teacher empowerment, technology integration, vocationalization, equity, internationalisation, and ethical learning create a comprehensive framework that prepares Indian students not just for exams but for life in an interconnected, rapidly evolving world. Through NEP 2020, Kasturirangan has given India a visionary road map for building an education system that is future-ready, globally aligned, socially conscious, and deeply Indian in spirit.

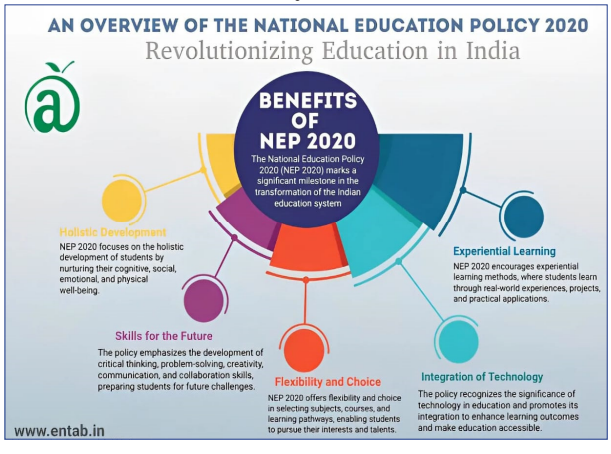
Relevance of Kasturirangan's Thoughts for Modern Science

Dr. K. Kasturirangan remains one of the most visionary figures in modern Indian science, and his ideas continue to hold strong relevance today. His contributions to space science, technological self-reliance, interdisciplinary research, and scientific diplomacy have become even more significant in the current context of a rapidly evolving global scientific landscape.

One of Kasturirangan's most important contributions was his insistence on self-reliance in high-end technology. At a time when India was heavily dependent on foreign technology, he spearheaded initiatives to develop indigenous capabilities in satellite communications, remote sensing, and launch vehicles (Chakrabarti, 2019). Today, when issues like technological sovereignty, cybersecurity, and supply chain resilience have become central concerns globally, Kasturirangan's early vision of technological independence has proven prophetic. India's success with missions like *Chandrayaan, Mangalyaan*, and *Gaganyaan* can be directly linked to the indigenous scientific ecosystem he helped nurture.

Another key dimension of his thought that remains highly relevant is the integration of pure sciences with applied sciences. As Chairman of

Figure-2: Overview of the National Education Policy–2020



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ISRO, he promoted a research culture that did not isolate satellite development from broader scientific inquiries like earth observation, climate monitoring, and space-based resource management (Sridhar, 2020). In today's world, where complex challenges like climate change, sustainability, and pandemics demand interdisciplinary solutions, his model of science serving society is critically important.

Kasturirangan was also an early advocate for planetary exploration. His push for India's lunar program laid the groundwork for India's broader participation in global space science, including interplanetary missions and space-based astronomy (Ramesh, 2021). In an era when lunar colonization, Mars exploration, and asteroid mining are becoming scientific and commercial priorities, his foresight in preparing India for planetary science has positioned the country as a credible player in international space efforts.

Furthermore, his leadership style emphasized international collaboration in science without compromising national interests. By opening ISRO to partnerships with agencies like NASA and ESA while maintaining technological autonomy, he established a balanced model of scientific diplomacy (Sahasrabudhe, 2020). This approach is vital today, as nations seek strategic partnerships for missions related to lunar bases, satellite constellations, and deep space exploration, while guarding critical technologies.

Finally, Kasturirangan's thoughts on democratizing science and technology — ensuring that benefits reach rural areas, farmers, disaster management agencies, and educational institutions — have become more urgent in today's debates about inclusive innovation. His vision that science must be both excellent and socially responsible continues to inspire policies that seek to bridge the digital divide and foster grassroots innovation.

Dr. K. Kasturirangan's scientific philosophy — emphasising self-reliance, societal relevance, interdisciplinary approaches, international collaboration, and inclusive growth — is not just historically significant but extraordinarily modern. His ideas form a blueprint for India's scientific ambitions in the 21st century, guiding the nation toward becoming a self-sustained, innovative, and ethically driven global scientific leader.

Criticism and Debates surrounding Kasturirangan's View

The National Education Policy (NEP) 2020, largely shaped by Dr. K. Kasturirangan's vision, has been widely praised for its ambition and forward-looking reforms. However, it has also attracted significant criticisms and debates from educationists, scholars, policymakers, and social activists. While Kasturirangan's framework seeks to revolutionize Indian education by making it holistic, multidisciplinary, and inclusive, critics argue that certain aspects may be impractical, overly idealistic, or insufficiently attentive to ground realities.

One major criticism revolves around the implementation feasibility of the proposed reforms. NEP 2020 lays out an ambitious roadmap — including early childhood education for all, vocational education from school onwards, universal foundational literacy, multidisciplinary higher education institutions, and large-scale teacher training — but critics argue that these transformations demand massive financial, infrastructural, and human resource investments which have not been adequately addressed (Tilak, 2020). Educationists like Prof. Jandhyala B. G. Tilak caution that without increasing public investment to at least 6% of GDP, as recommended in NEP itself, many of Kasturirangan's ideals risk remaining aspirational rather than achievable.

Another significant debate surrounds the vocationalization of education. While Kasturirangan envisioned integrating vocational skills into mainstream schooling to break elitist biases and improve employability, critics fear this could inadvertently reinforce socio-economic stratification (Kumar, 2021). There is apprehension that underprivileged students may be tracked disproportionately into vocational streams, while elite groups continue to dominate academic and professional fields, thus perpetuating inequality. Without careful safeguards, the integration of vocational education could replicate historical caste- and class-based divisions in a modern guise.

The promotion of mother-tongue education until at least Grade 5, as advocated by Kasturirangan, has also been contested. Linguists and educationists agree with the cognitive benefits of early learning in the home language (NCERT, 2019), but critics argue that in a diverse, multilingual country like India, the logistics of preparing textbooks, teacher training, and

administrative frameworks in hundreds of languages may be overwhelming. Moreover, in urban centers where English-medium education is seen as essential for global employability, parents may resist this policy, perceiving it as a barrier to economic mobility (Sridhar, 2020).

Privatisation concerns present another contentious issue. Kasturirangan advocated regulatory autonomy for higher education institutions and encouraged private participation (Ministry of Education, 2020). Critics, however, argue that without strict regulatory oversight, this could lead to the commercialisation of education. Scholars like Chattopadhyay (2021) have warned that deregulated private players may prioritise profits over educational quality, exacerbating the already stark inequalities between elite and marginalized groups.

Another sharp criticism is directed at the centralization tendencies within NEP 2020. While Kasturirangan aimed to create standards for quality and coherence across India's education system, opponents argue that education in India is constitutionally a concurrent subject, and excessive centralization may undermine federal principles (Kumar, 2021). Critics point out that states with diverse socio-linguistic realities must retain autonomy over education policy to cater to local needs. Imposing uniform curricular frameworks might erode regional cultures and democratic decentralization.

Concerns have also been raised regarding the Academic Bank of Credits (ABC) and the multiple entry-exit system in higher education. While Kasturirangan saw this as a way to offer flexibility and lifelong learning opportunities, some scholars fear it could lead to a "cafeteria model" of education, where academic depth and continuity may be sacrificed for fragmented, surface-level learning experiences (Ramesh, 2021). Without strong mentoring and support systems, students from disadvantaged backgrounds may especially find it difficult to navigate these complex options.

The new school structure of 5+3+3+4 proposed under NEP 2020, reflecting Kasturirangan's cognitive development model, has also generated debates. While child psychologists agree with its pedagogical soundness (NCERT, 2019), critics argue that transitioning an entire national system from 10+2 to 5+3+3+4 demands enormous retraining of teachers, redesign of textbooks, reorientation of assessments, and restructuring of school infrastructure—tasks that could take decades to fully achieve, risking policy fatigue and uneven implementation across states (Tilak, 2020).

Language policy debates further complicate the picture. Kasturirangan's emphasis on promoting Sanskrit and Indian classical languages alongside modern education has been perceived by some minority groups and regional language proponents as an attempt to saffronize education (Chattopadhyay, 2021). They argue that while preserving Indian heritage is important, education policy must be sensitive to India's pluralistic, multicultural ethos without privileging any single tradition.

In the area of assessment reforms, while Kasturirangan's vision to move towards formative, competency-based assessments is progressive, skeptics argue that without capacity-building among teachers and exam boards, implementation may remain symbolic. Many fear that "high-stakes board exams" will continue to dominate because of entrenched societal expectations around certification and college admissions (Sridhar, 2020).

The handling of teacher education also draws critical attention. NEP 2020's plan for four-year integrated B.Ed. programs is lauded (Ministry of Education, 2020), but critics point out the massive scale of restructuring needed for existing teacher education colleges, many of which are low-quality, under-regulated institutions. The transition may disproportionately burden small private colleges and create disruption in teacher supply chains if not carefully phased (Kumar, 2021).

Lastly, although Kasturirangan's vision for higher education internationalization is forward-thinking, critics worry about its potential to intensify brain drain. With foreign universities setting up campuses in India, the brightest students might increasingly pursue expensive foreign degrees domestically, deepening socio-economic inequalities unless sufficient scholarships and public sector investments are made (Ramesh, 2021).

Despite these criticisms, it must be recognized that most debates acknowledge the fundamental soundness of Kasturirangan's vision; the critiques are largely centered on issues of feasibility, equity, and sensitivity to India's complex diversity rather than the core principles themselves. His holistic, future-oriented, ethical, and learner-centric view

of education is widely appreciated. However, as Tilak (2020) notes, "policy without political will, administrative capacity, and sustained investment remains paper architecture." Hence, the success of Kasturirangan's ideas will depend not merely on their theoretical brilliance but on careful, inclusive, and context-sensitive implementation.

Dr. K. Kasturirangan's thought, as reflected in NEP 2020, sets a visionary course for Indian education, critical engagement and constructive debate are essential to refine and adapt this vision to India's complex realities. Only by addressing these criticisms honestly and thoughtfully can India realize the full potential of the transformative educational journey Kasturirangan envisaged.

Conclusion

Although Dr. K Kasturirangan has today entered eternal rest from this world, his life's work ensures that he remains alive among us all. His contributions will continue to breathe through the institutions he built, the missions he led, the reforms he envisioned, and the policies he architected. Dr. Kasturirangan's name will echo for generations not merely as a man who lived but as an immortal symbol of scientific excellence and educational renaissance. Through his work, he shall live forever in the aspirations and achievements of India's students, scientists, and educators.

Dr. K Kasturirangan stands among the finest architects of modern India's twin dreams: scientific advancement and educational empowerment. In the sphere of space science, his achievements are legendary. As the former chairman of the Indian Space Research Organisation (ISRO), he was instrumental in pioneering India's ambitious satellite programs, including the Indian National Satellite System (INSAT) and the Indian Remote Sensing (IRS) satellites (Sridhar, 2020). Under his leadership, ISRO not only strengthened India's communication, meteorology, and remote sensing capabilities but also laid the groundwork for future lunar and interplanetary missions. His stewardship during a critical phase of India's space journey earned him the highest national civilian honors, including the Padma Shri, Padma Bhushan, and Padma Vibhushan.

However, Dr. Kasturirangan's contributions were not limited to space. His pivot toward educational reform in the later stages of his career showcased his broader vision of nation-building through knowledge. As the chairman of the committee that drafted the National Education Policy (NEP) 2020, he envisioned an education system that would blend traditional Indian values with futuristic global competencies (Ministry of Education, 2020). The NEP—2020 is not just a document; it is a manifesto for India's future, aiming to create thinkers, innovators, responsible citizens, and lifelong learners.

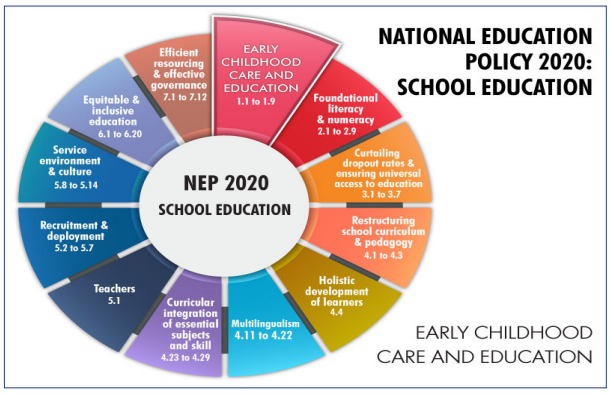
One of his most powerful ideas was the emphasis on holistic and multidisciplinary education. He broke the rigid silos that had traditionally separated science, humanities, and vocational subjects, promoting instead a flexible curriculum that fosters creativity, critical thinking, and innovation (Ramesh, 2021). In an era dominated by interconnected global challenges, this interdisciplinary approach reflects profound foresight. Students are no longer confined to narrow academic paths; instead, they are encouraged to explore multiple fields, thereby enhancing adaptability and problem-solving abilities essential for the modern world.

In addition, Dr. Kasturirangan emphasised foundational literacy and numeracy, ensuring that every child masters basic reading, writing, and arithmetic by Grade 3. Recognising the cognitive science behind early education, he prioritised Early Childhood Care and Education **(**ECCE) as the bedrock of learning (Chaturvedi, 2020). His vision ensures that the first steps of millions of Indian children into the world of knowledge are sturdy, joyful, and effective.

One of the strongest reflections of his architectural brilliance in education was the restructuring of the school system into a 5+3+3+4 model, aligning educational stages with a child's psychological and cognitive development. Such a model, rooted in both ancient Indian educational practices and modern neuroscience, demonstrates Kasturirangan's ability to synthesise the best of tradition and the best of science (Sahasrabudhe, 2020).

Another area where Dr. Kasturirangan's influence will be eternally felt is the empowerment of teachers. He envisioned teachers not merely as content deliverers but as leaders, mentors, and innovators. His proposals for rigorous teacher training, continuous professional development, and restoring dignity to the teaching profession are critical pillars of NEP 2020 (Ministry of Education, 2020). He believed that unless the teachers are respected and empowered, no education reform could succeed. Today, India's vision of a vibrant, dynamic, and learner-centric educational system is deeply tied to his emphasis on teacher leadership.

Figure-3 NEP–2020 for School Education



Source : https://www.google.com

Moreover, Dr. Kasturirangan's understanding of technology integration into education was both pragmatic and humanistic. He championed the idea of digital empowerment but warned against reducing education to mere online transactions. His balanced approach insists on preserving the human connection between teachers and students, making learning not just smart but soulful (Ramesh, 2021).

His focus on ethics, constitutional values, and character-building ensures that education is not merely about economic outcomes but about nurturing responsible, empathetic, and ethical citizens. In a world grappling with environmental crises, ethical dilemmas, and social divides, Dr. Kasturirangan's insistence on value-based education appears ever more vital.

Despite some criticisms and challenges surrounding the full implementation of NEP 2020 (Tilak, 2020), there is near-universal agreement that the policy, in its core ideals, represents one of the most visionary educational blueprints India has seen in independent history. It embodies the spirit of holistic development, inclusivity, flexibility, creativity, and rootedness in India's rich cultural heritage, all ideals close to Kasturirangan's heart.

Dr. K. Kasturirangan was not just a scientist or a policymaker; he was an architect of India's dreams. In the field of space science, he helped India reach for the stars; in the field of education, he sowed the seeds for a nation that thinks critically, acts ethically, innovates fearlessly, and remains culturally grounded. Though he may no longer walk among us, his spirit lives on—in the satellites orbiting above us, in the classrooms nurturing young minds, and in the policies shaping India's knowledge future. His life teaches us that true immortality lies not in the number of years lived but, in the impact, made on the lives of others. Through every teacher empowered, every student liberated, and every mind illuminated, Dr. Kasturirangan will continue to shine brightly, a beacon guiding India's journey toward becoming a truly *Vikshit Bharat* (Developed India). His name, forever linked with India's ascent in science and education, will be celebrated across generations — a testimony to a life lived in service of knowledge, progress, and humanity.

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Use of Drone Technology for Farming: Avenues for Aspiring Students

T Senthil Siva Subramanian*, K D Bhardwaj and S P Singh*****

Climate change majorly influences agriculture and food security. India is aimed to address the climate change-free from carbon emission, reduce fossil fuels and carbon footprint through net-zero targets. This could be achieved with the digital systems linked with emerging digital technologies. The digital transformation technologies have paved the way and became the game changer in many potential applications. The disruptive digital transformation tools and techniques such as quantum computing, artificial intelligence, industrial internet of things (IIOT), 5G, LoRaWAN technologies prove to be the technological trends in several domains especially the unmanned aerial vehicle systems. The launch of 5G and several digital technologies in India make a paradigm shift in the digital agriculture. India is adapting the best practices of E-agriculture with the utilization of several industry 5.0 technologies.

Unmanned aerial vehicles (UAVs) better known as drones are one of disruptive technologies of marvel of our 21st century.

Drone Hub in India: Pushpak – National Mission on Drone Technology

The Indian Institute of Technology Bombay (IIT-B) has been entrusted with leading the central government's *Pushpak – National Mission on Drone Technology*, aimed at advancing indigenous drone development across multiple sectors.

Alongside IIT-B, several prestigious institutions are participating in this initiative, including CDAC-Thiruvananthapuram, CDAC-Bengaluru, IIT-Gandhinagar, IISER-Bhopal, Veermata Jijabai Technological Institute (VJTI) Mumbai, and Kalasalingam Academy of Research and Education in Tamil Nadu.

Pushpak is designed to strengthen India's self-reliance in drone technology by fostering cutting-edge research and development (R&D), strategic industry collaborations, real-world testing infrastructure, and accelerated commercialization of drone innovations.

Startups and MSME are continuously working on frugal innovations to design and develop products and solutions on drone technologies, so that the same could be achieved in-line with national priorities. Indian is aiming to become the drone manufacturing hub by 2030. The introduction of Design Linked Initiative (DLI), Production linked scheme will give a boost for the startup and MSME to design and develop innovative drones for different applications (Figure 1).

Benefits of Agricultural Drones

What are the main benefits that the farmers can achieve from the use of agriculture drones?

UAVs can help farmers to optimize the use of inputs (seed, fertilizers, water), to react more quickly to threats (weeds, pests, fungi), to save time crop scouting (validate treatment/actions taken), to improve variable-rate prescriptions in real-time and estimate yield from a field.

Monitoring Plant Health

Drones equipped with special imaging equipment called Normalized Difference Vegetation Index (NDVI) use detailed color information to indicate plant health. This allows farmers to monitor crops as they grow so any problems can be dealt with fast enough to save the plants. Drones using 'regular' cameras are also used to monitor crop health. Drone imaging can produce accurate image location to the millimeter. This means that after planting, areas with stand gaps can be spotted and replanted as needed, and disease or pest problems can be detected and treated right away. Fig 2 illustrates simply how NDVI works.

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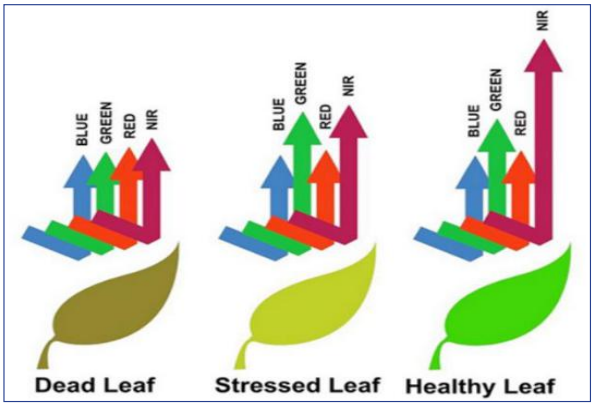
Figure 1 Shows the Different Schemes for Facilitating the Drone Technology

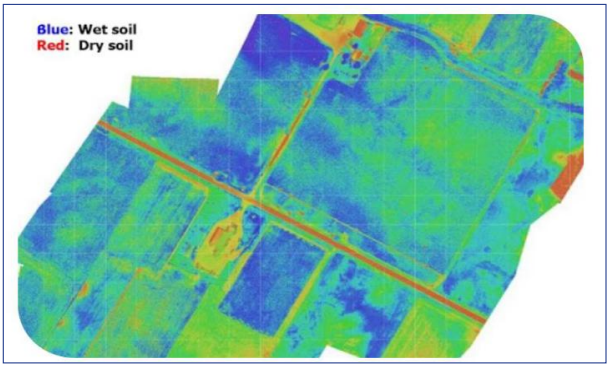
Fig-2 Working of NDVI



Monitoring Field Conditions

Drone field monitoring is also being used to Fig-3 Soil Mapping monitor the health of soil and field conditions. Drones can provide accurate field mapping including elevation information that allows growers to find any irregularities in the field(Fig-3). Having information on field elevation is useful in determining drainage patterns and wet/dry spots which allow for more efficiency watering techniques. Some agricultural drone retailers and service providers also offer nitrogen level monitoring in soil using enhanced sensors. This allows for precise application of fertilizers, eliminating poor growing spots and improving soil health for years to come.

Fig-3 Soil Mapping



Crop Damage Assessment

Agricultural drones fitted along with multispectral sensors and RGB sensors also detect field areas inflicted by weeds, infections, and pests Fig-4. According to this data, the exact amounts of chemicals needed to fight these infestations are known, and this helps diminish the costs inflicted by the farmer.

Spray Application

Drone sprayers can navigate very hard to reach areas, such as steep tea fields at high elevations (fig-5). Drone sprayers save workers from having to navigate fields with backpack sprayers, which can be hazardous to their health. Drone sprayers deliver very fine spray applications that can be targeted to specific areas to maximize efficiency and save on chemical costs.

There are sensors under the drone which tells the elevation of the drone from the land to keep the drone at the same height throughout the spraying process.

Fig-4 Crop Damage detected by Drones

Fig-5 Application of Drone Sprayers

Drone Irrigation

Using microwave sensing, drones can capture very accurate soil health information including moisture levels without the plants getting in the way. This means water can be distributed in a field in the most efficient way to conserve resources.

Drone Deployment: Multispectral Fixed Wing Agricultural Drone

Data from multispectral imaging has the following benefits.

- Identify pests, diseases and weeds. Optimize pesticide usage and crop sprays through early detection.
- Provide data on soil fertility and refining fertilization by detecting nutrient deficiencies. Help with land management and whether to take agriculture land in or out of production or rotate crops etc.
- Count plants and determine population or spacing issues.
- Estimate crop yield.
- Measure irrigation. Control crop irrigation by identifying areas where water stress is suspected. Then, make improvements to land areas such as install drainage systems and waterways based on the multispectral data.

Skill Programmes in Drone Technology

The National Skill Development Corporation (NSDC) provides a range of skill development programmes in drone technology, covering pilot training, development, and maintenance. These courses aim to equip individuals with the expertise needed to operate and manage drones across industries like logistics, agriculture, and more.

Drone Pilot Training

These courses emphasize hands-on experience in operating drones, including safety measures, flight techniques, and data collection methodologies.

***National Institute of Plant Health Management (NIPHM), Hyderabad*:** Drone pilot training, especially through the NaMo Drone Didi Yojana, plays a vital role in empowering women in rural India by equipping them with the skills to operate drones for agricultural purposes. As a key initiative under the National Rural Livelihood Mission, this program aims to provide 15,000 women-led Self-Help Groups (SHGs) with agricultural drones and specialized training. These trained pilots support various farming tasks such as crop monitoring, spraying, and sowing, enhancing agricultural efficiency.

NIPHM has been actively involved in drone pilot training, particularly under the NaMo Drone Didi Scheme, ensuring that participants gain the expertise needed for effective drone operations in agriculture.

Agricultural Sector Skill Council: A Kisan Drone Operator or pilot plays a crucial role in

utilizing drone technology for agricultural and allied activities. Their primary responsibility is to operate drones effectively while delivering specialized services, such as data collection and analysis, to enhance productivity and profitability. By leveraging drones, they contribute to sustainable farming practices and the protection of land resources.These operators deploy drones for specific tasks, including spraying plant protection chemicals or fertilizers, as well as gathering ground data for agricultural insights. Additionally, they are responsible for the regular upkeep and maintenance of drones and associated equipment to ensure optimal performance.

Indira Gandhi Rashtriya Uran Akademi (IGRUA)*:* The National Flying Training Institution in the country under the administrative control of the Ministry of Civil Aviation, Government of India offer drone pilot training.

Drone Developer Certification

These courses provide foundational knowledge in drone anatomy, software development, and autopilot systems, equipping learners with the skills needed for entry-level roles in drone technology. NASSCOM actively supports drone training in the IT-ITES sector through various initiatives, including the Skill India Digital Hub, Reliance Foundation Skilling Academy, and the Drone Developer Certification Programme offered by Skill India Digital Hub.

Drone Maintenance and Repair

These courses emphasize hands-on training in drone maintenance and repair, covering troubleshooting techniques and essential repairs for optimal drone performance.

The Electronics Sector Skills Council of India (ESSCI) provides specialized training programs for drone service technicians and assistant drone technicians. These initiatives are designed to equip individuals with the expertise needed to conduct routine maintenance, perform repairs, and ensure compliance with safety protocols for efficient drone operations.

Data Acquisition and Processing

These courses train individuals in collecting and processing drone-captured data, incorporating GIS and remote sensing techniques for accurate analysis.

Drone Programming and Automation

Focused on programming drones to execute specific tasks, these courses emphasize automation to streamline drone operations efficiently.

Drone Mapping and Geospatial Technologies

These courses equip learners with the expertise to utilize drones for mapping and geospatial data analysis, enhancing applications in fields like surveying, agriculture, and urban planning.

Short term / Online training/Certificate programmes

- ***Indian Space Research Organization (ISRO)****:* The Training Education & Outreach Group, National Remote Sensing Centre Indian Space Research Organisation Dept. of Space, Govt. of India, Hyderabad has scheduled a training program 5-Day Training on Drone Data Processing for Remote Sensing Applications (October 27 - 31, 2025)
- ***North Eastern Space Application Centre*** North Eastern Space Application Centre offers short term training program on UAV Remote sensing GIS, Drones and Machine Learning for Resource Mapping
- **Symbiosis Institute of Geoinformatics (Deemed University**), Pune: The institution offers a Certificate in Drone Data Acquisition and Processing, equipping students with both drone operation skills and the ability to process captured data for application development. This course provides comprehensive training in drone flight operations, focusing on data collection, mapping, and imagery analysis to enhance practical understanding and technical expertise

Postgraduate/Certification/Diploma Programmes Capacity-building for Human Resource Development in Unmanned Aircraft Systems

C-DAC and NIELIT are actively contributing to workforce development through the "Capacity Building for Human Resource Development in Unmanned Aircraft Systems (Drone and Related Technology)" program, an initiative by the Ministry of Electronics and Information Technology (MeitY), Government of India. This program aims to equip individuals with essential knowledge and technical expertise, enabling them to pursue career opportunities in the ICT industry, particularly in Unmanned

Aircraft Systems (UAS) and drone technology. Key focus areas include application programming, data analysis & visualization, machine learning, and image processing, fostering innovation and technical proficiency in these domains.

Postgraduate Programmes in Drone Technologies

Certification

All-India Council for Technical Education (AICTE) offers a 6-month AICTE-QIP-PG Certification Programme in "Intelligent Transportation Systems: Synergy of Artificial Intelligence, Drones, and EVs." This specialized program, conducted by the Electrical and Electronics Engineering Department at ABV-Indian Institute of Information Technology, Gwalior, focuses on integrating artificial intelligence (AI), drone technology, and electric vehicles (EVs) to drive advancements in smart transportation solutions.

Degree Programmes

The Indian Institutes of Technology (IIT) Jodhpur and Kanpur offer Master of Technology (M.Tech) programs specializing in Drone Technology, Anti-drone Systems, and Unmanned Aerial Systems (UAS), providing advanced education in this rapidly evolving field.

Additionally, Indian Institute of Information Technology, Design & Manufacturing Kurnool and the Institute of Infrastructure, Technology, Research and Management—an autonomous university established by the Government of Gujarat—also contribute to academic advancements in drone technology and related areas.

NIELIT, in collaboration with the Indian Institute of Drone Technology, offers a Master of Technology (M.Tech) program specializing in various aspects of Unmanned Aircraft Systems (UAS). The program covers key areas such as Radio Frequency Engineering, Electronics and System Integration, Structural Design and Materials Management, Geospatial Intelligence, and System Application Development—providing students with advanced technical knowledge and expertise in drone technology.

Centre for Artificial Intelligence & Robotics (CAIR) at IIT Mandi offers full-time and part-time Master of Technology by Research (MTech(R)), Ph.D., and Dual Degree programs in Robotics. The institute provides specialized training in diverse areas of **drone technology**, including:

- Aerial Manipulation
- Autonomous Navigation and Control in GPS-Denied Environments
- Drone Analytics
- Nano Drones
- Drone Applications for Surveillance and Industrial Structure Inspection
- Swarm Drones
- Novel Propulsion Mechanisms for Drones
- Airborne Sensors such as LiDAR and Multispectral Cameras
- Drone Electronics
- Energy Management for Drones

This programme is designed to equip students with cutting-edge expertise in robotics and drone technology, fostering innovation and practical applications across various industries.

The Government of Tamil Nadu, in collaboration with the Dr. Kalam Advanced UAV Research Centre, CASR, and the MIT Campus of Anna University, has established the Tamil Nadu Unmanned Aerial Vehicles Corporation. This initiative aims to position Tamil Nadu as the Drone Capital of India, fostering innovation and technological advancements in UAV development and applications. The centre offers training programs

Innovation Programmes in Product Development/Technology Readiness

All India Council for Technical Education (AICTE), in partnership with AVPL International Company, has set up 47 AeroVision Drone Labs across AICTE-approved institutions in India. These labs aim to enhance technical education and drive innovation by offering students practical training in drone technology, covering operation, maintenance, and assembly to equip them with industry-relevant skills.

AICTE Fellowship for Productization

All-India Council for Technical Education (AICTE) launched the AICTE Fellowship for Productization on May 14, 2025, aimed at supporting students in higher education institutions in developing frugal-jugaad products and services to address societal challenges and market demands.

This initiative enables students to work on proof of concept, prototyping, and commercialization, covering expenses related to raw materials, equipment, and testing. Additionally, the scheme provides guidance on intellectual property rights, business modeling, and technology transfer, ensuring a comprehensive approach to innovation. By fostering a drone-driven economy, the fellowship contributes to the vision of "Aatmanirbhar Bharat" and plays a crucial role in achieving the goals of "*Viksit Bharat*@2047".

Design Clinic by National Research and Development Corporation (NRDC)

The Design Clinic Facility (DCF), operating under the National Research Development Corporation (NRDC), is a strategic initiative dedicated to identifying and resolving design challenges. It brings together a multidisciplinary team of design experts to provide tailored solutions, helping innovators transform conceptual designs into tangible products. Through this facility, NRDC offers specialized consultancy services, guiding stakeholders through every stage—from conceptualization to prototyping—to ensure the successful development of innovative solutions that meet industry-specific needs.

NETRA – National Establishment for Technology Readiness Assessment

The National Research and Development Corporation (NRDC), in collaboration with CSIR–National Institute of Science Communication and Policy Research (NIScPR), has launched a program to assess the technology readiness level of products developed by innovators. This initiative aims to support technology advancement and commercialization through structured evaluation and guidance. The key objectives are:

- Evaluate the maturity level and readiness of emerging technologies.
- Assess market acceptability and commercial scalability of innovations.
- Identify potential risks associated with technology development.
- **Support** innovators through promotional schemes offered by NRDC.
- **Provide access** to NRDC's existing technologies to help innovators create commercially viable products.
- **Recommend** appropriate scaling strategies for technologies developed by innovators.

This collaboration plays a pivotal role in bridging the gap between innovation and real-world application, ensuring promising technologies reach the market efficiently

Acknowledgement

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The research article was the outcomes of the research studies conducted to analyze the significant importance of the emerging trends of technologies, especially the drone technology for precision farming.

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Cyber Security and Data Privacy in Higher Education Institutions

P Sasikala*

Cybersecurity and data privacy have become critical concerns for higher education institutions (HEIs) in an era of rapid digital transformation. Universities manage vast amounts of sensitive data, including student records, faculty information, and research assets, making them prime targets for cyberattacks. This article explores the growing cyber threats faced by HEIs, including phishing, ransomware, and insider threats, while highlighting unique institutional vulnerabilities such as open-access policies, Bring Your Own Device (BYOD) risks, and resource constraints. Data privacy regulations such as GDPR (EU), IT Act (India), FERPA (USA), and HIPAA (USA) impose strict requirements on HEIs to protect personal and academic data. However, compliance remains challenging due to decentralized IT infrastructures, third-party collaborations, and the lack of cybersecurity awareness among faculty and students. This article outlines best practices for HEIs, including multi-layered security frameworks, identity and access management, regular security audits, and awareness training programmes. The integration of AI-driven cybersecurity tools, blockchain for secure data storage, and Zero Trust Architecture (ZTA) offers promising solutions to enhance university cybersecurity resilience. Establishing Security Operations Centres (SOCs) in HEIs and fostering government-industry partnerships can further strengthen institutional security frameworks. As cyber threats continue to evolve, universities must adopt proactive governance strategies, invest in emerging security technologies, and build a strong cybersecurity culture to safeguard institutional integrity. This article provides actionable recommendations for HEIs to enhance cybersecurity defences, ensure regulatory compliance, and protect academic data in an increasingly digital world.

In the digital age, higher education institutions (HEIs) are heavily reliant on technology for academic, administrative, and research functions. This increased dependence on digital platforms, cloud storage, and online learning environments has exposed universities and colleges to a growing array of cybersecurity threats [1]. From student records to cutting-edge research data, HEIs manage vast repositories of sensitive information, making them attractive targets for cybercriminals. Ensuring robust cybersecurity and data privacy is, therefore, a pressing concern for educational institutions worldwide [2].

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Importance of Cybersecurity in the Digital Age

With the rapid expansion of digital infrastructure in academia, universities are more interconnected than ever before. Online learning platforms, remote access to research databases, and administrative portals have transformed the way education is delivered and managed [3]. However, this digital transformation comes with significant risks. Cyber threats can disrupt academic continuity, compromise sensitive data, and erode institutional trust. Effective cybersecurity measures are essential to:

Protect Sensitive Student and Faculty Data

Personal details, academic records, and financial information must remain secure to prevent identity theft and fraud.

Safeguard Research and Intellectual Property: Universities are hubs of innovation, and cybercriminals often target research data, patents, and scientific discoveries.

Ensure Uninterrupted Learning and Administration: Cyberattacks, such as ransomware, can shut down university systems, disrupting classes, examinations, and administrative processes.

Growing Threats to Educational Institutions

Higher education institutions face an increasing number of cyber threats, some of the most common being [4]:

Phishing Attacks: Cybercriminals use deceptive emails to trick faculty, students, and staff into revealing sensitive information, such as login credentials.

Ransomware Attacks: Hackers encrypt institutional data and demand payment to restore access, often crippling university operations.

Data Breaches: Unauthorized access to student records, financial transactions, and research data can lead to severe legal and reputational consequences.

Distributed Denial of Service (DDoS) Attacks: Attackers overload university servers, causing major disruptions in online learning and administrative functions.

Insider Threats: Faculty, students, or employees with access to institutional systems may accidentally or intentionally compromise cybersecurity.

These threats highlight the urgent need for HEIs to adopt proactive security measures and continuously upgrade their defence mechanisms.

Need for Data Privacy Protection in HEIs

In addition to cybersecurity threats, maintaining data privacy is a critical responsibility for HEIs[5]. Universities handle vast amounts of personally identifiable information (PII), including:

- Student admission records, grades, and financial data
- Faculty employment details and payroll information
- Health records of students and staff (especially in medical and research institutions)
- Confidential research data and intellectual property

Ensuring compliance with national and international data protection laws, such as the General Data Protection Regulation (GDPR), Family Educational Rights and Privacy Act (FERPA), and India's Information Technology (IT) Act, is essential. Non-compliance can result in legal penalties, loss of reputation, and diminished trust among students, parents, and stakeholders.

As cyber threats evolve, HEIs must prioritize cybersecurity policies, awareness programs, and technological solutions to protect their digital assets. A proactive approach to cybersecurity and data privacy will not only secure institutional infrastructure but also reinforce trust and confidence in higher education's digital future.

Cybersecurity Threat Landscape in Higher Education

Higher education institutions (HEIs) are among the most frequently targeted sectors for cyberattacks due to their vast digital infrastructure, open-access policies, and valuable data. Universities store extensive information, including student and faculty records, financial transactions, intellectual property, and sensitive research data, making them attractive to cybercriminals. The cybersecurity threat landscape in HEIs is constantly evolving, with increasingly sophisticated attacks posing significant risks to institutional integrity and academic continuity.

Common Cyber Threats in Higher Education

HEIs face a variety of cyber threats, many of which exploit the openness of academic networks and the lack of cybersecurity awareness among students, faculty, and staff. Some of the most prevalent threats include[6]:

Phishing Attacks

Cybercriminals send fraudulent emails impersonating university administrators, IT support, or financial offices to trick users into revealing login credentials, personal information, or financial details. These attacks are particularly dangerous as they exploit human error rather than system vulnerabilities.

Ransomware Attacks

Attackers encrypt institutional data and demand a ransom for decryption. These attacks can cripple university systems, disrupting online classes, examinations, and administrative processes. Ransomware incidents in universities have surged in recent years, with some institutions paying millions to restore their systems.

Malware and Spyware

Malicious software is used to infiltrate university networks, steal data, or compromise critical systems. Spyware can monitor keystrokes, collect sensitive information, and enable remote access to institutional resources.

Insider Threats

Faculty, students, and staff with access to institutional systems may pose cybersecurity risks, either intentionally or unintentionally. Insider

threats can arise from disgruntled employees, careless handling of credentials, or unauthorized sharing of institutional data.

Distributed Denial of Service (DDoS) Attacks

Attackers overwhelm university networks with excessive traffic, causing slowdowns or complete shutdowns of online learning platforms, research portals, and administrative systems. Such attacks disrupt education and can have long-term consequences for academic institutions.

Case Studies of Cyberattacks on Universities

Several universities worldwide have fallen victim to cyberattacks, highlighting the vulnerabilities in higher education cybersecurity[7]:

University of California, San Francisco (UCSF) Ransomware Attack (2020)

UCSF, a leading research institution, was targeted by the NetWalker ransomware group. The attackers encrypted crucial research data and demanded a ransom. The university eventually paid $1.14 million to regain access to its files.

Australian National University (ANU) Data Breach (2018-2019)

Hackers infiltrated ANU's network and remained undetected for months, exfiltrating 19 years' worth of sensitive data, including personal information of students, staff, and alumni. The breach was attributed to sophisticated nation-state actors.

Blackbaud Data Breach (2020)

Blackbaud, a cloud computing provider used by universities worldwide, suffered a ransomware attack, exposing the personal and financial data of students, donors, and alumni from multiple universities, including the University of York and University of Vermont.

Indian Universities Targeted by Phishing Attacks (2024)

A Threat Intelligence Report by Check Point Software Technologies Ltd. revealed that the Indian education sector experiences 8,195 cyber attacks per week, more than double the global average of 3,355. Several Indian universities reported phishing campaigns where hackers impersonated government and university officials to steal login credentials and access critical systems. These incidents highlight the growing cybersecurity risks in India's higher education sector.

Unique Vulnerabilities of Higher Education Institutions

HEIs face distinct cybersecurity challenges due to their open and collaborative environments, which prioritize accessibility over security. Key vulnerabilities include[8]:

Open-Access Culture: Universities encourage information sharing, collaborative research, and public access to resources, which often leads to weaker access controls and increased exposure to cyber threats.

Large and Diverse User Base: A typical university has thousands of students, faculty, and staff using multiple devices to access institutional networks, increasing the risk of cyber incidents due to inconsistent security practices.

Bring Your Own Device (BYOD) Policies: Students and faculty frequently use personal devices to access university systems, making it challenging to enforce uniform cybersecurity protocols. Unsecured devices can become entry points for attackers.

Outdated IT Infrastructure: Many universities operate on legacy systems that are difficult to update or replace, leaving them vulnerable to cyberattacks. Budget constraints often prevent regular upgrades to security systems.

Lack of Cybersecurity Awareness: Faculty and students may not be adequately trained to recognize phishing attempts, secure their devices, or follow best practices for data protection, increasing the likelihood of successful attacks.

Valuable Research and Intellectual Property: Universities house cutting-edge research in fields such as medicine, engineering, and artificial intelligence, making them prime targets for cyber espionage and intellectual property theft by state-sponsored actors and cybercriminals.

As cyber threats targeting higher education continue to evolve, universities must take proactive steps to strengthen their cybersecurity defences. A comprehensive cybersecurity strategy, including awareness training, robust security policies, and

advanced threat detection mechanisms, is essential to safeguarding institutional assets, protecting data privacy, and ensuring academic continuity.

Challenges in Securing Institutional Data

Securing institutional data in higher education institutions (HEIs) is a complex challenge due to their unique operational environment. Universities aim to balance openness for academic collaboration with the need for robust cybersecurity measures. However, multiple factors contribute to the difficulty in maintaining a secure digital ecosystem[9].

Open-Access Culture vs. Security Concerns

One of the fundamental challenges in securing data in HEIs is the inherent open-access culture that fosters collaboration, research, and knowledge-sharing. Unlike corporate organizations with strict security perimeters, universities emphasize accessibility to students, researchers, and external collaborators. This openness, however, presents significant cybersecurity risks:

Unrestricted Access to Information: Universities often allow open access to research papers, digital libraries, and databases, making it easier for cybercriminals to exploit vulnerabilities.

Decentralized IT Systems: Many HEIs have multiple departments managing their own IT infrastructure, leading to inconsistencies in security policies and enforcement.

Guest and Public Wi-Fi Networks: Open-access networks in libraries, campuses, and dormitories often lack stringent security controls, making them susceptible to cyberattacks like man-in-the-middle attacks and unauthorized data interception.

To mitigate these risks, universities must implement role-based access controls (RBAC) and network segmentation, ensuring that sensitive data is accessible only to authorized personnel while maintaining academic openness where necessary.

Bring Your Own Device (BYOD) and Remote Access Risks

With the rise of online learning, faculty and students frequently access university systems from personal laptops, smartphones, and tablets, often using unsecured networks. The Bring Your Own Device (BYOD) model, while convenient, introduces multiple cybersecurity challenges:

Unpatched and Outdated Devices: Personal devices may lack regular security updates, making them vulnerable to malware and exploits.

Use of Public Wi-Fi: Students and faculty accessing university resources from cafes, hostels, or other unsecured locations risk exposure to cyber threats like session hijacking and credential theft.

Lack of Endpoint Security: Universities cannot enforce strict security controls on personal devices, increasing the chances of unauthorized access and data leakage.

Mitigation Strategies

1. Enforce multi-factor authentication (MFA) for all remote logins.
2. Implement a Virtual Private Network (VPN) for secure remote access.
3. Encourage the use of endpoint detection and response (EDR) tools to monitor device security.
4. Conduct awareness campaigns on safe browsing habits and phishing attack prevention.

Lack of Cybersecurity Awareness Among Faculty and Students[1]

A major cybersecurity weakness in HEIs is the low level of awareness and training among students, faculty, and administrative staff. Many cyber incidents stem from human errors, such as clicking on malicious links, using weak passwords, or sharing sensitive information inadvertently. Common issues include:

Phishing Attacks: University users often fail to recognize phishing emails, leading to compromised credentials and data breaches.

Weak Passwords and Credential Reuse: Many students and faculty use the same password across multiple platforms, increasing their risk of account compromise.

Negligence in Handling Data: Sensitive research data or student records may be stored in unprotected cloud services or shared via unsecured email attachments.

Solutions

1. Conduct regular cybersecurity training workshops for students and staff.

2. Implement mandatory cybersecurity awareness programs as part of the academic curriculum.
3. Use simulated phishing campaigns to educate users on recognizing threats.
4. Enforce strong password policies with periodic resets and encourage the use of password managers.

Resource Constraints in Implementing Robust Security Measures

Unlike corporate enterprises with dedicated cybersecurity budgets, many universities operate under financial constraints, limiting their ability to implement advanced security solutions. Challenges include:

Insufficient Funding for Cybersecurity Tools: Many HEIs relies on outdated antivirus software and legacy IT systems, making them vulnerable to modern cyber threats.

Shortage of Cybersecurity Personnel: Universities often struggle to hire qualified cybersecurity professionals, leading to gaps in threat detection and response.

Delayed Security Upgrades: Many institutions delay software patches and system updates due to budgetary restrictions, leaving them exposed to known vulnerabilities.

Overburdened IT Staff: A small number of IT administrators often manage vast institutional networks, making it difficult to monitor and respond to threats effectively.

Strategies for Overcoming Resource Constraints

Leverage open-source cybersecurity tools for intrusion detection and network monitoring.

Partner with cybersecurity firms and government agencies for capacity building and training programs.

Seek grants and funding for cybersecurity initiatives from national and international organizations.

Establish a student-led cybersecurity club or Cybersecurity Centre of Excellence (CoE) to involve students in research and hands-on security projects.

The challenges of securing institutional data in HEIs stem from their open and collaborative environment, diverse user base, financial constraints, and lack of cybersecurity awareness. While these challenges are significant, universities can take proactive steps to improve cybersecurity by implementing awareness programs, adopting best practices for remote access, enforcing stricter access controls, and leveraging cost-effective security solutions. A well-planned cybersecurity strategy will not only protect institutional assets but also foster a culture of security and resilience in higher education.

Data Privacy Regulations and Compliance for HEIs

Higher education institutions (HEIs) handle vast amounts of sensitive data, including student records, faculty information, research data, and financial details. Ensuring data privacy and compliance with national and global regulations is critical to protecting this information from misuse, unauthorized access, and cyber threats. HEIs must navigate various legal frameworks while implementing robust data protection policies and security measures[10].

Global and National Regulations Governing Data Privacy

HEIs must comply with multiple data protection laws and regulations depending on their geographical location and the nature of their academic and research collaborations. Key regulations include:

General Data Protection Regulation (GDPR) European Union (EU):GDPR enforces strict rules on data collection, processing, and storage, emphasizing user consent, data minimization, and the right to erasure ("right to be forgotten"). Universities handling data from EU students, faculty, or exchange programs must ensure compliance.

Information Technology (IT) Act India: The IT Act (2000) and its amendments govern data protection and cybersecurity in India. Under Section 43A, organizations, including HEIs, must adopt reasonable security practices to protect sensitive personal data or face penalties for breaches. The Digital Personal Data Protection (DPDP) Act, 2023, further strengthens data privacy rights in India.

Family Educational Rights and Privacy Act (FERPA) USA: FERPA protects student education records in the U.S., granting students

and parents control over who can access their academic information. Universities must obtain consent before sharing student data with third parties.

Health Insurance Portability and Accountability Act (HIPAA) USA: Universities that operate medical colleges or handle student health records must comply with HIPAA, which mandates strict confidentiality and security of medical data.

Other notable regulations include *China's Personal Information Protection Law (PIPL), Canada's Personal Information Protection and Electronic Documents Act (PIPEDA), and Australia's Privacy Act.* Universities engaged in global collaborations must ensure compliance with multiple legal frameworks to prevent legal liabilities.

Institutional Responsibilities for Student and Faculty Data Protection

Universities are responsible for implementing strong data governance policies to protect student and faculty information from breaches, leaks, and unauthorized access. Key responsibilities include[11]:

Data Classification and Access Control: Institutions must classify data based on sensitivity levels (public, internal, confidential, highly confidential) and enforce role-based access control (RBAC) to restrict unauthorized access.

***Data Encryption and Secure Storage*:** HEIs must ensure that all personal and academic data is encrypted both in transit and at rest, preventing unauthorized access. Cloud-based data must comply with local hosting and data sovereignty laws.

***Transparency and Consent Management*:** Universities should have clear privacy policies, informing students and faculty about how their data is collected, used, and shared. Institutions must also obtain explicit consent before processing sensitive data.

***Incident Response and Breach Notification*:** Institutions must develop a Data Breach Response Plan to quickly identify, contain, and report security incidents. Compliance with GDPR, for example, requires data breaches to be reported within 72 hours.

***Regular Data Audits and Compliance Reviews*:** Universities should conduct periodic security assessments, vulnerability scans, and third-party audits to ensure adherence to data protection regulations.

Compliance Challenges and Best Practices

Despite the importance of data privacy compliance, HEIs face several challenges in implementing and maintaining regulatory adherence[12]:

***Decentralized IT Infrastructure*:** Many universities operate across multiple campuses with disparate IT systems, making centralized data protection difficult. Best practice: Implement centralized security policies and cloud-based data governance solutions.

***Lack of Awareness Among Faculty and Students*:** Many users unknowingly expose data to risks through weak passwords, phishing scams, or oversharing. Best practice: Conduct regular cybersecurity awareness training to ensure a culture of data privacy.

***Third-Party Risks*:** Universities often collaborate with external vendors, cloud service providers, and research partners, increasing exposure to data breaches. Best practice: Implement strict third-party data processing agreements (DPAs) and conduct vendor security assessments.

***Budget Constraints*:** Resource-limited institutions may struggle to invest in compliance tools, security staff, and cybersecurity frameworks. Best practice: Leverage open-source security solutions, government grants, and industry partnerships to strengthen compliance.

Navigating data privacy regulations and compliance is a complex but essential task for HEIs. Universities must align their policies with global and national data protection laws, implement strict security measures, and ensure transparency in data handling. By adopting best practices such as encryption, access control, regular audits, and awareness programs, HEIs can protect student and faculty data while avoiding legal and reputational risks. Strengthening cybersecurity governance will be key to ensuring a safe, compliant, and privacy-focused academic ecosystem.

Best Practices for Cybersecurity in Universities

Higher education institutions (HEIs) must adopt a proactive and multi-layered approach to

cybersecurity to protect sensitive data, academic resources, and research assets from cyber threats. Given the diverse user base, open-access policies, and increasing cyberattacks targeting universities, implementing robust security measures is essential[13].

Multi-Layered Security Approach

A defence-in-depth strategy is crucial for HEIs, where multiple security layers work together to mitigate risks. Universities should implement firewalls, intrusion detection and prevention systems (IDPS), endpoint security, and data encryption to protect networks and digital assets. Segregating networks (e.g., academic, administrative, research, and guest Wi-Fi) can limit the impact of breaches, preventing unauthorized access to sensitive information. Additionally, universities should use cloud security measures and secure backup solutions to ensure business continuity in case of cyber incidents.

Cyber Hygiene and Awareness Training Programs

Cybersecurity is not just a technological issue but also a human challenge. Many breaches occur due to human error, such as falling for phishing scams or using weak passwords. HEIs should conduct mandatory cybersecurity awareness programs for students, faculty, and staff to educate them about identifying phishing attempts, securing their devices, and handling sensitive data responsibly. Universities can integrate cyber hygiene training into orientation programs, organize regular simulated phishing campaigns, and encourage a "zero-trust" security mindset to minimize insider threats.

Strong Access Control and Identity Management

HEIs must enforce strict access control policies to ensure that only authorized individuals can access sensitive data and critical systems. Implementing multi-factor authentication (MFA), biometric verification, and role-based access control (RBAC) can significantly reduce unauthorized access risks. Universities should also implement single sign-on (SSO) solutions to streamline authentication processes while maintaining security. Additionally, ensuring that departing students, faculty, and staff lose access to institutional resources immediately upon their exit is vital in preventing data leaks.

Regular Security Audits and Penetration Testing

To stay ahead of cyber threats, universities must conduct regular security audits, vulnerability assessments, and penetration testing to identify and address weaknesses in their IT infrastructure. Periodic third-party security evaluations and compliance checks with regulations such as GDPR, IT Act (India), and FERPA can help universities maintain a strong security posture. Universities should also establish incident response plans and cybersecurity task forces to ensure rapid detection, containment, and mitigation of cyberattacks.

By adopting these best practices, HEIs can create a resilient cybersecurity framework, safeguarding institutional data while ensuring seamless academic and research operations. A proactive approach to cybersecurity will not only protect universities from financial and reputational damage but also foster a secure digital learning environment.

Role of AI and Emerging Technologies in Cybersecurity

With the growing complexity and frequency of cyber threats, higher education institutions (HEIs) are increasingly leveraging Artificial Intelligence (AI) and emerging technologies to enhance their cybersecurity defences. Advanced technologies such as AI-powered threat detection, blockchain-based security, and Zero Trust Architecture (ZTA) are transforming how universities protect sensitive data, research assets, and institutional networks[14,15].

AI-Powered Threat Detection and Response

AI and Machine Learning (ML) are revolutionizing cybersecurity by enabling real-time threat detection, anomaly detection, and automated response mechanisms. Traditional cybersecurity tools often struggle to keep up with evolving attack patterns, but AI-driven systems can analyse vast amounts of network traffic, identify irregularities, and predict potential threats before they escalate. Key applications of AI in cybersecurity for HEIs include:

***Automated Threat Intelligence*:** AI-driven security platforms collect and analyse threat intelligence from global databases, helping universities stay ahead of new cyber threats.

***Behavioural Analytics*:** Machine learning algorithms monitor user behaviour and flag suspicious activities (e.g., unauthorized access attempts, unusual file downloads, or login anomalies).

***AI-Powered Incident Response*:** Security automation enables rapid threat containment, reducing response times and minimizing damage from cyberattacks. AI can automatically isolate compromised devices, revoke access privileges, and trigger alerts for further investigation.

By integrating AI-driven security solutions, universities can enhance threat detection, reduce response times, and improve overall cybersecurity resilience.

Blockchain for Secure Data Storage

Blockchain technology offers a decentralized and tamper-proof approach to securing critical university data, including student records, research data, and financial transactions. Since blockchain operates on distributed ledger technology (DLT), data integrity is maintained, and any unauthorized changes are easily traceable. Key applications of blockchain in HEI cybersecurity include:

***Immutable Student and Faculty Records*:** Universities can use blockchain to securely store academic credentials, certifications, and transcripts, reducing fraud and unauthorized modifications.

***Secure Research Data Management*:** Sensitive research data, particularly in medicine and engineering, can be stored securely using blockchain to prevent intellectual property theft and cyber espionage.

***Decentralized Identity Management*:** Blockchain-based identity verification can enhance security by eliminating reliance on centralized authentication systems that are vulnerable to breaches.

By adopting blockchain, HEIs can enhance data integrity, reduce fraud risks, and establish a more secure academic ecosystem.

Zero Trust Architecture (ZTA) in Higher Education

Zero Trust Architecture (ZTA) is a modern cybersecurity framework that assumes no user or device can be trusted by default—every access request must be verified, regardless of whether it originates inside or outside the university network. Given the highly interconnected nature of HEIs, ZTA is crucial for protecting institutional data from both external and insider threats. Core principles of Zero Trust in universities include:

***Least Privilege Access*:** Users are granted only the minimal level of access required to perform their tasks, reducing the risk of unauthorized data exposure.

***Micro-Segmentation*:** The university network is divided into smaller, isolated zones to prevent lateral movement of attackers in case of a breach.

***Continuous Authentication and Monitoring*:** Instead of relying solely on one-time authentication (e.g., login credentials), ZTA continuously monitors user behaviour, device health, and risk levels to grant or revoke access dynamically.

***Multi-Factor Authentication (MFA) and Identity Verification*:** Strong authentication mechanisms ensure that only authorized personnel can access sensitive systems and databases.

By implementing ZTA, universities can drastically reduce attack surfaces, limit data breaches, and enhance network security across academic, administrative, and research domains.

Emerging technologies such as AI, blockchain, and Zero Trust Architecture are reshaping cybersecurity strategies in higher education. AI-driven threat intelligence enables faster response to cyberattacks, blockchain technology ensures data integrity, and Zero Trust principles create a more secure digital learning environment. As HEIs continue to embracedigital transformation, integrating these advanced security measures will be essential in safeguarding institutional assets, academic integrity, and student privacy.

Cybersecurity Governance and Policy Framework in HEIs

A well-defined cybersecurity governance and policy framework is essential for higher education institutions (HEIs) to protect sensitive data, maintain compliance with regulations, and ensure a resilient digital infrastructure. Given the increasing frequency of cyberattacks on universities, institutions must adopt a structured, proactive approach to cybersecurity. This includes establishing comprehensive policies, setting up dedicated security teams, and collaborating with

industry experts and government agencies to strengthen defences[15].

Importance of a Structured Cybersecurity Policy

A ***Structured Cybersecurity Policy*** serves as the foundation for an institution's security strategy, outlining the protocols, responsibilities, and best practices required to safeguard digital assets. A well-designed policy should cover:

Access Control and Identity Management**:** Define role-based access controls (RBAC) to restrict unauthorized access to sensitive university data.

Data Protection Measures**:** Establish guidelines for data encryption, secure storage, and backup protocols to prevent data breaches.

Incident Response and Recovery Plans**:** Develop standard operating procedures (SOPs) for detecting, reporting, and mitigating cyber incidents, ensuring minimal disruption to academic activities.

Acceptable Use Policies (AUP): Clearly define what constitutes safe and ethical use of university IT resources, covering areas like internet access, personal device usage (BYOD), and research data handling.

Regular Security Training and Audits**:** Mandate periodic cybersecurity training programs for students, faculty, and staff while conducting routine audits to identify and mitigate vulnerabilities.

An institution-wide commitment to cybersecurity governance ensures that faculty, students, and administrators understand their roles in protecting university data and IT infrastructure.

Establishing Security Operations Centres (SOCs) in Universities

To enhance cybersecurity resilience, universities should consider setting up Security Operations Centres (SOCs)—dedicated teams responsible for continuous monitoring, threat detection, and incident response. A university SOC can provide:

Real-Time Threat Monitoring**:** AI-driven security analytics to detect anomalies and suspicious activities within university networks.

Incident Response and Forensics**:** Immediate containment of security breaches and in-depth forensic analysis to identify the source of attacks.

Collaboration with IT and Cybersecurity Teams**:** Coordinating with internal IT departments to patch vulnerabilities, implement security updates, and improve network defences.

Security Awareness Campaigns**:** Conducting student-driven cybersecurity initiatives to create a culture of digital security across campus.

HEIs can partner with cybersecurity firms, government agencies, and research organizations to set up cost-effective SOCs, ensuring that even resource-constrained institutions have robust cyber resilience capabilities.

Collaboration with Cybersecurity Agencies and Industry Experts

Given the evolving nature of cyber threats, universities must actively engage with cybersecurity agencies, industry leaders, and research institutions to stay ahead of emerging risks. Collaborations can provide:

Access to Threat Intelligence**:** Universities can benefit from real-time threat intelligence sharing with organizations like CERT-In (India), NIST (USA), and Interpol's Cybercrime Division to proactively address security threats.

Cybersecurity Grants and Research Funding**:** Government bodies and industry leaders often provide funding for cybersecurity research, allowing universities to develop innovative security solutions.

Internships and Training Programs**:** Partnering with cybersecurity firms can help students gain hands-on experience in ethical hacking, digital forensics, and AI-driven security solutions.

Participation in Cybersecurity Drills and Simulations**:** Engaging in national and global cybersecurity exercises helps universities test their incident response capabilities and refine security policies.

A robust cybersecurity governance framework is critical for protecting HEIs from cyber threats. By implementing structured security policies, establishing Security Operations Centres (SOCs),

and fostering collaborations with cybersecurity agencies and industry experts, universities can enhance their cyber resilience and create a safer digital learning environment. As cyber risks continue to evolve, proactive governance will be key in ensuring the security and integrity of academic institutions worldwide.

Future Trends and Recommendations

As higher education institutions (HEIs) continue to digitize their operations, cyber threats are becoming more sophisticated. Universities must adopt forward-thinking cybersecurity strategies to address emerging risks and ensure long-term data protection. This section explores evolving cyber threats, the importance of fostering a cybersecurity culture in academia, and the need for stronger government-industry collaboration to enhance security in HEIs[16].

Evolving Threats and Adaptation Strategies

The *cyber threat landscape* for universities is constantly changing, with attackers deploying advanced techniques to exploit institutional vulnerabilities. Some key emerging threats include:

***AI-Driven Cyberattacks*:** Just as AI is used for cybersecurity defence, cybercriminals are leveraging machine learning to create sophisticated phishing scams, deep fake-based impersonation attacks, and automated malware propagation.

***Cloud Security Risks*:** With universities increasingly relying on cloud-based learning management systems (LMS) and online research platforms, ensuring secure configurations and data access control in cloud environments is crucial.

***Quantum Computing Threats*:** As quantum computing advances, traditional encryption methods may become obsolete, making it necessary for universities to explore quantum-safe cryptographic techniques.

Ransomware as a Service (RaaS): Cybercriminals now offer ransomware toolkits for hire, increasing the number of financially motivated attacks on HEIs.

To combat these threats, universities must focus on:

Continuous Threat Intelligence and AI-Driven defence Mechanisms to detect and prevent cyberattacks in real time.

Adoption of Zero Trust Security Models that verify every access request, regardless of the user's location or device.

Enhancing Cloud Security Strategies, including multi-factor authentication (MFA), data encryption, and third-party risk assessments for cloud service providers.

Building a Cybersecurity Culture in Academia

Cybersecurity is not just a technical issue, it requires a cultural shift in academia. Universities must prioritize cybersecurity awareness across all stakeholders, including students, faculty, and administrative staff. Key strategies include:

***Cybersecurity Awareness Programs*:** Regular training sessions, simulated phishing exercises, and interactive workshops to help users recognize security threats.

***Incorporating Cybersecurity in Curricula*:** Universities should introduce cybersecurity courses and research opportunities across disciplines, ensuring students develop cyberresilience skills for their future careers.

***Encouraging Student-Led Cybersecurity Initiatives*:** Creating Cybersecurity Clubs, Ethical Hacking Competitions (like Capture The Flag events), and Digital Safety Campaigns can foster engagement and knowledge-sharing among students.

***Establishing Cybersecurity Research Labs*:** Universities should invest in advanced cybersecurity research and development (R&D), partnering with tech companies and governments to create innovative security solutions.

By embedding cybersecurity into academic culture, HEIs can strengthen their digital defences and equip students with critical cybersecurity skills for the future workforce.

Need for Government and Industry Partnerships

Given the scale and complexity of cyber threats, HEIs cannot tackle cybersecurity challenges alone. Collaboration between universities, governments, and the private sector is essential to developing robust security frameworks. Key partnership areas include:

***Cybersecurity Policy Development*:** Governments must work with universities to

create standardized cybersecurity guidelines and compliance frameworks tailored to academic institutions.

***Public-Private Cybersecurity Task Forces*:** Universities can collaborate with cybersecurity firms, telecom providers, and government agencies to share real-time threat intelligence and coordinate responses to cyberattacks.

***Access to Cybersecurity Grants and Funding*:** Governments and industry leaders should provide financial support for cybersecurity infrastructure upgrades, SOCs (Security Operations Centres), and student scholarships in cybersecurity fields.

***Internship and Workforce Development Programs*:** Partnerships with cybersecurity companies can create internship opportunities, specialized training programs, and mentorship initiatives for students pursuing careers in cybersecurity.

The future of cybersecurity in HEIs depends on adaptive security measures, a strong cybersecurity culture, and multi-stakeholder collaboration. Universities must continuously evolve their security strategies, integrate cybersecurity into academic programs, and strengthen alliances with government and industry partners to protect institutional data and ensure a secure digital learning environment. By embracing these proactive measures, HEIs can safeguard academic integrity, research assets, and student privacy in an increasingly digital world.

Cyber Security Challenges in Education

Moderate cybersecurity awareness among teachers can be better understood by comparing it with awareness levels in other professions, such as healthcare or small business sectors, where digital literacy is equally vital[17]. Studies from the USA, UAE, and South Africa reveal a comparable gap, indicating that educators globally encounter systemic challenges in prioritizing cybersecurity amidst their diverse responsibilities. Teachers, however, bear the unique responsibility of protecting both their digital practices and their students', often with inadequate institutional support.

Student vulnerabilities further amplify this concern. Cyberbullying and identity theft have caused severe emotional and academic consequences. For instance, instances of students' personal information being misused online underscore the importance of proactive education on managing digital footprints and recognizing malicious activities. These challenges highlight the urgent need to empower educators with targeted training and resources to foster safer online environments.

In India, cyberbullying is on the rise, with limited reporting mechanisms exacerbating the issue. Comparatively, the USA grapples with sophisticated threats such as ransomware attacks on school networks, disrupting learning and compromising sensitive data. FBI reports indicate a rise in cyberattacks on K-12 schools during the pandemic, including data breaches and unauthorized access to student records.

Efforts in India are often concentrated in urban schools, leaving rural educators with minimal support. In contrast, the USA employs more structured cybersecurity measures, including teacher training, regular audits, and collaboration with federal entities like the Cybersecurity and Infrastructure Security Agency (CISA). Initiatives such as "Stop. Think. Connect" promote safe online practices for both educators and students.

A major challenge for India is the absence of a unified national cybersecurity framework for schools, leaving institutions to adopt safety protocols at their discretion. In contrast, the USA benefits from established frameworks like the Children's Internet Protection Act (CIPA), which mandates internet safety policies in schools and provides grants to enhance cybersecurity infrastructure. Nevertheless, underfunded districts in the USA continue to face significant challenges.

India must address socio-economic disparities to scale cybersecurity measures effectively, particularly in rural regions. While the USA has more advanced frameworks, it continues to face evolving threats such as ransomware. Both countries, and others globally, must prioritize teacher training and student awareness initiatives to effectively combat emerging cybersecurity risks.

Indian Laws and Government Initiatives[1]

There are various legislations that support cybersecurity.

The Information Technology Act, 2000 *https://www.indiacode.nic.in/bitstream/123456789/13116/1/it_act_2000_updated.pdf* (Came into

force in October 2000, Also called Indian Cyber Act, Provide legal recognition to all e-transactions, To protect online privacy and curb online crimes.

Information Technology Amendment Act 2008 (ITAA) *https://www.indiacode.nic.in/bitstream/123456789/15386/1/its amendment act2008.pdf* (The amendments in the IT Act mentioned: 'Data Privacy', Information Security, Definition of Cyber Café, Digital Signature, Recognizing the role of CERT-In, To authorize the inspector to investigate cyber offenses against DSP who was given the charge earlier)

National Cyber Security Strategy 2020 *https://www.dsci.in/files/content/ knowledge-centre/2023/National-Cyber-Security-Strategy-2020-DSCI- submission.pdf* (Indian Government is coming up with the National Cyber Security Strategy 2020 entailing the provisions to secure cyberspace in India. The cabinet's nod is pending and it will soon be out for the public).

Cyber Surakshit Bharat Initiative *https://www.meity.gov.in/writereaddata/files/Cyber-Surakshit-Bharat-Brochure.pdf* (MeitY in collaboration with National e-Governance Division (NeGD) came up with this initiative of Online Training Programme in 2018 to build a cyber-resilient IT set up).

CIET-NCERT *https://ciet.ncert.gov.in/activity/cyth* (Online Training on Cyber Threats for school students)

Cyber Swachhta Kendra *https://www.csk.gov.in/* (It is the Botnet Cleaning and Malware Analysis Centre under the Indian Computer Emergency Response Team (CERT-In) under MeitY, The aim of it is to promote awareness among Indian citizens to secure their data in computers, mobile phones, and other electronic devices).

Reserve Bank of India *https://www.rbi.org.in/Commonman/English/scripts/Notification.aspx?Id=1721* (Cyber Security Framework in Banks).

Cyber Hygiene Best Practices

Maintaining strong cyber hygiene is critical to safeguard sensitive information and financial transactions. Always use strong, unique passwords for your online accounts and enable two-factor authentication (2FA) for added security. Regularly update your software, apps, and operating systems to ensure you have the latest security patches. Avoid using public Wi-Fi and charging stations, and always verify the security of payment platforms and websites before transacting. Be vigilant about sharing personal information and monitor account activity through alerts and frequent reviews. Enable features like transaction limits and log out after sessions, especially on shared or public devices.

Cyber Threats and Avoidance[18]

Be cautious of cyber frauds like phishing, smishing, vishing, and identity theft, which aim to steal personal or financial data. Avoid clicking on unverified links, sharing sensitive details like OTPs or PINs, or saving payment information on shared devices. Types of fraud also include e-commerce scams, UPI frauds, and tech support scams. Always double-check bank details and UPI IDs before transactions and report suspicious activities immediately to your bank or the cybercrime portal. Quick action can mitigate risks and limit damage in the event of a breach.

Conclusion

As higher education institutions (HEIs) continue to embrace digital transformation, cybersecurity and data privacy must remain a top priority. Universities handle vast amounts of sensitive data, making them attractive targets for cybercriminals. The increasing frequency of attacks—such as ransomware, phishing, and data breaches—highlights the urgent need for robust security frameworks and compliance with global and national regulations like GDPR, the IT Act (India), FERPA, and HIPAA. To address these challenges, HEIs must adopt a multi-layered cybersecurity strategy, integrating advanced threat detection, identity management, encryption, and Zero Trust Architecture (ZTA). Regular security audits, faculty and student awareness programs, and strong access control mechanisms are essential for minimizing vulnerabilities. Establishing Security Operations Centres (SOCs) can provide real-time threat monitoring, while partnerships with government agencies, cybersecurity firms, and industry experts can enhance institutional defences. Moreover, building a culture of cybersecurity awareness in academia is crucial. Faculty, students, and administrators must be actively involved

in safeguarding institutional data. Universities should incorporate cybersecurity training into curricula, promote ethical hacking initiatives, and encourage research in advanced security technologies. Looking ahead, HEIs must remain proactive and adaptive, continuously evolving their security strategies to counter emerging threats. By investing in cybersecurity infrastructure, strengthening compliance measures, and fostering cross-sector collaborations, universities can create a resilient and secure digital learning environment that protects academic integrity and safeguards stakeholder data.

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The Impact of 'One Nation One Subscription' on NLIST and Its Implications for Higher Education Institutions

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The recent introduction of the 'One Nation One Subscription' (ONOS) scheme by the Government of India marks a significant shift in the landscape of digital academic resources. While ONOS aims to consolidate and streamline access to e-resources for government institutions and universities, it has raised concerns about the fate of existing digital library consortia, particularly the NLIST (National Library and Information Services Infrastructure for Scholarly Content) program. The impending discontinuation of NLIST from April 1, 2025, poses serious challenges for numerous aided and unaided higher education institutions across India.

Understanding NLIST and Its Significance

The NLIST program, developed under the aegis of the Ministry of Education and managed by INFLIBNET, has been a crucial initiative providing access to over 6,000 e-journals and 8 lakh e-books to colleges and universities. This initiative was designed to support research and education by making high-quality digital content available at minimal costs. Institutions recognized under sections 2(f) and 12(B) of the UGC Act benefited immensely from this program, as the government subsidized the cost, ensuring affordability and widespread access.

The government has declared 'One Nation One Subscription,' providing funds to other subscriptions such as NLIST would certainly go against the 'one subscription' policy that results in ceasing of funds for this project. But on the other hand, ONOS has not been provided to government-aided and unaided institutions which were having membership of NLIST.

The Introduction of 'One Nation One Subscription'

ONOS is a government-driven initiative aimed at centralizing academic subscriptions and ensuring uniform access to scholarly resources across government institutions and universities. While this policy shift is beneficial for government-funded institutions, it inadvertently excludes a significant number of non-government, aided, and unaided institutions. The exclusion of these institutions raises concerns about the accessibility of digital resources for a large segment of the academic community.

Since ONOS is set to replace previous funding models, projects like NLIST are left without financial backing from the government. As a result, INFLIBNET has initiated a survey to gauge the interest of aided and unaided institutions in continuing access to NLIST. The organization has proposed a model wherein these institutions would have to bear the full subscription costs, which are estimated to be three to four times higher than the previous subsidized rates.

Financial Burden and Viability Concerns

One of the critical questions arising from this transition is whether it is financially viable for aided and unaided institutions to continue their subscriptions at significantly increased costs. Many colleges, particularly those with limited budgets, may find it challenging to allocate resources for these e-subscriptions, especially when they were previously available at minimal charges. The steep hike in costs raises concerns about the sustainability of digital resource access for such institutions.

Moreover, when NLIST was available at a nominal cost, many institutions and library users did not fully utilize its offerings. The question then arises: Will institutions be willing to pay substantially higher fees now that the resources are no longer subsidized? The answer remains uncertain, as financial constraints and priority allocations could lead to reduced subscriptions and, consequently, diminished access to scholarly content.

The Impact on Libraries and Academic Research

For many college libraries, NLIST served as a cornerstone in establishing the presence of digital academic resources. Its discontinuation poses a significant challenge, as it may lead to a decline in digital resource availability, impacting research quality and academic development. Faculty members and researchers who previously relied on

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NLIST for access to journals and e-books will now have to seek alternative resources, which may not be as affordable or comprehensive.

Additionally, this transition may widen the gap between well-funded institutions and those struggling with financial limitations. Government institutions will continue to benefit from ONOS, while others may be forced to reduce their digital subscriptions due to cost constraints, thereby creating disparities in academic resource availability.

The Way Forward

As the academic community grapples with these changes, several steps need to be considered to address the challenges posed by the discontinuation of NLIST:

1. **Negotiation for Affordable Access**: Aided and unaided institutions, along with academic bodies, should engage with INFLIBNET and the government to negotiate more affordable subscription rates, ensuring that these crucial resources remain accessible.
2. **Awareness and Utilization**: Institutions should work on increasing awareness and utilization of digital resources among faculty and students to justify future investments in e-resources.
3. **Exploring Alternative Resources**: Colleges may explore partnerships with other digital consortia or open-access initiatives to supplement the loss of NLIST.
4. **Government Policy Reassessment**: Policymakers should consider extending ONOS benefits to aided and unaided institutions to create a more inclusive digital academic environment.
5. **Institutional Collaboration**: Colleges can form consortia to collectively subscribe to digital resources, thereby reducing individual financial burdens and maintaining access to essential scholarly materials.

Conclusion

The discontinuation of NLIST in favour of the ONOS initiative represents a significant shift in India's approach to digital academic resources. While ONOS promises centralized access for government institutions, the exclusion of aided and unaided colleges creates challenges that need urgent attention. If institutions are unable to afford the increased subscription costs, it could lead to reduced access to scholarly content, impacting research and education quality. Thus, it is imperative for the academic community, policymakers, and institutions to collaborate and find viable solutions that ensure continued access to critical digital resources for all stakeholders in higher education.

References and Readings

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The Emerging Era of Agentic AI: Redefining Roles in Data Analytics

Ashank Desai, Principal Founder and Chairman, Mastek Limited, New Delhi, delivered the Convocation Address at the Special Convocation Ceremony at the Indian Institute of Management, Ahmedabad on April 16, 2025. He said, "Success belongs to those who raise their hands to own challenges. Be the person who contributes, collaborates, and builds. And today, you're stepping into a world that desperately needs solutions, especially in the space you've trained for, Advanced Analytics." Excerpts

Standing here today is deeply special for me. Forty-five years ago, I was seated where you are now – as a graduating student of this very institution. I still remember the excitement, the pride, and the quiet curiosity as we waited for our Chief Guest to speak.

And today, I speak to you from that very stage –not just with pride, but with a deep sense of responsibility to give back.

Three Reflections for Your Journey Ahead

I don't intend to keep this too long. Instead, I'll share three thoughts with you — lessons that have shaped my life as a professional, as a founder, and as a lifelong learner.

Be Part of the Solution, Not the Problem

In any organization, in any system — problems are easy to spot. But what sets leaders apart is the willingness to solve, not just criticize.

As Chairman of Mastek, I've seen this time and again – success belongs to those who raise their hands to own challenges. Be the person who contributes, collaborates, and builds. And today, you're stepping into a world that desperately needs solutions — especially in the space you've trained for: Advanced Analytics.

You now hold a Postgraduate Diploma in Advanced Analytics – a degree that is as relevant as it is powerful.

Across the boards I serve on, I see analytics courses attracting the highest interest – and rightly so. This is the era of data-driven decision making. We are generating zettabytes of data every single day — but are we really using it?

Industries like consumer marketing, clinical trials, telecom, social media — they're all seeking people who can turn noise into insights. That's where you come in. From roles like Data Analysts, Business Intelligence Professionals, to Product Managers and Decision Scientists — you have an expansive runway ahead.

But remember — analytics is changing fast. You've heard of ChatGPT and Large Language Models, but we're entering a new wave: Agentic AI.

Agentic AI is not just about passive insights — it autonomously makes decisions, plans, and takes actions. It doesn't replace you, it augments you.

As data professionals, you will now spend less time cleaning data — and more time interpreting business signals, spotting anomalies, and enabling strategy. Your job is moving up the value chain — and that's a good thing.

You'll have to design systems that allow AI agents to act across previously siloed departments. You'll need to constantly observe, adapt, and learn faster than the technology itself.

The age of Agentic AI is not coming — it's here. And you are the vanguard.

Nurture Every Relationship

While skills matter, relationships will accelerate your growth. The network you've built at IIMA – your batchmates, seniors, alumni — they're not just contacts. They're lifelong collaborators.

Let me share a personal story. Back in 1979, when I was still a student, I found my co- founders, my classmates, and I began what later became Mastek. At the time, software development was virtually unknown in India. But we took the leap. Even when being IIMA students we got guidance encouragement from Professors like Patel, Bhatnagar, and Mohan Kaul.

We went to Delhi to meet then policymakers in Department of Electronics to guide us. We met influential IIMA alumni. This institute and its people shaped the Indian IT industry. I was the founder member of

NASSCOM and later Chairman of Nasscom too, so I can say this with confidence.

Make full use of the libraries, mentors, alumni, and friendships. They will open doors long after you leave this campus.

With Privilege Comes Responsibility

Graduating from IIM Ahmedabad is no small achievement. You are now among the most privileged professionals in the country. But with that privilege comes a duty — to act with ethics, integrity, and accountability.

You will help businesses grow. You will advise governments and social organizations. And you also have a responsibility to give back — to this institute, and to society.

Whether it's recommending IIMA to colleagues, mentoring juniors, or contributing in your own way — remember: you are now an ambassador of IIMA.

Personally, I contributed by helping establish a Leadership Centre here — focused on leadership research and impact. You'll find your own path to give back, too.

In Closing: Your Journey is Just Beginning

Let me end with a small story.

I started as a mechanical engineer. I never imagined I would enter IT — let alone become an entrepreneur. But life has its own plans. Your career may not unfold exactly as you expect. And that's okay.

What matters is this:

- Do what you love
- Play to your strengths
- Be curious, stay adaptable
- And most importantly, enjoy the journey

Let me leave you with a line I hold dear from the *Bhagavad Gita:*

"KarmanyeVadhikaraste, MaPhaleshuKadaachana"

You have a right to action, not to its fruits.

So go out there. Give your best. Enjoy the work. The rest will follow.

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CAMPUS NEWS

National Seminar on Artificial Intelligence and the Future of the Economy

The one-day National Seminar on 'Artificial Intelligence and Future of the Economy: Opportunities, Challenges, and Employment Dynamics' was jointly organised by the Departments of Economics and Management Studies, GTN Arts College, Dindigul, Tamil Nadu, recently. More than 250 participants, including academicians, researchers, students, and professionals, participated in the event. The Convener, Dr. P Ravichandran introduced the theme of the event and delivered his welcome address. He provided a comprehensive explanation of the objectives of the event, emphasising AI's critical role in reshaping the global economic and employment landscape.

In his Presidential Address, Dr. S Saravanan, Principal, GTN Arts College, underscored the necessity for students, researchers, and faculty to adopt AI technologies. He highlighted that AI is no longer optional but essential for enhancing research and employability skills in today's competitive world.

The Inaugural Address was delivered by Lion Dr. K Rethinam, Secretary of the College. He addressed the audience on the vast employment opportunities that AI would create shortly, urging participants to equip themselves with the necessary skills to thrive in an AI-driven global economy. The event also included felicitations by Dr. Durai Rathinam, College Director, and Vice Principals, Dr. M Ponniah and Dr. U Natarajan, who congratulated the organisers and shared their insights on AI's role in entrepreneurship, education, and economic growth.

Dr. N Markkandeyan, Academic Director, delivered the Keynote Address emphasising that AI is omnipresent and poised to rule the future. He urged participants to embrace AI, warning that failure to adapt would result in obsolescence in the rapidly evolving technological landscape.

The Technical Session, chaired by Dr. S Arun, Assistant Professor of Economics, was focused on 'The Transformative Role of Education and Training in Fostering an AI-powered Economy'. The Resource Person, Dr. Bala Balamurugan, Former Director of Management Studies and Assistant Professor of Economics, Thanthai Periyar Government Arts and Science College, Trichy delivered an insightful lecture entitled, 'The Role of Education and Training in an AI-Powered Economy'. Dr. Balamurugan discussed how AI can revolutionise education by offering personalised learning experiences, adaptive teaching methods, and real-time feedback. He emphasised the urgent need for educational institutions to focus on AI-specific skill development, such as programming, data analytics, and AI ethics, to meet industry demands. The resource person highlighted how economies are increasingly relying on AI for productivity, efficiency, and innovation. He elaborated on the potential of AI to drive economic growth through automation and data-driven decision-making. Dr. Balamurugan also addressed the challenges in integrating AI into education systems, such as lack of infrastructure, resistance to change, and the digital divide. The session concluded with an engaging Q&A segment, where participants sought practical advice on incorporating AI into academic and professional contexts.

Dr. Sudhashini, Assistant Professor of Management Studies, chaired the session on 'Academic and Research Excellence in the AI Era: Tips and Tools'. He explored the practical applications of AI in academic and research domains. The Resource Person, Dr. K Ramasamy, delivered a detailed lecture on 'Academic and Research Excellence in the AI Era: Tips and Tools'. He introduced various AI-powered research tools, including plagiarism detection software, reference management systems, and language translation applications, which enhance accuracy and efficiency. He explained how AI significantly reduces the time and costs associated with research activities, enabling researchers to focus on innovation and critical thinking. AI's role in breaking language barriers was highlighted, with examples of tools that facilitate multilingual research and communication. Dr. Ramasamy emphasized the growing importance of AI in ensuring academic

rigor and research excellence, urging participants to familiarize themselves with emerging technologies.

Dr. Muthukumaran, Assistant Professor of Management Studies chaired the session on 'Impact of AI on Job Creation and Skill Development'. He addressed the impact of AI on job creation and skill development. Dr. M B Arun Balakrishnan, Assistant Professor of Commerce, Christ College, Tirupur, Kerala delivered an engaging lecture on 'Impact of AI on Job Creation and Skill Development'. Dr. Balakrishnan highlighted that while AI is disrupting traditional job roles, it is also creating opportunities in new sectors such as AI ethics, cybersecurity, and robotics. The resource person emphasised the need to acquire both technical skills (e.g., machine learning, coding) and soft skills (e.g., critical thinking, adaptability) to remain competitive in the AI job market. He elaborated on global trends in AI-driven employment, predicting significant growth in sectors like healthcare, finance, and education. Dr. Balakrishnan discussed barriers to skill acquisition, such as the lack of access to training resources, and proposed solutions like online learning platforms and government-supported AI initiatives. The session concluded with a vibrant discussion, where participants shared their perspectives on the opportunities and challenges associated with AI-driven job markets.

The seminar concluded with a Valedictory Address by Prof. S Ramaswamy, Advisor, GTN Group of Institutions. He provided a comprehensive overview of the seminar's key takeaways, emphasizing the importance of AI in driving future economic and societal progress. The Vote of Thanks was proposed by Dr. V Kaveri, Head, Department of Management Studies, who expressed gratitude to the dignitaries, resource persons, participants, and organisers for their contributions to the seminar's success. The participants provided enthusiastic feedback, appreciating the seminar's relevance and the expertise of the resource persons. Many expressed their intention to implement the insights gained into their academic and professional pursuits. The seminar successfully achieved its objective of fostering awareness about AI's transformative potential in the economy and job market. It provided participants with actionable insights and inspired them to embrace AI-driven opportunities for personal and professional growth.

National Seminar on Sardar Vallabhbhai Patel and the Foundation of India

A two-day National Seminar on 'Sardar Vallabhbhai Patel and the Foundation of India: Constitution, Governance, and National Integration' is being organised by the Centre for International Relations and Governance, Maharashtra National Law University, Nagpur from July 18-19, 2025. The event is sponsored by the Indian Council of Social Science Research, New Delhi. It is a part of the *Rashtriya Ekta* (National Unity) Seminars, an initiative by the Indian Council of Social Science Research (ICSSR) to commemorate the 150th birth anniversary of Sardar Vallabhbhai Patel. It will bring together academicians, researchers, policymakers, and students to share insights and engage in dialogue on Sardar Patel's enduring legacy.

Sardar Vallabhbhai Patel, the 'Iron Man of India,' stands as a towering figure in the shaping of modern India, an architect of India's political and territorial integrity; his role in laying the foundation of India is unparalleled. His remarkable leadership during the consolidation of princely states, his contributions to the formulation of India's Constitution, and his vision for robust governance make him a symbol of national unity and integration. The event seeks to revisit and celebrate the legacy of Sardar Patel, particularly focusing on his contributions to Constitution-making, governance, and national integration. At a time when India is navigating the complexities of federalism, social cohesion, and governance in a globalised world, the principles and practices espoused by Sardar Patel hold a key role in Indian polity. Sardar Patel's contributions to the Constituent Assembly and his emphasis on the principles of democracy, equality, and justice still have relevance in the contemporary world and merit critical analysis. The Subthemes of the event are:

- Sardar Patel and the Drafting of the Indian Constitution.
- Sardar Patel as a Lawyer.
- Patel's Vision for Federalism and Centre-State Relationship.
- Governance and Administration: Lessons from Patel's Leadership.
- Unification of Princely States: Strategies and Challenges.

- Sardar Patel and the Promotion of Communal Harmony.
- National Security and Unity: Patel's Role in Strengthening India.
- Political Philosophy of Sardar Patel.
- Political Movements of Sardar Patel.
- Sardar Patel's Commitment to Social Justice and Gender Equality.
- Sardar Patel's Contribution for National Integration.
- Sardar Patel's Contributions to National Security and Nationalism.
- Sardar Patel's Administrative Approaches.
- The Legacy of Sardar Patel for Twenty-first Century Bharat.
- Relevance of Sardar Patel's Ideas in Contemporary India.

For further details, contact the Coordinator, Dr. Madhukar Sharma, Head, Centre for International Relations and Governance, Maharashtra National Law University, Nagpur-44110, Maharashtra, Mobile No: 07206171199. E-mail: *madhukar@nlunagpur.ac.in* For updates, log on to: *www.nlunagpur.ac.in*

International Conference on Advances in Robotics

A four-day International Conference on 'Advances in Robotics' is being organised by the Department of Mechanical Engineering, Indian Institute of Technology, Jodhpur, Rajasthan from July 02-05, 2025. The event of The Robotics Society aims to create a forum to present and exchange new ideas by researchers and developers from India and abroad working in the fields of robotics and its applications. The various themes of the event are:

- Kinematics, Dynamics and Design of Robots.
- Computer Vision and AR/VR for Robotics.
- Multi-robot System and Distributed Control.
- Robotics and Control Systems.
- Grasping and Human-Robot Interaction.
- Medical, Rehabilitation and Assistive Robotics.
- Soft Robotics and Bio-Inspired Robotic Systems.
- Field Robots: Legged, Flying and Underwater.
- Collaborative Robots for Industry Automation.
- Planning and Navigation in Unstructured Environments.
- Robot Learning and GenAI and LLMs for Robotics.
- Telerobotics and Haptics.

For further details, contact Prof. Suril Vijaykumar Shah, Professor, Department of Mechanical Engineering, Indian Institute of Technology, Jodhpur-342030, Rajasthan. E-mail: *surilshah@iitj.ac.in* and/or *2025@advancesinrobotics.com.* For updates, log on to: *www.iitism.ac.in*

International Conference on Digital Technologies

A two-day International Conference on 'Digital Technologies for Business Excellence and Sustainable Development and Creating *Vikshit Bharat*@2047' is being organised by the Department of Management Studies and Industrial Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Jharkhand, from July 05-06, 2025, through a hybrid mode. The areas of Digital Technologies for Business Excellence and Sustainable Development are:

- Business Analytics.
- HR Management.
- Operations Management.
- Energy Management.
- Strategic Management.
- Financial Management.
- Industrial Engineering.
- Artificial Intelligence and Machine Learning.
- Circular Economy.
- Information System and Information Technology.
- Blockchain Technology.
- Internet of Things.
- Entrepreneurship and Innovation.
- Marketing Management.
- Sustainability Management.

For further details, contact Convener, Dr Rashmi Singh, Assistant Professor, Department of Management Studies and Industrial Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad-826004, Jharkhand, Mobile No: 09590399698, E-mail: *rashmis@iitism.ac.in*. For updates, log on to: *https://www.bits-pilani.ac.in/SeminarsWorkshops*

Faculty Development Programme on Intellectual Property Rights

A five-day Faculty Development Programme on 'Intellectual Property Rights' is being organised by the Association of Indian Universities (AIU)—Academic and Administrative Development Center (AADC) and Amity Institute of Biotechnology, Amity University, Jaipur, Rajasthan from March 24-28, 2025. Around 40 Faculty Members and Research Scholars of Amity University Rajasthan participated in the event. The Inaugural Address was delivered by the Vice Chancellor, Prof. Amit Jain, emphasising the importance of filing patents for the faculty members and research scholars and on how to commercialise the patents. The Nodal Officer, Mr. Akshat Shrivastava, Coordinator of the event, welcomed the participants and explained about the Association of Indian Universities (AIU) and its activities, elaborating upon the rationale behind the opening of Academic and Administrative Development Centres across India. Mr. Shrivastava enlightened the importance of choosing the theme of IPR and organising it along with the Amity Institute of Biotechnology. The first session of the programme was delivered by Prof. Vinay Sharma, Director, Amity Institute of Biotechnology. He elaborated on the IPR and its different components. He enlightened on how Research could be commercialised and shared details about Patent Drafting and how to convert a Research Paper to a Patent. Prof. Vinay Sharma elaborated on what IP is, defining IP as a category of assets created using human intellect and having commercial value. It is tangible but can be stored in Soft Form too. Prof. Sharma further elaborated on various IPR aspects and components such as IPR as a statutory right given by the government for a limited period, the importance of IPR in establishing goodwill and brand value in the Market, IPR Components, TRIPS: Trade Related Aspects of the Intellectual Property Rights, IPS Law of India and how IPR Works, and copyrights.

Prof. Anil G Variath, Director, Amity Law School, elaborated on 'IP Assets Management' and explained the topics such as Understanding IP Concepts, Legal Framework, IP Valuation and Strategy, IP Portfolio Management, and Technology Transfer and Licensing.

Prof. Kashmir Singh, Punjab University, elaborated on the 'Role of IPR in Empowering India towards *Viksit Bharat* Mission 2047'. He discussed upon the Current State of IPR in India, India's performance in global IP rankings, the role of IPR in facilitating a knowledge-driven economy, how IPR is instrumental in fostering innovation and Research and Development (R&D) related activities across sectors, the importance of IP in promoting sustainable and inclusive development, policy and legal frameworks for IPR in India, overview of the National IPR Policy, IPR and economic growth, how IPR can be leveraged by startups and small enterprises, and case studies of successful IP-driven innovations in India.

Dr. Madhulata Kumari, Assistant Professor, Amity Institute of Biotechnology, focused on Provisional Patent Application Filing, its Definition and Purpose and discussed when to file a Provisional Patent, understanding the appropriate time to file a provisional application, contents of a Provisional Patent Application, the role of claims in patent drafting, and patent filing Process and Procedure.

Dr. Bharti Jain, Founder, Swash Legal, focused on the Role of IPR in Protecting Start-up Innovations. The speaker emphasised securing a competitive advantage, creating a Barrier to Entry, enhancing market position, IPR for Raising Funds and Attracting Investors, IP as an asset, monetising IP, IPR as a tool for business expansion, global Expansion, brand recognition, developing an IP Portfolio, and IPR challenges faced by start-ups.

Dr. Rakhi Mutha, Associate Professor, Amity Institute of Information Technology, discussed the 'Patentability Search and its Importance'. Her session dealt with the purpose of patentability search: steps in patentability search, identifying keywords, searching patent databases, reviewing non-patent literature, and analyse results. The speaker enlightened about the things which cannot be Patented**,** such as Abstract Ideas, Natural Phenomena, Inventions Contrary to Public Order or Morality, Scientific Theories and Mathematical Methods, Methods of Treatment and Surgery, Plants and Animals. Prof Bafna, Amity Law School, elaborated upon Geographical Indication (GI) and categorised types of GIs**.** He emphasised the importance of Geographical Indications, the Legal Framework for GI and the National Framework for GI Protection. He talked about the GI Registration Process and the various challenges during GI Registration. The event concluded with the presence of the Pro Vice Chancellor, Dr. G K Aseri, sharing his words of wisdom and encouraging the participants to implement the learnings of the programme. The Convener, Prof. Vinay Sharma, Dean, Research and Director, Amity Institute of Biotechnology, Amity University Rajasthan and was coordinated by Dr. Madhulata Kumari and Co-coordinated by Dr. Rakhi Mutha. ❑

THESES OF THE MONTH

SCIENCE & TECHNOLOGY
A List of doctoral theses accepted by Indian Universities
(Notifications received in AIU during the month of March-April, 2025)

AGRICULTURAL & VETERINARY SCIENCES

Animal Husbandary

1. Ingale, Rohit Ramesh. **Process standardization for the manufacturing of novel fruit burfi by using Dragon fruit (*Selenicere usundatus*) powder**. (Dr. S G Narwade), Department of Animal Husbandry and Dairy Science, Vasantrao Naik Marathwada Agricultural University, Parbhani.

Biotechnology

1. Sabhyata. **Identification of nitrogen use efficient and nutritionally rich wheat and its genome wide mapping**. (Dr. Diwakar Aggarwal and Dr. Arun Gupta), Department of Biotechnology, Maharishi Markandeshwar University, Ambala.
2. Shefali. **Genome wide identification of GRAS gene family in bread wheat (*Triticum aestivum* L)**. (Dr. Reeti Chaudhary and Dr. Pradeep Sharma), Department of Biotechnology, Deenbandhu Chhotu Ram University of Science and Technology, Murthal.
3. Tanvi. **Studies on weed diversity and effect of their compost on growth and yield of cole crops**. (Dr. Raj Singh), Department of Biotechnology, Maharishi Markandeshwar University, Ambala.

Extension Education

1. Bhoyar, Shrutika Diliprao. **Occupational aspirations of rural youth in Marathwada Region**. (Dr. S R Jakkawad), Department of Extension Education, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhanii.

Food Science & Technology

1. Kale, Priyanka Ramkrishn. **Studies on quality evaluation of quinoa seeds with its exploration in extruded products**. (Dr. D R More), Department of Food Technology, Vasantrao Naik Marathwada Agricultural University, Parbhani.
2. Wadmare, Vidhya Baban. **Studies on development of process technology of liquid jaggery and its' value added product**. (Dr. K S Gadhe), Department of Food Chemistry and Nutrition, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhanii.

Genetics & Plant Breeding

1. Saini, Manoj Kumar. **Identification of restores and potential hybrids on the basis of heterosis and combining ability using CMS lines in rice (*Oryza Sativa* L)**. (Dr. D P Pandey), Department of Genetics and Plant Breeding, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur.
2. Shedge Pranjal Jalindar. **Genetical studies and stability analysis for yield and yield contributing characters in cowpea (*Vigna unguiculata* (L) walp)**. (Dr. D K Patil), Department of Genetics and Plant Breeding, Vasantrao Naik Marathwada Agricultural University, Parbhani.

Soil Science

1. Pawar, Sanjay Narayanrao. **Assessment of runoff potential and soil loss vulnerability and suggestion of water harvesting and erosion control structures for university area**. (Prof. B.W Bhuibhar), Department of Soil and Water Conservation Engineering, Vasantrao Naik Marathwada Agricultural University, Parbhani.

Veterinary Sciences

1. Mohapatra, Sangita. **Evaluation of in *silico* screened active compound (s) and its nanoformulation against Canline Distemper Virus (CDV) in vitro**. Department of Veterinary Pharmacology and Toxicology, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana.

BIOLOGICAL SCIENCES

Biochemistry

1. Trivedi, Savitri Jayprakashbhai. **In vitro differentiation of hepatic lineage from mesenchymal stem cells using synthetic and phytopharmaceuticals**. (Dr. N K Jain), Department of Biochemistry, Gujarat University, Ahmedabad.

Biotechnology

1. Sharma, Sonia. **Isolation, screening, characterization and application of endophytes from Amorphophallus paeoniifolius**. (Prof. Neerja Wadhwa and Prof.Pammi Gauba), Department of Biotechnology, Jaypee Institute of Information Technology, Noida.

Food Science & Nutrition

1. Sonal. **Evaluation of the nutritional potential of Digera Muricata (Kondhra) leaves, development of value added food products and their impact assessment on the iron status of adolescent girls**. (Dr. Nutan), Department of Food and Nutrition, Bhagat Phool Singh Mahila Vishwavidyalaya, Khanpur Kalan.

Life Science

1. Lalbiakdika, H. **Diversity and phytochemical profiles of weeds in paddy fields of Mizoram**. (Prof.F Lalnunmawia and Prof. H Lalruatsanga), Department of Botany, Mizoram University, Aizawl.

2. Sutradhar, Ashok Kumar. **Morphological cytological and tissue culture studies of two members of polygonaceae of Tripura**. (Dr. B K Datta and Prof. R K Sinha), Department of Botany, Tripura University, Suryamaninagar.

Microbiology

1. Rana, Huma. **Studies on value addition and post harvest quality management of jaggery using coating of selected herbal plants**. (Prof. Amar P Garg and Prof. Saurabh Jain), Department of Microbiology, Shobhit Institute of Engineering & Technology, Meerut.

Zoology

1. Sah, Ruchika. **Ecotoxicological and GIS spatial risk assessment of estrogenic Endocrine Disrupting Compounds (e-EDCs) from middle Ganga**. (Dr. Gautam Talukdar), Department of Wildlife Science, Saurashtra University, Rajkot.

EARTH SYSTEM SCIENCES

Environmental Science

1. Anand, Saumya. **Bacterial assisted approaches for cadmium removal under different simulated conditions**. (Prof. Vipin Kumar), Department of Environmental Science and Engineering, Indian Institute of Technology, Dhanbad.

2. Langrai, Larikynti. **Provisioning ecosystem services emanating from community forests and their role in the livelihoods of the people of East Khasi Hill District Meghalaya**. (Dr. S.S Chaturvedi), Department of Environmental Studies, North Eastern Hill University, Shillong.

3. Mishra, Ambikesh Kumar. **An investigation into emission inventory and source apportionment study around OCL (Odisha Cement Limited) Rajgangpur, Dist-Sundargarh Odisha, India**. (Prof. Manish Kumar Jain and Prof. Vipin Kumar), Department of Environmental Science and Engineering, Indian Institute of Technology, Dhanbad.

Geology

1. Mishra, Pooja Umashankar. **Assessment and understanding of ice surface melt and the resultant morphological features over polar ice sheets and ice shelves using remote sensing data**. (Dr. N Y Bhatt and Dr. Sandip R Oza), Department of Geology, Gujarat University, Ahmedabad.

ENGINEERING SCIENCES

Biomedical Engineering

1. Sagar, Milind. **Biosynthesis of Rudraksha (*Elaeocarpus Ganitrus*) mediated silver nanoparticles for potential biomedical applications**. (Dr. Manisha Rastogi and Dr. Shiva Sharma), School of Biomedical Engineering and Health Sciences, Shobhit Institute of Engineering & Technology, Meerut.

Chemical Engineering

1. Srishti. **Development of water-repellent, biodegradable jute fabric-showcasing versatile applications**. (Dr. Aditya Kumar and Dr. Apurba Sinhamahapatra), Department of Chemical Engineering, Indian Institute of Technology, Dhanbad.

2. Tiwary, Shishir. **CO_2 capture at high temperatures using modified CaO-based sorbents: Experimental analysis and kinetic modelling**. (Prof. Soubhik Kumar Bhaumik), Department of Chemical Engineering, Indian Institute of Technology, Dhanbad.

Civil Engineering

1. Saikrishnamacharyulu, Ippili. **Assessment of reinforced slope stability of soil using multiple regression models**. (Dr. Vasala Madhava Rao and Dr. Balendra Mouli Marrapu), Department of Civil Engineering, GIET University, Gunupur.

Computer Science & Engineering

1. Beulah, Kondapalli. **An industrial gas leakage detection in and around Visakhapatnam, India using machine learning and Internet of Things approaches**. (Dr. P Vamsi Krishna Raja and Dr. P Krishna Subba Rao), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

2. Bonthu, Sridevi. **Enhancing automated short answer grading through text augmentation and domain adaptation**. (Dr. S. Rama Sree and Dr. M H M Krishna Prasad), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

3. Dhillon, Arwinder. **Computational intelligent framework for biomarker identification in multi-omics data**. (Dr. Ashima Singh and Dr. Vinod Kumar Bhalla), Department of Computer Science & Engineering, Thapar Institute of Engineering and Technology, Patiala.

4. Dubey, Shivendra. **Genome sequence and mutation rate analysis of COVID-19 using data mining**. (Dr.Dinesh Kumar Verma and Prof.Mahesh Kumar), Department of Computer Science & Engineering, Jaypee University of Engineering and Technology, Guna.

5. Kiran, Sirra Kanthi. **Enhanced fake news detection through hybridization of deep learning and nature-inspired optimization techniques**. (Prof. M Shashi and Dr. K B Madhuri), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

6. Mishra, Gitanjali. **Automatic text summarization using intelligent techniques**. (Dr. Nilambar Sethi and Dr. L Agilandeeswari), Department of Computer Science & Engineering, GIET University, Gunupur.

7. Nethala, Tulasiraju. **An optimized microarray data extraction and cancer classification using deep learning techniques**. (Dr. Bidush Kumar Sahoo and Dr. Pamidi Srinivasulu), Department of Computer Science & Engineering, GIET University, Gunupur.

8. Patel, Niteshkumar Gunvantbhai. **Rule based Gujarati grammar implementation using concepts of natural language processing**. (Dr. Dhiren B Patel), Department of Computer Science & Engineering, Gujarat Vidyapith, Ahmedabad.

9. Pooja Rani. **Drug synergy prediction using deep learning techniques**. (Dr. Kamlesh Dutta and Dr. Vijay Kumar), Department of Computer Science & Engineering, National Institute of Technology, Hamirpur.

10. Rao, Gottapu Sankara. **Enhancing the network security by detection and mitigation of network based DoS/DDoS attacks in network traffic using machine learning techniques**. (Dr. P Krishna Subba Rao), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

11. Saini, Meenakshi. **Dynamic resource provisioning based scheduling in cloud computing environment**. (Dr. Neeraj Mangla), Department of Computer Science & Engineering, Maharishi Markandeshwar University, Ambala.

12. Saroha, Surbhi. **An intelligent human computer agent architecture based on emotional analysis for career counseling**. (Dr. Mamta Bansal and Dr. Anil K Ahlawat), Department of Computer Science & Engineering, Shobhit Institute of Engineering & Technology, Meerut.

13. Sateesh, Gudla. **Energy efficient and reliable routing mechanisms for data delivery in wireless sensor networks**. (Dr. Kuda Nageswara Rao), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

14. Srinivas, Vadali. **Optimizing data mining techniques: Advanced approaches for liver lesion analysis using deep learning for segmentation and severity assessment**. (Dr. G V S R Deekshitulu and Dr. J V R Murthy), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

15. Srinivasulu, D Lakshmi. **A novel deep learning-based approach for clustering big data**. (Dr. Suvarna Vani Koneru), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

16. Sudha Rani, T. **Machine learning based methods for protein sequence classification and structure prediction**. (Dr A.Yesu Babu and Dr.D.Haritha), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

17. Thota, Narasimha Rao. **A new approach to generate simplified solution to the imbalance datasets**. (Dr. D Vasumathi), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

18. Tomar, Vinita. **Critical path aware test case optimization under regression testing using metaheuristic techniques**. (Dr. Mamta Bansal), Department of Computer Science & Engineering, Shobhit Institute of Engineering & Technology, Meerut.

19. Vijaya Raju, M. **A deep learning based urdbean plant survival and farmer life risk sustain study on cloud platform**. (Dr. A. Sudhir Babu and Dr. P Krishna Subba Rao), Department of Computer Science & Engineering, Jawaharlal Nehru Technological University, Kakinada.

20. Yadav, Pinky. **Designing an assessment technique for negation impact in natural language processing**. (Dr. Indu Kashyap and Dr. Bhoopesh Singh Bhati), Department of Computer Science & Engineering, Manav Rachna International Institute of Research and Studies, Faridabad.

Electrical & Electronics Engineering

1. Bishla, Sandeep. **Power quality and stability improvement for optical EV charging using hybrid generation sources**. (Dr. Anita Khosla), School of Engineering and Technology, Manav Rachna International Institute of Research and Studies, Faridabad.
2. Choudhary, Juhi. **Fault detection and system reconfiguration for vector controlled synchronous reluctance motor drive**. (Dr. Chandra Bhushan Mahto), Department of Electrical Engineering, Aryabhatta Knowledge University, Patna.

Material Engineering

1. Majumder, Debabrata. **A study of thermally responsive polymer based ceramic inks**. (Dr. P Karuna Purnapu Rupa), Department of Materials Science and Engineering, Tripura University, Suryamaninagar.

Mechanical Engineering

1. Pandey, Sachchidanand. **Assessment of electric vehicles safety and standards for enhanced customer acceptability**. (Prof.Devendra Vashist), Department of Mechanical Engineering, Manav Rachna International Institute of Research and Studies, Faridabad.
2. Ranjan, Rakesh. **High temperature deformation studies of Fe-Ni and Ni-base alloys XH 43 and XH 62 for aerospace applications**. (Prof.Ashis Mallick, Dr. M R Suresh and Dr. Rohit K Gupta), Department of Mechanical Engineering, Indian Institute of Technology, Dhanbad.
3. Sharma, Gaurav Kumar. **Effect of input parameters on the performance of active solar still for sustainable distillation**. (Dr. Ashis Mallick, Dr. Desh Bandhu Singh and Prof. Navneet Kumar), Department of Mechanical Engineering, Indian Institute of Technology, Dhanbad.
4. Sharma, Vivek. **Development of low entropy alloy-based nanocomposite to high entropy alloys and its characterization**. (Prof.Ashish Mallick), Department of Mechanical Engineering, Indian Institute of Technology, Dhanbad.
5. Singh, Saumya. **Thermofluidic investigation of thin film evaporation: Effects of external fields and transient behavior**. (Prof. Pawan Kumar Singh and Prof. Soubhik Kumar Bhaumik), Department of Mechanical Engineering, Indian Institute of Technology, Dhanbad.

MATHEMATICAL SCIENCES

Mathematics

1. Garg, Arpan. **Modelling and analysis of thermo-bioconvection problems**. (Prof.Y D Sharma and Dr. Subit Kumar Jain), Department of Mathematics, National Institute of Technology, Hamirpur.
2. Madhukar, Sarda Mahesh. **A study on the fractional domination function and fractional domination number of graphs**. (Dr. Rekha Jain and Dr. Ganesh Munde), Department of Mathematics, Medi-Caps University, Rau, Indore.
3. Pattanaik, Pradosh Kumar. **Absolute index summability methods and degree of approximation of series of real and fuzzy numbers**. (Dr. Biplab Kumar and Rath Dr. Susanta Kumar Paikray), Department of Mathematics, GIET University, Gunupur.
4. Paul, Kailash Chandra. **Design and implementation of inventory management system**. (Dr. Manas Ranjan Sarangi and Dr. Chandan Kumar Sahoo), Department of Mathematics, GIET University, Gunupur.
5. Pattanaik, Pradosh Kumar. **Absolute index summability methods and degree of approximation of series of real and fuzzy numbers**. (Dr.Biplab Kumar Rath Dr. Susanta Kumar Paikray), Department of Mathematics, GIET University, Gunupur.
6. Paul, Kailash Chandra. **Design and implementation of inventory management system**. (Dr. Manas Ranjan Sarangi Dr. Chandan Kumar Sahoo), Department of Mathematics, GIET University, Gunupur.
7. Tamanna. **Study on divergence measures in extended fuzzy environment**. (Dr. Satish Kumar), Department of Mathematics, Maharishi Markandeshwar University, Ambala.
8. Vandana. **Study of some soliton types on submanifolds**. (Dr. Rajeev Budhiraja), Department of Mathematics, Maharishi Markandeshwar University, Ambala.

MEDICAL SCIENCES

Biochemistry

1. Sonia. **Evaluation and comparison of high sensitive C- reactive protein and urinary calcium/creatinine ratio in normal pregnancy and preeclampsia**. (Dr. Sunita Manhas), Department of Medical Biochemistry, Maharishi Markandeshwar University, Ambala.
2. Sukhpal Singh. **Elucidation of the mechanism of neuroprotective actions of cyclosporine A and a pyrazolone derivative (CMB087229) in rotenone induced models of Parkinson's disease**. (Prof Sasanka Chakrabarti and Prof Bimal K Agrawal), Department of Medical Biochemistry, Maharishi Markandeshwar University, Ambala.

Biotechnology

1. Gautam, Megha. **Identification and characterization of phytocompounds and temozolomide combinations for glioblastoma multiforme**. (Prof.Reema Gabrani), Department of Biotechnology, Jaypee Institute of Information Technology, Noida.

Dentistry

1. Kumari Kavita. **Implementing direct observation of procedural skills assessment for enhancing clinical skills learning (of implant) among dental postgraduate residents: An action research**. (Dr. Irfanual Huda), Department of Prosthodontics and Crown & Bridge, Aryabhatta Knowledge University, Patna.

2. Raj, Rachna. **Knowledge attitude and practice regarding COVID-19 among Dental Healthcare Professionals in major dental hospitals at Patna a cross sectional study**. (Prof.Minti Kumari), Department of Public Health Dentistry, Aryabhatta Knowledge University, Patna.

Physiotherapy

1. Sharma, Nidhi. **Normative reference values of sideways walking tandem walking cross stepping, heel walking and toe walking among children**. (Prof. Manu Goyal), Department of Physiotherapy, Maharishi Markandeshwar University, Ambala.

2. Sharma, Sunita. **Effectiveness of non invasive intervention on anterior uterocervical angle in primary dysmenorrhea patients: A randomized controlled trial**. (Dr. Subhasish Chatterjee and Dr.Harneet Narula), Department of Physiotherapy, Maharishi Markandeshwar University, Ambala.

PHYSICAL SCIENCES

Chemistry

1. Chirra, Swathi. **Synthesis and biological screening of some new sulfonyl containing heterocycles**. (Prof. M Ravinder), Department of Chemistry, Chaitanya (Deemed To Be University), Himayatnagar, Hyderabad.

2. Madaan, Vasundhara. **Investigation on structural magnetic and photocatalytic properties of mixed metal oxide nanoparticles**. (Dr.Krishan Kumar), Department of Chemistry, Deenbandhu Chhotu Ram University of Science and Technology, Murthal.

3. Mishra, Purti. **Macrocyclic ligands and complexes synthesis and characterization**. (Dr. Pooja Sethi), Department of Chemistry, Maharishi Markandeshwar University, Ambala.

4. Pervaram, Kavitha. **Synthesis and biological studies on O, N containing heterocyclic compounds**. (Prof. S Kavitha), Department of Chemistry, Chaitanya (Deemed To Be University), Himayatnagar, Hyderabad.

5. Priyanka Rani. **Preparation of polymide based nanocomposites for electromagnetic interference shielding applications**. (Dr.Rajender Singh Malik), Department of Chemistry, Deenbandhu Chhotu Ram University of Science and Technology, Murthal.

6. Sonu. **Metal organic framework derived 3D hierarchical porous nanostructures for energy storage and visible light photocatalysis applications**. (Dr. Nirankar Singh), Department of Chemistry, Maharishi Markandeshwar University, Ambala.

Physics

1. Priya. **Investigation and characterization of hybrid nanocomposites for gas sensing application**. (Dr. Surender Duhan and Dr. Rakesh Malik), Department of Physics, Deenbandhu Chhotu Ram University of Science and Technology, Murthal.

2. Rout, Chinmaya Kumar. **Structural, optical, electrical and magnetic characteristics of rare earth ferrites $BiFeO_3$ multiferroic composites**. (Dr Dillip Kumar and Pattanayak Dr. Samita Pattanayak), Department of Physics, GIET University, Gunupur.

3. Sonia. **Ferrite based metal oxide nanocomposites for waste water treatment via photocatalysis approach**. (Dr. Ashok Kumar and Dr.Parmod Kumar), Department of Physics, Deenbandhu Chhotu Ram University of Science and Technology, Murthal.

4. Usha Rani, N. **Synthesis and characterization of nanoparticles of metal oxides**. (Prof. Amireddy Raju), Department of Physics & Electronics, Chaitanya (Deemed To Be University), Himayatnagar, Hyderabad.

❑

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WANTED

Applications are invited (in prescribed format) from eligible candidates for filling vacancy of Principal in SSSP Mandals (Grant in-aid) Kala Mahavidyalaya, Nandur Ghat Tq. Kaij Dist. Beed. The Applications duly completed in all respect should reach **within 15 days** form the date of publication of this advertisement to the Secretary, Shiv Sagar Seva Bhavi Shikshan Prasarak Mandal, Kala Mahavidyalaya's Campus Nandur Ghat Tq. Kaij Dist. Beed.

Sr. No.	Name of Post	No of Post	Category
1	**Principal**	01	Open to all

Note :-

1. Qualification, pay scale and conditions of services shall as per the rules and regulations prescribed by the UGC, Govt. of Maharashtra and University. **2.** This Advertisement is made as per No Objection certificate from Joint Director (Higher Education), Chhatrapati Sambhajinagar region, Chhatrapati Sambhajinagar vide letter No. JHDE Chhatrapati Sambhajinagar/NOC/2025/45 dated 21.04.2028 & Dy Registrar. Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar letter Special all/2025/920279 dated 03.05.2025. **3.** Employed candidates shall apply though proper channel and shall submit No Objection Certificate from the employer. **4.** Candidates must get verified A.P.I. score from the University. **5.** No T.A. & D. A. will be paid for attending the interview.

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Registrar I/c

07th May 2025

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Advt. No. SES/SRIEIT/APPT/01/25

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				Maths	Physics	English	Chemistry
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Professor (Regular Basis)	01	--	--	--	--	--	--
Associate Professor (Regular Basis)	01	02	02	01	--	--	--
Assistant Professor (Regular Basis)	01#	01	--	01	--	--	--
Assistant Professor (Contract Basis)	--	02	02	01	01	01	01
Assistant Director-Physical Education (Regular Basis)	01						
Laboratory Assistant (Regular Basis)	01	01	01	--	--	--	--

ESSENTIAL REQUIREMENTS FOR REGULAR POSITIONS :

1. Minimum of 15 years of residence in Goa. **2.** Knowledge of Konkani. **3.** Knowledge of Marathi shall be desirable.

Eligibility, Qualifications & Pay Scale:

• As per AICTE guidelines & regulations, 01st March 2019. For further details, kindly visit **www.acite-india.org** • # - Candidate with Masters Degree in Computer Engineering/ Information Technology will be preferred. • Laboratory Assistant : Diploma in relevant discipline/subject. In the event of candidates for the post of Professor and Associate Professor are not available and/or not found suitable, the advertised posts shall be filled at level of **Assistant Professor** on contract basis.

Candidate may download Application Form from the college website www.ritgoa.ac.in. Filled application along with attested copies of testimonials, certificates should reach to the Administrative Office of the Institute or email soft copies of filled applications with enclosures to recruitments@ritgoa.ac.in **within 15 days** from the date of publication of this advertisement. Incomplete Application and/or application without enclosures will not be accepted and rejected without giving any notice.

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AIDED

Sr. No.	Cadre	Subject	Total No. of CHB Posts	Category
1	**Assistant Professor**	History	02	02- OPEN
2	**Assistant Professor**	Commerce & Business Law	04	04 - OPEN
3	**Assistant Professor**	Marathi	02	02 - OPEN
4	**Assistant Professor**	English	01	01 - OPEN
5	**Assistant Professor**	Mathematics	01	01 - OPEN

The above posts are open to all, however, candidates from any category can apply for the post.

Reservation for women will be as per **University Circular No. BCC/16/74/1998 dated 10th March, 1998. 4% reservation shall be for the persons with disability as per University Circular No. Special Cell/ICC/2019-20/05 dated 05th July, 2019.**

Candidates having knowledge of Marathi will be preferred.

"Qualification, Pay Scales and other requirement are as prescribed by the UGC Notification dated 18th July, 2018, Government of Maharashtra Resolution No. Misc-2018/C.R.56/18/UNI-1, dated 8th March, 2019 and University Circular No. TAAS/(CT)/ICD/ 2018-19/1241, dated 26th March, 2019 , Higher & Technical Department Government Resolution No. अर्थसं–2022 / प्र.क्र.105 / (1) / मशि–3, दिनांक 27 मार्च 2023, University Circular No. सीटीएयु / 01 / 2024–2025, दिनांक 24 / 04 / 2024, and Higher & Technical Department Government Resolution No. संकिर्ण–2021 / प्र.क.181 / 21 / विशि–1, दिनांक 17 ऑक्टोंबर, 2022, University Circular No. सीटीएयु / 03 / 2024–2025, दिनांक 26 / 04 / 2024 for filling the post on clock hour basis revised from time to time" The Government Resolution & Circular are available on the website mu.ac.in.

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3	**Assistant Professor**	Physics	02	02 – OPEN
4	**Assistant Professor**	Botany	02	02 – OPEN
5	**Assistant Professor**	Chemistry	01	01 – OPEN
6	**Assistant Professor**	Zoology	02	02 – OPEN

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Candidates having knowledge of Marathi will be preferred**.**

"Qualification, Pay Scales and other requirement are as prescribed by the UGC Notification dated 18th July, 2018, Government of Maharashtra Resolution No. Misc-2018/C.R. 56/18/UNI-1, dated 8th March, 2019 and University Circular No. TAAS/(CT)/ ICD/2018-19/1241, dated 26th March, 2019, Higher & Technical Department Government Resolution No. अर्थसं–२०२२/प्र.क्र. १०५/(१)/मशी–३, दिनांक २७ मार्च, २०२३, University Circular No. सिटीएयु/०१/२०२४–२०२५, दिनांक २४/०४/२०२४, and Higher & Technical Department Government Resolution No. संकीर्ण–२०२१/प्र. क्र. १८१/२१/विशी–१, दिनांक १७ ऑक्टोबर, २०२२, University Circular No. सिटीएयु/०३/२०२४–२०२५, दिनांक २६/०४/२०२४ for filling the post on clock hour basis revised from time to time."

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Association of Indian Universities

Notification of AIU's National Workshop for University Registrars

To strengthen the administrative leadership of universities, AIU is organizing National Workshop for University Registrars.

This will cover key areas such as:

- Good Governance Practices
- Financial Management & Compliance
- Regulatory Framework & Policy Updates
- Conflict Resolution & Legal Aspects & More
- Digital Transformation
- RTI.

June 26-27 2025

Gujarat Technological University
Ahmedabad

Nominate by
May 30, 2025

₹ 3500+GST
To be paid directly to the host University.

Only 50 Seats
Please note that only the first 50 nominations will be accommodated, on a **first-come, first-served basis.**

Last Date for Registration:
30th May 2025

The workshop is designed to provide University Registrars with valuable insights, practical strategies, and networking opportunities that will enhance their effectiveness in managing the academic and administrative functions of their institutions.

We earnestly seek the participation of your esteemed institution in this important initiative. The engagement of Registrars will be instrumental in strengthening administrative leadership across Indian Universities.

For registration or queries, please contact:

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Joint Secretary
Association of Indian Universities (AIU)
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