



Engineering the Future: A Conversation with PROF. ABHAY KARANDIKAR, DIRECTOR, IIT KANPUR

Q. What is the mission and uniqueness of IIT Kanpur?

As a higher educational institute of national importance, IIT Kanpur aims for excellence in education through a creative and dynamic learning environment. Driven by our motto “Tamaso mā jyotirgamaya” (Lead me from darkness to light), we strive to offer a holistic enabling environment by bridging the gap between academia, industry and society, promoting sustainable research solutions across sectors, and fostering entrepreneurial spirit and skill to youths. Guided by the vision of our founding Director, we strive to ensure that our students inculcate values and leadership qualities that can contribute for the betterment of society and the nation, at large.

Q. What are the learning outcomes that IIT Kanpur focuses on?

Education at IIT Kanpur goes beyond the classroom; our strong system calls for the growth of a comprehensive, research and innovation-driven mindset or outcome, clubbed with the academic requirements. IIT Kanpur wants to give students a solid grounding in knowledge and proficiency in their area of study. We think we can develop future leaders who can make impact in a variety of fields

by encouraging a thorough understanding of theoretical concepts, practical skills, and the capacity to use knowledge in addressing real-world issues.

Q. Placements play a significant role in the career development of engineering students. How does your institute ensure strong placement opportunities for students, and what efforts are made to forge relationships with reputed companies in the industry? Would you like to share some statistics or examples of successful placements from recent years?

At IIT Kanpur, we have a dedicated Students' Placement Office (SPO) headed by a committee comprising faculty representatives to ensure the best of placement opportunities for our students. SPO staff and student volunteer team help in conducting all the necessary placement-related activities. Apart from regular placement preparations, we prioritize fostering industry collaborations, conducting pre-placement talks, encouraging internships, and leveraging our extensive alumni network, to enhance the scope of placement. To forge relationships with companies, we invite them for pre-placement talks with students. This helps in establishing cohesive understanding among students and recruiters. Students are encouraged and supported to pursue internships with renowned companies. Thanks to

the efforts of our SPO team, the placement season of 2022-2023 witnessed an impressive increase in recruiters, with 55 new companies offering internships and job opportunities. More than 60 companies extended 208 pre-placement offers (PPOs), which is a 33% increase as compared to the last year. A total of 1215 students were placed through the SPO during the academic year 2022-23.

This year, the SPO organized the first-ever industry-academia connect, 'SAMVARDHAN', featuring 15+ companies offering career guidance and hands-on experiences. The event provided students with opportunities to connect with employers, network, exchange ideas, and build professional networks. The SPO collaborated with companies and alumni to offer placement and internship opportunities to differently abled students as well, achieving a placement rate of 73%. With a plan of involving more IITs in this initiative in the future, the joint drive aims to expand the reach and impact of the program, helping to provide more opportunities for such students across the country and to promote greater inclusivity and diversity in the workforce.

Q. How does your institute foster an environment of innovation and entrepreneurship among engineering students? Can you provide examples of successful initiatives or startups that have emerged from your institute?

We prioritize providing entrepreneurial encouragement to our students, so that they can transition from being mere job seekers to becoming job creators. We have implemented a dynamic Student Entrepreneurship Policy aligned with the National Innovation & Startup Policy (NISP) and the National Education Policy (NEP) 2020, with a focus on fostering startup incubation among students. Students might choose between taking a semester off and engaging in entrepreneurial activity for registered credits. This initiative intends to further the vision of AtmaNirbhar Bharat (Self-reliant India) and change how people perceive entrepreneurship in society. We have a thriving research and innovation ecosystem at IIT Kanpur, which encourages students and researchers to ideate, innovate and launch their entrepreneurial ventures.

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The extensive portfolio under our technology business incubator, Startup Incubation & Innovation Centre (SIIC) comprises more than 150 startup ventures nurtured within our incubation system, covering a wide range of sectors such as social impact, disability assistance, medical technology, agritech, sustainability, and more.

Over 70 enterprises under the SIIC are led by women. IIT Kanpur's startup ecosystem welcomes students from IITs and other institutions, fostering an innovation-driven mindset among young entrepreneurs. Ranked **number one in the NIRF Innovation Category 2023**, demonstrates the institution's commitment to excellence in academic, research, and innovation, influencing the educational landscape. The goal of AtmaNirbhar Bharat has been supported by a number of IITK startup. **PHOOL's** ground-breaking "flower cycling technology" has sparked revolutionary transformation. It recycles temple flower waste into incense sticks, organic gulaal, vermicompost, and **FLEATHER**, a bio-alternative to animal leather that is also ethically and economically feasible. **PHOOL** has won several awards on national and international level, including the "**BIRAC Innovator Award 2021**". IIT Kanpur's incubator firm, **Noccare**, manufactured invasive high-end ICU ventilators at a low cost. **E-Spin Nanotech** invented and created the Swasa N-95 mask. **EndureAir** manufactures advanced UAV/drone solutions, utilizing IIT Kanpur's expertise in research and development. These drones have been used in disaster

response missions, surveying, and medicine delivery. **Offgrid** is involved in development of efficient & safe batteries using commonly available, eco-friendly materials for the sustainable future. **Kritsnam Technologies**, recognized by DIPP as an Official Start-up for **Make In India** initiative, is a company in the field of IoT with focus on water resource management solutions for the sustainable future.

Q. In today's rapidly evolving technological landscape, what steps does your institute take to ensure that the curriculum remains up-to-date and aligned with industry demands?

To keep up with the dynamic industry and technological advancements, we constantly update our curriculum to meet evolving needs. Our introduction of new interdisciplinary programs, prioritization of hands-on learning through internships, research projects, and experiential courses, and enhancement of student counseling services are some of the priority-based measures. These reforms align with the National Education Policy (NEP) 2020, which emphasizes flexible curricula and multidisciplinary education.

In 2021, we conducted a comprehensive review of undergraduate and postgraduate curriculum, incorporating recommendations from the Undergraduate and Postgraduate Academic Review Committees. Our academic programs already offer flexibility, with options for double majors, minors, dual degrees, and master's degrees in different fields.

Under the curriculum revamp, we proposed additional degree alternatives such as Honours degree and inter-departmental programs encompassing social sciences, communication, humanities, economics, management, and environment (SCHEME). The Institute has introduced the first of its kind eMasters Degree with industry-focused programs, specially designed for working professional to help them learn new skills and extend career opportunities in cutting-edge fields. The undergraduate education framework includes opportunities for student exchange during the Master's phase, admission through global Olympiads, recognition of academic credits for entrepreneurial and industry-based experiences, and an exit option degree for students who choose to discontinue the program.

To further enhance multidisciplinary education as per NEP 2020, IIT Kanpur has also established new departments focused on economic sciences, cognitive science, sustainable energy engineering, design, and space science and astronomy.

Q. What steps does your institute take to promote industry-academia collaboration, practical experience and exposure through internships, or industry projects? Can you

share any notable industry partnerships that have benefited your students?

For any IIT or higher educational institute, ensuring a robust ecosystem of industry-academia collaboration is essential for various institutional as well as student-development goals. At IIT Kanpur, we are committed to foster strong industry-academia collaboration through industry-sponsored research projects, consultancy services, specialized technical assistance, and establishment of industry-focused R&D centers. We actively engage with startup incubation, patent licensing, and technology transfer.

Q. What initiatives or resources does your institute provide to support students in developing essential skills such as teamwork, communication, and leadership, which are crucial for a successful engineering career?

At IIT Kanpur, we prioritize the development of essential skills such as teamwork, communication, and leadership among our students, through a diverse range of initiatives and resources.

Our workshops, training programs, and project-based learning opportunities enable students to enhance

their problem-solving and collaboration abilities. Our Students' Placement Office (SPO) plays a crucial role in their career journey by providing career counseling sessions conducted by professionals, focusing on soft skills, professional communication, and personality development.

We also offer resume writing workshops to assist students in creating impressive resumes. By collecting corporate feedback on employee expectations and sharing feedback from previous placement experiences, the SPO ensures that the graduating students are one-step ahead in their preparations. We also organize career awareness talks by esteemed alumni, further enriching students' understanding of potential career paths.

IIT Kanpur encourages student clubs and organizations to offer platforms for experiential learning and leadership development, as well. The recent development in this regard is the formation of the Toastmasters (TM) Club under the Students' Placement Office.

This Club, established with the support from our alumnus Mr. Suresh Bazaj, aims to enhance the students' communication and leadership skills, and foster self-confidence and personal growth.



Q. In the wake of global challenges like climate change and sustainability, how does your institute incorporate these aspects into the engineering curriculum and encourage students to contribute to sustainable development?

Climate emergency is a grave concern for all and as higher educational institutes, we have a major role to play. IIT Kanpur has established the Chandrakanta Kesavan Centre for Energy Policy and Climate Solutions. It assists policy makers with practical solutions to the problems of climate change. The Centre is the driving force behind IIT Kanpur's commitment to carbon neutrality. A master's program with a focus on Energy, Technology, and Policy as well as an online master's program in Energy, Technology, Economics, and Policy have been undertaken as a component of this centre. As far as curriculum is concerned, IIT Kanpur has a dedicated Department of Sustainable Energy Engineering, which, apart from offering degree programs at the juncture of sustainability, alternative energy, and climate change, also offers multidisciplinary research opportunities that hold the potential to contribute to the larger national goal. Our state-of-the-art research facilities give the students an opportunity to be engaged in air pollution assessment projects, river and water resource management projects, and many more. We also have a student-led 'sustainability cell' and Indian Green Building Council (IGBC) Student Chapter, through which, we are extending the scope for our students to contribute significantly to sustainable development.

Q. One thing that really interests aspirants is the campus life of an institute, especially when it's their home away from home. How would you describe that at IIT Kanpur?

We are fortunate to enjoy a thriving campus at IIT Kanpur with a variety of flora and animals, including the peacock—our country's pride. We strive to ensure that the students have all kinds of facilities for their personal as well as professional development within the campus. The office of the Dean of Students' Affairs takes care of all the activities pertaining to student's growth. The Student's Gymkhana, and the Sports and Physical education Committee (SPEC) are responsible for organizing various events. Students get ample scope to engage in extracurricular activities and form collectives to pursue their hobbies at IIT Kanpur.

Q. Finally, what advice would you give to aspiring engineers who are considering pursuing their engineering education and aspirants who are yet to join engineering programs? What sets your institute apart and makes it an ideal choice for engineering aspirants?

I believe that all the students who are aspiring to pursue a career in engineering courses, shall choose branches of study as per their strength, not as per what others think or opine. Many a times, suggestions or pressure from peers or others may misguide students. They should map their strengths first and prioritize the next course of action based on that. In my view, the IITs shall not be compared based on mere rankings as

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all have unique offerings for students based on their courses of study.

At IIT Kanpur, we have been prioritizing study and research in various inter-disciplinary domains. We also have one of the most flexible academic programs with choices for a double major, minor, and dual degree as well as the option of a master's degree in a different area. IIT Kanpur has been paving the way and has been a top choice for aspirants, starting with the first computer-related courses in India with the arrival of the IBM 1620 to IIT Kanpur in 1963 and now incorporating the new emerging domains like artificial intelligence and machine learning. ■■