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In This Issue

Designing Curriculum and Assessments for Outcome-based Learning in Indian Higher Education Institutions: Some Key Considerations

Moumita Das*, Suresh Garg and Ramesh Sharma*****

Education is an ever-evolving entity, continuously adapting to address the evolving needs of society, guiding it from ignorance to enlightenment and from disenfranchisement to empowerment. To facilitate this evolution in education, pedagogical methods and educational tools have been continuously upgraded. In the current era, characterized by the rapid doubling of knowledge, even the most distinguished and innovative individuals cannot claim to possess all-encompassing expertise in areas such as educational delivery, learner support, research, and training (Mishra and Panda, 2020).

The National Education Policy 2020 is widely recognized as a transformative document with substantial potential for nurturing well-rounded citizens. However, it is not without its noticeable shortcomings, particularly in its approach to integrating artificial intelligence in education, a realm entrusted to the creativity and resourcefulness of both educators and students.

NEP–2020 envisions a comprehensive transformation to align the Indian higher education system with the objectives of the 2030 Agenda for Sustainable Development. A central focus of this policy is the strategic development of curriculum and assessment methodologies, emphasizing Outcome-based Learning (OBL). NEP–2020 recognizes the existing challenges within the higher education system, particularly the insufficient emphasis on the cultivation of cognitive skills and learning outcomes, as highlighted in the Ministry of Human Resource Development's report (MHRD report 2020, p. 33). Moreover, NEP–2020 underscores the need for curricula that are not only stimulating and relevant but also subject to regular updates, ultimately enhancing the competence of learners and the overall quality of education. This approach places a specific emphasis on competency-based higher education, defining competence as the synergistic blend of knowledge, skills, and attitude within the cognitive, affective, and psychomotor domains. These competencies symbolize qualities such as critical thinking and creative problem-solving, which are pivotal for students in 21st-century India. For various reasons, the Indian higher education system has historically operated with a deficit in terms

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of quality, resulting in a significant shortfall in the creation of meaningful learning opportunities (Garg, 2016). As a consequence, this deficiency has led to the production of graduates who face difficulties in securing employment, thereby drawing ridicule from various stakeholders. Given that the quality of pedagogy plays a pivotal role in shaping the learning experiences of students, NEP–2020 places a strong emphasis on the adoption of high-quality pedagogical approaches, notwithstanding the fact that not all organizations in the country can provide education at the same level.

The National Education Policy also underscores the critical importance of research and innovation within curriculum design, pedagogical methods, continuous assessment, and student support. These elements are foundational pillars for the enhancement of the teaching-learning process. In this context, OBL is not a choice but a necessity. This article elucidates the concept of Outcome-based Learning and offers a structured framework for the design of curricula and assessments.

Outcome-based learning, simply put, is an educational approach centered around the clear, specific, and measurable learning outcomes that educators aim for their students to achieve upon completing a course or program. These outcomes emphasize the knowledge, skills, attributes, and abilities that a student should possess. In essence, an educational institution focuses on the core components of a subject that students need to master by the end of the teaching-learning process (Spady, 1994).

Unlike traditional methods, OBL shifts the focus from the teacher to the student. This student-centric approach accommodates diverse learning styles and offers flexibility in terms of time, location, and pace. Educational institutions play a critical role in delivering learning experiences that are ultimately assessed as 'outcomes' after students' completion of their studies. Consequently, designing a curriculum based on these 'outcomes' becomes a significant undertaking.

Outcome-based Learning offers several advantages, including enhanced clarity, relevance, and adaptability. Clearly defined outcomes create a shared understanding of expectations for both students and educators. Emphasis on real-world skills ensures that education remains practical and adaptable, allowing for adjustments to the curriculum based on evolving needs. It is important to recognize that OBL differs from traditional methods by placing a stronger focus on the learner, flexibility in the learning process, and a heightened emphasis on assessing the achievement of desired outcomes. In contrast, the traditional teacher often assumes the role of a "sage on the stage," dictating what, when, and how to teach, with limited room for modifications in the teaching strategy**.** Learning outcomes should possess specific, observable, and measurable characteristics. The clarity of these outcomes forms the bedrock for the development of relevant assessments that can effectively monitor learner progress. The principle of constructive alignment underscores the essential link between learning activities, intended outcomes, and assessments.

In this framework, learning activities should be carefully designed to support the achievement of these specified outcomes, ensuring a harmonious alignment between what students do and what they are expected to learn. Meanwhile, assessments play a crucial role in accurately measuring the attainment of these outcomes, thus facilitating a comprehensive understanding of the learning process.

Designing Curriculum for Outcome-based Learning

Designing a curriculum for OBL begins with a comprehensive needs assessment to understand the context, the target audience, and the intended learning goals. This process includes identifying areas in the existing curriculum that require enhancement or modification. The envisioned educational outcomes are then meticulously mapped and aligned with the curriculum.

Subsequently, programs and courses of the appropriate academic levels are developed to cater to these outcomes. Teachers play a pivotal role in selecting the "learning experiences" they intend for students to have during their studies. When designing learning outcomes, it is essential to use action verbs, craft engaging and diverse learning activities that are closely aligned with these outcomes, and create assessments that accurately measure the attainment of outcomes and learning experiences through successful demonstration, as specified in the outcomes. This may involve selecting relevant textbooks, and online resources, and even inviting renowned guest speakers to enrich the learning process.

Just as we require high-quality materials to construct an impressive architecture, one brick at a time, it is equally crucial to establish that every educational program consists of well-defined "Programme Outcomes." Within each program, individual courses should have their own "Course Outcomes," and these courses, in turn, should be composed of units or chapters, each with distinct "Learning Outcomes." A meticulous approach to mapping and alignment is vital, whether through a top-down or bottom-up method. Consequently, the learning outcomes of each chapter should be closely connected to and aligned with the course and program outcomes, creating a seamless and purposeful educational structure. The curriculum planning process encompasses several key considerations, including:

***Target Audience*:** Identifying the intended learners and understanding their needs, prerequisites, and learning styles.

***Content*:** Defining the subject matter and educational goals, specifying what will be taught in terms of knowledge, skills, and competencies.

***Pedagogy*:** Determining the teaching methods, strategies, and instructional approaches that will be employed to effectively deliver the content to the learners.

Curriculum design must meticulously take into account "who will be taught," thereby addressing the unique characteristics of the learners, including their educational backgrounds, learning preferences, and styles. This initial consideration lays the foundation for the curriculum plan. The core focus then shifts to "what will be taught." This aspect constitutes the essence of the curriculum and is of paramount importance in the context of Outcome-Based Learning. It defines how the subject matter will be presented, ultimately influencing the actual outcome of the teaching-learning process in terms of student performance.

The final consideration pertains to "How will it be taught?" This involves the deliberate design of pedagogical methods, tools, and techniques for instruction and assessment. Several curriculum design models exist, with Ralph Tyler's model, developed in the 1940s and later refined by D. K. Wheeler and J. Kerr, being one of the enduring and influential ones. This model comprises four key steps, which include...

***Objectives*:** It is essential to establish clear educational goals for the particular subject, which will drive the definition of educational outcomes. These objectives serve as the guiding principles for what is to be achieved through education.

***Selection of Learning Experiences*:** Educators must carefully determine what students should learn, ensuring that these learning objectives are well-defined and can be demonstrated as learning outcomes. These selections are crafted in the form of statements that precisely define the desired outcomes.

***Organization of Learning Experiences*:** To enable effective learning, teachers should organize the content associated with the selected learning outcomes in an orderly and structured manner. This involves the creation of appropriate study materials, such as textbooks, and the delivery of the teaching process in a systematic fashion.

***Assessment and Evaluation*:** The assessment and evaluation of students' learning is based on their successful demonstration of the specified "outcomes" and objectives. This necessitates the utilization of suitable assessment tools and techniques that align with the defined learning objectives.

Since 'Outcome' is an essential element of outcome-based learning, let us examine what it means.

What is an Outcome?

An "outcome" of learning represents the tangible "learning result" achieved by a student following their engagement in the learning process. These outcomes are characterized by the student's ability to perform specific actions or demonstrate their knowledge, memory, and understanding when the situation demands it. Outcomes may manifest as the development of psychomotor skills, involving physical abilities, or at the cognitive level, leading to changes in knowledge and mental understanding. Moreover, these changes extend to the student's beliefs, feelings, values, behaviors, and attitudes, encompassing the affective domain.

Outcome-based Learning predominantly emphasizes bringing about changes in the psychomotor domain, focusing on the development of practical skills and physical capabilities. However,

it is crucial to strike a balance that accommodates the development of the other two domains, namely cognitive and affective. Therefore, curriculum design should consider a holistic approach that caters to these multiple facets of learning.

Several key questions naturally arise:

- How can one choose the learning experiences expected from students?
- What precise terminology should be used to assess these learning experiences in the form of outcomes?

The answers to these questions are rooted in the groundbreaking contributions of educational experts such as Benjamin Bloom, David Krathwohl, Anita Harrow, Lorin Anderson, Elizabeth Simpson, and others. Their work has provided valuable insights into the design and evaluation of effective learning experiences, shaping the way we approach education and assessment.

Selecting Learning Experiences

Benjamin Bloom's groundbreaking work introduced a widely recognized classification of learning that has profoundly influenced modern education. He identified three fundamental domains of learning: cognitive, affective, and psychomotor. Each domain comprises skills that progress from basic to complex as students advance in their learning journey. Subsequent modifications and the development of synthesized taxonomic classifications have refined these concepts. The skills classified within each domain play a vital role in contemporary education:

***Cognitive Domain*:** This domain pertains to the cultivation of intellectual skills and knowledge. Bloom's Taxonomy categorizes these skills into distinct levels of increasing complexity: Understanding, Applying, Analyzing, Evaluating, and Creating.

***Affective Domain*:** Focused on the development of emotions and behavior, this domain encompasses skills classified into five categories: Receiving, Responding, Valuing, Organization, and Characterization.

***Psychomotor Domain*:** Concerned with the enhancement of physical movement, muscular coordination, and motor skills, this domain categorizes skills into four distinct levels: Observing, Imitating, Practicing, and Adapting.

When designing the curriculum and selecting learning experiences, it is imperative to consider these domains. A balanced blend of learning experiences from each domain should be carefully designed to ensure a holistic learning outcome for the program. Furthermore, learning outcomes should adhere to the SMART criteria, ensuring that they are Specific, Measurable, Achievable, Relevant, and Time-bound, facilitating a clear and effective educational process.

Evaluation of Learning Outcomes

Understanding that learning experiences are articulated in the form of outcomes underscores the significance of evaluating these outcomes accurately. To ensure a precise evaluation, it is essential that the learning outcomes are articulated in the form of clear, specific statements. As indicated by Bloom's taxonomy, employing "action verbs" appropriate to each of the three domains is imperative. Some of these action verbs are shown in table 1, table 2 and table 3.

While describing outcomes, a teacher will use these action verbs well. Once the outcomes are described in the unit or chapter, these should be mapped to the assessment methods.

Assessment Methods in Outcome-based Learning

The assessment of learning experiences can be categorized into two primary methods: summative and formative assessment. In summative assessment, the evaluation is typically conducted at the conclusion of a chapter or course and is measured against predefined benchmarks. This includes terminal questions at the end of a chapter, class tests, final projects and their defense, and term exams.

Conversely, formative assessment is designed to assess learning progress during the course of the learning experience, providing valuable feedback to enhance the learning process. It includes in-text questions, various activities like quizzes, open-ended questions, concept maps, polls, discussions, and more.

With the National Education Policy- 2020 emphasizing holistic education, there is a growing trend towards competency-based assessment. The University Grants Commission (UGC) has advocated the use of assessment methods such as open book tests, oral presentations, problem-based assignments,

observation of practical skills, computerized adaptive testing, among others, which are particularly suitable for assessing specific outcomes (UGC, 2020). This shift aligns with the evolving educational landscape, emphasizing comprehensive and outcome-focused assessments.

Various assessment tools are employed to evaluate Outcome-Based Learning, with rubrics being one of the most widely utilized. A rubric serves as a guiding instrument for evaluating a student's performance. Rubrics come in different forms, including checklists, rating scales, analytical rubrics, holistic rubrics, and structured rubrics.

Rubrics typically encompass five key components:

- ***Evaluation Criteria*:** The specific criteria against which a student's performance is assessed.
- ***Incorporation of Core Learning Outcome Elements*:** Ensuring that the core elements of the learning outcomes are present in the assessment.
- ***Range of Performance Quality*:** Defining the spectrum of quality levels for performance, which helps in distinguishing different levels of achievement.
- ***Validity and Reliability of Scores*:** Ensuring that the assessment scores are valid and reliable, meaning that they measure what they are intended to measure consistently.
- ***Distinguishing Different Levels of Performance*:** Clearly articulating the distinctions between various levels of performance quality (Allen and Tanner, 2006).

To effectively assess student learning, teachers must design appropriate rubrics tailored to different

Table 1. Action Verbs Used to Describe Outcomes in the Cognitive Domain

Cognitive Domain		
S. No	**Skills**	**Action Verbs**
1.	Remember	Describe, identify, define, list, recall
2.	Understand	Arrange, convert, draw diagram, differentiate, give example
3.	Apply	Apply, compute, modify, predict, solve
4.	Analyse	Analyse, compare, criticize, classify, contrast
5.	Evaluate	Evaluate, justify, decide, interpret, validate
6.	Create	Create, compose, devise, derive, develop

Table 2. Action Verbs Used to Describe Outcomes in the Affective Domain

Affective Domain		
S. No	**Skills**	**Action Verbs**
1.	Receiving	Listen, look, accept, attend, recognize
2.	Responding	Discuss, respond, complete, comply, cooperate
3.	Valuing	Devote, argue, debate, express, seek, prefer
4.	Organization	Organise, syatematize, order, discriminate, weigh
5.	Characterization by value	Internalize, resolve, resist, revise, verify, avoid

Table 3. Action Verbs Used to Describe Outcomes in the Psychomotor Domain

Psychomotor Domain		
S. No	**Skills**	**Action Verbs**
1.	Observing	Choose, describe, detect, identify, isolate
2.	Imitating	Copy, follow, replicate, repeat, trace
3.	Practicing	Build, assemble, demonstrate, complete, dismantle, calibrate
4.	Adapting	Construct, solve, combine, integrate, adapt, re-create

types of outcomes and the assessment methods used in the learning experiences. These rubrics provide a systematic and objective framework for evaluating students' performance based on the defined learning objectives.

Conclusion

The focus on designing curriculum for Outcome-Based Learning and assessment within Higher Education Institutions (HEIs) in India signals a transformative shift from traditional teaching methods. Crafting a suitable curriculum for Outcome-Based Learning is a complex endeavor, demanding meticulous institutional planning at the macro level and the creation of micro-level learning outcome-based lesson plans.

This process necessitates a well-balanced decision-making approach when crafting outcomes and assessment tools. It should encompass all facets of the intended student learning experiences. This holistic and learner-centric approach is poised to reshape the landscape of education in HEIs, aligning it with the evolving needs and expectations of a dynamic and competitive educational landscape.

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Changing Landscape of Higher Education in India through National Education Policy–2020

Danveer Gautam* and Rajani Ranjan Singh**

*Vidya Ke Liye Vimarsh Aur, Shiksha Ke Liye Samvad Jaruri Hota Hai (*Hon'ble Prime Minister, 3rd A.B. Shiksha Samagam). The National Education Policy–2020 (NEP—2020) represents a transformative reform in India's education system, aiming to meet the demands of the 21st century. It emphasizes experiential learning, vocational education, and technology integration to enhance critical thinking and equip graduates with industry-relevant skills. NEP-2020 focuses on early childhood care, personalized learning, and teacher training while envisioning a 5+3+3+4 education structure and increasing the Gross Enrollment Ratio to 50% by 2035. The policy seeks to nurture holistic development and create a skilled workforce. Approved by the Union Cabinet on July 29, 2020, NEP-2020 addresses the shortcomings of the existing system, emphasizing inclusivity, diversity, and ethical values. By promoting academic freedom, institutional autonomy, and accountability, NEP–2020 holds the promise of a brighter future, fostering innovation and empowering socially conscious individuals.

The policy was developed through an extensive consultative process, involving inputs from education experts, stakeholders, and the public. It aims to address the changing demands of the 21st-century world and align India's education system with global standards while preserving and promoting the country's cultural and traditional knowledge systems. The NEP- 2020 focuses on several key areas, including *early childhood education*, *school education*, *higher education*, *vocational education*, *teacher training*, and *technology integration*. It lays particular emphasis on promoting multidisciplinary and holistic learning, promoting creativity and critical thinking, and encouraging research and innovation.

The New Education Policy (NEP) 2020 outlines several key objectives with a specific focus on higher education. These objectives were formulated to address the challenges in the existing higher education system and to envision a more inclusive, innovative, and globally competitive landscape. The key objectives are:

Promoting Multidisciplinary Education: The NEP–2020 aims to promote multidisciplinary education in higher institutions, encouraging students to explore diverse subjects and disciplines. This approach is intended to foster critical thinking, creativity, and problem-solving abilities among students.

Increasing Gross Enrollment Ratio (GER) in Higher Education: The policy sets a goal to increase the Gross Enrollment Ratio in higher education to 50% by 2035. This objective seeks to expand access to higher education for a larger segment of the population and bridge existing gaps in enrollment rates.

Promoting Research and Innovation*:* NEP---2020 emphasizes the importance of research and innovation in higher education. The policy envisions the establishment of a National Research Foundation (NRF) to foster a culture of research and provide funding for high-quality research projects.

Ensuring Flexibility in Curriculum and Pedagogy: The policy advocates for a flexible curriculum and pedagogical approach that allows students to choose courses according to their interests and career aspirations. It also promotes the use of technology to enhance learning experiences.

Promoting Equity and Inclusion: NEP–2020 aims to promote equity and inclusion in higher education by providing special provisions for marginalized and underrepresented groups. It emphasizes the importance of scholarships and financial aid to support students from economically disadvantaged backgrounds.

The purpose of this thematic paper is to critically examine the impact of the National Education Policy

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on higher education in India. The paper aims to analyze and evaluate the key aspects of the policy that pertain to higher education, including governance, curriculum reforms, research, and access. It seeks to understand the potential opportunities and challenges presented by NEP-2020's implementation in the higher education sector.

The scope of the paper is to provide a comprehensive and evidence-based assessment of the policy's implications on higher education. It will draw on relevant research, official documents, and expert opinions to offer insights into the transformative changes envisaged by the NEP 2020. Additionally, the paper will explore potential avenues for successful implementation, taking into account the various challenges that may arise in the process. While the focus is on higher education, the paper acknowledges the interconnectedness of the education system as a whole and its potential impact on India's socioeconomic and intellectual growth.

Governance in Higher Education Under NEP- 2020

Governance in higher education under NEP 2020 is set to undergo significant changes. The policy proposes the establishment of the National Higher Education Regulatory Authority (NHERA) to streamline regulatory practices and grant greater autonomy to institutions. Moreover, it emphasizes the creation of multidisciplinary institutions to bridge the gap between specialized fields and encourage cross-disciplinary collaboration, fostering innovation and research initiatives. These governance reforms aim to create a more flexible and responsive higher education system, empowering institutions to adapt to changing needs and promoting academic excellence and accountability.

Under the New Education Policy (NEP) 2020, structural changes in the governance of higher education are proposed to bring about transformative improvements. One of the key proposals is the establishment of the National Higher Education Regulatory Authority (NHERA). NHERA is envisioned to be an overarching regulatory body that will replace multiple existing bodies, ensuring a more streamlined and efficient regulatory framework. This change aims to reduce bureaucratic hurdles and enhance institutional autonomy, allowing universities and colleges to make decisions more independently.

National Higher Education Regulatory Authority

The National Higher Education Regulatory Authority is a key component of India's New Education Policy 2020, aiming to transform higher education governance. It will replace multiple regulatory bodies, promoting institutional autonomy and transparency. NHERA's primary objective is to foster academic excellence, innovation, and research while maintaining quality standards. It will facilitate reforms, interdisciplinary collaboration, and industry-academia partnerships, empowering institutions to adapt to societal needs and enhance global competitiveness. NHERA's establishment is a crucial step towards realizing NEP 2020's vision of a dynamic and inclusive higher education landscape in India.

Multidisciplinary Institutions and their Implications

The New Education Policy 2020 emphasizes the establishment of multidisciplinary institutions in India's higher education system to promote integrated learning and cross-disciplinary collaboration. These institutions offer diverse academic disciplines, fostering innovative research and problem-solving skills among students and faculty. By providing a comprehensive and flexible learning experience, graduates can develop versatile skill sets aligned with the dynamic job market demands. NEP 2020 envisions nurturing creativity, critical thinking, and holistic understanding, contributing to the growth of a skilled and adaptable workforce driving India's progress on the global stage. The creation of multidisciplinary institutions is a key step towards fostering a future-ready and competitive higher education landscape in the country.

Autonomy and Accountability of Institutions

Under NEP 2020, higher education institutions in India are granted greater autonomy to make independent academic decisions, fostering innovation and academic freedom. However, with this autonomy comes the responsibility of being accountable for maintaining academic standards and quality. NEP 2020 emphasizes the need for transparent governance and rigorous quality assurance mechanisms. To ensure accountability, the policy proposes the establishment of the National

Higher Education Regulatory Authority (NHERA), which will monitor and evaluate institutional performance. NHERA's role is to strike a balance between institutional autonomy and maintaining quality standards, creating a higher education ecosystem that promotes academic excellence, flexibility, and societal relevance while upholding principles of transparency and accountability.

Curricular Reforms and Pedagogical Changes

Curricular reforms refer to systematic changes and improvements made to educational curricula to enhance learning outcomes and adapt to the evolving needs of students and society. These reforms often involve updating course content, introducing new teaching methodologies, and incorporating innovative technologies. Such changes aim to promote critical thinking, problem-solving, and practical skills development among students. These reforms have been advocated by educational experts and researchers as essential for improving the quality of education and preparing students for the challenges of the 21st century (Smith, 2018). They help bridge the gap between traditional educational practices and the demands of a rapidly changing world, fostering a more relevant and effective learning experience for students.

Curricular reforms have gained significant attention in recent years due to the changing dynamics of the job market and the increasing demand for a highly skilled and adaptable workforce. Researchers argue that traditional curricula may not adequately prepare students for the challenges posed by emerging technologies and complex global issues (Brown, 2020). As a result, educational institutions worldwide have initiated various reforms to foster creativity, collaboration, and interdisciplinary learning. These changes aim to equip students with the knowledge and skills necessary to thrive in a knowledge-based economy and address societal challenges effectively. Through continuous evaluation and improvement of curricula, educators strive to create a more inclusive, relevant, and future-oriented education system (Jones, et. al., 2022).

Pedagogical changes refer to innovative shifts in teaching methods and instructional approaches aimed at enhancing the learning process and improving student engagement and outcomes. These changes may include the integration of technology in classrooms, flipped learning, project-based learning, collaborative activities, and personalized instruction. Research shows that these pedagogical changes can foster critical thinking, creativity, and problem-solving skills among students (Johnson et al., 2019). Additionally, they can create a more student-centered learning environment, catering to individual needs and learning styles, ultimately leading to improved academic performance and higher levels of student motivation (Smith & Anderson, 2021). Embracing these pedagogical reforms is crucial for preparing students to thrive in a rapidly changing and technology-driven world.

Under the NEP---2020, curricular reforms and pedagogical changes in India's higher education system are proposed to foster a more flexible and interdisciplinary learning approach. The policy advocates for multidisciplinary education, integrating diverse disciplines, and promoting critical thinking. Additionally, it introduces the Academic Bank of Credits to enable credit transfer between institutions, experiential learning for practical knowledge, and the integration of vocational education with mainstream programs. These reforms aim to create a student-centric and dynamic higher education landscape that prepares learners with versatile skills for the demands of the 21st-century workforce.

- ***Shift towards a Multidisciplinary Approach***

  The New Education Policy (NEP) 2020 advocates a significant shift towards a multidisciplinary approach in India's higher education system. This transformative change aims to break down the traditional boundaries between academic disciplines and promote cross-disciplinary collaboration. Under the multidisciplinary approach, students are encouraged to explore diverse subjects and fields of study, allowing for a more holistic and integrated learning experience. This approach fosters critical thinking, creativity, and problem-solving skills by enabling students to draw insights from various domains. By nurturing a multidisciplinary mindset, NEP 2020 seeks to produce well-rounded graduates who can adapt to complex real-world challenges and contribute to innovative research and solutions across diverse sectors.

- ***The Academic Bank of Credit System***

  The Academic Bank of Credit (ABC) system is a key introduction under the New Education Policy (NEP) 2020 in India's higher education landscape. It is designed to revolutionize credit

transfer and accumulation mechanisms, providing students with greater flexibility in their educational pursuits. The ABC system allows students to earn credits for completing courses, which can be stored in a digital bank. These credits are transferable between institutions, enabling seamless mobility and recognition of learning achievements. The ABC system empowers learners to choose personalized learning pathways, promotes lifelong learning, and facilitates the recognition of skills and knowledge beyond traditional academic boundaries, contributing to a more dynamic and learner-centric higher education ecosystem.

The Academic Bank of Credit (ABC) system is an educational framework that allows students to accumulate and transfer credits earned from various courses, modules, or programs across multiple institutions. This system aims to promote flexibility and mobility in higher education, enabling students to tailor their learning pathways according to their individual interests and career goals. The ABC system facilitates seamless credit transfer and recognition, streamlining the process for students to pursue interdisciplinary studies and gain a comprehensive education (Johnson & Smith, 2018). Through the ABC system, students can have greater control over their learning journey, making education more accessible, efficient, and learner-centric.

- ***Promotion of Experiential and Vocational Learning***

  The promotion of experiential and vocational learning emphasizes the value of hands-on experiences and practical training in education. This approach integrates theoretical knowledge and practical applications, equipping students with job-relevant skills, and closing the gap between academia and the workforce. Research indicates that experiential and vocational learning can enhance student engagement, motivation, and employability (Brown & Johnson, 2017). By incorporating internships, apprenticeships, and industry partnerships, educational institutions can better prepare students for successful careers and foster a deeper understanding of their chosen fields.

  The New Education Policy (NEP) 2020 promotes experiential and vocational learning in India's higher education system. The policy emphasizes the integration of practical experiences and vocational skills within academic programs. By providing hands-on learning opportunities and industry exposure, NEP 2020 aims to bridge the gap between theoretical knowledge and real-world applications. This approach enhances students' employability and equips them with relevant skills for their chosen careers, fostering a more job-ready and skilled workforce.

- ***Integration of Technology in Pedagogy***

  The integration of technology in pedagogy refers to the incorporation of digital tools, applications, and resources into the teaching and learning process. This approach aims to enhance educational experiences, promote active engagement, and support personalized learning. Research shows that technology integration can improve student motivation and academic achievement while also equipping them with essential digital skills for the modern world (Johnson & Smith, 2020). The integration of technology in pedagogy has revolutionized the educational landscape, offering diverse opportunities for innovative and interactive learning experiences. Digital tools such as virtual simulations, educational apps, and online collaboration platforms have been shown to foster critical thinking, problem-solving, and creativity among students (Garcia, et. al., 2022). Additionally, technology enables educators to differentiate instruction and cater to individual learning needs, promoting personalized learning pathways. Embracing technology in pedagogy can lead to improved learning outcomes and better preparation of students for the digital era.

  NEP–2020 emphasizes the integration of technology in pedagogy to enhance teaching and learning processes. By leveraging digital tools and online platforms, the policy aims to create a more interactive and engaging learning environment. Technology integration facilitates personalized learning, access to resources, and collaboration, empowering students and educators with innovative teaching methodologies for better educational outcomes.

Research and Innovation in Higher Education

Research and innovation in higher education play a crucial role in advancing knowledge, driving

economic growth, and addressing societal challenges. Universities and higher education institutions serve as hubs for research activities, fostering cutting-edge discoveries and technological advancements. Through research, faculty and students contribute to the development of new ideas and solutions, enriching academic disciplines and promoting critical thinking. Additionally, a culture of innovation encourages creativity and entrepreneurship, preparing students for a rapidly evolving job market (Smith & Johnson, 2019).

- ***Strengthening Research Infrastructure and Funding***

  Under NEP 2020, there is a focus on strengthening research infrastructure and funding in India's higher education system. The policy aims to enhance the research ecosystem by providing adequate resources and funding support to universities and research institutions. By investing in research infrastructure and funding, NEP 2020 aims to promote high-quality research, encourage innovation, and elevate India's standing in the global research community, contributing to the nation's socio-economic development and knowledge advancement.

- ***Encouraging Collaboration Between Academia and Industry***

  Encouraging collaboration between academia and industry is essential for fostering innovation, enhancing research outcomes, and bridging the gap between theoretical knowledge and practical applications. Through strong partnerships, universities gain access to real-world challenges and industry expertise, while industries benefit from the latest research findings and a skilled talent pool. Initiatives like joint research projects, internships, and industry-sponsored programs provide valuable experiential learning opportunities for students. NEP 2020 in India recognizes the significance of industry-academia partnerships and promotes collaborative efforts to align academic endeavors with industry needs. This facilitates knowledge transfer, and skill development, and creates a more relevant and application-oriented higher education system.

- ***Focus on Indigenous Knowledge Systems and Languages***

  Modern education systems, including India's NEP 2020, recognize the significance of integrating indigenous knowledge systems and preserving native languages. By incorporating traditional knowledge, practices, and languages of local communities, education becomes more culturally relevant and inclusive. This approach enhances students' sense of identity and appreciation for indigenous cultures. NEP 2020 emphasizes the inclusion of indigenous knowledge in the curriculum and promotes the use of local languages in early education. By celebrating and preserving India's linguistic diversity, the policy fosters cultural identity and pride among students while ensuring a more contextually relevant and inclusive educational experience. The focus on indigenous knowledge systems and languages in education is essential for preserving cultural heritage, promoting inclusivity, and fostering a sense of identity among indigenous communities (UNESCO, 2020).

- ***Promoting Innovation and Entrepreneurship***

  NEP 2020 places a strong emphasis on promoting innovation and entrepreneurship in India's higher education system. The policy encourages universities and colleges to foster an entrepreneurial spirit among students, providing them with opportunities to explore and develop innovative ideas. By supporting startup incubators, technology parks, and industry collaborations, NEP 2020 aims to create an ecosystem that *nurtures creativity, problem-solving, and risk-taking*. This focus on innovation and entrepreneurship prepares students to become job creators rather than just job seekers, contributing to economic growth and societal development.

Enhancing Access and Inclusivity

NEP 2020 aims to enhance access and inclusivity in India's higher education. The policy focuses on increasing the Gross Enrollment Ratio (GER) by providing equitable opportunities for all segments of society, including marginalized communities. It offers scholarships, financial support, and special provisions to ensure that talent and merit, rather than economic constraints, determine educational pursuits, fostering a more inclusive and diverse higher education landscape.

The National Education Policy (NEP)–2020 in India focuses on key aspects to enhance higher education accessibility and quality:

- Firstly, it targets the Gross Enrollment Ratio (GER) in higher education, aiming for a 50% enrollment rate by 2035. To achieve this, NEP 2020 advocates for multidisciplinary institutions, online learning options, and expanding educational institutions across regions.
- Secondly, the policy addresses educational disparities among marginalized and underrepresented groups by providing targeted support, scholarships, and financial aid. This approach ensures equitable opportunities for economically disadvantaged backgrounds, scheduled castes, scheduled tribes, and marginalized communities, fostering social inclusion and development.
- Thirdly, NEP 2020 emphasizes scholarships and financial assistance to students, particularly those facing economic challenges. The policy envisions a learning environment where talent and merit drive educational pursuits, regardless of financial limitations, nurturing diversity and inclusivity.
- Lastly, NEP 2020 underscores gender equality in higher education, advocating for inclusive and safe spaces for female students and faculty. The policy aims to remove gender-based barriers and biases, empowering women to actively engage in all fields of study, research, and societal growth.

Collectively, NEP 2020 strives for an education system that ensures equal access, empowers marginalized groups, supports students financially, and promotes gender parity. By addressing these critical dimensions, the policy aims to create a holistic and inclusive higher education landscape in India.

Threats to Implementing NEP–2020 in Higher Education

The implementation of NEP–2020 in higher education faces several challenges. Resistance to change from stakeholders, including institutions and administrators, may hinder the smooth adoption of new policies. Additionally, the requirement for significant infrastructure development and financial resources poses a hurdle. Faculty development and training are also essential to align with the policy's objectives. Striking a balance between regional diversity and implementing standardized reforms is crucial. Overcoming these challenges requires careful planning, collaboration, and continuous evaluation to ensure the successful realization of NEP 2020's transformative vision for higher education in India. The Implementation of NEP 2020 in Higher Education in India Faces Several Challenges.

- ***Firstly*****,** resistance to change from stakeholders such as educational institutions, faculty, and administrators can impede the adoption of new policies and practices. Overcoming this resistance requires effective communication and support to address concerns and gain buy-in.
- ***Secondly*****,** inadequate infrastructure and resource limitations pose a hurdle. The policy's goals may be hindered by budget constraints and logistical issues, necessitating proper funding and resource allocation to ensure its successful execution.
- ***Thirdly*****,** faculty development and capacity building are crucial. Faculty members must be equipped with the skills to align with NEP's new pedagogical approaches and multidisciplinary focus. Continuous training and professional development are essential to deliver innovative and student-centric learning experiences.
- ***Lastly*****,** balancing India's regional and cultural diversity is challenging. Adapting the policy to cater to different regions while maintaining standardized practices requires careful consideration of local contexts. This ensures that the policy's benefits are accessible across the nation.

Addressing these challenges is vital to successfully implementing NEP–2020 and achieving its goals of transforming higher education in India. It requires collaborative efforts, adequate resources, and a nuanced approach that accommodates both national and local needs.

Opportunities and Future Prospects

The UNESCO report "Reimagining Our Future Together: A New Social Contract for Education" envisions a *transformative framework for education, emphasizing equity, inclusivity, and adaptability*. It underscores the need to redefine education in the face of evolving challenges, such as *technological advancements, climate change, and social inequalities.* The report advocates for a renewed *social contract that prioritizes lifelong learning, promotes digital literacy, and supports marginalized communities.* It emphasizes collaborative efforts among governments, educators, and civil society to foster innovation and sustainable development. By centering on holistic education that nurtures critical thinking, empathy,

and global citizenship, the report envisions a future where education becomes a driving force for positive societal change and empowers individuals to thrive in an interconnected world.

The World Education Forum's Education 4.0 report presents promising opportunities and future prospects for global education. It envisions harnessing the potential of the fourth industrial revolution to reshape learning methodologies and prepare students for a rapidly changing world. The report highlights the chance to integrate advanced technologies like *AI, virtual reality, and online platforms, enhancing educational quality and accessibility.* It emphasizes fostering critical skills such as problem-solving and creativity, empowering learners to thrive in the evolving job market. Moreover, the report underscores the role of collaboration between academia, industry, and policymakers to drive innovative reforms. By embracing these opportunities, Education 4.0 has the potential to revolutionize education, producing skilled individuals capable of navigating and contributing to a dynamic and interconnected global society.

The UNESCO report "Reimagining Our Future Together: A New Social Contract for Education" and the World Education Forum's Education 4.0 report share common themes and opportunities with India's National Education Policy (NEP) 2020.

All three reports underscore the need for education to adapt to the demands of the modern world, marked by technological advancements and evolving societal needs. They emphasize the importance of a holistic and learner-centered approach that prioritizes critical thinking, problem-solving, and adaptability. The reports advocate for equitable access to quality education, addressing disparities among marginalized and underrepresented groups. They also highlight the role of technology in enhancing educational experiences and fostering lifelong learning.

The NEP–2020 similarly aims to transform education in India by *promoting experiential learning, multidisciplinary education, and technology integration.* It also focuses on *expanding access to education, offering scholarships, and fostering gender equality.*

Overall, these reports collectively advocate for a paradigm shift *in education towards inclusivity, innovation, and relevance to prepare individuals* for a rapidly changing world.

Policy NEP-2020 presents immense opportunities and promising future prospects for India's higher education system. The emphasis on multidisciplinary education, experiential learning, and technology integration can produce a skilled and adaptable workforce. Strengthening research infrastructure and promoting industry-academia collaborations can spur innovation and boost India's research output. By enhancing access, inclusivity, and gender equality, NEP 2020 can empower diverse talents and foster a more equitable society. Successfully implementing the policy will pave the way for a vibrant, globally competitive higher education landscape, contributing to India's socio-economic growth and intellectual advancement.

- ***Global Recognition and Competitiveness of Indian Higher Education***

  This policy has the potential to enhance global recognition and competitiveness of Indian higher education. By promoting interdisciplinary learning, research excellence, and industry collaboration, Indian institutions can produce graduates with diverse skill sets, making them more competitive in the global job market. The policy's focus on innovation and inclusivity can attract international students and researchers, bolstering India's reputation as a knowledge hub on the global stage.

- ***The Synergy between Research, Education, and Innovation***

  NEP 2020 fosters synergy between research, education, and innovation in India's higher education. By integrating research into the education process and promoting an innovation-driven curriculum, the policy aims to create a dynamic ecosystem that nurtures creativity and problem-solving. This synergy ensures that academic pursuits are relevant and impactful, and contribute to societal progress. The synergy between research, education, and innovation is crucial for driving societal progress and economic growth (European Commission, 2018). By integrating research findings into education, universities can provide cutting-edge knowledge to students, fostering a culture of innovation that leads to the development of new ideas and technologies with real-world impact.

- ***Nurturing Critical Thinking and Problem-Solving Skills***

  NEP–2020 aims to nurture critical thinking and

problem-solving skills in higher education. By promoting experiential learning, interdisciplinary approaches, and research-driven education, the policy encourages students to think critically, analyze information, and apply knowledge to real-world challenges. This emphasis prepares graduates to be adaptable and effective problem solvers in diverse contexts.

- ***Fostering International Collaborations***

  NEP–2020 seeks to foster international collaborations in India's higher education system. The policy encourages universities and institutions to establish partnerships with global counterparts for research projects, student exchanges, and faculty collaborations. By promoting international exposure and knowledge sharing, NEP 2020 aims to enrich the learning experience, promote cross-cultural understanding, and elevate India's position in the global academic community. Fostering international collaborations is vital for creating a global knowledge exchange, promoting cultural understanding, and addressing complex global challenges (British Council, n.d.). Collaborations between institutions from different countries enable the sharing of expertise, resources, and perspectives, enriching research and educational experiences for all involved.

Conclusion

The National Education Policy (NEP) 2020 signifies a transformative phase for higher education in India, aimed at aligning the system with 21st-century demands. NEP prioritizes experiential learning, vocational education, and technology integration to cultivate critical thinking, creativity, and problem-solving skills. It emphasizes research, innovation, and industry-academia collaboration, envisioning autonomy, accessibility, and inclusivity. Despite challenges like resistance to change and infrastructure limitations, NEP 2020 offers substantial opportunities. It can bolster India's global recognition, competitiveness, and research output by fostering international collaborations and promoting innovation. NEP's successful implementation promises a more inclusive and brighter future for Indian higher education, aligning with multidisciplinary development and producing socially conscious global citizens.

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A Ray of Hope against Menace of Ragging

Digvijay Singh*

After a push from the Apex Court from time to time, the University Grants Commission (UGC) now believes in the popular aphorism that 'prevention is better than cure' to curb the menace of ragging. Since 1999, it has recommended and adopted multiple preventive measures to curb ragging. As a step further, it has recently decided to observe 'Ant-Ragging Day' on 12th August every year followed by a celebration of 'Anti-Ragging Week' from 12-18 August to increase awareness against ragging (UGC, 2023).[1] On the other hand, with the admissions in the new academic session, some of the Higher Education Institutions (HEIs) are grappling with the incidents of ragging. The recent serious incidents of ragging in Jadavpur University and Kakatiya Medical College are a few examples that have again shocked many HEIs of the country. Besides psychological effects, the severe form of ragging results in sexual assault, sexual harassment, suicide, or death of the victims, which are dealt with under various criminal laws. This is resulting in gross violations of the human rights of the students on HEI campuses. The issue becomes more serious when we come across the fact that a total of 25 students have committed suicide in the last five years due to incidents of ragging.[2]

The HEIs are increasingly witnessing sexual abuse of students, as one of the severest forms of ragging. In Jadavpur University, a few students including former students are booked *inter alia*, under the Prevention of Children from Sexual Offences Act, 2012 (POCSO). The POCSO protects children from sexual assault, sexual harassment, and pornography and establishes special courts for the trial of such offenses. In its forty-six-page report, the Internal Complaints Committee of Jadavpur University has found an incident of 'utter humiliation' with the deceased student.[3] Last year a few students were also booked under POCSO for ragging a female student in a Government College in the Ganjam district of Odisha.

Chronology of Preventive Measures

A serious note on ragging was first taken by the UGC when the Apex Court directed it to take proactive measures to curb the menace of ragging in a writ petition filed by the *Vishwa Jagriti Mission* in the year 1999. The case was finally decided by the Court in the year 2001.[4] It opined that "the incidents of ragging have crossed the limits of decency, morality, and humanity." The Court issued detailed guidelines to curb the menace of ragging and suggested that "the movement should be initiated by the institutions right from the time of advertisement for admissions." In the light of the Court's guidelines, a Committee was constituted by UGC under the Chairmanship of Prof. K.P.S. Unni, who was the former registrar of Jawaharlal Nehru University, New Delhi (UGC, 1999). The Committee submitted its report in the same year and observed that negative manifestations of ragging had become more prevalent and thus, recommended a model based on Prohibition, Prevention, and Punishment (PPP) approach to deal with the menace.

The Committee was of the opinion that "ragging has both positive and negative manifestations and over the years the word ceased to denote the healthy practice and has acquired negative connotations and notoriety." It defines ragging as "the acts of teasing, taunting, playing a practical joke upon someone or holding comic parades and other activities during a certain period of a college term to raise money for charity."[5] UGC circulated the Guidelines and Report to all the HEIs for compliance and necessary action (UGC, 1999).

It opined that nowadays, ragging may include "display of noisy, disorderly conduct, teasing, excitement by rough or rude treatment or handling, indulging in rowdy, indiscipline activities which cause or likely to cause annoyance, undue hardship, physical or psychological harm or raise apprehension or fear in a fresher, or asking the students to do any act or perform something which such a student will not do in the ordinary course and which causes him/her shame or embarrassment or danger to his/her life." The Committee also identified different forms and causes of ragging; and vulnerable locations for ragging in and outside the campus of HEIs. The Committee believed that the increasing politicization of educational institutions and the resultant erosion of standards of behavior amongst students is one of the

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major causes of increasing incidents of ragging. The same is also evident in the recent incident of ragging at Jadavpur University.

It is also pertinent to mention here that a few states have enacted their own separate laws to curb the menace of ragging in educational institutions established under their authority and control. Karnataka, Tripura, Andhra Pradesh, Tamil Nadu, Kerala, Assam, and Maharashtra have passed their own laws to curb the menace of ragging even before any initiatives taken by UGC. On the other hand, West Bengal, Himachal Pradesh, Uttar Pradesh Goa, Jammu, and Kashmir have passed laws to strictly deal with the menace of ragging after the UGC Regulations on Curbing the Menace of Ragging in Higher Education Institutions, 2009.

Serious View of Apex Court

In 2006, the Apex Court in *University of Kerala* v. *Council, Principals' Colleges, Kerla*[6] expressed its dismay that despite the concern shown in *Vishwa Jagriti Mission* case "practically very little has been done to prevent the menace of ragging in educational institutions". While taking serious note of the issue the court directed that "in the prospectus of the higher educational institutions it should be mentioned that if any incident of ragging comes to the notice of the authority concerned, the accused student will be given the opportunity to explain and if his explanation is not satisfactory the authority would expel him from the institution." The requirement of giving opportunity is basically to confirm the 'Principles of Natural Justice'. The Court constituted a committee headed by Shri R.K. Raghavan, former director of the Central Bureau of Investigation (CBI) to recommend "how the provisions already enacted in several states and statutes to be framed to prevent the menace, can effectively eliminate the menace." In its first report, the committee suggested certain measures to be taken by the educational institution including mandatory submission of undertaking. The Apex Court directed to implementation of the recommendations of the Committee on ragging and of the Lyngdoh Committee on elections to student unions.

In the second report, the Committee took stock of the situation and reviewed the progress made by different authorities. In the third report, the Committee expressed its disappointment over the helplessness shown by the regulatory bodies and directed educational institutions (through the regulatory agencies) to incorporate in their admission notices/ advertisements appropriate messages regarding 'Zero Tolerance' towards ragging (Raghavan Committee, 2006). The Apex Court accepted that "Ragging is a systematized form of human rights abuse as embodied under the Constitution of India….. Over the years in all over the world and especially in South Asia, the practice of 'Ragging' has come to be meant as an extreme 'harassment', 'terror' and even 'physical and mental torture' of freshers." In 2008, the UGC communicated the directions of the Committee to all the regulatory bodies across the country that "the Universities/Colleges should mention in their prospectus/brochure that the total number of 'Ragging Incidents' taken place in their institution in each year for the information of the public." It is submitted that an institution may not prefer to disclose such an incident in a brochure due to the fear of its public image. One may hardly find any mention of such an incident in the brochure of any institution in the country. Institutions, which are very cautious about their public image in competitive environments will surely manage to skip this requirement. However, the disclosure of such incidents in the prospectus may be ensured by making a key indicator under suitable criteria with certain weightage and assessed by the National Assessment and Accreditation Council (NAAC).

Proactive Move of UGC

Finally, the UGC Regulations on Curbing the Menace of Ragging in Higher Education Institutions, 2009 was adopted with the ambitious objective to "root out ragging in all its forms from educational institutions…..". To fulfill the above objective, it again relied on the PPP model as recommended by Unny Committee in 1999. It gives meaning to the term 'ragging' basically based on the definition of Unny Committee. It is conducted including rowdy or undiscipline activities having the effect of teasing, treating, or handling the rudeness of other students, which causes psychological harm or raises fear. Punishable ingredients of ragging are also covered under the criminal laws of the country. Such conduct may tend to establish supremacy over other students or get some political advantage. The Regulations ask all the educational institutions in the country to strictly observe the provisions of any law dealing with ragging. It further considers ragging at par with the offense of rape and atrocities against Schedule

Cast and Schedule Tribe and made it a cognizable offense. The measures for prevention, prohibition, and punishment of ragging under the regulation start with notification of admission in educational institutions (UGC, 2009).

The title of the regulation was further changed to "Curbing the Menace of Ragging in Higher Education Institution Regulations" in 2012. Further, a new definition of ragging was inserted in the Regulations in 2016. It is now defined as "any act of physical or mental abuse (including bullying and exclusion) targeted at another student (fresher or otherwise) on the ground of colour, race, religion, caste, ethnicity, gender (including transgender), sexual orientation, appearance, nationality, regional origins, linguistic identity, place of birth, place of residence or economic background." The new definition of ragging seems more comprehensive and wider in its ambit. It may include any act which results in physical or mental abuse of any student by another student.

In 2017, the UGC launched the Anti-Ragging mobile app as a handy tool to facilitate easy reporting of incidents of ragging by the students directly to the UGC. Again in 2018, the UGC requested all the HEIs to set up an anti-ragging mechanism by establishing anti-ragging cells, committees, and squad, adequate publicity through different media, displaying anti-ragging boards at prominent places, and installing CCTV cameras at vital points in campuses. To help distressed students it also launched the National Anti-Ragging Helpline and appointed a monitoring agency called *Aman Satya Kachroo* Trust (UGC, 2017).

UGC released the Information Education Communication (IEC) Guidelines on Curbing the Menace of Ragging, in 2022 and adopted a zero-tolerance policy. It believes that "no act of ragging, major or minor, shall go unnoticed. No trigger, male or female, student, or non-student, shall go unpunished. No institution that fails to take action against ragging shall be allowed to operate." It has established a monitoring agency called Centre for Youth (C4Y). The agency started working on April 01, 2022, to support the National Ragging Prevention Programme in the country. Different councils and regulatory bodies are making collaborative efforts with UGC to address the menace of ragging (UGC, 2022).

Recently, the UGC again asked HEIs to take proactive measures to make campuses ragging-free.[7] As per the view of UGC, Jadavpur University failed to take proactive measures on the university premises. It has mandatorily recommended basic measures including publicity of anti-ragging measures and details of concerned authorities, anti-ragging warning in the admission prospectus, E-admission booklet/E-leaflets giving details on guidance in case of ragging, and installing CCTV cameras at vital points. It has also recommended counseling and monitoring measures to detect early signs of ragging and its identification and surprise inspection at various places. The counselling of students to detect early signs of ragging may be well implemented through a mentor-mentee system. In this system allotted mentor should regularly interact with allotted mentees (newly enrolled students) to detect any such signs. It will also boost the confidence of new students and will develop a sense of belongingness. Additional weightage to key indicators relating to the mentor-mentee system under criterion 2 of NAAC should be given if it detects and records any early signs of ragging.

Ray of Hope

The celebration of Anti-Ragging Day and Week in August 2023, which obviously did not yield good results the first time due to the ongoing admission of new students, is a good start to channeling all the directives and regulations in one place. The Nodal Offices established in different HEIs may play an instrumental role in creating awareness amongst students about ragging and its negative impact in years to come. Nodal Offices should celebrate Anti-Ragging Day and Anti-Ragging Week every year with full potential and maximum participation of students should also be ensured to make it successful. It may be a ray of hope to completely eradicate the menace of ragging from educational institutions.

Endnotes

1. UGC Letter No. D.O.No.F.1-74/2016(ARC), dated July 5, 2023.
2. Reported in *the Hindu* on 18 August, 2023.
3. Reported in *the Hindu* on 21 September, 2023.
4. *Vishwa Jagriti Mission through President* v. *Central Government through Cabinet Secretary & Ors.,* AIR 2001 SC 2793.
5. The Report of the Committee Constituted by the University Grants Commission to Frame Guidelines to Curb the Menace of Ragging in Universities/Educational Institutions, 1999, Clause 1.
6. (2009) 7 SCC 726.
7. D.O. Ito.1-1Sl2OO9 (ARC) pt.III, 24 May, 2023. ❑

STEM in Higher Education in India: How Far We Are?

Kushagri Singh* and Deepty Gupta**

Science, Technology, Engineering, and Mathematics (STEM) disciplines and skills are integrated in the teaching and learning process known as STEM education. It attempts to encourage students' capacity for problem-solving, research, exploratory learning, and critical thought. Additionally, it makes them ready for the benefits and difficulties of a knowledge-based, globalised society (1).

Any subject can benefit from STEM education, which also helps kids become more enthusiastic and prepared for college and careers (1). Nevertheless, not everyone has access to or opportunities for STEM education, particularly in terms of wealth, colour, ethnicity, or gender. In addition, attempts to reform STEM higher education should pay more attention to diversity, equity, inclusion, and theoretical coherence (2).

STEM Education Status Globally

While the state of STEM education differs by nation and location, there are certain general trends and difficulties. Research in STEM education is becoming more important globally, and the identities of STEM education journals are getting more distinct over time, according to a survey of 798 articles in 36 journals. Access, equity, quality, and the applicability of STEM education in many contexts are challenges as well, though (3).

To fulfill the demand for a trained workforce and to promote innovation, certain nations have made significant investments in STEM education. For instance, China has been developing its STEM education system and is the country that produces the most STEM graduates overall. Through a few programmes, including the STEAM (Science, Technology, Engineering, Arts, and Mathematics) movement, which strives to include creativity and the humanities into STEM instruction, South Korea has also been pushing STEM education.

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Other nations have had trouble drawing in and keeping STEM students, particularly among women and minority groups. For instance, the US has lagged behind other nations in STEM participation and skill, particularly in engineering and computer science. Additionally, there is a lack of diversity among STEM students and professionals in the UK (4). For students who desire to pursue STEM-related studies overseas, there are numerous options. The top study-abroad opportunities for STEM majors include the following:

- DIS Copenhagen: Science & Health
- CIEE Global Institute: Open Campus Block Program
- SIT Study Abroad: Climate Change & The Arctic
- IES Abroad: Engineering & Society
- Arcadia University: STEM Summer Research
- University of Auckland: Direct Enrollment
- University of Cape Town: Semester Exchange
- University of Sydney: Direct Enrollment

The courses, research projects, internships, field excursions, and cultural activities that are available through these programmes can enhance your STEM education and extend your view of the world.

STEM Courses Offered by Different Universities in Higher Education

STEM programmes offer instruction in science, technology, engineering, and mathematics. They may be accessible to students pursuing bachelor's, master's, or doctorate degrees in higher education. Numerous subjects, including astronomy, computer science, engineering, chemistry, physics, biology, and others, can be covered in STEM courses. Depending on their staff, resources, interests in certain areas of study, and student demand, different universities may offer a variety of STEM courses. Harvard University, Stanford University, MIT, Caltech, Oxford University, Cambridge University, ETH Zurich, and other premier colleges throughout the globe provide STEM courses (5). Popular STEM programmes that students select for their international studies include:

Computer Science

This course examines both the theory and practice of computers, including software engineering, artificial intelligence, machine learning, and cybersecurity. It also covers topics like programming languages, algorithms, data structures, and cybersecurity.

Engineering

The use of science and mathematics in the design, construction, and operation of systems, machines, structures, and processes is covered in this subject. Engineering has several subfields, including civil, mechanical, electrical, chemical, biomedical, aerospace, and others.

Mathematics

The study of numbers, patterns, forms, logic, and abstract ideas is covered in this course. Mathematics is used in modeling, statistics, optimisation, cryptography, and many other areas of science and industry.

Chemistry

The study of matter and its interactions at the atomic and molecular levels is covered in this course. Numerous branches of science and technology, including biochemistry, pharmacology, nanotechnology, materials science, etc., involve chemistry. The study of nature and its phenomena of various sizes is covered in the physics course. Understanding mechanics, thermodynamics, electromagnetic, optics, quantum mechanics, relativity, etc. requires a solid foundation in physics.

Biology

The numerous facets of studying life and living things are covered in this subject. Numerous scientific and technological domains, including biotechnology, genetics, ecology, neuroscience, and others, are impacted by biology (5,6).

Current Scenario of STEM Education in Indian Higher Education

The current state of STEM education in Indian higher education is as follows:

- As a means of fostering student achievement, creativity, and employability, STEM education is increasing prominence and popularity among students, instructors, and policymakers.
- Several programmes and organisations support STEM education, including the STEM India Foundation, which aims to give instructors and students direction, resources, and chances to come up with ideas and develop in STEM fields.
- A number of major corporations, including FORD and Maruti Suzuki, support STEM initiatives and programmes through their CSR initiatives, such as Robo Shiksha Kendra, which gives poor youngsters hands-on robotics training.
- STEM education aligns with the National Education Policy 2020, which acknowledges the need for a framework that fosters students' creativity, hands-on learning, and critical thinking.
- Technology and ed-tech platforms are enabling interactive, experiential, and personalised learning for students in rural and urban regions, and STEM education is developing as a result.
- STEM education confronts a few obstacles, including those related to accessibility, fairness, quality, and relevance in various contexts, as well as the need for more qualified teachers, infrastructure, curriculum, and STEM-related assessment (7-9).

Drawbacks Associated with STEM Education in Indian Higher Education

Some of the drawbacks associated with STEM education in Indian higher education are:

- Socio-economic issues: Especially in rural and isolated locations, many Indian students have social and economic issues that restrict their access to and opportunities for STEM education.
- High-quality infrastructure: Many educational institutions lack or use obsolete labs, equipment, tools, and resources, which are necessary for STEM instruction.
- Keeping up with scientific progress: It can be difficult for educators and curriculum authors to keep STEM education current and relevant to the newest advancements and innovations in science and technology.
- There are no definite rules or requirements: The area of STEM education is wide and interdisciplinary, and there is no standard definition or structure that applies to all institutions and educational levels.

- Less emphasis on other courses: STEM education may minimise or disregard other crucial topics, such as the humanities, social sciences, and languages, which are as crucial for a well-rounded education (10-15).

Promoting STEM Education in Indian Higher Education

STEM education should be promoted in Indian higher education because it:

- Fosters more critical thinking, problem-solving, and creativity in students
- Encourages them to think critically and apply their knowledge to real-world situations
- Helps them think logically and make better decisions in the future
- Teaches students skills and professionalism in the early stages of education
- Establishes the foundation of STEM in Indian higher education
- Is committed to giving students the knowledge and abilities they need to excel in the twenty-first century

Because India has one of the largest higher education systems in the world and ranks second in terms of the higher education network, STEM education is also vital for India. However, there are concerns regarding STEM education's accessibility, fairness, relevance, and quality in various contexts. As a result, STEM education can aid in closing these disparities and raise the bar for higher education in India (16).

STEM Education Initiatives in India

The following are a few instances of STEM education programmes in India:

- Atal Tinkering Labs (ATL): This government programme intends to establish a network of innovation labs in schools across the nation where kids may access tools, mentors, and resources for working on STEM projects and acquiring 21st-century skills.
- STEM Learning: Through small scientific centres, maker spaces, robotics kits, and teacher preparation initiatives, this social company educates underprivileged kids in STEM fields in both rural and urban settings.
- STEMROBO Technologies is an educational technology company that provides competitions, coding platforms, robotics kits, and online courses to schools and students.
- Deeksha STEM is an educational technology startup that offers online courses, live sessions, practical activities, and examinations to students in grades 8 through 12.
- Covestro India STEM Education: Through scholarships, mentoring, and experience trips, this prominent polymer company's CSR effort helps impoverished girls in Maharashtra and Gujarat pursue STEM degrees.
- IBM STEM for Girls in India: Through digital platforms, hands-on learning, career counselling, and role models, the multinational technology corporation IBM India supports STEM education for girls in 10 states. Through interactive workshops, online courses, and mentorship programmes, the Girls 4 Tech Programme from Mastercard, a renowned payment firm, supports STEM education for females worldwide.
- Cisco's Girls Power Tech programme: This is a global programme by Cisco, a well-known networking corporation, to support STEM education for women through online meetings, in-person visits, and career counselling from Cisco staff members.

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Themes/Subthemes for the Special Issues of University News-2023-24

S. No.	Zonal Vice Chancellors' Meets-2023-24	Theme/ Subthemes for Special Issues	Last Date to Contribute	Date of Publication
1.	**West Zone**	**Future of Work and Skill Development** *Subthemes* • Sustainable Careers: Navigating a Dynamic Workplace • Human-centered Skills in a Tech-driven World: Soft Skills and Emotional Intelligence • Resilience & Adaptability: Impact of Gig Economy on Higher Education	**December 04, 2023**	December 18-24, 2023
2.	**Central Zone**	**Nurturing Research and Innovation Ecosystem** *Subthemes* • Collaborative Research Networks: Fostering Inter-disciplinary Research • Entrepreneurship and Innovation: From Idea to Impact • Innovative Funding Models for Research	**January 01, 2024**	January 15-21, 2024
3.	**North Zone**	**Globalization and Internationalization of Higher Education** *Subthemes* • International Collaborations and Partnerships: Building Bridges for Higher Education • Global Higher Education Policy and Regulation: Harmonizing Standards • Student Mobility and Diversity: Enhancing International Experience	**January 31, 2024**	February 12-18, 2024

*The Articles may be submitted to The Editor, University News, Association of Indian Universities, New Delhi through E-mail: *ramapani.universitynews@gmail.com* and *universitynews@aiu.ac.in* on or before the last date mentioned above.

Horticulture: The Key Booster of Country's Economy

S Abdul Nazeer, Hon'ble Governor of Andhra Pradesh and Chancellor, Dr. Y S R Horticultural University, Venkataramannagudem, Andhra Pradesh delivered the 5th Convocation Ceremony of the Dr. Y S R Horticultural University, Venkataramannagudem, Andhra Pradesh on May 12, 2023. He said, "The changing scenario driven by globalization, climate change, and dwindling natural resources demands quality and competitive education as well as research, to meet the International standards and develop climate-resilient technologies to make horticulture more profitable. The knowledge with which you would be leaving the university would serve you as the fundamental mandate in your life. I wish you to have a passionate pursuit of excellence with a human touch. Society has high hopes for you to make horticulture a viable and profitable sector." Excerpts

The prestigious national and State-level awards won by the university, such as Best performing AICRP Centre on Biological Control, Andhra Pradesh State Bio-diversity Conservation Award, Best Extension Education Institute Award, Excellence in Skill Development Award and various awards received by the faculty and students for their excellence are a testimony of the concerted efforts of the institute.

Even though achievements of farm scientists are commendable, it is a fact that the benefits of breakthroughs made in this sector are reaching the farming community with a considerable time lag, that too only in small measure. The conventional systems of delivery and extension need to be revolutionized utilizing latest Information and Communication technologies. There is a need to invigorate farm research to cater the needs of farmers and to bring about good crop husbandry practices so that a residue free produce is made available to the consumer.

Developments in the dry regions often reflect the pervasiveness of poverty as demonstrated by growing constraints of water, land degradation, migration due to frequent droughts, malnutrition etc. which are of great concern. Technologies need to be developed to bring large areas of marginal lands in arid and semi-arid regions under cultivation. The perennial horticultural crops which are more remunerative and appear to be the best option for replacing subsistence-farming and to alleviate poverty and malnutrition in arid ecosystem.

Farm mechanization which could bring substantial improvements in productivity is constrained with fragmentation of agricultural holdings. Realizing the challenges, the overall development of horticulture thus requires synergy among the technologies, input supplies, marketing system, credit policies and institutions. The Indian farmers deserve appreciation for making the nation self-sufficient as they have shown resilience in farming, in the face of uncertain monsoons, increased input costs, biotic and abiotic stresses, market competition with farm gate prices continuing to be static.

The university's growth is measured not in terms of mere numbers, but in terms of quality education, research and extension for the noble cause of serving farmers. Though young, the Horticultural University has made vital contributions in increasing productivity and combating biotic and abiotic stresses with its new varieties and technologies. However, there is no room for complacency and Horticultural University should become a vibrant hub at the cutting edge of research, working in close coordination with the farming community by offering them time bound and cost-effective solutions. Technology development, and providing solutions to the field problems, using indigenous technologies with refinement should be the ultimate goal of the university. Research on post-harvest management including processing and value addition should be given top priority. Innovations in mechanization, digitalization of services, protected cultivation, organic production and crop diversification deserve emphasis and attention. Hopefully, the university will focus on target-oriented, location-specific and market-driven research, as well as efficient technology transfer, to benefit all stakeholders of horticulture.

The changing scenario driven by globalization, climate change and dwindling natural resources demand quality and competitive education as well as research, to meet International standards and develop climate resilient technologies to make horticulture more profitable.

My advice to the University is to implement

the New Education Policy in the right spirit to ensure quality education and better career and entrepreneurial opportunities for the students. I suggest the university to design course curriculum in line with the requirements of the industry and other stakeholders.

I congratulate the students who have received medals and awards for their academic distinction. Above all, I would like to commend the graduating class of Dr. Y.S.R. Horticultural University for having chosen horticulture as a career, which is also going to be a way of life. You have the great privilege of staying close to a sector which is the heart beat of the nation. The experiences ahead of you would be sufficiently rewarding to compensate the challenges and hardships you have gone through during your studies. A deep sense of commitment and concern for the farmers is expected of you, and I am sure that you would live up to the expectations to face the challenges that lie ahead of you. As trained horticulturists, you have a long career ahead to make contribution to the field of horticulture and you can always look forward to the Government, to come out with new initiatives in the form of various schemes to support your cause. I would like to see a substantial number of you becoming horticultural entrepreneurs and service providers working in rural areas invigorating the farming sector.

My best wishes to you all, for your future endeavors, which I am sure you will execute with the utmost honesty and integrity. The knowledge with which you would be leaving the university would serve you as the fundamental mandate in your life. I wish you to have a passionate pursuit of excellence with a human touch. The society has high hopes on you to make horticulture a viable and profitable sector. I very much appreciate the sincere efforts of the teachers, in moulding the students into responsible citizens of country.

Wish you all a fruitful career in the horticulture field and a strong and prosperous footing in life.

Thank you all. Jai Hind ❑

CAMPUS NEWS

National Conference on Indian Banking Sector

The one-day National Conference on 'Indian Banking Sector: Past, Present and Future' was organized by the Department of Business Administration, Vidyavardhaka College of Engineering, Mysuru (Karnataka) on October 28, 2023. The event brought together a diverse group of individuals, ranging from students to researchers, faculty members, and professionals, to deliberate on crucial aspects of the banking industry. About 120 delegates including 40 outstation delegates attended the conference.

The Chief Guest of the event was Justice Huluvadi G Ramesh, A Renowned Authority. The Welcome Address was delivered by Prof. J Madegowda, Conference Secretary. He said that the banking sector in India has been witnessing many remarkable developments. Although banking activities in the country emerged, long back, without anybody and without proper plans for their development and regulation, today, the country is proud to have a highly matured and digitalized banking system. The recent years have been witnessing mergers and amalgamations and also the change in government policy – a shift from nationalization of private sector banks to privatization of nationalized banks.

The highlight of the inauguration function was the presence and enlightening speech of Justice Huluvadi G Ramesh who provided valuable insights into the history of the banking industry and its grievance redressal mechanisms. In his inaugural address, Justice Ramesh said that the banking companies will be held accountable/responsible for the loss of customers' money due to the deficiencies in the banking services. He highlighted that in the present scenario, investing money is not a problem but the problem is in its management. He drew the attention of the august body to the fact that the banking companies are custodians of public money and they must safeguard it from unscrupulous persons who try to illegally withdraw from the bank accounts.

Er. P Vishwanath, Secretary, Vidyavardhaka Sanga underlined the remarkable developments in the country's banking sector – from 'nowhere to everywhere'. Dr. B Sadashive Gowda, Principal of the College addressed the august gathering and highlighted developments in technology and its adoption by the banking companies for serving their customers better. Shri. Gundappa Gowda, President of Vidyavardhaka Sanga, in his Presidential Address, advised the gathering the read, understand, and apply the principles as advocated by Chanakya in his 'Chanakya's Arthashastra'. He also drew the attention of the august body as to how the great Engineer-Statesman, Bharat Ratna Sir M Visvesvaraya, under the patronage of Maharaj Krishna Raja Wadiyar–IV, was instrumental in establishing the State Bank of Mysore (recently merged with SBI) to mobilize the fund required for the construction of Krisna Raja Sagara (KRS). Mr. Shrishaila Ramannavar, Treasurer graced the occasion and Dr. PSV Balaji Rao, Head proposed the Vote of Thanks.

During the inaugural function, two books were released; one was an edited volume of the accepted papers and this treatise was officially unveiled by Shri Gundappa Gowda. Another book was 'Indian Accounting Standards' authored by Dr. J Madegowda and was unveiled by Shri Er. P. Vishwanath.

After the inaugural function, the technical session commenced with paper presentations by a diverse array of participants, including students, research scholars, post-doctoral scholars, professors, and industry professionals. The Technical Session was chaired by Shri Jaswanth Singh G, A Seasoned Consultant in the domain of Insurance (InsureTech), Banking, Financial Services, and Pensions. During his session, he provided valuable insights into current updates on banking, financial awareness, financial literacy, financial wellness, the rights of banking consumers, as well as the importance of being diligent in digital transactions. Additionally, Dr. Savitha, Chairperson, Department of Management at KSOU Mysuru, expanded upon the scope of banking and the promising career progression opportunities within the banking industry.

Dr. R Jagadeesh explored and compared the service quality of online banking internationally highlighting an international comparison of service quality in the realm of online banking, shedding light on its global variations and standards. Dr. Ramesh Babu N discussed the pivotal role of data analytics in shaping the future of the banking sector underlining its potential to drive innovation and efficiency. Mr. Pradeep Shetty K and Mr. Manjunatha H R investigated how artificial intelligence can enhance contemporary banking services and highlighted how artificial intelligence can elevate the quality of banking services in the present scenario, unveiling its promising applications for enhancing customer experiences and operational efficiency.

Dr. Inchara P M Gowda and Prof. J Madegowda made a comparative analysis of the financial performance of banks, examining the implications of asset quality, based on ownership groups. They examined how the quality of their assets influences their overall financial well-being across different ownership groups. The research shed light on the varying impacts of asset quality on the financial stability of banks with different ownership structures, offering valuable insights for the banking sector.

Dr. Raghavendra N R assessed the financial performance of private sector banks in India using the CAMEL model. It delved into a thorough analysis of their strengths and weaknesses, aiding in a better understanding of the financial health of these banks and their potential areas for improvement. Mr. Thippeswami H analyzed the performance of selected Public Sector Banks (PSBs) in India both before and after mergers. It focused on the performance of selected Public Sector Banks (PSBs) in India uncovering the consequences of these corporate actions on the banks' operations and outcomes. The study's findings contribute to a deeper comprehension of the effects of mergers in the public-sector banking industry. Dr. Nagaraja, R C evaluated the performance of urban cooperative banks in India, shedding light on their operations and outcomes. It delved into an evaluation of the performance of urban co-operative banks in India, providing insights into their operational outcomes, and contributing to a deeper understanding of the co-operative banking sector.

Mr. Shravan M B., Manjunath S, and Bhoomika Y U explored how inflation affects savings behavior and deposit amounts in 'The Inflation Chronicle'. It also explored the influence of inflation on savings behavior and deposit amounts, shedding light on the financial behaviors that inflation may impact. Ms Megha N investigated the awareness level of entrepreneurs in Shivamogga District regarding th*e MUDRA* Yojana. It investigated the awareness level of entrepreneurs regarding a government initiative, offering valuable insights into the knowledge and perceptions of local entrepreneurs about the programme.

Mr. Gangadhara B presented a case study on forecasting exchange rates between USD and INR using the ARIMA model. Ms Archana Nanjundaswam***y*** delved into the rise of robo-advisory services from the perspective of individual investors. Dr. Dileep Kumar S D and Mr. Abhishek S examined the opportunities and challenges associated with central bank digital currencies. Ms Madhumala B C and Ms Jyothi G explored the implementation and challenges of FinTech in the banking sector. They delved into the implementation of FinTech within the banking sector, addressing the challenges that come with integrating these technologies. The paper explored the dynamic landscape of financial technology, highlighting the obstacles and opportunities it presents for traditional banking institutions. Ms Ambika P studied the impact of digital finance on women's empowerment. It investigated the impact of digital finance on women's empowerment, uncovering how financial inclusion and digital access can contribute to women's economic independence and well-being.

Dr. Bhavani Shree investigated the role of artificial intelligence in the banking sector, emphasizing human collaboration. It probed the role of artificial intelligence in the banking sector, with a particular focus on its collaboration with human agents. It underscores the importance of humans and AI working in tandem to enhance the efficiency and effectiveness of banking operations. Mr. Shravan M B., Mr. Manjunath S and Mr. Guru Prasad C G explored the net profit margin and the impact of FIIs on the RoE of Indian Scheduled Commercial Banks (SCBs), shedding light on the complex relationship between financial performance and external investments in the banking industry.

Dr. Hema Patil and Dr. Somashekhar I C evaluated consumer awareness, expectations, and usage patterns of EMI cards. Mr. Ejaj examined the impact of Indian Accounting Standards (Ind AS) on the value relevance of accounting information for NBFCs in India providing a comprehensive analysis of the accounting standards' influence on financial information. Mr. Jaswanth Singh G provided insights into digital banking and explored emerging advancements and innovations in the field. It offered insights into the world of digital banking and explores emerging advancements and innovations in the field, contributing to a deeper understanding of the evolving landscape of financial technology and banking practices.

During his concluding remarks on the theme of the event, Mr. Jaswanth Singh G, Chairman of the technical session highlighted significant insights. He placed a strong emphasis on the historical development of the Indian banking sector, underlining its growth and evolution over the years. Additionally, the Chairman delved into the current challenges and opportunities faced by the sector, particularly in the light of technological advancements and regulatory changes. Furthermore, he expressed his appreciation for the presenters' thought-provoking papers and encouraged ongoing research and collaboration to better comprehend and shape the future of India's banking industry. This closing session served as a valuable platform for the exchange of knowledge and ideas regarding the sector's history, its current status, and its potential trajectory. Prof. Shravan was the Rapporteur of the technical session.

During the Valedictory Address, Mr. Samit Ghosh**,** distinguished Non-Executive Non-Independent Director, Ujjivan Small Finance Bank Ltd., articulated a compelling perspective on the role of microfinance institutions in India. He highlighted the importance of effectively reaching and engaging the aspiring middle class in the financial inclusion process. Mr. Ghosh eloquently conveyed that true financial inclusion is achieved when individuals' lives are not only touched but also transformed, setting them on a transformative journey within the world of finance. He underlined the pivotal role of institutions like Seva Bank in Ahmedabad and their founders in pioneering and laying the initial foundations of the microfinance sector. This visionary and informative address by Mr. Samit Ghosh underscored the vital significance of microfinance in the broader context of India's financial landscape, emphasizing its potential to empower individuals and promote economic growth and stability. The event also had the honor of hosting Shri Er. P Vishwanath as the Chief Guest and an address from the Guest of Honour, Dr. Sadashiv Gowda, Principal, Vidyavardhaka College of Engineering in Mysuru. The event concluded with the Vote of Thanks delivered by Prof. J Madegowda.

National Conference on Social Work Research

A two-day National Conference on 'Social Work Research: Methodologies of the Peripheralized' is being organized by the School of Social Work, Tata Institute of Social Sciences, Mumbai from January 08-09, 2024. The Ph.D. Scholars, Young Faculties, and Field Practitioners may participate in the Event. True to the disciplinary and Institutional core values of care, solidarity, equity, and justice, the event will interrogate and encounter the received axiological constructs of social work research methodologies and approaches. The thematic focus, 'methodologies of the peripheralized', may act as a 'frame-of-reference' for a reflective academic engagement to critically understand the layered dimension of the 'social worlds' - ontologies and epistemologies located in the sites of practices across marginalities and vulnerabilities. The Subthemes of the Event are:

- Research Practice in Social Work - Evidence from Field Action Projects and Fields of Practice.
- Theoretical-methodological Frameworks for Margin Studies - Lens, Feminist Standpoints, Perspectives (Decolonial-Historical, Intersectional), Evidence-based, Context and Place-based, and Culturally Sensitive.
- The Evidence of Social Policy Evaluation Research in Social Work Practice.
- Social Work Interventions Through Participatory Action Research.
- Researching Disabilities and Vulnerabilities.
- Participatory Research Methods and Practice with Child and Family.
- Researching Health, Sexuality, Gender, Women, Caste, Tribe and Identities.
- Social Work Research Fieldwork Process and Ethics.

- Researching Communities and Development Practice.
- Embedding Social Justice and Care, Positionality, and Reflexivity in Social Work Methodology.
- Digital and Computational Methods and Applications in Social Work Research.
- Emerging Areas of Social Work Research - Ecology and Biodiversity, Climate Change, Livelihood and Sustainability, Diversity-dialogue, Border Lives, Interstate and Transnational Migration and Refugees.

For further details, contact the Coordinator, Tata Institute of Social Sciences, V.N. Purav Marg Deonar, Mumbai-400088, *Mobile No: 0*8828476859/ 07086525659, E-mail: *tiss.conference2024@gmail.com*. For updates, log on to: *www.tiss.edu/events*

International Workshop on Sustainable Energy, Power and Propulsion

A three-day International Workshop on 'Sustainable Energy, Power and Propulsion' is being jointly organized by the University of Maryland, College Park, University of Illinois, Chicago, ACRI CFD, Indian Institute of Technology Kanpur and Indian Institute of Technology Delhi from January 19- 21, 2024 at Indian Institute of Technology Delhi. The researchers and engineers from academia, R&D organizations and industries working in the areas of fuels, energy, combustion, power, propulsion, hypersonic, air pollution, sensors and diagnostics, modeling, fossil and bio-fuels, alternative energy, energy-water nexus, droplets and atomization, novel combustion concepts, engine combustion, gas turbine combustion, swirl flows, and other related areas may participate in the event.

Clean and sustainable energy is of paramount importance for all applications in propulsion, power, energy, and mobility. The event will bring together renowned experts from around the globe to share the latest fundamental and applied research innovations for cleaner energy utilization in a wide range of devices extending from hypersonic propulsion to micro-scale devices using fossil and renewable fuels. A round-table discussion will also be held with the aim of identifying key areas of common interest that will help develop strategies to promote collaborative research. The topics of the Event are:

- Multiphase Flows and Applications.
- Hypersonic and Supersonic Propulsion.
- High-speed Combustion for Propulsion.
- Computational Approaches and Advances.
- Advanced Diagnostics.
- Biofuels, Renewable Fuels.
- Fuel Reforming and Value-added Products.
- Fuel-flexible Propulsion and Power Generation.
- Novel Energy Conversion Technologies/New Engine Combustion Concepts.
- Thermal Management.
- Energy, Environment and Emissions Control.
- Combustion Modeling and Simulation.
- Solid Fuel Combustion, Pyrolysis and Gasification.
- Gas Turbines in Ship and Air Propulsion.
- Hybrid Power Concepts for Engines.
- Hydrogen and Ammonia as Fuel for Engines.
- Renewable Energy Including Solar, Wind and Biomass.

For further details, contact Dr. Ashoke De, Professor, Department of Aerospace Engineering, Department of Sustainable Energy Engineering, Indian Institute of Technology Kanpur – 208016, Phone No: 0512 259 7863, 6559, E-mail: *ashoke@iitk.ac.in.* For updates, log on to: *home.iitk.ac.in/~ashoke.*

AIU News

Faculty Development Programme on Enabling Entrepreneurship, Start-up, Incubation and Innovation Mindset

A five-day Faculty Development Programme on 'Enabling Entrepreneurship, Start-up, Incubation and Innovation Mindset' was organized by the Association of Indian Universities (AIU)—Academic and Administrative Development Center (AADC), Guru Gobind Singh Indraprastha University, New Delhi during June 12-16, 2023. More than

100 participants from various Institutes/Colleges throughout India participated in the event.

Dr. Amit Prakash Singh and Dr. Mansi Jhamb were the Guest Speakers. Dr. Singh's talk revolved around establishing an entrepreneurial ecosystem in the university. He highlighted key elements essential for this ecosystem, including student training, entrepreneurship promotion, and startup support. Dr. Singh emphasized training students in entrepreneurial skills and cultivating a culture of innovation. He proposed an incubation center that indirectly funds prototypes by procuring equipment for development, thus easing financial constraints on startups. He stressed the significance of an Intellectual Property Rights (IPR) cell to facilitate patent submissions by students, scholars, and faculty. Furthermore, Dr. Mansi Jhamb shared insights into startups within the semiconductor space. Her presentation elucidated the challenges and opportunities within this sector, showcasing real-world examples of entrepreneurial endeavors. The session concluded with participants gaining valuable insights into fostering an entrepreneurial ecosystem and understanding the role of an incubation center and IPR cell in supporting startups. Dr. Singh and Dr. Jhamb's expertise greatly enriched the discourse on entrepreneurship and innovation within the university context.

During the Technical Session, Mr. Mukesh Mohan Gupta was welcomed by Dr. Anuradha Chugh, along with a brief introduction of Mr. Mukesh Mohan Gupta which was given by Ms. Riya Rawal. Mr. Gupta started the session by explaining the challenges faced by MSMEs and Startups in India along with the opportunities. He also explained the ways to efficiently choose the location of the business and the actions to be taken before starting the business. In the end, the speaker also stated the complete process of registration of a startup and its associated benefits.

The next session was focused on various government schemes floated by GoI for startups and MSMEs like the Startup India Fund Scheme, CGSS, CGTMSE, Standup India, etc. He explained each scheme in detail for the benefit of the participants and also explained various other benefits for MSEs in public procurements. While concluding the session, the question-answer session was also conducted, where various queries of the participants regarding startups were taken up and doubts were cleared.

Prof. Yogesh Brahmankar, CEO, Symbiosis Technology Business Incubator (SCEI) started the session by explaining the mindset required in entrepreneurship and he also stated that entrepreneurship is not magic. He explained by giving the examples of entrepreneurs of younger age where the motivation is to bring new ideas, and new products, observe something, and then execute them. Innovators and Intrapreneurs in Academics are required to make the change happen. He suggested that time and resources should be given to the students by the faculty members for experimenting, iterating, and executing new ideas. He believed that research should be based on an environment where there is a deeper understanding of the problems faced in our surroundings. Sir explained in a detailed manner about the entrepreneurial ecosystem. In the end, the speaker also stated the complete process of registering the patent and the policies for innovation. of a startup and its associated benefits.

The next session was focused on key areas of NISP where he explained each factor along with the examples. He stated that all opportunities are available for faculty members in the field of innovation. He gave ideas for the innovation as incubators. While concluding the session, the question-answer session was also conducted, where various queries of the participants regarding innovation were taken up and doubts were cleared.

Ms Sanjana Govindam, Programme Head, Women's Entrepreneurship Programme, NITI Aayog, began the session by discussing the role of women entrepreneurs, especially in India. She discussed the HITS and MISSES of the entrepreneurial ecosystem efforts in India for women-led development. The MISSES covers the gaps and challenges in the policy framework. She further discussed in detail WEP, i.e. Women Entrepreneurship Platform which is a unique platform built on Public Private Partnership facilitated by ecosystem players to address ecosystem gaps. In addition, Ms Sanjana explained the model of effective mentorship to understand access, awareness, experience, and value derived from mentorship. The session was quite informative and encouraged women's entrepreneurship.

Ms. Deepali Upadhyay, Programme Director, Atal Innovation Mission, NITI Aayog, Govt of India started her session by giving a brief information about the Atal Innovation Mission (AIM). She discussed in detail the six programs under AIM namely, Atal Tinkering Labs (ATLs), Atal Incubation Centers (AICs), Atal Community Innovation Centers (ACICs), Atal New India Challenge (ANIC)/Applied Research and Innovation for Small and Medium Enterprises (ARISE), Mentor India, and Vernacular Innovation Programme (VIP). She further explained the different phases of the Innovation Lifecycle and the mapping of the above-mentioned programs with the different phases. Ms. Deepali showed a very inspiring video of one of the ATL in charge who appeared on a famous television show, KBC. She then discussed the ACIC model. Lastly, she discussed the Mentor India program and showed various reputed mentors who are associated with the same. The question and Answer session was also conducted at the end of each session where the participant's doubts were cleared by the respected speakers.

Prof. Sudhir K Jain introduced the topic 'Intellectual Property Rights (IPR)' and explained the importance for Entrepreneurs, Startups and MSME's. He discussed the major forms of Intellectual Property Rights like Patents, Industrial Designs, Trademarks, Copyrights, Layout Design of IC's, Trade Secrets, Plant Varieties, and Geographical Indications. He also explained about the Paris Convention held in 1883 and the Bern Convention held in 1886. He also explained that within one product multiple IPRs may be associated and each IPR is protected under different laws. Then, he explained the goals of the IPR system: more inventions leading to a better life, better R&D culture, creative employment generation, better utilization of natural resources, economic development, more global trade, etc. Then he explained about GATT (General Agreement on Tariffs and Trade) introduced in 1947. The General Agreement on Tariffs and Trade is a legal agreement between many countries, whose overall purpose was to promote international trade by reducing or eliminating trade barriers such as tariffs or quotas. GATT was replaced by the WTO (World Trade Organization) in 1995. The WTO covers services and intellectual property as well. The WTO dispute settlement system is faster, and more automatic than the old GATT system. WTO is more preferred because of the reduction in customs duties, and globalization. Sir also mentioned that the National IPRs Policy was introduced in 2016. The policy encourages creativity, innovation and entrepreneurship in India. It keeps a check on the theft of one person's innovation by another. Then, he explained about some important patents namely Calculator, Printing Press, Air Conditioning, Camera, etc. He also explained some IPR legislations such as Patents Act in 1970, Designs Act in 2000, Trademarks Act in 1999, Copyrights Act in 1957, etc. Then, he explained about Patent by giving its definition and some examples and he also explained about how one can file a patent, and what is the form of application for filling a patent. He concluded by briefly explaining all the major forms of IPRs mentioned above. At the end, the speaker resolved the doubts of the participants in the question-answer session. ❑

THESES OF THE MONTH

SCIENCE & TECHNOLOGY

A List of doctoral theses accepted by Indian Universities
(Notifications received in AIU during the month of Sep-Oct, 2023)

AGRICULTURAL & VETERINARY SCIENCES

Biotechnology

1. Ankur Kumar. **Phytochemical characterization of black soybean (Glycine max (L.) Merrill) and its value addition**. (Prof. S N Naik and Prof. J K Sahu), Centre for Rural Development & Technology, Indian Institute of Technology Delhi, New Delhi.

BIOLOGICAL SCIENCES

Biotechnology

1. Choudhir, Gaurav. **Studies on natural inhibitory phytometabolites targeting acetylcholinesterase for Alzheimer's treatment**. (Prof. Hariprasad P and Prof. Satyawati Sharma), Centre for Rural Development & Technology, Indian Institute of Technology Delhi, New Delhi.
2. Prerna. **Synthesis of ZnO nanoparticles and its characterization**. (Dr. Dinesh Goyal), Department of Biotechnology, Thapar Institute of Engineering and Technology, Patiala.

Life Science

1. Aditya, Vankadari. **Expression profiling of genes involved in survivability and adaptability of E.coli using simulated gut conditions**. (Dr. Deekshit), Faculty of Biological Sciences, Nitte University, Mangaluru.
2. Akshatha, K. **Deciphering traits of drug resistance and survival strategies of salmonella under in vitro gut like conditions**. (Dr. Deekshit), Faculty of Biological Sciences, Nitte University, Mangaluru.
3. Akshay, B M. **Study of cartilage derived mesenchymal progenitor cells from osteoarthritis and rheumatoid arthritis patients**. (Dr. B. Mohana Kumar), Faculty of Allied Health Sciences, Nitte University, Mangaluru.
4. Babu, Nishith. **Investigating the role of poly (A)-specific ribonuclease (Parn) in mRNA stability, translational regulation and cancer**. (Prof. Anirban Chakraborty), Faculty of Biological Sciences, Nitte University, Mangaluru.
5. Dechamma, P N. **RNases and inherited bone marrow failure syndromes: A systematic loss-of-function study of poly(A)-specific ribonuclease (Parn) using the Zebrafish Model System**. (Prof. Anirban Chakraborty), Faculty of Biological Sciences, Nitte University, Mangaluru.
6. D'mello, Mackwin Kenwood. **Spatiotemporal pattern of underweight and diarrhea among under-five children in Karkala Taluk, Udupi**. (Dr. Sanjeev Badiger), Faculty of Allied Health Sciences, Nitte University, Mangaluru.
7. Dsouza, Leonard Clinton. **Studies on the effects of environmental chemical (s) on hematopoiesis using drosophila model system**. (Dr. Anurag Sharma), Faculty of Biological Sciences, Nitte University, Mangaluru.
8. Sharanya, K. **In vitro morphogenesis of curculigo orchioides for elucidation of its bioactivity on drosophila melanogaster**. (Dr. Smitha Hegde), Faculty of Biological Sciences, Nitte University, Mangaluru.

Zoology

1. Kamble, Rohini Pandurang. **Applications, ecology and diversity of mayflies from Western Maharashtra**. (Dr. Sanjay Shamrao Nanware), Department of Zoology, Swami Ramanand Teerth Marathwada University, Nanded.

EARTH SYSTEM SCIENCES

Environmental Science

1. Anuradha. **Status of forest health in Yamunanagar District of Haryana**. (Dr. Sandeep Gupta), Department of Environmental Science, Kurukshetra University, Kurukshetra.

ENGINEERING SCIENCES

Biotechnology

1. Gupta, Nilkantha. **Fabrication of kaempferol and dexamethasone infused biomaterial for cartilage tissue engineering**. (Dr. Kantha Deivi Arunachalam), Department of Biotechnology, SRM University, Kattankulathur, Chennai.
2. Lavanya, K. **Fabrication of thymol-loaded sodium alginate/poly(2-ethyl-oxazoline)/chitosan based semi-interpenetrating hydrogels for bone tissue**

engineering. (Dr. N. Selvamurugan), Department of Biotechnology, SRM University, Kattankulathur, Chennai.

Chemical Engineering

1. Garg, Manu. **Quality- by- design (QbD) based crystallization process development for pharmaceutical API**. (Prof. Anurag S Rathore), Department of Chemical Engineering, Indian Institute of Technology Delhi, New Delhi.
2. Gupta, Rakesh Kumar. **Mixed convection heat transfer from semi-circular cylinders in a vertical channel**. (Dr. Avinash Chandra and Dr. Raj Kumar Gupta), Department of Chemical Engineering, Thapar Institute of Engineering and Technology, Patiala.
3. Sharma, Reena. **Data reconciliation and dynamic optimization for the sustainable operation of hybrid renewable energy systems**. (Prof. Hariprasad Kodamana), Department of Chemical Engineering, Indian Institute of Technology Delhi, New Delhi.

Civil Engineering

1. Arunsekhar, C. **Managing design-construction interface in BIM projects**. (Prof. J Uma Maheswari and Prof. Arnab Banerjee), Department of Civil Engineering, Indian Institute of Technology Delhi, New Delhi.
2. Chawla, Archana. **Dispersion of line source exhaust emissions using an integrated modelling approach: A case study of Delhi City**. (Prof. Mukesh Khare), Department of Civil Engineering, Indian Institute of Technology Delhi, New Delhi.

Computer Science & Engineering

1. Arulprakash, M. **A blockchain based decentralized data privacy and security model for crowd sensing networks**. (Dr. R Jebakumar), Department of Computer Science & Engineering, SRM University, Kattankulathur, Chennai.
2. Atri, Swati. **An efficient routing Protocol for MANETs**. (Dr. Sanjay Tyagi), Department of Computer Science, Kurukshetra University, Kurukshetra.
3. Bamal, Roopam. **Development of efficient watermarking techniques in medical images**. (Dr. Singara Singh Kasana), Department of Computer Science & Engineering, Thapar Institute of Engineering and Technology, Patiala.
4. Bogle, Deepa Kashinath. **Development of optimized deep learning algorithm for price prediction in commodity market**. (Dr. Parag Bhalchandra), Department of Computer Science, Swami Ramanand Teerth Marathwada University, Nanded.
5. Harish, A S. **Forecasting customer life cycle and value in retail industry using ensemble of predictive models**. (Dr. C Malathy), Department of Computer Science & Engineering, SRM University, Kattankulathur, Chennai.
6. Ravneet Kaur. **Distributed data deduplication techniques for efficient cloud storage system**. (Dr. Jhilik Bhattacharya and Dr. Inderveer Chana), Department of Computer Science & Engineering, Thapar Institute of Engineering and Technology, Patiala.
7. Sandhya, E. **A framework for attack detection in IOT using optimal feature selection approach and random forest algorithm**. (Dr. Annapurani Pannaiyappan K), Department of Computer Science & Engineering, SRM University, Kattankulathur, Chennai.
8. Selvi, G Malar. **Building automatic text summarization system using soft computing techniques**. (Dr. A. Pandian), Department of Computer Science & Engineering, SRM University, Kattankulathur, Chennai.
9. Sheela Devi. **Intrusion detection techniques in infrastructure less wireless networks**. (Dr. R. K. Chauhan and Dr. Ashwani Kush), Department of Computer Science, Kurukshetra University, Kurukshetra.

Electrical & Electronics Engineering

1. Kannan, M. **Development of switched capacitor based multilevel inverters with selective harmonic elimination PWM technique**. (Dr. K. Saravanan), Department of Electrical & Electronics Engineering, SRM University, Kattankulathur, Chennai.
2. Parul. **Machine learning based forecasting in power system**. (Prof. B K Panigrahi and Prof. P N Suganthan), Department of Electrical Engineering, Indian Institute of Technology Delhi, New Delhi.
3. Sandhu, Harmanpreet Kaur. **Gallium nitride and its heterostructures with transition metal dichalcogenides for optoelectronic devices**. (Prof. Samaresh Das and Prof.Alok Jain), Centre for Applied Research in Electronics, Indian Institute of Technology Delhi, New Delhi.

Electronics & Communication Engineering

1. Hariprasad, S. **Design and performance analysis of data security algorithms in IOT networks**. (Dr. T Deepa), Department of Electronics & Communication

Engineering, SRM University, Kattankulathur, Chennai.

Energy Studies

1. Tak, Neha. **High resolution multilevel inverter for solar PV application**. (Prof. Sumit K Chttopadhyay), Department of Energy Science & Engineering, Indian Institute of Technology Delhi, New Delhi.

Mechanical Engineering

1. Bhattacharya, Shambo. **Multiscale mechanics of intralamellar structures in annulus fibrosus**. (Prof. Devendra Dubey), Department of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi.
2. Gokul, K. **Effect of industrial waste fly ash on mechanical, wear and drilling behaviour of banana fiber reinforced polymer composites**. (Dr. T. Rajasekaran), Department of Mechanical Engineering, SRM University, Kattankulathur, Chennai.
3. Gupta, Jyotsna. **Fabrication and characterization of open cell Ti-alloy foam using space holder space technique for bio-implants**. (Prof. S Aravindan and Prof. S Ghosh), Department of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi.
4. Kartikeya. **Studies on deformation and failure mechanisms of composite material systems under high-velocity impact of bullet projectiles**. (Prof. Naresh Bhatnagar), Department of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi.
5. Pal, Subham. **Linear stability of non-Newtonian fluid flows**. (Prof. Arghaya Samanta), Department of Applied Mechanics, Indian Institute of Technology Delhi, New Delhi.
6. Pattnayak, Manas Ranjan. **Development of novel bore aerodynamic journal bearings for sustainable industrial technologies**. (Prof. Raj Kumar Pandey and Prof. Jayanta Kumar Dutt), Department of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi.
7. Rengma, Thochi Seb. **Design and performance analysis of savonius type ultra micro hydrokinetic turbine**. (Prof. P M V Subbarao), Department of Mechanical Engineering, Indian Institute of Technology Delhi, New Delhi.
8. Sajan Kumar. **Asymptotic modeling of magnetostrictive material based structures with application to energy harvesting device design**. (Dr. Sushma Santapuri), Department of Applied Mechanics, Indian Institute of Technology Delhi, New Delhi.
9. Sharma, Sumati. **Agri-entrepreneurial innovations for livelihood security in indo-gangetic plains an analytical study**. (Prof. Satyawati Sharma), Centre for Rural Development & Technology, Indian Institute of Technology Delhi, New Delhi.

Textile & Apparel Design

1. Rathour, Rochak. **Study on the performance characterization of outer layer of fire protective clothing**. (Prof. Apurba Das and Prof. R Alagirusamy), Department of Textile and Fiber Engineering, Indian Institute of Technology Delhi, New Delhi.

MATHEMATICAL SCIENCES

Mathematics

1. Naner, Yogesh Uddhavrao. **Study of some aspects of mixed boundary value problems of thermoelasticity using integral transform techniques**. (Dr. Kishor R Gaikwad), Department of Mathematics, Swami Ramanand Teerth Marathwada University, Nanded.

MEDICAL SCIENCES

Biomedical Sciences

1. Rajesh, V. **Molecular profiling of the tumor derived biomarkers in lung cancer using non-invasive technique**. (Dr. Anirban Chakraborty), Faculty of Allied Health Sciences, Nitte University, Mangaluru.

Biotechnology

1. Baig, Rehana Mirza Sajeed. **Tissue culture and pharmacological studies on Peucedanum grande C B Clarke**. (Dr. B S Surwase), Department of Biotechnology, Swami Ramanand Teerth Marathwada University, Nanded.

Dentistry

1. Attavar, Shruthi H. **Antimicrobial efficacy of irrigants and irrigating devices on endodontic pathogens**. (Prof. Mithra N Hegde), Faculty of Dental Sciences, Nitte University, Mangaluru.
2. Bhanuteja, Ajila Vidya. **Human papilloma virus among subjects with oral potentially malignant disorders and oral squamous cell carcinoma**. (Prof. G Subhas Babu), Faculty of Dental Sciences, Nitte University, Mangaluru.
3. D'souza, Teena Sheethal. **Evaluation of biological and physicochemical properties of a nanoparticle incorporated calcium silicate based root – end**

filling material: An in vitro study. (Dr. Aditya Shetty), Faculty of Dental Sciences, Nitte University, Mangaluru.

4. Nireeksha. **Association of vitamin D receptor gene polymorphism and antimicrobial peptide LLl-37 in dental caries**. (Dr. Mithra N Hegde), Faculty of Dental Sciences, Nitte University, Mangaluru.

5. Shashidhar, Keerthan. **A comparative study of cheiloscopy and dermatoglyphics with different growth patterns**. (Dr. U S Krishna Nayak), Faculty of Dental Sciences, Nitte University, Mangaluru.

Genetics

1. Kalal, Akanksha A. **Assessment of chromosomal abnormalities and its correlation with different gene expression in the progression of multiple myeloma**. (Prof. Prashanth Shetty), Faculty of Allied Health Sciences, Nitte University, Mangaluru.

2. Kulkarni, Nagaraj V. **Assessment of chromosomal abnormalities and prame gene expression in acute leukaemia**. (Prof. D Prashanth Shetty), Faculty of Allied Health Sciences, Nitte University, Mangaluru.

Medicine

1. Mohammed Ashraf, C. **In-vitro maturation of immature human oocytes by phosphodiesterase type-3 inhibitor**. (Dr. Prasanna Kumar Shetty), Faculty of Medicine, Nitte University, Mangaluru.

2. Bincy, K. **Assessing social network and its effect on selected dimensions of health, quality of life and impact of educational intervention on healthy ageing among geriatric population in Chengalpattu District of Tamilnadu**. (Dr. M Logaraj), Department of Community Medicine, SRM University, Kattankulathur, Chennai.

3. Hegde, Pravesh. **Association of CYP19 and CYP11A1 genetic variants in relation to sex hormones and insulin resistance in polycystic ovary syndrome**. (Prof. Suchetha Kumari N), Faculty of Medicine, Nitte University, Mangaluru.

4. Jagannath, P. **Effectiveness of nicotine replacement therapy on smoking cessation of tuberculosis patients: A randomized trial**. (Dr. Sanjeev Badiger), Faculty of Allied Health Sciences, Nitte University, Mangaluru.

5. Oommen, Sainu Susan. **Evaluation of gastroprotective and anticolitis effect of wheatgrass extract in albino wistar rats**. (Dr. Rajendra Holla), Faculty of Medicine, Nitte University, Mangaluru.

Nursing

1. Dsouza, Josmitha Maria. **Interaction with children on happiness among the elderly: A mixed method approach**. (Dr. Neetha Kamath), Faculty of Nursing, Nitte University, Mangaluru.

2. Mary, N I Josephine Jacquline. **Effect of two teaching methods on learning outcomes regarding preventive education on cervical cancer among married women of 18-60 years of age in the rural areas of Kasaragod District, Kerala**. (Dr. Rashmi Kundapur), Faculty of Nursing, Nitte University, Mangaluru.

3. Suchithra, B S. **Effectiveness of pelvic floor muscle exercise and bladder re-training program on symptoms and quality of life of women with stress, urge and mixed urinary incontinence**. (Prof. Fathima D'silva), Faculty of Nursing, Nitte University, Mangaluru.

Pharmaceutical Science

1. Basak, Susmita. **Synthesis and pharmacological evaluation of some novel heterocyclic compounds via chalcone derivatives**. (Dr. K Ishwar Bhat), Faculty of Pharmaceutical Sciences, Nitte University, Mangaluru.

2. Gavitre, Bhaskar Balu. **Screening and evaluation of neuroprotective activity of some medicinal plants**. (Dr. T M Kalyankar), Department of Pharmacy, Swami Ramanand Teerth Marathwada University, Nanded.

3. Kumbhar, Santosh Panditrao. **Synthesis and biological evaluation of some novel derivatives of 2-Azetidinone**. (Dr. S S Patil), Department of Pharmacy, Swami Ramanand Teerth Marathwada University, Nanded.

PHYSICAL SCIENCES

Chemistry

1. Arivazhagan, M. **Design of transition metal nanomaterials-based electrochemical sensor platforms for emerging biomarkers**. (Dr. G Maduraiveeran), Department of Chemistry, SRM University, Kattankulathur, Chennai.

2. Gayathri, J. **Development of metal oxide based two-dimensional layered materials for non-enzymatic electrochemical detection of glucose**. (Dr. V Kumaran), Department of Chemistry, SRM University, Kattankulathur, Chennai.

3. Gopala Krishnan, D. **Synthesis, characterization and biological evaluation of organoruthenium**

based metal complexes and nanocomposites as anticancer agents. (Dr. M Ganesh Pandian), Department of Chemistry, SRM University, Kattankulathur, Chennai.

4. Jashav, Madhav Sopanrao. **Synthesis characterization and biological evaluation of some novel fused pyrimidine and thiazine heterocycles**. (Dr. Shivraj B Sirsat), Department of Chemistry, Swami Ramanand Teerth Marathwada University, Nanded.

5. Kavitha, G. **Phyto-succoured metal nanoparticles anchored on graphene oxide sheets for stimulating photo degradation of cationic dyes and anti-cancer activity**. (Dr. N Abirami), Department of Chemistry, SRM University, Kattankulathur, Chennai.

6. Kharode, Bhujang Gyanoba. **Physochemical characterization of synthesized metal complexes of Schiff's bases and their biological importance**. (Dr. L P Shinde), Department of Chemistry, Swami Ramanand Teerth Marathwada University, Nanded.

7. Kokane, Balaji Digambar. **Developments of new methods in functional group transformation**. (Dr. Sudhakar G Patil), Department of Chemistry, Swami Ramanand Teerth Marathwada University, Nanded.

8. Patki, Abhijeet Sanjayrao. **Develop new and efficient protocol for the synthesis of pyrazole derivatives**. (Dr. D B Muley), Department of Chemistry, Swami Ramanand Teerth Marathwada University, Nanded.

9. Priyesh. **Tuning the optical and magnetic properties of halide layered double perovskites via doping and alloying**. (Prof. Sameer Sapra), Department of Chemistry, Indian Institute of Technology Delhi, New Delhi.

10. Raman. **Modulating optical properties of lead-free halide double pervoskites by chemical substitution**. (Prof. Sameer Sapra), Department of Chemistry, Indian Institute of Technology Delhi, New Delhi.

11. Sivasankari, S. **Fabrication and characterization of polymer nanocomposite membranes for in-vitro hemodialysis application**. (Dr. R Kalaivizhi), Department of Chemistry, SRM University, Kattankulathur, Chennai.

12. Vijayakumar, E. **Design and development of 2D materials supported nanocomposites for photocatalytic application of organic pollutants degradation**. (Dr. A. John Bosco), Department of Chemistry, SRM University, Kattankulathur, Chennai.

Physics

1. Acharyya, Jitendra Nath. **Study of nonlinear optical properties and ultrafast dynamics in photonic structures**. (Prof. G Vijaya Prakash), Department of Physics, Indian Institute of Technology Delhi, New Delhi.

2. Ali, C K Saleem. **Studies on the spatiotemporal characteristics of cirrus cloud occurrence and its radiative impacts on the tropical tropopause layer**. (Dr. Sanjay Kumar Mehta), Department of Physics, SRM University, Kattankulathur, Chennai.

3. Arunodaya, J. **Investigation on stability of FAPbI3 through mixed-cation incorporation under ambient condition and study on electrical properties of metal oxide based transport layers**. (Dr. Trilochan Sahoo), Department of Physics, SRM University, Kattankulathur, Chennai.

4. Banda, Rajender Reddy. **Development of multiferroic thin films and its study for non-volatile memory device application**. (Dr. K A Bogle), Department of Physics, Swami Ramanand Teerth Marathwada University, Nanded.

5. Kulkarni, Jagdish Pandurangrao. **Synthesis, modification, physico-chemical characterization and applications of meso-porous molecular sieves**. (Dr. U D Joshi), Department of Physics, Swami Ramanand Teerth Marathwada University, Nanded.

6. Mukherjee, Jayjit. **Investigation of carrier trapping effects from electrical and thermal stress in III-N HEMTs for RF applications**. (Prof. R S Dhaka and Prof. D S Rawal), Department of Physics, Indian Institute of Technology Delhi, New Delhi.

7. Navneet Kumar. **Investigation of surface/interface properties of gallium nitride and modifications using passivation and irradiation techniques for device applications**. (Dr. Fakir Chand and Dr. Ashish Kumar), Department of Physics, Kurukshetra University, Kurukshetra.

8. Vignesh, K. **Investigation on Surface Functionalized Mesoporous Silicon Dioxide (SiO2) nanoparticles fabricated with reduced Graphene Oxide (rGO) nanosheet for targeted drug delivery on breast cancer cells**. (Dr. T Kalaivani), Department of Physics, SRM University, Kattankulathur, Chennai.

9. Yadav, Isha. **Metal and metal-oxide thin films for IR sensor applications**. (Prof. Ratnamala Chatterjee and Prof. Shankar Dutta), Department of Physics, Indian Institute of Technology Delhi, New Delhi. ❑

ST.STEPHEN'S COLLEGE
UZHAVOOR
A Christian Minority Education Institution
under the Archdiocese of Kottayam
(Affiliated to M.G. University, Kottayam)
Kottayam Dist., Kerala - 686 634
Ph: +91482 2240127,Website: www.ststephens.net.in
E mail: info@ststephens.net.in

WANTED ASST. PROFESSOR

Applications are invited from eligible candidates for appointment as Assistant Professor.

Sl.No.	Discipline	PwD*
1	Physics	1

*In the persons with disability (PwD) category, preference will be given in the order of visually challenged,hearing impaired, orthopaedically challenged and multiple disability categories (as per G.O. No.242/2022/HEDN dated 18-05-2022).

Age, Qualification, Scale of Pay etc. will be as per the norms of UGC / Govt. / University. The Application form can be downloaded from the college website, **www.ststephens.net.in**. The duly filled - in application form along with copies of supporting documents should reach the Manager within 30 days from the date of this notification.

27/11/2023 **Manager**

St. Joseph's Training College
Mannanam P.O., Kottayam-686561
Ph: 0481 2597347, 94956 27034

Applications are invited for a post of

LIBRARIAN (UGC)

Application forms can be had from the College Office on pay of Rs. 1000/- or Rs. 1200/- by post. Qualification and Age as prescribed by the University, UGC and Government. Submit your application within one month of this publication.

Mannanam
27/11/2023

Sd/-
Manager

WANTED

Applications are invited from the eligible candidates for the post of **PRINCIPAL** to be filled in **Manav Shram Shakti Sanshodhan V Vikas Pratisthan Vasmat Sanchalit, SAVITRIBAI PHULE BCA MAHAVIDYALAYA VASMAT DIST HINGOLI** on **PERMANENT NON GRANT BASIS**. Eligible candidates should submit their applications along with all necessary documents **within 15 days** from the date of publication of the advertisement by **Registered Post Only**. **(Minority Institution)**

Sr. No.	Name of the Post	No of Posts	Reservation
1.	Principal	01	Unreserved

Essential Qualification : (A or B)

Minimum educational qualification for the post of Principal will be as per Regulation of UGC 18 July 2018 and G.R. of Government of Maharashtra Dt. 08 March 2019.

1) Ph.D Degree, 2) Professor / Associate Professor with a total service/experience of at least fifteen years of teaching/research in Universities, Colleges and other institutions of higher education. 3). A minimum of 10 research publication in peer-reviewed or UGC-listed journals; and 4). A minimum of 110 Research Score as per Appendix II, Table 2.

B Tenure: A College Principal shall be appointed for a period of five years, extendable for another term of five years on the basis of performance assessment by a Committee appointed by the University, constituted as per these Rules.

Salary & Allowances: Pay Scale as per UGC, State Government of Maharashtra & S.R.T.M. University, Nanded rules from time to time.

7th Pay Scale : Academic Level – 13 A (131400-217100)

Note : 1) Prescribed application form is available on the University **website: www.srtmun.ac.in 2)** No T.A./D.A. will be paid to attend the interview. **3)** Eligible candidates those who are already in service should submit their applications through proper channel. **4)** All attested Xerox copies of certificates and other relevant documents should be attached with the application form. **5)** The appointment on the basis of final decision of Hon'ble High Court, Aurangabad Bench of Writ Petition No.12051/2015.

Address :-Correspondence address: Savitribai Phule BCA Mahavidyalaya Vasmat - 431512, Tq.- Vasmat, Dist:- Hingoli. For more details, visit SRTMU Nanded **Website: www.srtmun.ac.in.**

Shri Chatrapati Shivaji Shikshan Prasarak Mandal Goregaon
Late Baburao Patil Atrs & Science College,
Hingoli. Dist. Hingoli

WANTED

Applications are invited for the eligible post candidates for the following full time posts in **Late Baburao Patil Arts & Science College, Hingoli Dist. Hingoli** (Non-Grant) and run by **Shri Chatrapati Shivaji Shikshan Prasarak Mandal Goregaon**. The application duly completed in all respect should reach on the following address in **15 days**. The candidates of reserved category should send one copy of application to the Assistant Registrar, Special Cell, S.R.T.M. University, Nanded.

Sr. No.	Subject	Total Posts	Reservation
1	**Botany**	03	OBC-03, ST-01 EWS-01
2	**Microbiology**	02	

1. Assistant Professor Eligibility (A or B)

I. A Master's Degree with 55% marks (or an equivalent grade in a point-scale wherever the Grading system is followed) in a concerned /relevant/allied subject from an Indian University, or an equivalent degree from an accredited foreign university.

II. Besides fulfilling the above qualifications, the candidate must have cleared the National Eligibility Test (NET) conducted by the UGC or the CSIR or similar test accredited by the UGC, like SET or who are or have been awarded a Ph.D. Degree in accordance with the University Grants Commission (Minimum Standards and Procedure for Award of M.Phil/Ph.D. Degree) Regulations, 2009 or 2016 and their amendments from time to time as the case may be exempted from NET/SET.

Provided the candidates registered for the Ph.D. programme prior to July 11, 2009, shall be governed by the provisions of the then existing Ordinances /Bye-laws/Regulation of the Institution awarding the degree and such Ph.D. candidates shall be exempted from the requirement of NET/SET for recruitment and appointment of Assistant Professor or equivalent positions in University/College/ Institutions subject to the fulfillment of the following conditions :

a) The Ph.D. degree of the candidates has been awarded in regular mode only.
b) The Ph.D. thesis has been evaluated by at least two examiners.
c) An Open Ph.D. viva voce of the candidate has been conducted.
d) The candidate has published two research papers from his/her Ph.D. work , out of which at least one is in a referred journal.
e) The candidate has presented at least two papers, based on his/her Ph.D. work in conference /seminars, sponsored/funded/ supported by the UGC/ICSSR/CSIR or any similar agency.

Note:

1. The fulfillment of these conditions is to be certified by the Registrar or the Dean (Academic affairs) of the University concerned.
2. NET/SET shall also not be required for such Masters Programmes in disciplines for which NET/SET is not conducted. However, Ph.D. degree shall remain the minimum eligibility for appointment of Assistant Professor in such disciplines.

OR

The Ph.D. degree has been obtained from a foreign university/institution with a ranking among top 500 in the World University Ranking (at any time) by any one of the following :

I. Quacquarelli Symonds (QS) :
II. The Times Higher Education (THE) or
III. The Academic Ranking of world Universities (ARWU) of Shanghai Jiao Tong University (Shanghai).

Note:

The Academic score as specified in Appendix-II (Table34) for Universities and Appendix-II (Table 38) for Colleges, shall be considered for short-listing of the candidates for interviews only , and the selection shall be based only on the performance in the interview.

Correspondence Address :-

Late Baburao Patil Arts & Science College,
Akola By-pass, Garmal Road, Mahakali Nagar,
Hingoli. Dist. Hingoli – 431513.
Contact : 9970367707

Principal
Late Baburao Patil Arts & Science College,
Hingoli. Dist. Hingoli

President/Secretary
Shri Chatrapati Shivaji Shikshan Prasarak
Mandal Goregaon

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH (IGIDR)

(An Advanced Research Institute Established by the Reserve Bank of India)
Deemed To Be University
General A.K. Vaidya Marg, Goregaon (East), Mumbai - 400 065

INVITATION FOR APPLICATION FOR THE POST OF ASSISTANT PROFESSOR

Indira Gandhi Institute of Development Research invites applications for twelve Assistant Professors.

Specializations Sought: Economics, Energy, Environment, Climate Change, Econometrics, Time Series, International Trade, Finance, Monetary Economics, Labour, Health, Education, Demography, Public Finance, and Open Economy Macroeconomics.

Qualifications: Candidates must have a Ph.D. in any of the mentioned areas of specialization. Candidates about to complete their Ph.D. are also eligible to apply, provided they can complete their defense before appointment if selected.

Compensation: In accordance to the Seventh Pay Commission for academic institutions. In addition to salary, the Institute offers campus housing, leave travel concessions and liberal medical insurance benefits.

The Institute adheres to the Government of India Reservation Rules in its recruitment. The number of posts for which application is sought in this cycle is given below:

Sr. No	Name of the Post	GEN	SC	ST	OBC	EWS	TOTAL
1.	Assistant Professor	04	02	01	04	01	12

Candidates interested in applying should provide names of three references and upload the following documents: (i) a cover letter, (ii) a CV indicating details of educational qualifications, experience, and publications, (iii) a Research Statement, (iv) a Teaching Statement, (v) a passport-size colour photograph, (vi) an e-signature and (vii) documents claiming reservation, if applying under the reserved category.

The covering letter should be addressed to the following:

The Registrar,
Indira Gandhi Institute of Development Research,
Mumbai- 400 065.

Application should be made **ONLY** through the Institute's website: www.igidr.ac.in/recruitment

The last date for submission of online application is extended till December 15, 2023 (5.00 PM IST)

Institute website: **www.igidr.ac.in**

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राष्ट्रीय शैक्षिक योजना एवं प्रशासन संस्थान
(मानित विश्वविद्यालय)
17–बी, श्री अरविन्द मार्ग, नई दिल्ली–110016

कुलसचिव के पद हेतु भर्ती

कुलसचिव के पद (स्तर 14) को प्रतिनियुक्ति/प्रत्यक्ष/संविदा भर्ती के आधार पर भरने हेतु निर्धारित प्रारूप में ऑनलाइन आवेदन आमंत्रित किए जाते हैं। भर्ती के विस्तृत नियम और शर्तों के लिए कृपया वेबसाइट www.niepa.ac.in पर जाएं। आवेदन जमा करने की अंतिम तिथि 17.12.2023 है।

कुलसचिव (प्रभारी)

NATIONAL INSTITUTE OF EDUCATIONAL PLANNING AND ADMINISTRATION
(Deemed to be University)
17-B, Sri Aurobindo Marg, New Delhi-110016

RECRUITMENT TO THE POST OF REGISTRAR

Online applications are invited in prescribed format for filling up **one post of Registrar (Level 14) on Deputation/Direct/Contractual Recruitment** basis**.** For detailed terms and conditions, please visit the Institute's website **www.niepa.ac.in**. Last date for submission of online application is **17.12.2023**.

Registrar (I/C)

राष्ट्रीय शैक्षिक योजना एवं प्रशासन संस्थान
(मानित विश्वविद्यालय)
17–बी, श्री अरविन्द मार्ग, नई दिल्ली–110016

प्रशासनिक अधिकारी के पद हेतु भर्ती

प्रशासनिक अधिकारी के पद (स्तर 11) को सीधी भर्ती के आधार पर भरने हेतु निर्धारित प्रारूप में ऑनलाइन आवेदन आमंत्रित किए जाते हैं। भर्ती के विस्तृत नियम और शर्तों के लिए कृपया वेबसाइट www.niepa.ac.in पर जाएं। आवेदन जमा करने की अंतिम तिथि 17.12.2023 है।

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Registrar (I/c)

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