DIRECTOR'S REPORT

Honorable Shri N. R. Narayana Murthy, Founder, Infosys Limited, Dr. K. Radhakrishnan, Honorable Chairperson, Board of Governors of IIT Kanpur, Members of the Board of Governors, Members of the Academic Senate, all graduating students and their family members, members of faculty, alumni, staff, and student community: I heartily welcome you all to the fifty-sixth convocation of IIT Kanpur. I would also like to congratulate the graduating students and their families on this joyous occasion.

ACADEMIC ACTIVITIES

After several waves of the COVID-19 pandemic and the related challenges, the session has successfully brought back academic normalcy. It is my privilege to share some of our activities for this year.

I am happy to inform you that the total number of PhD degrees awarded at this Convocation is 251. In our efforts to encourage outstanding scholars, the Senate has approved the provision for an additional Master's degree to be awarded along with a PhD, subject to fulfilling a defined set of academic requirements. I am glad to inform you that 15 students are graduating in this Convocation's fifth batch of MTech and PhD Joint Degrees. I am also happy to convey that the first batch of 68 students of the eMasters programme will be conferred a degree today in this 56th Convocation.

In all, 2125 degrees are being awarded at this Convocation with the following details:

Graduation Data

Degree	Number of Recipients
PhD	236
MTech-PhD (Joint Degree)	15
MTech	483
MBA	21
MDes	16
MS (by Research)	51
PGPEX-VLFM	40
DIIT	1
MSc (2-yr)	150
eMasters	68
Double Major	18
Dual Degree	124
MS-PD (MS part of the Dual Degree)	14
BTech	739
BS	149
Total	**2,125**

In keeping with the flexibility that IIT Kanpur academic Programme is known for, 37 students are graduating with two Minors, whereas 191 students are graduating with one Minor. You will be delighted to know that 12 graduating students are graduating with three Minors, and 1 student is graduating with four Minors. In all, 305 Minors are being awarded. In addition, by spending one additional year at the Institute, 124 undergraduate students are graduating with a Master's degree and the Bachelor's, while 18 of our undergraduate students are graduating with a Second Major. 15 of our postgraduate students are graduating with an additional Master's and PhD degrees by doing other credits. Of the 1,030 students of the Bachelor's and Bachelor's-Master's dual degree programmes who are being awarded the degree today, 240 students are graduating with Distinction (CPI of 8.5 and above). To keep pace with the evolving knowledge in science, technology, and other areas, the Senate has approved 92 new undergraduate courses and 119 new postgraduate courses from June 1, 2022 to May 30, 2023.

It is a great pleasure to inform you that the graduating students have been issued their degrees conferred at the 56th Convocation today in the physical as well as digital modes. The degrees are shared through an in-house blockchain-driven technology developed at our Institute under the National Blockchain Project. The digital degrees are also being uploaded to the National Academic Depository.

Academic Initiatives

Several academic initiatives to strengthen our educational programs in the long run have been undertaken this year.

Postgraduate Academic Review Committee (PGARC)

As part of its decadal review of academic programs and associated curricula, IIT Kanpur has announced a comprehensive revamp of its post-graduate curriculum, laying down a new template with path-breaking features. The transformative steps were part of the Postgraduate Academic Review Committee Report (PGARC 2020-21) approved by the IIT Kanpur Senate in its 556th meeting in May 2023.

MTech programme in "Cognitive Systems" by the Department of Cognitive Science

While the other institutions in India offer MSc and PhD programs in Cognitive Science, there was a need for programmes that focus on basic research and technological aspects of Cognitive Science studies. The proposed MTech in Cognitive Systems attempts to bridge this gap between basic research, technological developments, and applications. The applications of interest would include domains like Education, Clinical Neuroscience, etc., where technological systems and devices based on Cognitive Science will play a significant role.

MTech programme in "Unmanned Aerial Systems" by the Department of Aerospace Engineering

The Department of Aerospace Engineering at IIT Kanpur has been leading the effort in this domain through various technology developments and demonstrations; it is prudent for the department to anchor this unique interdisciplinary MTech course in Unmanned Aerial Systems (UAS). With the availability of experts, a dedicated runway, a flight-testing laboratory, and a National Wind Tunnel Facility, IIT

Kanpur is well equipped to coordinate and manage the MTech programme on UAS.

Two-year MSc programme in "Economic Sciences" by the Department of Economic Sciences

The Department of Economic Sciences launched a two-year programme in Economic Sciences. The potential for interaction with other sciences, including social sciences and engineering, will impart a distinct interdisciplinary flavour to the programme, making it distinct from many currently taught Master's programs in India. This programme allows us to be at the forefront of research and teaching in Economics. The Master's programme will facilitate the incorporation of the ever-expanding domain and ever-growing technical complexity of Economics as a subject.

eMasters programme in "Sustainable Construction Practices and Project Management" by the Department of Civil Engineering

The Department of Civil Engineering started an eMasters programme in Sustainable Construction Practices and Project Management. Recently, the competitive attitude among the stakeholders and financial constraints have made any project quite challenging. In this context, a proper blend of academic and industrial thoughts is much appreciated to excel in this field. Experts from both academia and industry will teach this course. The course is intended to prepare the students to effectively learn project management and modern and sustainable construction practices in civil engineering.

eMasters programme in "Business Intelligence & Data Science" by the Department of Industrial & Management Engineering

The Department of Industrial & Management Engineering launched an eMasters programme in Business Intelligence & Data Science. It aims to give learners a comprehensive introduction to essential data science tools pertinent to business intelligence, including a conceptual approach of mining and analytical methodologies for precise descriptive and predictive analytics. The programme is designed to address the needs of practitioners from diverse backgrounds ranging from engineering, management, finance, economics, law, and public administration.

eMasters programme in "Fintech Management" by the Department of Industrial & Management Engineering

The foundation of digital payment and transaction is the financial technology which also includes cybersecurity, blockchain, and other operational risks. The Department of Industrial & Management Engineering has launched an eMasters programme in Fintech Management to educate working professionals in one of the world's fastest-growing industries. The eMasters in Fintech Management addresses the needs of practitioners from diverse backgrounds ranging from engineering, management, finance, economics, law, and public administration either from the digital finance sector or those who wish to pursue a career in the same.

eMasters programme in "Economics and Finance for Business" by the Department of Economic Sciences

Any business programme is significantly impacted by knowledge of economics and finance. The Department of Economic Sciences launched an eMasters programme in Economics and Finance for Business to meet the growing demand of working professionals to update their knowledge in economics and finance. This programme offers a unique opportunity to learn economics and finance from business intelligence and decision-making perspectives. The programme offers a unique opportunity for business professionals to grasp a practical understanding of different economic tools and pricing mechanisms.

eMasters programme in "Economics, Finance, and Data Analysis" by the Department of Economic Sciences

The popularity of economics, finance, and data sciences has made economics indispensable. The Department of Economic Sciences launched an eMasters programme in Economics, Finance, and Data Analysis for Businesses to meet the rising demand of working professionals to update their knowledge with the latest developments. This programme offers a unique opportunity to learn economics and finance with solid exposure to quantitative economics and data analysis skills. The programme suits industry-specific demands in the banking, financial services, and consultancy domains. It offers unique opportunities to budding economists and early career and mid-level economic professionals.

eMasters programme in "Economics, Finance, and Public Policy" by the Department of Economic Sciences

A new eMasters programme in Economics, Finance, and Public Policy was developed by the Department of Economics Sciences to meet working professionals' needs and provide them with the most recent information and developments. This programme offers a skill-based learning opportunity for policymakers and regulators working with central and state ministries/departments. This programme is unique as it provides a learning opportunity to shape-up the thought process on different aspects of public policy planning and implementation-specific modules on public policy, public finance, programme evaluation, and applied macroeconomics and finance.

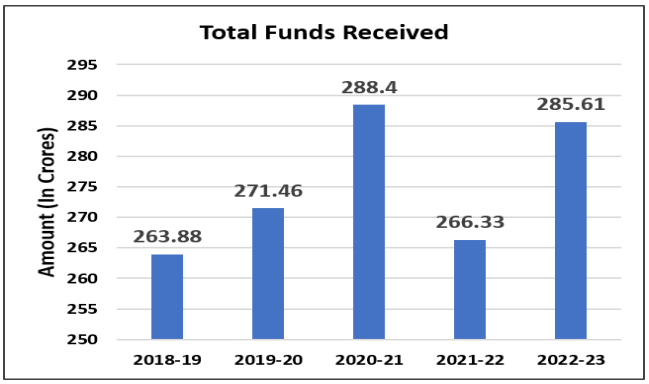
RESEARCH & DEVELOPMENT

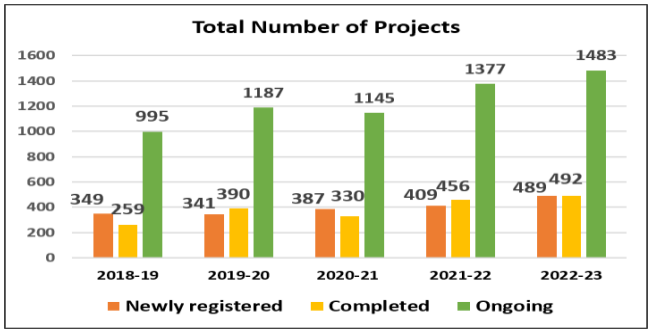
IIT Kanpur has registered steady growth in its research and development activities this year.

Research Highlights

- 1483 externally funded ongoing projects with a total sanctioned amount of Rs. 1449.39 crore.
- 298 sponsored projects were sanctioned during 2022-23 worth Rs. 139.08 crore.
- 191 consultancy projects were sanctioned during 2022-23 of Rs. 82.73 crore.
- During 2022-23, total funds received for sponsored projects are Rs. 215.18 crore and for consultancy projects are Rs. 70.43 crore.

Sponsored Research
(a five-year summary)





Leading Funding Agencies

National Security Council Secretariat	Rs. 26.07 crore
Science and Engineering Research Board	Rs. 24.20 crore
Department of Science and Technology	Rs. 14.98 crore
Ministry of Education	Rs. 8.97 crore
Indian Council of Medical Research	Rs. 6.90 crore

Five major funding agencies with sanctioned amount.

Leading Funding Industry Partners

Tata Steels, Vedanta Ltd., Mekon Ltd. Ranchi, Wavetek Microelectronics and Shell.

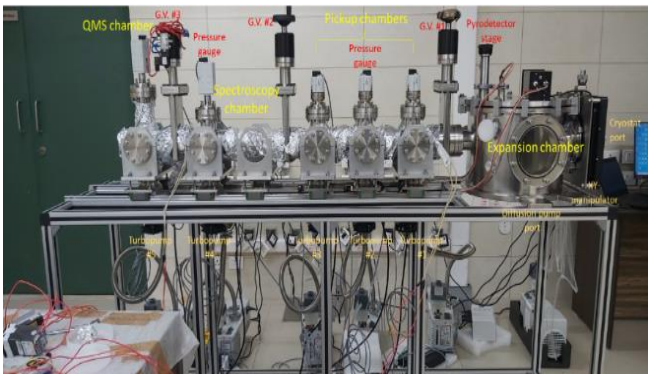
Major Projects Sanctioned

Some of the major projects sanctioned for the year 2022-2023 are mentioned below.

Exploring Chemistry at the Molecular Level Using High-Resolution IR Spectroscopy in Superfluid Helium Nanodroplets – funded by Science and Engineering Research Board

A helium droplet spectrometer is being set up at IIT Kanpur. The set-up will be the first such spectrometer in India. It is one of the ~15 in the whole world. Helium droplets are clusters of helium atoms, which have an equilibrium temperature of 0.37 K. These droplets are superfluid. Molecular beams of these droplets can be produced by expanding ultrapure helium gas (99.9999% purity) into the vacuum (~1 × 10^{-6} mbar) from a precooled nozzle (temperature 8-22 K, backing pressure 20-80 bar) of 5-micron diameter. The produced droplets then pass through multiple vacuum chambers, which have a background pressure of < 5×10^{-9} mbar and are finally detected by a quadrupole mass spectrometer attached to the last vacuum chamber.

Isolation of single molecules as well as the formation of large molecular aggregates can easily be achieved inside droplets. Molecular-level pathways of chemical reactions, occurring at sub-kelvin temperatures relevant to interstellar chemistry, can be traced. The project aims to study these molecular processes using high-resolution infrared spectroscopy. For this, the helium droplet setup will soon be coupled with a high-resolution (linewidth ~ 0.0001 cm^{-1}), broadband (2500-4500 cm^{-1}) mid-infrared laser source to study, e.g., O-H, N-H, C-H, O-D, C-D, and S-H, vibrations of the molecules and molecular aggregates.



Laboratory Testing for Ongoing Study on Hydrogen Blending in Natural Gas Pipeline- funded by GAIL (India) Ltd.

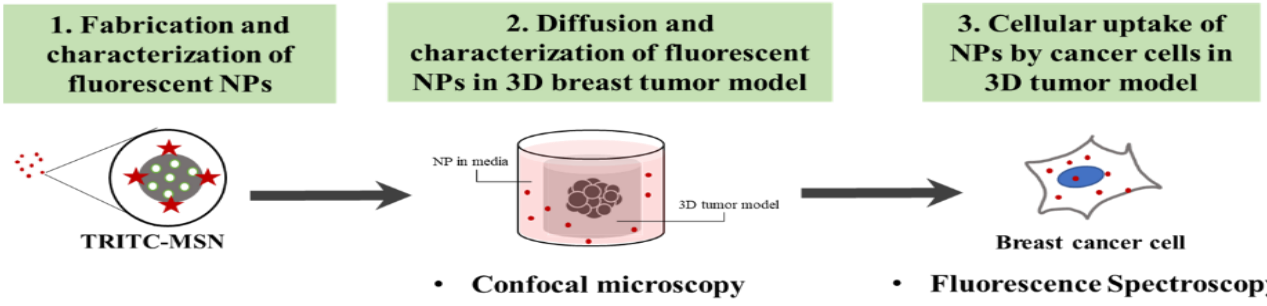
As part of the National Hydrogen Mission, GAIL (India) Ltd. has entrusted IIT Kanpur to determine the appropriate blend of hydrogen into natural gas that can be passed through the existing pipeline network avoiding considerable damage due to hydrogen embrittlement.

The project entails systematic testing of steel pipelines in hydrogen environment maintained at high pressure around 100 bar. This requires design and development of permeation chambers and in-situ testing facilities that will facilitate mechanical testing of steel specimens in hydrogen blended natural gas at IIT Kanpur.

Understanding and Overcoming the Acellular Barrier of Breast Tumors for Improving Nanoparticle Mediated Chemotherapy – funded by Department of Biotechnology

Advanced stage breast cancers are stiffer than lower stage tumors. The stiffness is associated with fibrosis which acts as a barrier for nanoparticle (NP) penetration, thus contributing to poor clinical translation of NP-based therapies.

TRITC- Tetramethylrhodamine
MSN- Mesoporous Silica Nanoparticles



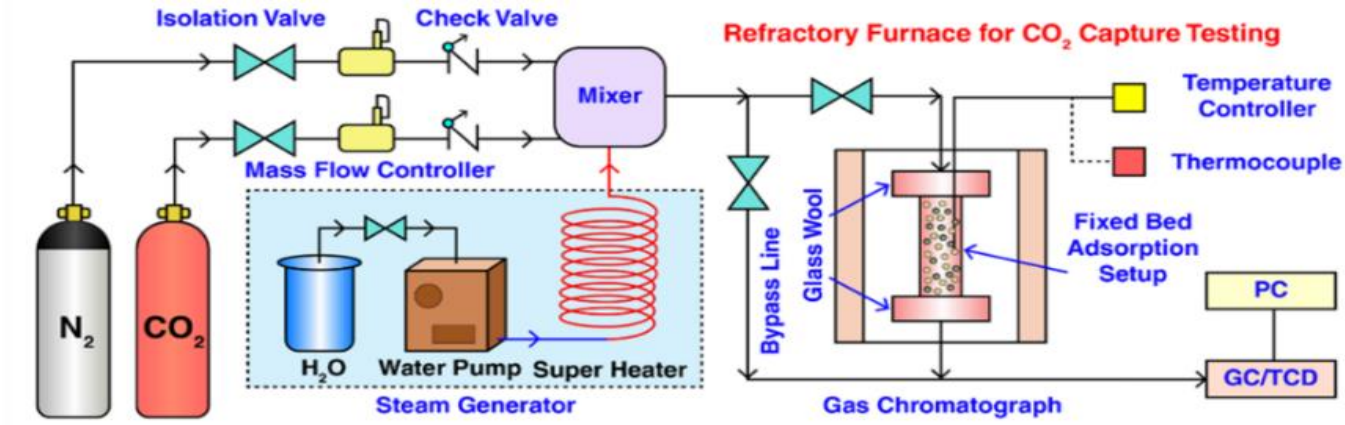
This project proposes to study the diffusion of NPs in a 3D breast tumor model of varying stiffness associated with cancer progression. Furthermore, it proposes a sequential delivery of collagenase followed by niclosamide (a potential anti-fibrotic agent), using pH responsive NPs. Collagenase is expected to degrade stiff hydrogel (which mimics tumor stroma) and niclosamide is expected to inhibit the deposition of new extra cellular matrix, thus facilitating an improved NP penetration and accumulation into the tumoroid.

The improved bioavailability of NP in the tumor is expected to significantly enhance the therapeutic efficacy of traditional chemotherapy. Moreover, the proposed strategy can be used as a platform technology for other solid tumors as well as fibrotic diseases.

Utilization of Coal Gangue to Develop Porous Adsorbents for CO_2 Capture – funded by Ministry of Coal

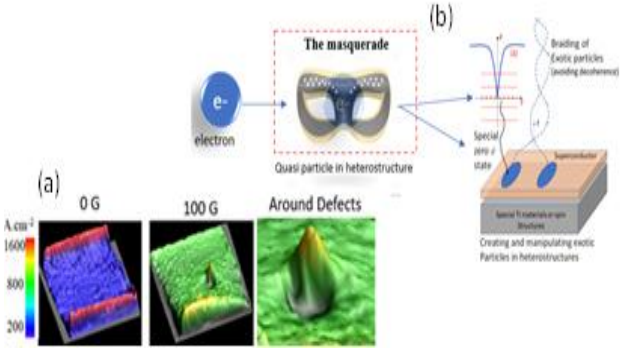
Carbon capture, utilization, and sequestration (CCUS) is a promising technique to mitigate global warming as we continue to gradually switch towards cleaner fuels. In this technique, carbon dioxide, emitted from various sources including power plants and industries, is captured, utilized as feedstock for various chemicals, and injected into the subsurface including deep sea aquifers and depleted oil and gas fields.

Currently, amine-based processes are commonly used for carbon dioxide capture. However, this technique has various disadvantages including being energy intensive and requiring expensive solvents. The objective of this study is to develop low-cost porous adsorbents for carbon dioxide capture utilizing waste material generated during coal mining process.



Building a unique Magneto-optical setup with capability for simultaneous imaging of electric current, magnetization & bulk transport measurement at low temperature with vector magnet for imaging strong correlation driven Topological Insulator & its heterostructures – funded by Science and Engineering Research Board

A unique setup for imaging electric current distribution for application in the domain of advanced quantum materials and devices is developed at the Magneto-Optical imaging lab of IIT Kanpur. Redesigning of the system is ongoing, with a view to achieve enhanced sensitivity between room to cryogenic temperatures, and in low to very high magnetic field environments.



Using this, the project aims to explore strong correlation driven physics in new Quantum materials like Topological Insulator (TI) and their heterostructures, hosting unexpected new quantum phases and phenomena. Such systems potentially host robust new topologically protected quantum states which help avoid decoherence issues of quantum information bits. The development of the imaging technique to image electric currents down have already been demonstrated to a few milli-Amperes.

Ambient air quality Monitoring over Rural areas using Indigenous Technology (AMRIT) – funded by Open Philanthropy

Air pollution is an environmental threat that causes the mortality of more than a million people in India every year, as per the Disease Burden India report. Previously, Air Quality (AQ) research highlighted more insights about urban AQ in India, but more knowledge is needed about rural AQ.

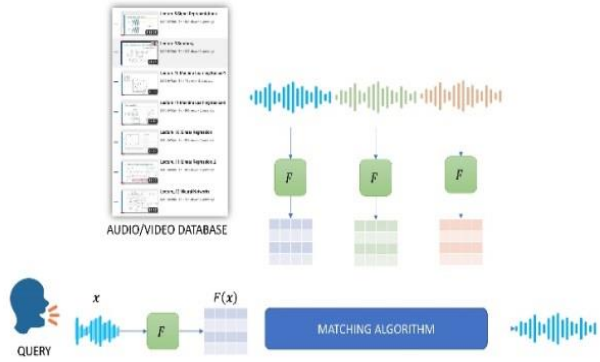
This project aims to support rural AQ monitoring. The objectives of this project are to create micro airsheds within the different states to effectively manage the AQ at the district level by understanding the contributions from various sources. Furthermore, the rural AQ data from the project will be utilized for science and policy development for better rural AQ management plans to avoid adverse impacts on citizens' health. Initially, the project aims to monitor the rural AQ over Bihar and Uttar Pradesh in collaboration with respective State Pollution Control Boards. The project will create the research facility using indigenous technology with the support of two start-ups: Respirer and Airveda.

Indo-Italian Centre of Excellence for Restoration and Assessment of Environmental Impacts on Cultural Heritage Monuments – funded by Department of Science & Technology and Italian Ministry of Culture

The national monuments must be restored and maintained so that they last for many generations. The adverse impact on the monuments can be both from natural and anthropogenic occurrences. This requires repairs, reinforcement and restoration work to continue adopting modern technologies. It also requires that one understands the cause-effect relationship for the health of the monuments and heritage buildings. The potential damage to the historical monuments from air pollution can cause structural and aesthetic harm to the monuments.

The objective of this project is to undertake joint research activities by the Indian and Italian sides from academia, exchange of knowledge, and experience, train research scholars who will provide support for the relevant activities, identify the monuments requiring restoration and conservation work, and demonstrate restoration. The proposed network of excellence is expected to achieve a long-term collaboration between India and Italy including the exchange of knowledge, experience, research and technology development, publications, and training of research scholars and post-doctoral fellows. The other outcomes include demonstrating monument conservation and restoration in India and Italy and study of the environmental impacts on monuments.

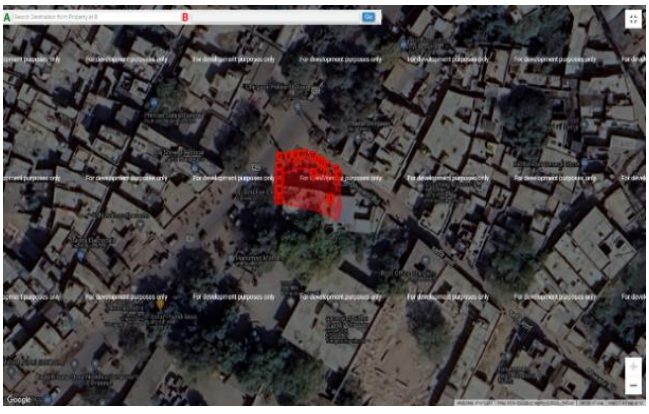
Speech Technologies In Indian Languages - funded by Ministry of Electronics and Information Technology



Search is a problem ubiquitous in diverse domains and modalities. Speech search engine plays a vital role in numerous speech communication applications, including audio/video search and retrieval, audio broadcast monitoring, and voice-based surveillance. The performance of the speech search system depends critically on the representation of the speech signal. A good feature representation should be speech-specific, and at the same time, it should be robust to the speaker and channel variability. In this project, we are developing two kinds of speech search systems – (i) language-dependent (works for a specific language), and (ii) language-agnostic (works for any language). The system will be used for NPTEL audio/video search for Indian languages.

GIS (Geographic Information System)/GPS (Global Positioning System) Mapping of Waqf Properties in The State of Uttar Pradesh - funding by Uttar Pradesh Sunni Central Waqf Committee, Lucknow

The main objective of the project is to digitally map all the properties that fall under Sunni Waqf Board of UP including Mosque, shops, houses, agricultural land etc. GIS/GPS



mapping of such properties are done in field to gather all information on a Digital Platform. The project intends to track the growth of properties over the past 40-50 years, identify encroached properties and provide valuable insights into the changing landscape and potential trends for the Sunni Waqf Board. By having a comprehensive and accurate record of properties, the Sunni Waqf Board can identify any underutilized or unutilized assets that could be developed or monetized to generate additional income. This increased revenue can benefit both the board and the government.

Similar successful initiatives have been undertaken in Punjab, Gujarat, Andhra Pradesh, and Himachal Pradesh.

COLLABORATIONS THROUGH MoUs

IIT Kanpur and **Centre of Bio Medical Research (CBMR)**, Lucknow signed an MoU to undertake translational research with special reference to patient care. The areas identified for collaboration are AI in healthcare, biomedical devices, identification & synthesis of small molecules for drug discovery.

An MoU has been signed between IIT Kanpur and **Central Manufacturing Technology Institute (CMTI)**, Bangalore to collaborate as strategic partners for undertaking R&D activities in Laser Technology, Photonics Sciences & Engineering, Advanced Manufacturing, Machine tools and related thrust areas of technology.

An MoU was signed with **New Energy and Industrial Technology Development Organization (NEDO)** to support the implementation of the study for the LCA Analyses of Hybrid Electric Vehicles vis-a-vis Internal Combustion Engine Vehicles and Electric Vehicles in India.

National Highways Infrastructure Development Corporation Limited (NHIDCL) and IIT Kanpur signed an MoU to establish the basis of collaboration to take up various activities of common interest such as sharing knowledge on innovative ideas and technologies in the field of highway engineering and others as per mutually agreed terms and conditions.

Defense Research and Development Organization (DRDO) exchanged MoU for setting up DRDO Industry Academia Centre of Excellence with IIT Kanpur in the presence of Hon'ble Raksha Mantri Shri Rajnath Singh at DEFEXPO22 in Gandhinagar. The centre at IIT Kanpur will focus on advanced materials and flexible electronics.

IIT Kanpur and the **University at Buffalo (UB)**, the State University of New York have signed an MoU to establish the IIT Kanpur-UB Joint Centre of Excellence in Biomedicine and Bioengineering at IIT Kanpur. It is a step forward in continuation of the MoU we signed last year with UB.

IIT Kanpur and **University of California at Santa Cruz (UCSC)** have signed an MoU for collaborations including exchange of faculty & students, joint research activities, exchange of academic publications and short-term programs/visits.

Building upon the previous MoU, IIT Kanpur and **Rice University, USA** signed cooperation agreement that sets out guidelines for the two universities to develop joint research and academic engagements in the broad areas of Engineering, Sciences, Medicine/Healthcare, Humanities, and Management/Business.

IIT Kanpur has signed an MoU with **RITES Ltd.**, the leading Transport Infrastructure Consultancy and Engineering under Ministry of Railways. It aims to strengthen and develop a sustainable future by working together towards decarbonization in various sectors and NetZero, complemented by climate change studies.

IIT Kanpur will collaborate with **Niche Agriculture & Pharmaceuticals Limited** for research in the field of formulation of advanced medicines for treating chronic medical conditions. An MoU was signed in the presence of Mr. Harisharan Devgan, Chairman, Niche Group of Companies.

Mr. Ajay Dubey (BT/CHE/1980) and his wife, Mrs. Rooma Dubey, have generously donated Rs 2 crore towards the establishment of "**Rooma & Ajay Dubey Healthcare Innovation and Ideation Program**" (HII) at IIT Kanpur. The program will support student start-ups in developing innovative solutions and technologies in medical care, for which an MoU was signed at IIT Kanpur.

IIT Kanpur and **Bharat Heavy Electricals Limited (BHEL)** have signed an MoU to jointly work on the emerging opportunities in the Indian Defense and Aerospace sectors.

R&D Events

Participation of IIT Kanpur in UP Global Investor's Summit 2023 IIT Kanpur participated in the UP Global Investors Summit 2023 in Lucknow. The three-day long Summit aimed to bring together policymakers, corporate leaders, business delegations, academia, think tanks, and government leaders from across the globe to explore business opportunities and forge partnerships collectively. Cutting-edge innovations and technologies developed under different departments and centres at IIT Kanpur, C3i Hub, Startup Incubation and Innovation Centre, IIT Kanpur, Centres for Excellence in AI, Centre of Drones, and Defence Industrial Corridor and startups incubated at IIT Kanpur participated in the event exhibiting their products across various domains. Hon'ble Chief Minister of Uttar Pradesh Shri Yogi Adityanath ji and Hon'ble Union Cabinet Minister Shri Nitin Gadkari ji visited IIT Kanpur stall in UP Global Investors Summit 2023.

IIT Kanpur's participation at inter IIT Research fair IInven Tiv 2022

An inter IIT research fair "IInven Tiv" was organized at IIT Delhi on October 14 and 15, 2022 to bring together key stakeholders from the industry, government institutions and academia to collaborate, exchange ideas, learn and innovate. The event was inaugurated by the Hon'ble Union Minister of Education and Minister of Skill Development & Entrepreneurship, Shri Dharmendra Pradhan ji. Around twenty-three IITs participated in this event and displayed seventy-five technologies. Along with students, IIT alumni from around the world, faculty from different CFTIs, and scientists from DRDO, ISRO, CSIR, and ICAR and representatives from the Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce & Industry (FICCI), and National Association of Software and Service Companies (NASSCOM) participated. IIT Kanpur displayed twelve technologies, and among these, two technologies, namely Drone and 5G test bed, were chosen as showcase technologies. IIT Kanpur had the highest number of projects at this event.

Research Infrastructure

DRDO Industry Academia Centre of Excellence (DIA-CoE), IIT Kanpur

DRDO has signed an MoU with IIT Kanpur for setting up the DRDO Industry Academia Centre of Excellence IIT Kanpur (DIA-CoE, IIT Kanpur), for collaborative directed research under identified research areas. DRDO and IIT Kanpur have jointly decided the following research verticals:

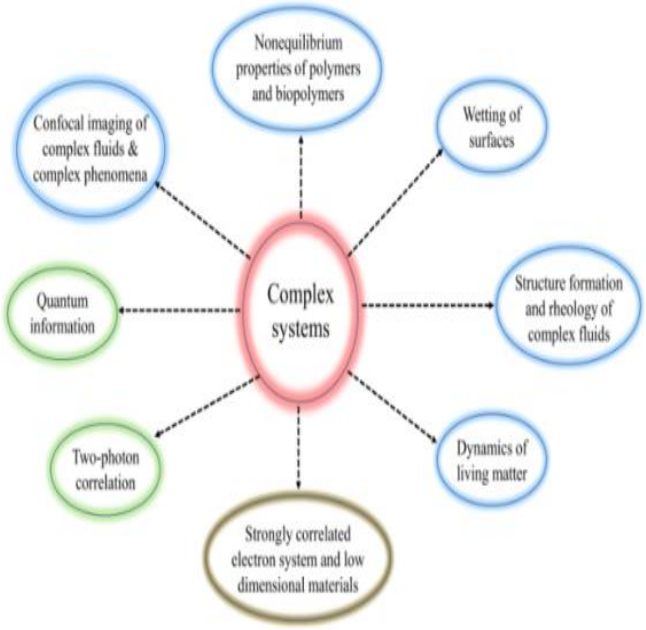
- Printing on Flexible Substrates
- Advanced Nanomaterials
- Accelerated Material design and development
- High Energy Materials
- Bio- Engineering

Integrated Clean Energy Material Acceleration Platforms (ICMAP)

In a new collaborative initiative in energy innovation launched by the Department of Science & Technology, Govt. of India, IIT Kanpur has been adjudged as a lead institute to lead one of the three Integrated Clean Energy Material Acceleration Platforms (ICMAP). The Integrated Clean Energy Material Acceleration Platforms were launched at the Mission Innovation (MI) Annual Gathering session on 4th April 2022, by Hon'ble Minister of Science and Technology Dr. Jitendra Singh ji. He awarded the citations to the three respective centre leads of the Clean Energy Material Acceleration Platforms.

These Material Acceleration Platforms are set up with the aim of leveraging emerging capabilities in next-generation computing, artificial intelligence (AI) and machine learning (ML), and robotics to accelerate the pace of materials discovery up to 10 times faster.

Advanced Experimental Facility for Probing Complex Materials and Phenomena



Through this research funding, Department of Physics wishes to improve our abilities to study various complex materials and phenomena in a range of systems including complex fluids, living matter, and quantum materials. To this end, we are in a process to develop a central facility with state-of-the-art confocal microscope, rheometer, q-CMOS cameras, and refurbishing the existing PPMS. Specifically, we would like to image and perform mechanical measurements (rheology) of soft and living matter, also in *operando conditions*. Furthermore, coupling the rheometer with the confocal imaging would open enormous possibilities within the domain of our research interests. The q-CMOS cameras will be used to study coherence and entanglement of high-dimensional quantum states. PPMS will be helpful in investigating emergent quantum phases in strongly correlated electrons systems and low dimensional materials. We believe that the current FIST proposal will allow us to develop these facilities and thereby strengthen our capabilities as a department in addressing the pressing problems in various areas as depicted in the figure.

New Initiatives

Study Centre for Indian Knowledge System for Holistic Advancement

IIT Kanpur launched ŚIKṢĀ (Study Centre for Indian Knowledge System for Holistic Advancement) on the auspicious occasion of Akshaya Tritiya. The centre's mission is to promote, facilitate, and benefit from Indian Knowledge & Linguistic studies, Consciousness studies, Archaeo-metallurgy & Materials, Darsanas, Acoustics & Music, and Water management systems.

INNOVATION AND INCUBATION

During the Financial Year 2022 – 23, 114 IPR's were filed by the Institute including 88 Indian Patent applications, 3 US Patents, 20 Design registrations, 1 Trademark application and 2 Copyrights, 121 previously filed IPRs were granted, and 6 technologies were licensed to Industry Partners.

Till date, 944 IPRs have been filed, out of which 465 have been granted so far along with 129 technologies licensed for commercialization.

Technology Licensed (2022-23)

A gene therapy technology for hereditary eye diseases

In a historic moment, a pioneering technology has been licensed to Reliance Life Sciences Pvt. Ltd. that has the potential to revolutionize the field of gene therapy, especially for many genetic eye diseases. There are many inherited disorders caused by a faulty gene. 'Gene Therapy' replaces the faulty gene with a functional version of the gene to treat such disorders.

This marks a momentous occasion where a gene therapy related technology developed in an academic institution has been transferred to a company in India. The gene therapy technology from IIT Kanpur, which has been protected with an *Indian Patent Application No. 201811035192,* will be further developed as an Indigenous Product by Reliance Life Sciences.

Developed by Professor Jayandharan Giridhara Rao and Mr. Shubham Maurya from the Department of Biological Sciences and Bioengineering (BSBE), IIT Kanpur, the patented technology modifies the gene of an organism to treat a hereditary disorder. In this case, the site refers to a specific location on an Adeno-associated virus (AAV) (viral vector) used for gene therapy. The technology modifies this location to optimize its ability to deliver genes to the affected cells and improve its effectiveness. The technology has the ability to improve gene therapy for many hereditary diseases, especially inherited eye diseases. It has shown significant promise in correcting the vision impairment in animal models of blindness. The technology holds great promise for treating a wide range of hereditary eye diseases including Leber congenital amaurosis, an eye disorder that is present from birth; and Retinitis pigmentosa, a disease causing progressive sustained vision loss.

A Tactile smart watch for visually impaired

An invention developed for the visually impaired has been licensed to Ambrane India Pvt. Ltd. for mass manufacturing and sales. It is a novel touch sensitive haptic smart watch for the visually impaired and blind persons, developed by Professor Siddhartha Panda and Mr. Vishwaraj Srivastava from the National Centre for Flexible Electronics at IIT Kanpur. The invention has been granted an Indian Patent No. 406040.

The haptic watch addresses the drawbacks of the conventional technologies. It has 12 touch sensitive hour markers arranged over the dial face. User needs to scan the markers with his/her fingers. Suppose the time is 3:40, 3rd and 8th marker will be termed as the active markers. There will not be any response on inactive markers but on touching the active markers, vibration pulse gets generated. A long pulse on 3 will indicate hours and a short pulse on 8 will indicate minutes.

This watch is a fusion of tactile and vibration watches. The complexity of vibration watch generating more than 20 pulses has been reduced to 2 pulses and the fragile nature of a tactile watch is eliminated. Thus, the watch is easy to use and scores on privacy, affordability and robustness.

Tactile watch for visually impaired

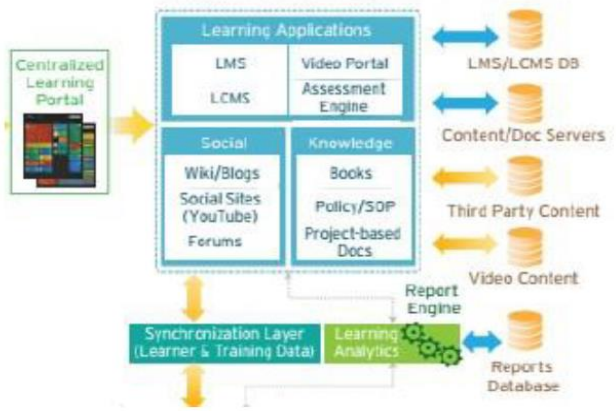
This variant of the technology, i.e., the smartwatch, is equipped with smart features to indicate health parameters such as heart rate, step count, hydration reminder and smart timer to set short timer by using simple gestures. The existing smartwatches for the blind and visually impaired use audio-based output which is not private, and users generally may not feel confident using it everywhere and the braille smartwatch is expensive. The developed smartwatch which offers a tactile-haptic interface for display of time and health parameters, addresses these drawbacks. The use of innovative haptic icons makes it easy to navigate the menu and a simple gesture like the double-tap can open a particular health monitoring app. These numbers are communicated in a similar way as the time.

Online/ Offline hybrid delivery platform

The technology is a learning platform, which has been licensed to IIT Kanpur Foundation and Advanced Continuing Education & Training (IFACET) with an objective of improving the quality of faculty of institutes, colleges in the respective States/UTs through faculty training programs for:

- Engineering, Polytechnics etc. in emerging areas of Electronics & IT.
- Arts, Commerce & Science colleges etc. on utilization of IT tools and techniques for application in their respective domain of knowledge/ learning/ teaching/ enhancing productivity.
- To develop state-of-the-art facilities like technical labs, well equipped library, interactive virtual learning facility etc.

It is an online dynamic platform for designing and delivering E&ICT courses to a large audience in a very short period, through social, mobile, analytics, and cloud technologies. The online delivery model has been designed, developed and deployed by IIT Kanpur. This platform has an ability to handle 30,000+ quizzes to be attempted daily (~ 10,000 teachers), with minimal incremental cost for both delivery of the courses and launch of new facilities.

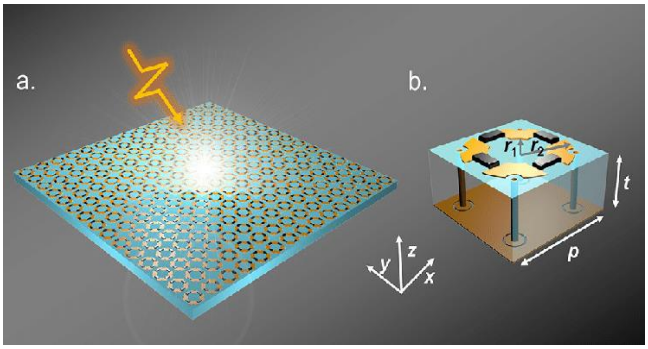


Textile based metamaterial absorber with broadband absorption

The technology has been licensed to an industry partner for an increasing usage of electromagnetic metamaterial for communication applications, including new forms of metamaterial-enabled personal communication satellites and radar. The technology has been invented keeping in mind the increasing demand for communication antennas for applications such as satellite communication, Wi-fi Router, radar communication and 5G communications. Optical filtering, medical devices, remote aeronautical operations, sensor detectors, solar power management, crowd control, radomes, antenna lenses, and even earthquake protection are all possible applications of Metamaterials.

Metamaterial Absorber

A technical know-how - metamaterial absorber has been licensed which is a type of material intended to efficiently absorb electromagnetic radiation such as light. Metamaterials are an advance in materials science. Hence, those metamaterials that are designed to be absorbers offer benefits over conventional absorbers such as further



miniaturization, wider adaptability, and increased effectiveness. Intended applications for the metamaterial absorber include emitters, photodetectors, sensors, spatial light modulators, wireless communication, and use in solar photovoltaics and thermophotovoltaics.

STARTUP INCUBATION AND INNOVATION CENTRE IIT KANPUR

Noteworthy Events and Programs in the Year 2022-23

- Around 16 incubated startups joined SIIC in a delegation to Singapore to meet more than 8 international industrialists and Venture Capitalists. The visit has initiated a dialogue to strengthen bilateral ties with Singapore's business community.
- DWIH-German Centre for Research and Innovation organized 'Innovators Connect Tandem Program' in collaboration with SIIC & C-CAMP to enable international alliance among German and Indian

early-stage entrepreneurs. 16 early-stage startups participated in all, 3 were from SIIC & C-CAMP.

- The 1st ASEAN-India Startup Festival which was part of the overall ASEAN-India Science**,** Technology and Innovation Cooperation program between the ASEAN COSTI and DST**,** GoI. SIIC coordinated AISF'22 along with BRIN, Indonesia, which received impressions from more than 10,000 people, including researchers, startups, inventors, and over 60 startups from ASEAN Member States and India.

- The MoU exchange between Korea Startup Forum and SIIC will extend co-incubation and technology exchange opportunities to Korean-based Startups and benefit Indian Startups, simultaneously. The MoU was signed during the COME-UP Startup Festival, one of the largest startup events in Asia.

SIIC has executed 3 Accelerator Programs with support from our Government and Corporate stakeholders, enabling the pool of 21 phenomenal startups to optimize their entrepreneurial ventures.

1. **NIRMAN Accelerator Program**

   SIIC has launched a first-of-its-kind product accelerator program for innovators developing sustainable solutions in the Healthcare and Agriculture domains, supported by the Department of Science and Technology (DST), Government of India, through its NIDHI scheme portfolio.

2. **Social Innovation Lab by CITI Accelerator program & Demo Day**

   The lab aims at discovering incredible early stage & growth stage, high - impact, for - profit start-ups working in social impact spaces.

3. **IAN-IIT Kanpur Accelerator Program**

   On account of the National Startup Day, Startup Incubation and Innovation Centre, IIT Kanpur, is launching the IAN-IIT Kanpur Future Tech Accelerator Program.

Abhivyakti 2023

The two-day Annual Festival, 'Abhivyakti', organised by SIIC, IIT Kanpur, was held on 4th and 5th March 2023. SIIC is a leading startup incubator, providing early-stage startups with the necessary support and resources to succeed. This festival provided an exceptional platform for showcasing ideas and innovations, and networking opportunities with industry experts and investors for the necessary support and resources to succeed.

Milestones of the Year 2022-23

Kaushambi gets World's First Solar Powered Floating Grid: i-Ghat, supported by NTT Data Services, managed by SIIC IIT Kanpur, executed by AIPL Pvt. Ltd., a startup Incubated at SIIC IIT Kanpur.

- SIIC IIT Kanpur participated in Aero India DEFEXPO22 in Gandinagar, Gujarat.
  SIIC IIT Kanpur reached 150+ Incubatees this year.

Success at SIIC IIT Kanpur

- Phool.Co an IIT Kanpur backed innovation shines at global stage as Prince William unveils the finalists for the 2nd Annual Earthshot Prize.
- COSGrid Networks is one of the 6 winners of the MVP stage organized by the Data Security Council of India.
- Proplant food was selected among the top 75 innovations across India and displayed during Independence Day at Vigyan Bhawan in Delhi.
- NapID Cybersec won the Reserve Bank of India (RBI) Hackathon.
- NapID Cybersec represented India at VIVATECH2022 in Paris as one of the top 15 innovations of the country, where India was awarded 'Country of The Year'. Selected as the top 10 startup solution in Global Fintech Fest 2022, Mumbai.
- CD SPACE Robotics the only indigenous drone manufacturer at the Drone Festival of India.
- Secure Blink Tech featured in Inc42 Media's '30 Startups to Watch'.
- Saptkrishi won the Schfellar India Social Innovation Fellowship. The 2nd finalist for the Ericsson Innovation Awards 2022 for 'Impact Sustainable Future'.
- AiRTH was awarded the Best Innovation of the Year at the World Environment Expo 2022. The only technology that has been proven to deactivate the LIVE SARS-CoV-2 virus.
- Greengine Pvt. Ltd signed a partnership agreement with IOCL for a Net Zero future. Selected in India Water Pitch Startup Challenge-AMRUT for a grant of 20L INR from MoHUA.
- Technisanct signed a partnership agreement with IOCL for a Net Zero future. Selected in India Water Pitch Startup Challenge-AMRUT for a grant of 20L INR from MoHUA.
- Brookshire Pvt. Ltd presented their Entrepreneurial journey at GEB, Bangkok.
- Worker Union support WUS' analysis for Data Push to Atmanibhar Bharat was selected for the TIDE Scaleup funding program (GTM).
- Surobhi Agro is one of the top social startups in the Tata Social Enterprise Challenge.

  Life & Limb selected for the MeitY TIDE 2.0 Scale-up funding at Digital India Week.
- Werehab was selected for the NASSCOM DeepTech Club program. Selected among the top 75 innovations that got displayed on Independence Day at Vigyan Bhawan, Delhi. Availed credits as one of the top 250 startups at the Amazon Sambhav

Entrepreneurship Challenge. Won the TiE Nagpur's Women Pitching Competition.

- Novoearth bagged a position in the Pitch Battle Competition at the 1st ASEAN-India Start-up Festival 2022. Among the five winners of the Techtonic: Innovations in Sustainable Construction program.

The following table lists the companies incubated in SIIC by our alumni.

Name of alumni	Entrepreneur in the field
Mr. Sarvagya Shukla (Skyai Technologies Private Limited)	SkyAI is developing anti drone solutions to counter the threats posed by UAV's and drones. SkyAI is developing AI based object detection models for detecting the airborne drones using high resolution visual and IR cameras. SkyAI solution is an end-to-end solution that will detect, localize and eventually neutralize the target drones.
Mr. Irfan Qayoom, Dr. Ashok Kumar (Regenmedica Pvt. Ltd.)	Regenmedica, is a team of experts in the domain of bone tissue engineering, aims at developing polymeric and ceramic materials as regenerative therapies for tissue damage focusing primarily on the development of nanohydroxyapatite based bioactive ceramic as an antibiotic carrier for the treatment of bone tuberculosis. The innovation will benefit industrial, clinical and societal levels by providing an affordable, easy to operate indigenous product.
Mr. Suyash Sinha (Garudaire Private Limited`)	Garudaire deals in the business of UAV Security. Varun is a smart surveillance and interceptor drone capable of multi-modal sensing and deep learning event analysis of cyber and physical events to provide a deep situational awareness. It is also capable of taking a few key actions to thwart such attacks.

C3iHub

C3iHub (Cybersecurity and Cybersecurity for Cyber-Physical Systems Innovation Hub) is a Technology Innovation Hub established at IIT Kanpur in 2020, funded by the Department of Science and Technology, Government of India, under the National Mission of Interdisciplinary Cyber-Physical Systems. As the name implies, C3iHub addresses cybersecurity issues of cyber-physical systems in its entirety. From analysing security vulnerabilities and developing tools to address them at various levels of critical cyber-physical system architectures, to nucleating start-ups developing such tools at scale, to partnering with industries for co-development and technology transfer, to training the next generation of cybersecurity researchers, C3iHub works on every level that facilitates country's adoption and advancement of cyber-physical systems. Current employee strength of C3iHub as a Section 8 company is more than 100 and expected to reach 200 by the end of 2023.

Past year was a significant year for C3iHub as several technologies/technology products got deployed, several have become ready to be deployed.

C3iHub has successfully installed a SoC (Security Operations Centre) with IPA (Indian Ports Association). This is the second SoC deployment by C3iHub protecting the country's critical infrastructures. In 2021, C3iHub had deployed SoC at NHAI headquarters. The SoC at IPA protects computers that monitor port operations under IPA. C3iHub security experts are present on-site 24/7 to monitor cybersecurity threats, analyze security log data from SIEM (Security Information and Event Management) platform, report about threats, and provide fixations. In addition, C3iHub CERT-IN empaneled Security Audit team has completed security audits for all major ports under IPA and Mangalore Refinery and Petrochemicals Limited (MRPL). Another SoC installation is under progress in BIT Mesra as a part of providing end-to-end security services; honeypots, asset management solutions, intrusion detection systems are being deployed by C3iHub-incubated start-ups.

C3iHub SoC Installed at IPA (2022)

Over the past year, C3iHub has developed a unique solution to help cybercrime investigation officers and law enforcement officers with cybercrime incident responses. Although cybercrimes (i.e., attacks targeting humans, like customer care frauds, online matrimonial frauds, etc.) have surged dramatically in recent years, currently there is no framework for cybercrime incident response to understand what happened, how it happened, how to attribute the crime, and how to collect the chain of evidence to bring the criminals to justice. C3iHub has developed a TTPs (tactics, techniques and procedures)-based framework (and interactive tool to navigate the framework), whereupon a systematic process can be established for various types of cybercrimes, and evidence collection and mapping of pieces of evidence can be made to understand the attacker's behavior in a crime lifecycle. The solution (TRL 8) will soon be deployed with Telangana Police.

Searching pre-defined crime path – Screenshot of the Tool

C3iHub has developed another unique solution, blockchain-based Transferable Development Rights (TDR) system that allows secure, transparent, and tamper-proof storage and management of Development Rights Certificates. The technology will enable transparent trading of land holdings in cities that have been acquired by city administration, and reduce litigations, possibility of frauds etc. The technology (TRL 9) is ready to be deployed with Kanpur Development Authority. With incubated start-up Trential (formerly known as CRUBN), C3iHub has deployed blockchain-based immutable, globally verifiable, instantly shareable Self-Sovereign Identity (SSI) digital identities - with AKTU (over 55,000 degrees) and NSDC (50 lakh digital certificates/year).

C3iHub is also developing Cyber Security Capability Maturity Models (CCMM) and assessment and analytics frameworks for critical sectors of the country (power and energy, government, health, telecom, transport etc.) with NCIIPC (National Critical Information Infrastructure Protection Centre), which will help organizations associated with these sectors to improve their security posture.

C3iHub has supported 41 start-ups so far (16 new last year), and nearly half of the start-ups' products have already reached TRL 7 or higher. C3iHub has also supported 33 R&D (8 new last year) projects to date. Through ongoing cybersecurity skill development programs, C3iHub has trained about 600 individuals this past year.

IIT KANPUR RESEARCH AND TECHNOLOGY PARK FOUNDATION (TECHNOPARK@IITK)

IIT Kanpur Research and Technology Park Foundation (brand name, Technopark@iitk) is a Section 8 not-for-profit company set up in 2019, with the ambitious endeavor to invite industry and R&D organizations to co-locate their R&D centres within its premises and create indigenous futuristic technologies in close collaboration with IIT Kanpur research fraternity.

The company started its operations in March 2019 and since then has had close to 150+ industry interactions. With seven new companies coming on board last year for R&D collaborations, the research park is gradually evolving and making steady progress.

Highlights (2022-23)

- TISA Aerospace, Singularity Tech, HRMac Technologies and Medetronix set up their R&D centres.
- Technithon International and JK Cement renew their partnerships and expand their R&D activities with IIT Kanpur.
- The Uttar Pradesh Expressways Industrial Development Authority (UPEIDA) and Technopark@iitk sign an MoU for jointly exploring collaborations with companies in the UP-Defence Corridor and handling their R&D needs.
- In collaboration with IIM Lucknow Entrepreneurship Incubator, a 9-month accelerator program, in the fields of IoT, AI and ML, launched, and eight startups selected in the first cohort.
- The quarterly talk series titled 'FORTECH' was launched. The talks featuring eminent speakers from Industry, Academia and Government serve as a forum for knowledge exchange that will bring the major stakeholders together for a more rigorous and close-knit R&D collaboration.
- Outreach activities held in partnerships with UPEIDA, PHDCCI, CII, UPGIS, UP Trillion Dollar Economy ET Conclave.

R&D Impact of Member Companies

Number of Industry R&D Set ups

- 11 (8 residential; 3 affiliates)

Number of Collaborative Research Projects

- 2 completed; 4 ongoing; 10 in pipeline

Number of Student Engagements

- 5 part-time; 2 full-time offers

Joint Publications

- 5

Number of MoUs facilitated by Technopark@iitk

- 2 (POCT Group of Companies and TVM Signalling and Transportation Systems)

Product Development

- LAMAS, a comprehensive suite of tools and services leverages advanced technologies of IoT, AI, and ML to provide real-time insights and recommendations for sustainable agriculture and rural development (lake monitoring).
- Highly advanced hand-held electrochemical analyser by June 2023.
- Saliva-based non-invasive Portable Device for Oral Cancer Screening by 2024.

The new face of industry-academia partnerships

The upcoming Phase I Infrastructure of Technopark@iitk is a state-of-the-art green architecture with two-and-a-half lakh square feet of space. The six floors including the Ground Floor are built around a central atrium. Housed within IIT Kanpur campus, the building has provisions for:

- 500-10,000 square feet units.
- Conference & Meeting rooms, Auditorium.
- Cafeteria/Creche.
- Recreational facilities.

Following companies have expressed their interest to be a part of Technopark@iitk:

- Laurus Labs
- POCT Group of Companies
- Technithon International
- TVM Signalling and Transportation Systems
- TISA Aerospace, GCRS, Medetronix, HRMac Technologies.

SAMTEL CENTRE FOR DISPLAY TECHNOLOGIES AND NATIONAL CENTRE FOR FLEXIBLE ELECTRONICS

The Samtel Centre for Display Technologies, known more popularly as Samtel Centre or SCDT, is a multi-disciplinary research and development centre which caters to prototype building and eventual productisation of technology related to Flexible Electronics. The area of focus broadly includes large area electronics which are typically printable and are likely to be built on an organic electronics base. The ideas explored at the centre are necessarily linked to a real-world application with some practical value. The prototype building and productisation are carried out primarily at its industry outreach arm - which is the National Centre for Flexible Electronics (FlexE Centre) - typically with active involvement and participation of industry partners right from the early stages of development and product conception.

The National Centre for Flexible Electronics (NCFlexE, also known as the FlexE Centre) was set up as a Centre of Excellence at the Indian Institute of Technology (IIT) Kanpur in 2014 with financial support from the Ministry of Electronics and Information Technology (MeitY), the Government of India, and IIT Kanpur. The vision of this Centre consisting in catalyzing the development of domestic industry in the field of large area flexible electronics is being executed with the Centre serving as a bridge between the academic ecosystem and the industrial ecosystem.

Summary of the various activity parameters for the centre for the last financial year are listed below:

- Patents filed - 4
- Publications - 7
- NDA with industries - 7
- Ongoing projects - 6
- New projects with Industry partnerships - 2

Technology Transfer

Two technologies developed at NCFlexE, IIT Kanpur on a watch, and a smartwatch for the blind and visually impaired are licensed to Ambrane India. A formal MoU was signed by the Tech Transfer Office in the Directorate on February 2, 2023.

Outreach Activities

Participation and exhibition in the following events

- Digital India Week 2022 Expo ‘Digital Mela’ in Gandhinagar Gujarat from 4th July to 8th July 2022
- ELCINA Industry Meet on Enabling Electronics, Semiconductor & Display Industry in Gujarat –

Ecosystem Opportunities for National & State ESDM Industry" in Gandhinagar Gujrat on 11th November 2023

- Roadshow on an International Exhibition on Printing and Allied Machinery Industries at Bangalore on 24th February 2023
- Roadshow, an International Exhibition on Printing and Allied Machinery Industries at Haridwar on 3rd March 2023
- International Exhibition on Printing and Allied Machinery Industries at Mumbai from 27th March 2023 to 30th March 2023.

SCDT-FlexE Centre Webinar Series

SCDT and FlexE Centre Webinar Series brings together every month scientists, engineers, researchers, students, entrepreneurs, and industry players involved in different aspects of flexible electronics from around the country (and sometimes from outside India as well) on a common platform. Speakers in these monthly one-hour webinars are accomplished individuals in any field associated with flexible electronics. This forum is helping improve interactions between the different stake holders in the technology as it evolves. All details can be found at https://www.iitk.ac.in/scdt/webinars. html

The 2023 Kanpur Lectures Series on Engineering and science in our world by Professor Sandip Tiwari

A five-part lecture series was organized on Engineering and Science in our world by SCDT and supported by Electrical Engineering. The lectures were given by Professor Sandip Tiwari, Charles N. Mellowes Professor of Engineering at Cornell University, USA and Distinguished Visiting Professor, IIT Kanpur. The fourth talk in this series was also the Professor K.R. Sarma Distinguished Lecture for 2023.

Awards and Honors

- Professor Monica Katiyar was elected a Fellow of the Indian National Academy of Engineering - 2022.
- Ms. Aakanksha Jain (PhD student) received "Augmenting Writing Skills for Articulating Research (AWSAR) Award 2022" under the Best Stories in PhD category sponsored by the Department of Science and Technology (DST), India.

NATIONAL AEROSOL FACILITY

The establishment of the National Aerosol Facility (NAF) at IIT Kanpur, supported by the Department of Atomic Energy (DAE) reflects our nation's ambition for lateral knowledge translation to serve the purpose of academia involvement in Nuclear Safety Studies. This is a distinctive experimental facility which aims to study the phenomenon that governs the generation and transport characteristics of the radionuclides expected to be released in the aerosol form during a postulated reactor accident scenario in the context of Indian Pressurized Heavy Water Reactors (PHWRs). While most of the global research is relevant to Boiling Water Reactors or Pressurized Water Reactors, NAF caters to the needs of PHWR safety research and is a first of its kind for aerosol behavioral studies in southern Asia.

Specifically, the established facility would help the researchers to evaluate the accidental source terms to the environment, from the viewpoint of Impact Assessment (IA). It also aims to establish a database on the physical properties of materials of nuclear relevance that are important inputs for numerical codes used in safety analyses. The facility has been built as a collaboration between BARC, BRNS and IIT Kanpur. Experimental programs are conceptualized for performing R&D studies for quantifying aerosol retention in Primary Heat Transport systems for different input conditions reflected by postulated nuclear reactor accident scenarios. This test facility can also be useful for aerosol researchers within the country and for carrying out intercomparison and benchmarking experiments with international collaborators.

The National Aerosol Facility is designed for a pressure of 10 bar and a temperature of 400°C. The maximum operating pressure of this facility is restricted to 5 bar and the maximum operating temperature is restricted to 350°C. NAF has a Programmable Logic Controller (PLC) based control system on a high-speed data transfer network using a SCADA system, for the centralized monitoring & control of the experimental facility.

The first project on NAF was aimed at the design, fabrication, installation, and commissioning of a state-of-the-art National Aerosol Facility (NAF) along with its peripheral systems such as aerosol and steam generator, steam/gas injection and mixing system, exit gas scrubbing system, etc., and associated process and aerosol instrumentation systems and then to study on aerosol behavior under severe accident conditions in the context of Indian nuclear reactor. This project which began in April 2015 was completed in March 2022. Ten members of the research staff and five doctoral candidates have undergone training in this facility.

Within this time period, many research accomplishments occurred which were the first of its kind. The study on the interaction of cesium-bound fission products aerosols with abundant inorganic compounds of the atmosphere and their hygroscopic properties was achieved which was never done

before. A new mathematical model was developed where aerosol microphysics of particles were examined for the charge effect. This charge-coupled model was validated experimentally, and later coagulation was also included in the model for charge effect. The developed model is fast and numerically stable. It can be used for several applications involving coagulation dynamics of charged aerosol particles. Studies on Cloud Condensation Nuclei (CCN) activity of fission product aerosols and their effect on the size and other properties were also accomplished which is very important in the event of radioactive release to the humid environment. Different depositional mechanisms of aerosols were studied and their resuspension in a piping system that resembles the Primary Heat Transport (PHT) system of an Indian nuclear reactor. Research was carried out on the aerosol measurements technique that is to be deployed for the NAF piping system and the way to reduce the anomalies that arise during measurement were achieved. The optimization of the controlling parameters of the aerosol generation was done to achieve a high concentration of the aerosols that are speculated to be released during a reactor worst-case accident.

The facility conducted pilot tests in a segment of straight test piping during October 2022. The research was conducted by a team from RP&AD (BARC), RSD (BARC), and IIT Kanpur. The goals of the experiment were to characterize the aerosol mass concentration at the mixing vessel's outlet and at the straight test segment, which was eight meters in length.

Recently a new project was signed with RSD, BARC named 'Aerosol Transport Behaviour Experiments at National Aerosol Facility in Context of Nuclear Reactor Accidents' in April 2023 and a cluster project (4-5 feeder projects) named 'Studies in National Aerosol Facility for generating database of Aerosol behaviour under severe reactor accident scenarios for Indian PHWR" with RPAD, BARC. This facility is in advanced stage.

NAF has hosted a wide array of other innovative projects aimed at addressing air pollution in India in the year 2022-2023. These projects in large under this facility are as diverse as the regions they serve, and they involve 48 dedicated staff members, working towards cleaner air for all. These projects are:

- Centre of Excellence in Advanced Technologies for Monitoring Air-quality indicators (ATMAN), https://atman.urbansciences.in/, approved by PSA office, Government of India which is currently executing 3 projects supported by a group of philanthropic funders, including the Bloomberg Philanthropies, the Open Philanthropy, and the Clean Air Fund. All together there are 14 Post Docs, one Consultant, Research Engineers, One Project fellow.
    - "To Support the Rural Air Quality Monitoring Project" sanctioned by "OPEN philanthropy".
    - "Dynamic Hyper-Local Source Apportionment for Real-Time Policy Action" sanctioned by "Clean Air fund".
    - "Atman-Centre of Excellence: Core Support Grant" sanctioned by "BLOOMBERG Philanthropy".
- "DHSA at Kanpur" sanctioned by "RITES, India".
- "Contribution To Research for Clean Air Project in India" sanctioned by "Swiss Agency for Development and Cooperation, Switzerland".
- "Testing And Efficacy of Pure Skies under Different Conditions of Temperature Humidity Wind Speed and Distance" sanctioned by "DEPL".
- "Building Capacity to Improve Air Quality in South Asia: Reducing PM 2.5 Through Low-Cost Sensor Network Driven Policy Decisions" sanctioned by "Duke University".
- "Integrated Online Air Pollution Monitoring and Decision Support System" sanctioned by "Clean Air Fund".
- "Study On Effect of Coal Blending on Ambient Air Quality and Management of Fly Ash" sanctioned by "UDUPI Power Corporation".
- "Testing The Efficacy of Pure Skies in Real Field Conditions at A City Deployment" sanctioned by "DEPL".
- "Service Agreement to Carry Out Chemical Analysis of The Air Samples" sanctioned by "Centre for Study of Science Technology and Policy".
- "Easiur India: Development of Air Quality Modeling Decision Support Tools for Policy-Makers" sanctioned by "International Sustainable Energy Foundation".

NATIONAL CENTRE FOR GEODESY

The National Centre for Geodesy (NCG) at IIT Kanpur was set up on July 1, 2019, with the support of the Department of Science and Technology (DST), Govt. of India. NCG is the first of its kind centre in India to support educational and research activities in the field of Geodesy. The centre is established as a solution to the limited national-level education in the country on Geodesy and other aligned areas with the primary aim of acting as a hub of excellence in teaching and research at the national and international levels. The primary objective of the NCG is to nucleate and strengthen the activities in the field of geodesy education, capacity building, and academic research and development. During the last year, NCG has taken up various tasks in line with its objectives. NCG has organized three short-term courses/workshops/training in the field of geodesy and allied areas, which were attended by participants from a diverse range of stakeholders, including Academia, Industry, Military, and Government. In addition to the short-term training, NCG has organized a brainstorming session on understanding the synergies between geodesy and oceanography, which was attended by senior personnel of nine different organizations.

A total of eight PG students were supported by the NCG for training at different national and international institutes, of which two have received Ernst Mach Grant to continue their research training at TU Wien in space geodesy. Moreover, internships have been offered to the four non-IIT Kanpur and three IIT Kanpur graduate students. Any interested

student/researcher from any institute can apply for an internship at the NCG by filling out an internship form available on the NCG website. Selected students are provided a stipend as per the prevailing norms of the Centre for Continuing Education (CCE), IIT Kanpur.

NCG is also committed to supporting up to 12 DIIT and 6 MS (by Research) students, as per the IIT Kanpur guidelines. These students have to pursue their thesis in geodesy or allied areas. The DIIT program is initiated mainly to attract working professionals from Government departments/ institutions, industry, and faculty members in academic institutions involved in teaching and R&D in geoinformatics.

NCG has been undertaking research initiatives in a wide domain of geodesy. A few of the main initiatives include:

- **Project Saptarshi:** Establishment of the first space geodetic technique core observatory in India.
- **Indian Geodetic Reference Frame (InGReF):** Redefining the Indian geodetic datums, i.e., horizontal, vertical, gravity, and tidal datums.
- **Cal/Val for NISAR mission:** Establishing corner reflectors for the calibration of the upcoming NASA-ISRO combined SAR mission.
- **IDS station in India:** Establishing the first DORIS station in India, a technique for precise orbit determination.

In addition to these, recently NCG has collaborated with the Survey of India (SoI) to work on four joint projects that include i) Analysing the best strategy for Indian gravimetric geoid sgeodetic applications using CORS, and iv) Finalising the strategy for a way forward to establish Indian geodetic datums.

Regarding collaboration, NCG staff and students have collaborated with primarily Curtin University and University of Melbourne, Australia, TU Wien, Austria, GFZ Potsdam, Germany, Technical University of Konya, Turkey, and Hanoi University of Mining and Geology, Vietnam. These are in addition to the other collaborations which NCG has developed within Project Saptarshi. Further, NCG personnel are actively participating in the joint study/working groups of the International Association of Geodesy. Thus, NCG has been collaborating with researchers from numerous institutes in the world who are pursuing academia and research in geodesy. Also, following the meeting on 18th November 2022 with the Russian delegate at the 2nd UNWGIC, NCG is working with the Moscow State University of Geodesy and Cartography to sign an MoU for various activities including but not limited to the collaboration with academia and research in geodesy and allied areas. NCG has already signed MoUs with 10 organizations in India for various activities. These are in addition to the MoUs that IIT Kanpur has with different international Institutes for academic and research exchange programs. To strengthen the collaboration among the national institutes, NCG has planned to set up a "Society of Geodesy".

Further, NCG is committed to acting as the national resource centre, i.e., making available its resources to other Indian institutions for education and training purposes. In view of this, the NCG library is being set up with the primary aim of establishing a literature bank on the fundamentals of Geodetic Science and its applications and thereby make available the same to all interested. It already consists of ~50 books/manuals on the subject of geodesy and allied areas. A cloud-based service is also being planned at the NCG to provide various stakeholders access to the available software at the NCG. The permanent GNSS station at NCG, which was part of the Asia-Pacific Reference Frame has now been included in the IGS network. Hence, its data is also freely available to all interested. Following the latest geospatial guidelines, NCG is committed to sharing the geodetic data from the NCG facilities as and when requested for educational and research purposes.

Further, to spread Geodesy education and R&D in India and contribute towards the growth of Indian geodetic infrastructure, six Regional Centres for Geodesy (RCGs) have been established to work in tandem with NCG in a hub-and-spoke model. The six RCGs are established at: IIT Bombay, IIST Trivandrum, IRS Anna University, IIT (ISM) Dhanbad, MNNIT Allahabad, and MANIT Bhopal. The NCG will provide some initial handholding in terms of training students, researchers, and faculty members in Geodesy in these RCGs.

THE MEHTA FAMILY CENTRE FOR ENGINEERING IN MEDICINE

The Mehta Family Centre for 'Engineering in Medicine (MFCEM)' will leverage the existing engineering strength of IIT Kanpur and the biomedical research emphasis of BSBE faculty to enable a fast growth in the initial phase of the new "Centre for Engineering in Medicine". The centre will allow the department to focus on 'engineering solutions to medical problems,' while allowing it to grow in terms of personnel (faculty, post-doctoral fellows, students and project employees); academic programs (integrated PhD, MS by research and more minors for UG students) and infrastructure (new building). The centre will initially focus on three main areas: Regenerative Medicine, Molecular Medicine and Engineering, Digital Medicine. The major achievements of the centre in the year 2022-2023 are listed below:

Awards/ Honors

- Professor Sandeep Verma received the 5th Pran Nath Vohra Oration, Punjab University.
- Professor Sandeep Verma was awarded Gold Medal by The Society for Materials Chemistry, BARC.
- Professor Bushra Ateeq delivered an invited talk in "CNR Rao Endowed Lecture Series".
- Professor Bushra Ateeq was featured in the "Vigyan Vidushi- 75 Women Trailblazers of Science".
- Professor Bushra Ateeq was featured in the "The Torchbearers of Indian bioscience- Profiling India's Top 20 Promising Bioscience Innovators".
- Professor Bushra Ateeq was featured in Entrepreneur India magazine under "Shepreneurs Women to Watch", 2023.

- Professor Nitin Gupta was awarded The C.N.R. Rao Faculty Award (2020).
- Professor Ashok Kumar has been chosen by the National Academy of Medical Sciences. (NAMS) for the 'Dr. Nandagudi Suryanarayana Rao Academic Award'.
- Professor Dhirendra Katti was awarded the Tata Innovation Fellowship, from DBT India.

Fellowships to the Academies

- Professor S. Ganesh has been elected Fellow of Indian National Science Academy, 2022.
- Professor Arun Kumar Shukla has been elected Fellow of Indian National Science Academy.
- Professor Bushra Ateeq has been elected as Member (2022) of the Guha Research Conference (GRC).

Recognition/Chair Positions

- Professor Dhirendra Katti was awarded the Rajeeva and Sangeeta Lahri Chair Professorship.
- Professor Bushra Ateeq has been conferred the Joy Gill Chair (April 2022).
- Dr. Pragathi Balasubraman has been awarded The Anjali Joshi New Faculty Fellowship award.

Grants and Fellowships

Around 4 research grants and fellowships have been sanctioned to various faculty members from funding agencies like DBT, Lenek Technologies, SIIC Startup, ICMR and BIRAC-PACE.

Patents

Around 4 patents were granted, and 2 were filed in the year 2022-2023.

Events

Invited Talks/Lectures: A total of 41 invited talks and lectures were organized, where distinguished MFCEM faculty members shared their expertise and insights with the academic community. These talks covered a wide range of research areas, contributing to the dissemination of knowledge and promoting academic dialogue.

MFCEM Dialogues: MFCEM organized interactive events known as MFCEM Dialogues, featuring esteemed speakers who are stalwarts in their respective research fields. Eminent personalities such as Prof. Noel Buckley from the University of Oxford, Prof. Shyni Varghese from Duke University, Prof. Sriram Subramaniam from the University of British Columbia, Prof. Nitish Thakor from Johns Hopkins University, Prof. Suman Chakraborty from IIT Kharagpur, and Matt Abrahams from Stanford Graduate School of Business graced these events, fostering intellectual exchange and inspiring the academic community.

MFCEM Workshop: Mr. Rafeeque Mavoor conducted a workshop on scientific illustrations, enhancing the visual representation of research findings. Additionally, Dr. Sarah Hyder Iqbal delivered a session on science and public engagement, emphasizing the importance of effectively communicating scientific knowledge to the public. The workshop provided valuable insights into these critical aspects of scientific research.

Joint Seminars and Colloquia: Collaborative efforts were made with other departments and institutions to organize joint seminars and colloquia. Notable speakers included Professor Chandrasekhar Kanduri from the University of Gothenburg, Professor Amitabha Chattopadhyay from CSIR-CCMB, Hyderabad, Dr. Jeremy N. Burrows from Medicines for Malaria Venture, Geneva, and Professor Saman Habib from CSIR-Central Drug Research Institute, Lucknow. These joint events facilitated interdisciplinary discussions and promoted cross-pollination of ideas.

Conference Seminars: Professor Ashok Kumar organized the International Conference on "Recent Advances in Biomedical Sciences & Regenerative Medicine, 2022," providing a platform for researchers to present and discuss their work in the field. Professor Bushra Ateeq organized mini-symposia under GATI, focusing on "Breaking the Glass Ceiling in Academia," aiming to address gender disparities in academic careers.

Publications: The faculty members of MFCEM have made significant contributions to research with around 67 peer-reviewed publications. These publications represent the dedication and expertise of the faculty in advancing knowledge and making valuable scientific contributions.

Student Achievements: The students of MFCEM have also excelled in their academic pursuits. Sakshi Goel, a Ph.D. student under the guidance of Prof. Bushra Ateeq, was awarded the prestigious INSA Medal for Young Scientists 2022. Nabodita Sinha, a student of Professor Ashwani Kumar Thakur, received the Carl Storm International Diversity Fellowship, recognizing her contributions to the field.

These achievements and initiatives demonstrate the commitment of MFCEM faculty to promoting knowledge exchange, fostering academic excellence, and nurturing a culture of research and collaboration. The efforts made by MFCEM have not only contributed to the advancement of scientific knowledge but also recognized and celebrated the achievements of students.

GANGWAL SCHOOL OF MEDICAL SCIENCES AND TECHNOLOGY AT IIT KANPUR

Hon'ble Union Minister of Education and Skill Development & Entrepreneurship, Shri Dharmendra Pradhan ji laid the foundation stone of the Gangwal School of Medical Sciences and Technology and Yadupati Singhania Super Speciality

Hospital at IIT Kanpur campus on 16th July 2022 by unveiling the plaques. The ceremony was presided over by Dr K Radhakrishnan, Chairman, Board of Governors, IIT Kanpur. The medical school donors Shri Rakesh Gangwal, Co-Founder, Indigo Airlines; Singhanias of JK Cement Ltd.; Shri Muktesh Pant, Founder, Micky and Vinita Pant Charitable Foundation; Shri Hemant Jalan, Founder, Indigo Paints Ltd.; and Shri Gaurav Sharma, VP, India Software Labs, IBM India Pvt. Ltd. graced the occasion.

Gangwal School launched its website (https://gsmst.iitk.ac.in/) and Newsletter "Svasthya" (https://gsmst.iitk.ac.in/svasthya-pdf/) in December 2022.

Tata Consulting Engineers Limited (TCE) was onboarded as Project Management Consultant for the project. Both Hosmac India Pvt. Ltd. and TCE are working with IIT Kanpur team on collating the procurement and design drawing for a composite tender for the Medical School. The tender for the construction of Gangwal School was published in CPP Portal on 3rd March 2023 and several potential bidders attended the pre-bid meeting.

The tender for the construction of studio apartments for Resident doctors and Campus development of the School Complex with funding support from REC Foundation and IBM India Pvt Ltd. has been initiated in the allocated site for Gangwal School at IIT Kanpur Campus. Campus development including boundary walls, road development, landscaping, etc. is going on. At present, the casting of slab up to G+4 is completed for the residential block at the site as shown in the image.

Research & Development: As part of futuristic medical technology, eleven R&D centres of excellence (CoE) have been planned. A few of the CoEs have been recognized by donors for funding. These CoEs will be executed phase-wise and will be delivered to the society and country.

As part of CoE in Cardiovascular and Pulmonary Disease Research, an ambitious multidisciplinary project 'Hridyantra' working to develop a new generation indigenous Left Ventricular Assist device (LVAD) is progressing towards animal trials. IIT Kanpur team with expert clinicians aim to develop superior performing, better hemocompatible, and low-cost LVAD, making its implantation affordable to a substantially greater fraction of people suffering from end-stage heart failure.

Several activities including symposia, seminars, team visits, and workshops are being conducted by the R&D team to actively engage in the MedTech domain.

- AI in Healthcare
- Cancer Research
- Cardiovascular & Pulmonary Disease Research
- Metabolic Disorders
- Neuroscience, Neurotechnology & Mental Health
- Non-invasive Medical Imaging & Diagnostics
- Orthopaedics & Prosthetics
- Point-of-care Diagnostics
- Therapeutics
- Telemedicine & Robotics
- Tropical & Infectious Diseases

A few of the activities are as follows:

IIT Kanpur and the Gangwal School hosted a one-day national workshop on Telemedicine and Artificial Intelligence on 2nd July 2022 at IIT Kanpur Outreach Centre in Noida.

The Gangwal School, IIT Kanpur, organized a closed-door workshop for the Hridyantra program dedicated to the development of the LVAD.

A team of three faculty members from IIT Kanpur namely Professor S K Mishra, Dr. Soumya Ranjan Sahoo and Dr. Priyanka Bagade, CoE Telemedicine & Healthcare Robotics participated in Indian Mobile Congress 2022 held on 1-4 October at Pragati Maidan, New Delhi on the invitation of Tata Communications Tech. Ltd.

A two-member delegation from Tata Telecommunications, Mr. Sanjeev Srivastava & Mr. Sujoy Jain visited CoE in Telemedicine and Robotics team members at IIT Kanpur on 7th November 2022.

The Gangwal School organized an event as part of the Pant Workshop Series on Medical Sciences and Technology with the joint participation of IIT Kanpur – Swansea University (United Kingdom) on Cardiovascular & Pulmonary Flows on 12th December 2022.

Dr. Devi Shetty, Chairman, Narayana Hrudayalaya Limited; Mr. Yashdeep Kumar, Global Director, Stryker Technology Centre at Stryker Corporation, USA; Professor Pratap S. Khanwilkar, Founder & CEO, Ignition Key LLC, Texas; etc. visited LVAD team. They are closely associated with the Hridyantra project from the beginning and mentor the fellows in the project.

The Gangwal School and CoE in Orthopedics and Prosthetics, supported by SPARC-MoE organized an event as part of the Pant Workshop Series on Medical Sciences and Technology "Advances in Designing and Manufacturing Technologies for Orthopedic Biomaterials" on 13th & 14th March 2023.

Academic Relations & Partnership

At present, the following seven faculty have been appointed for the Gangwal School:

Dr. Vikram Mathews	Professor & Director, Department of Haematology, Christian Medical College & Hospital, Vellore	Distinguished Visiting Professor
Mr. Yashdeep Kumar	Global Director, Stryker Technology Centre at Stryker, USA	Adjunct Professor
Dr. Saurav K. Bhunia	Principal R&D Engineer, Cardiovascular Systems, Inc, USA)	Adjunct Professor
Professor Saroj Kanta Mishra	Former Professor, Department of Endocrine Surgery, SGPIMS, Lucknow	Distinguished Visiting Professor
Dr. Nazneen Aziz	Former President and CEO, Variant Genomics, Inc, USA	Visiting Professor
Professor Krishnan Ganapathy	Director, Apollo Telemedicine Networking Foundation & Apollo Tele Health Services, Chennai	Distinguished Visiting Professor
Professor Pratap S. Khanwilkar	Founder & CEO, Ignition Key LLC, Texas	Visiting Professor of Practice

An MoU with Apollo Hospitals was signed for research in the clinical application of Artificial intelligence, Telemedicine, Genomics, and other areas of mutual interest in healthcare technology.

Discussion at various levels for collaboration is ongoing with the University of Melbourne, Imperial College London, Australian National University, etc.

CHANDRAKANTA KESAVAN CENTRE FOR ENERGY POLICY AND CLIMATE SOLUTIONS

The Indian Institute of Technology, Kanpur (IITK) has established the Chandrakanta Kesavan Centre for Energy Policy and Climate Solutions to assist policy makers with practical solutions to the problems of climate change. India as a signatory to the Paris Climate Agreement will need to develop, adapt and implement technologies to reduce emissions and grow sustainably. The Centre can spearhead the development of technology and policy solutions to help India and the world combat climate change. The Centre is named after Dr. Chandrakanta Kesavan, who pioneered the entry of Indian women in the fields of science and engineering. The Centre was made possible by a gift from Alka and Sudhakar Kesavan to IIT Kanpur. Sudhakar Kesavan graduated from IIT Kanpur with a B.Tech in Chemical Engineering in 1976.

The main objectives of the Centre are

- To spearhead energy and climate policy solutions to help India address climate change related problems.
- To emerge as a platform for bringing together eminent academics, technologists, researchers and policy makers to discuss and address energy policy and climate issues.
- To strengthen and promote outreach, communication, grassroots engagement in the areas of energy policy and climate change issues.
- To help IIT Kanpur campus to become carbon neutral.

Highlights (2022-23)

- Chandrakanta Kesavan Lecture Series: Initiated in the centre, this series featured nine lectures by eminent personalities from academia and industries. The lectures covered topics such as energy solutions, air quality challenges, and solar PV, enriching knowledge in these fields.
- Symposium on "Demystifying UNFCCC Conference of Parties (CoP)": Held on 02 March 2023, the symposium aimed to provide insights into the international negotiations versus local climate action. Scholars, researchers, and environmental scientists attended, with a focus on shaping relevant programs aligned with India's requirements.
- Symposium on "India's Sustainable Future: Challenges and Opportunities vis-à-vis Global Perspectives": Conducted on 12 October 2022, this symposium brought together policy makers, climate and energy experts, and academicians. The objective was to exchange perspectives on emerging energy and climate policies, technology, sustainability, and related subjects, fostering strategic collaborations.
- Workshop on "Developing an actionable approach to Carbon Neutrality": Organized on 11 October 2022, this workshop addressed the pressing issue of greenhouse gas emissions and ecosystem restoration. Stakeholders from Kanpur, Pune, and other regions discussed the topic and developed actionable approaches to progress towards NetZero practices.

SHIVANI CENTRE FOR THE NURTURE AND RE-INTEGRATION OF HINDI AND OTHER INDIAN LANGUAGES (OILS)

Shivani Centre for Nurturing and Integration of Hindi and Other Indian Languages is committed to serve as the focal point of providing a soft landing to the students of IIT Kanpur. Shivani Centre aims to actively engage with the IIT Kanpur students, arriving from remote locations, and provide language assistance. In parallel, Shivani centre strives to promote faculty members and tutors alike to create and translate pedagogical content in Hindi and other Indian languages. The translation and creation of pedagogical content is expected to provide repository of materials to build fundamental concepts, while not losing out those due to pace with teaching in English language. In addition, the steering committee will also promote teaching in bilingual mode in order to facilitate the in-class learning and grasping of concepts effectively, mitigating the disadvantages to students from remote locations.

Recent activities:

- The three days Literature Festival, 'Akshar,' was hosted by the "Shivani Centre" to commence the centenary year celebration of the life and work of Shivani Ji.
- A podcast was hosted by Mr. Amit Varma on “The life and Times Mrinal Pande: The Seen and Unseen of”.

OFFICE OF INTERNATIONAL RELATIONS

New Partnerships

IIT Kanpur has signed several new partnership agreements with universities in Asia, Europe and North America. These new partnerships include:

1. **Asia** - Niigata University and Yokohama National University, Japan for cooperation in the areas of faculty and student exchange, joint research activities and exchange of academic materials and publications.

2. **Europe** - Lund University and KTH Royal Institute of Technology in Sweden for cooperation in the areas of faculty and student exchange, joint research activities and exchange of academic materials and publications; and Fondazione Istituto Italiano di Tecnologia, Italy for exchange of students, organizing joint seminars/workshops, joint research and development of joint laboratories.

3. **North America** – University at Buffalo, USA for setting up a collaborative research centre with IIT Kanpur; Rice University, USA for shared research and industry engagement in the areas of engineering, science, medicine, humanities and business; University of California Santa Cruz, USA for cooperation in the areas of faculty and student exchange, joint research activities and exchange of academic materials and publications; and University of Alberta, Canada for a joint doctoral degree program.

Establishment of New "Collaborative Research Centre" with University at Buffalo

In March 2023, IIT Kanpur signed an agreement with University at Buffalo to set up the **"**IIT Kanpur-UB Centre of Excellence in Biomedicine and Bioengineering**"**.

Delegation from University at Buffalo

The research focus of this Centre will be on developing materials and technologies for both *in vitro* and *in vivo* applications in biosciences. This is in continuation of the MoU that was signed in May 2022 for the purpose of research collaboration as well as Joint Degree Program at the Doctoral level with University of Buffalo.

Establishment of Joint "Research Grant Awards" with Rice University

In November 2022, IIT Kanpur and Rice University signed a cooperation agreement to explore and participate in collaborative teaching, training, research, and other activities. This agreement builds on the previous agreement signed between IIT Kanpur and Rice University for pursuing collaborative research in the specific areas of Energy/ Environment, Healthcare/ Biomedical Sciences/ Biomedical Engineering and Data Science/Information/Computer Science & Engineering. In an effort to further facilitate research collaboration between faculty at IIT Kanpur and Rice University, the first call for *"Rice-IITK Strategic Collaboration Awards"* was announced in April 2023. The awardees of this program (to be announced in July 2023) will receive seed funding that will enable faculty and student exchange and is expected to lead to joint research grants, joint publications, and joint patents.

Joint Degree Programs

IIT Kanpur signed a Joint Degree Program agreement for doctoral students with University of Alberta, Canada in January 2023. IIT Kanpur now has Joint Degree Partnerships with 13 universities spread across four continents:

1. **North America**: Five Universities including University of Alberta, Canada; Iowa State University, USA; Drexel University, USA; New York University, USA; and University at Buffalo, USA
2. **Asia**: Four Universities including Asian Institute of Technology, Thailand; National Yang Ming Chiao Tung University, Taiwan; and National University of Singapore, Singapore
3. **Europe:** One University – University of Heidelberg, Germany
4. **Australia:** Three Universities including University of Melbourne, La Trobe University and Curtin University

A total of 60+ students from IIT Kanpur are currently pursuing their doctoral degree as part of one of these joint degree programs.

Visits of Foreign Delegations to IIT Kanpur

Several foreign university delegations visited IIT Kanpur in 2022-23 to discuss possibilities for academic and research collaborations. Many of these have led to fruitful relationships between IITK and the partner University abroad and some of them are part of an ongoing collaboration.

- **From Australia,** delegations from the Australian National University (ANU) and the University of Melbourne (UoM) visited IIT Kanpur. As an outcome of these visits:
  - UG students from IITK would participate in the **"**Future Research Talent" program at ANU that is aimed at nurturing the research interest of UG students interested in taking up research as a career.
  - UoM faculty who visited identified potential faculty collaborators at IIT Kanpur.
- **From USA,** delegations from Rice University, University of California Santa Cruz and University at Buffalo visited IIT Kanpur to sign agreements. All these delegation visits were

primarily aimed at strengthening an existing relationship.

Signing of the agreement between IIT Kanpur and University of California Santa Cruz, USA

- **From Canada,** the University of Alberta delegation visited IIT Kanpur to formalize a "Joint Degree Program" at the Doctoral level between IITK and University of Alberta.
- **From Nepal,** Lumbini Technological University (LTU) and Tribhuvan University (TU) visited IIT Kanpur. As an outcome of these visits:
  - LTU is a new University being set up in Nepalgunj, Nepal which is ~300 kms from Kanpur. IITK has been identified by LTU leadership as a potential partner/mentor in its formative years. IITK has offered to help LTU with the establishment of its academic curriculum and academic programs.
  - TU has initiated a new program in Aerospace Engineering and visited IITK to start a collaboration with the Department of Aerospace Engineering at IITK.

IIT Kanpur Visits Overseas

Australia

IIT Kanpur's Delegation Visiting Australian National University, Australia

A delegation from IIT Kanpur visited leading universities in Australia in March to strengthen ongoing relationships and to explore new opportunities for collaborations. The delegation included Professor Abhay Karandikar, Director; Professor S. Ganesh, Deputy Director; Professor Dhirendra S. Katti, Dean of International Relations; Professor Kantesh Balani, Dean of Resources & Alumni; Professor SC Srivastava, Director, IIT Kanpur-La Trobe University Research Academy; Professor Priyanka Ghosh, Academic Program Director, IIT Kanpur-La Trobe University Research Academy; and Professor Sandeep Verma, Professor, IIT Kanpur and Adjunct Faculty, La Trobe University. The delegation toured and met with officials at Curtin University (CU), University of Melbourne (UoM), La Trobe University (LTU), Australian National University (ANU) and University of New South *Wales (UNSW).* As an outcome of this visit*:*

- **With CU** – IITK plans to enhance the ongoing Joint Degree Program by increasing faculty participation in collaborative research projects.
- **With LTU** - IITK is exploring new avenues of collaboration with LTU – Inclusion of an Industry partner as part of the IITK-La Trobe University Research Academy.
- **With UoM** - IITK plans to expand the ongoing relationship with UoM by including new programs such as summer and winter internships, semester exchange and possibly other joint degree programs.
- **With ANU** – Professor Russell Gruen, Dean of College of Health and Medicine at ANU has been offered a Distinguished Visiting Professor position at IITK. Professor Gruen is widely published, and has a wealth of experience in medical education, research, and clinical practice. In addition, IITK is currently exploring the possibility of a Joint Degree Program at the Doctoral level with ANU.

Professor Dhirendra S. Katti, Dean of International Relations, IIT Kanpur attended the Southeast and South Asia and Taiwan Universities (SATU) General Assembly in November 2022 where he met Professor Huey-Jen Jenny Su, President National Cheng Kung University (NCKU) & SATU Chairperson and Professor Jerzy Duszynski, President Polish Academy of Sciences and discussed strategic partnerships with IIT Kanpur. Professor Katti also visited National Yang Ming Chiao Tung University (NYCU) and National Tsing Hua University (NTHU) with whom IITK has ongoing academic and research collaborations. Consequent to this visit, Professor Karandikar, Director IIT Kanpur has been invited to be a member of the Steering Committee of the SATU Presidents' Forum.

Professor Dhirendra S. Katti, Dean of International Relations, represented IIT Kanpur at the 'India–Vietnam Business and Investment Summit' held at Ho Chi Minh City, Vietnam. The event focused on cooperation between India and Vietnam in the fields of education, healthcare, and IT. On the education front, the discussion centred on the areas of collaboration between Indian and Vietnamese Universities so as to promote student and faculty exchange. The summit

also aimed at increasing the presence of Indian Universities in Vietnam.

Financial Aid to Foreign Students

Beginning 2022-23 I Semester, IIT Kanpur instituted fellowships for foreign students admitted in postgraduate programs. All foreign students admitted in a Masters or PhD program and who do not have any other scholarship/funding are now eligible to receive the Institute Fellowship at par with that of Indian students. So far, four students from Nepal, Bangladesh and Ethiopia have benefited from this fellowship.

Foreign Students at IIT Kanpur

IIT Kanpur hosted 34 foreign students in 2022-2023 with 25 of them pursuing a post-graduate degree at IITK, 03 for semester exchange and 06 for internships.

The 25 students pursuing a post-graduate degree are from countries such as Bangladesh, Jordan, Indonesia, Bhutan, Syria, Ethiopia, Sudan, Iran, Nepal, and Myanmar. The degrees being pursued by these 25 students are as follows:

- 13 are pursuing a PhD degree and
- 12 are enrolled in a Masters program

In addition to this, IIT Kanpur has also hosted six internship students from Bhutan, Australia, Bangladesh and Nigeria.

Three undergraduate students from Ecole Nationale Supérieure d'Arts et Métiers (ENSAM), France are currently at IIT Kanpur for two semesters under an exchange program between IIT Kanpur and ENSAM.

Short-Term Courses for Foreign Working Professionals

In 2023, IITK organized three courses under the Indian Technical and Economic Cooperation Programme (ITEC), the leading capacity building platform by the Ministry of External Affairs, Government of India.

IITK offers various courses under ITEC every year and in 2023, the courses offered by IITK were:

- ***Data Science for Managerial Decision-Making:*** Course taught by Professor Faiz Hamid and Professor Deep Mukherjee
- ***Strategic HRM for Organizational Excellence:*** Course taught by Professor Amit Shukla
- ***Robotics:*** Course taught by Professor Ashish Dutta, Professor Mangal Kothari and Dr. Anjali Kulkarni

Participants of the ITEC course on Robotics

These short-term courses were aimed specifically at working professionals from ITEC partner countries such as Bangladesh, Ethiopia, Mongolia, Morocco, Myanmar, Tajikistan, Malawi, Algeria, Vietnam, Cambodia and Palestine. Over 50 students participated in these courses held offline at IIT Kanpur.

IIT Kanpur Student Mobility Overseas

- 70+ undergraduate students from IIT Kanpur were nominated for semester exchange at partner universities in 2022-23.
- Over 30 IIT Kanpur students were accepted for internships at foreign universities.

OFFICE OF RESOURCES AND ALUMNI

Out of the total amount of Rs. 282.00 crore pledged by donors in the last financial year, a total of Rs. 183.12 crore has been received in FY 2022-23, as compared to Rs. 114.06 crore received in the last financial year, and the balance is expected to be received based on the milestones achieved as set by the donors in the next one year.

S. No.	Some Notable Contributions	Pledged Amount In Rs. (Crore)	Received till 31st March 2023 Amount In Rs. (Crore)
1.	Gangwal School of Medical Sciences and Technology	285.56	164.56
2.	Centre for Energy Policy and Climate Solutions	18.25	14.97
3.	Mehta Family Centre for Engineering in Medicine	17.50	7.71
4.	The Pawan Tewari Goldman Sachs Sustainability Faculty Chair/The Pawan Tewari Goldman Sachs Scholarships	7.12	2.71
5.	Rajiv and Ritu Batra New Faculty Fellowship, Rajiv and Ritu Batra Endowed Chair for Cybersecurity and Rajiv and Ritu Batra Student Award in Cybersecurity	2.25	2.25
6.	Professor T.R. Viswanathan Endowment Fund	2.15	2.15
7.	IIT Kanpur Development Foundation	2.14	2.14
8.	Rooma & Ajay Dubey Healthcare Innovation and Ideation Program	2.05	2.05
9.	BIS Standardization Chair	1.25	1.25
10.	Sonu Agrawal Memorial Chair	1.25	1.25

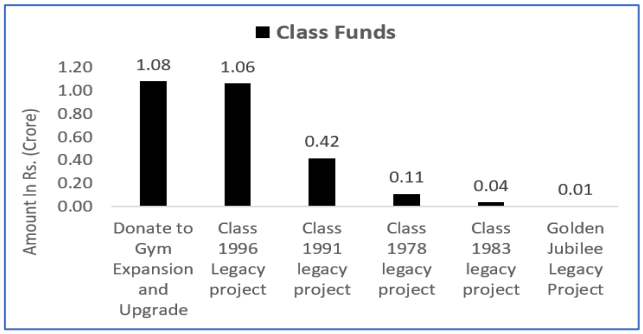
11.	Class of 1970 Initiative Gym Expansion & Upgrade	1.08	1.08
12.	Department of Chemical Engineering Modernization of the Unit Operations Laboratory (UOL) and the Workshop Facility	0.78	0.78
13.	Biochar Project	0.48	0.48
14.	Shraman Foundation Scholarship	0.48	0.48
15.	Madan Mohan Singhal memorial scholarship	0.27	0.27
16.	Shri Ram Sahai Agarwal Scholarship, Smt. Vidyawati Agarwal Scholarship and Smt. Tara Ghate's Scholarship	0.26	0.26
17.	Satish and Kamlesh Agarwal CSE Student Scholarship	0.26	0.26
18.	Shri Trilok Chandra Memorial Scholarship	0.25	0.25
19.	Pritam Lal Shakuntala Rawal Memorial Scholarship	0.15	0.15
20.	Smt. Saroja Krishnan Scholarship	0.13	0.13
21.	Raghvendu Shukla Memorial Merit Award	0.12	0.12

Campaigns

Various campaigns in the year 2022-23 were run by IIT Kanpur to raise funds for different initiatives from time to time.

S.No	Campaign Name (Student/Faculty & Community welfare)	Amount In Rs. (Crore)
1.	Professor T.R. Viswanathan Endowment Fund	2.15
2.	Annual Gift Program	1.53
3.	Sonu Agrawal Memorial Chair	1.25
4.	Class of 1970 Initiative Gym Expansion & Upgrade	1.08
5.	Professor N. Sathyamurthy Endowment Lecture Series	0.13

Alumni across various Classes have contributed for academic and non-academic initiatives for the benefit of students and IITK community.



Major Donations received towards Endowment Activities in FY 2022-23

S. No.	Faculty Chairs	Amount In Rs. (Crore)
1.	The Pawan Tewari Goldman Sachs Sustainability Faculty Chair	2.41
2.	Rajiv and Ritu Batra Endowed Chair for Cybersecurity	2.25
3.	Professor T. R. Viswanathan Chair	2.15
4.	Sonu Agrawal Memorial Chair	1.25
5.	BIS Standardization Chair	1.25

S. No.	Award	Amount In Rs. (Crore)
1.	Raghvendu Shukla Memorial Merit Award	0.12

S. No.	Scholarships	Amount In Rs. (Crore)
1	Shraman Foundation Scholarship	0.41
2	Madan Mohan Singhal memorial scholarship	0.27
3	Shri Ram Sahai Agarwal Scholarship, Smt. Vidyawati Agarwal Scholarship and Smt. Tara Ghate's Scholarship	0.26
4	Shri Trilok Chandra Memorial Scholarship	0.25
5	AlphaGrep Scholarship	0.25
6	Satish and Kamlesh Agarwal CSE Student Scholarship	0.18
7	Pritam Lal Shakuntala Rawal Memorial Scholarship	0.15
8	Smt. Saroja Krishnan Scholarship	0.13
9	Kashinath Jagdish Prashad Shakuntala Mittal Memorial Scholarship	0.02

Major Activities (money received till 31st Mar, 2023)

S. No.	Major Activities	Amount In Rs. (Crore)
1.	Gangwal School of Medical Sciences and Technology	164.56
2.	Centre for Energy Policy and Climate Solutions	14.97
3.	Mehta Family Centre for Engineering in Medicine	7.71

4.	Rajiv and Ritu Batra New Faculty Fellowship, Rajiv and Ritu Batra Endowed Chair for Cybersecurity and Rajiv and Ritu Batra Student Award in Cybersecurity	2.25
5.	Rooma & Ajay Dubey Healthcare Innovation and Ideation Program	2.05

Major Donors (FY 2022-23)

S. No.	Name of Donors	Association with IIT Kanpur	Amount In Rs. (Crore)
1	Rakesh Gangwal	BT/ME/1975	68.78
2	Dev Joneja	BT/ME/1984	6.93
3	Hemant Jalan	BT/CHE/1977	6.00
4	Anil Bansal	BT/ME/1977	4.46
5	Muktesh Pant	BT/CHE/1976	4.08
6	Sudhakar Kesavan	BT/CHE/1976	4.07
7	The Mehta Family Foundation		3.28
8	Deepak Mohan Narula	BT/EE/1985	2.45
9	Rajiv Batra	BT/EE/1982	2.26
10	Ajay Dubey	BT/CHE/1980	2.05
11	Pawan Tewari	BT/EE/1988	1.96
12	Bureau of Indian Standards		1.25
13	Ranodeb Roy	BT/CSE/1990	1.02
14	Jagjeet S. Bindra	BT/CHE/1969	0.93
15	Rathin Datta	BT/CHE/1970	0.49
16	ONE Media 3.0 LLC		0.39
17	Jayadev Misra	BT/EE/1969	0.37
18	Sudhir Mohan Mittal	BT/CHE/1970	0.35
19	Alok Agarwal	BT/EE/1979	0.26
20	Vaishali Agarwal		0.24
21	Uday Mahagaokar	BT/CHE/1970	0.22
22	Mukesh Singh	BT/CSE/1997	0.22
23	Shraman Foundation		0.20
24	Satish Agarwal		0.18
25	Gokul Rajaram	BT/CSE/1995	0.16
26	Arish Ali	BT/EE/1996	0.16

Gangwal School of Medical Sciences and Technology received following donations till 31st March 2023.

Donor Name	Association with IITK	Pledged Amount USD (Crore)	Pledged Amount Rs. (Crore)	Received Amount Rs. (Crore)	Purpose
Muktesh Pant	BT/CHE/1976	0.25	18.62	15.20	Gangwal School of Medical Sciences and Technology (GSMST)
Dev Joneja	BT/ME/1984	0.25	18.62	12.98	GSMST
Anil Bansal	BT/MSE/1977	0.25	18.62	4.46	Gangwal GSMST
Rakesh Gangwal	BT/ME/1975	1.35	100.00	76.33	GSMST
J K Cement Ltd. (Late Mr. Yadupati Singhania)	BT/CE/1977		60.00	15.00	Yadupati Singhania Super Specialty Hospital at IIT Kanpur
IBM India	Organization		37.00	22.50	GSMST
REC Ltd.	Organization		14.40	6.64	Gangwal GSMST
Hemant Jalan	BT/CHE/1977		18.30	9.00	GSMST
Deepak Mohan Narula	BT/EE/1985		2.45	2.45	GSMST
Total:		**2.1**	**288.01**	**164.56**	

CSR Initiatives (FY 2022-23)

S. No	Name of Company	Amount In Rs. (Crore)
1.	Citibank N.A.	22.97
2.	IBM India Pvt. Ltd.	13.50
3.	J K Cement Ltd.	10.00
4.	REC Foundation	6.79
5.	Portescap India Pvt. Ltd.	1.18
6.	AIA Engineering Ltd.	1.00
7.	Ericsson India Pvt. Ltd.	0.90
8.	TCS Fellowship	0.56
9.	Suraj Logistix Pvt. Ltd.	0.51
10.	Vertiv Energy Pvt. Ltd.	0.42
11.	Cookson India Pvt. Ltd.	0.40
12.	PFC Consulting Limited	0.31
13.	LIC Housing Finance Ltd.	0.31
14.	Power Finance Corporation Limited	0.29
15.	AlphaGrep Securities Pvt Ltd.	0.25
16.	National Highways & Infrastructure Development Corporation Limited	0.25
17.	Integra Micro Systems Pvt. Ltd.	0.20
18.	Noccarc Robotics Private Limited	0.16

19.	Vacmet Foundation	0.16
20.	Ganesha Ecosphere Ltd.	0.14
21.	Bright 4 Wheel Sales Private Limited	0.12
22.	ANSYS Software Private Limited	0.12
23.	Frontier Alloy Steel Ltd	0.10
24.	Kewal Engineering Private Limited	0.09
25.	Power System Operation Corporation	0.08
26.	EcoEnergy Insights Limited	0.07
27.	Rahman Industries Ltd.	0.06
28.	Metal Cans and Closures Private Limited	0.05
29.	PNC Infratech Ltd.	0.05
30.	TA Foundation	0.05
31.	Faiveley Transport Rail Technologies India Pvt. Ltd.	0.02
32.	Envirad Projects Pvt. Ltd.	0.01
	Total	**61.13**

Alumni Impact

Our alumni have been the proud recipients of various honours and awards in various categories during FY 2022-23 as listed herewith:

Category of Award	Number of Awards
Academic Awards	05
Industrial Awards	Zero
Government Awards	01

Some of the major achievements of our alumni are:

S. No.	Award	Name of Alumni	Award Endowed by
1.	Padma Bhushan	Professor Deepak Dhar (MSC2/PHY/1973)	Govt. of India
2.	Indian National Academy of Engineering	Professor Monica Katiyar (BT/MME1987)	Indian National Academy of Engineering
3.	Indian National Academy of Engineering	Professor Jayant K. Singh (BT/CHE/1997)	Indian National Academy of Engineering
4.	Indian National Academy of Engineering	Professor Nitin Saxena (BT/PhD/CSE/2002/2007)	Indian National Academy of Engineering
5.	Szent-Györgyi Prize	Dr. Rakesh K. Jain (BT/CHE/1972)	National Foundation for Cancer Research
6.	Subrahmanyan Chandrashekhar Prize	Professor Arnab Rai Choudhuri (MSC2/PHY/1980)	The Division of Plasma Physics
7.	2022 Okawa Research Grant	Dr. Deepak Pathak (BT/CSE/2014)	The Okawa Foundation
8.	2022 IEEE Electron Devices Society Early Career Award	Dr. Girish Pahwa (Phd/EE/2020)	Institute of Electrical & Electronics Engineers

Some Notable Professional Achievements by our Alumni:

S. No.	Name of Alumni	Position
1.	Mr. Raj Kumar (BT/EE/1986)	Chief Secretary of Gujarat
2.	Dr. Ajay Kumar (BT/EE/1984)	IITK Distinguished Visiting Professor
3.	Dr. Smita Hashim (BT/EE/1986)	Zoom, Chief Product Officer
4.	Mr. Anup Bagchi (MT/CHE/1990)	MD & CEO of ICICI Prudential Life Insurance
5.	Mr. Krithi Krithivasan (MT/IME/1987)	MD & CEO of Tata Consultancy Services Ltd.
6.	Mr. Pankaj Gupta (BT/EE/1994)	MD & CEO of Pramerica Life Insurance
7.	Mr. Saurabh Tripathi (BT/EE/1996)	Leader, Global Financial Institutions Practice at Boston Consulting Group, Mumbai
8.	Professor Jayathi Murthy (BT/ME/1979)	President of the Oregon State University, USA
9.	Dr. Arvind Krishna (BT/EE/1985)	Elected to the Board of Directors of Federal Reserve Bank of New York
10.	Shri Pradeep Goyal (BT/MME/1978)	Elected the Senior VP of ASM International
11.	Mr. Shubham Gupta (BT/ME/2014)	Forbes Asia 30 Under 30, Healthcare & Science
12.	Mr. Bhanu Pratap Singh Tanwar (BT/EE/2014)	Forbes Asia 30 Under 30, Consumer Technology
13.	Mr. Rahul Kumar (BT/EE/2014)	Forbes Asia 30 Under 30, Healthcare & Science
14.	Mr. Vivek Jaiswal (BT/EE/2015)	Forbes Asia 30 Under 30, Healthcare & Science
15.	Mr. Vikram Singh Meena (BT/CHE/2016)	Forbes Asia 30 Under 30, Industry, Manufacturing & Engineering
16.	Mr. Hardik Bansal (BT/CSE/2016)	Forbes Asia 30 Under 30, Consumer Technology

17.	Mr. Ravish Agrawal (BT/MSE/2016)	Forbes Asia 30 Under 30, Consumer Technology
18.	Mr. Harshvardhan Chhangani (BT/EE/2016)	Forbes Asia 30 Under 30, Consumer Technology
19.	Mr. Anil Bansal (BT/MME/1977)	The South Asian Times Person of the Year 2022.

Notable entrepreneurial endeavours by some of our alumni:

S. No.	Name of the Alumnus	Startup
1.	Suyash Sinha (BT/CSE/1998)	Garudaire Private Limited deals in the business of UAV Security. Their flagship Varun is a smart surveillance and interceptor drone capable of multi-modal sensing and deep learning event analysis of cyber and physical events to provide a deep situational awareness. It is also capable of taking a few key actions to thwart such attacks.
2.	Sarvagy Shukl (BT-MT/AE/2009)	SkyAI is developing ANTI-DRONE SOLUTIONS to counter the threats posed by UAV's and drones. SkyAI is developing AI based object detection models for detecting the airborne drones using high resolution visual and IR cameras. SkyAI solution is an end-to-end solution that will detect, localize, and eventually neutralize the target drones.

Awards to the Alumni by the Institute on Foundation Day

Institute celebrated its foundation day on 2nd November 2022. Every year on this day, IIT Kanpur recognizes the accomplishments of its alumni and confers them with the Institute Fellows, Distinguished Alumnus, Distinguished Services, Young Alumnus and Satyendra K. Dubey Memorial awards. BOG Chairperson Dr. K. Radhakrishnan presided over the function and Shri S. Ramadorai, former CEO & MD of Tata Consultancy Services Ltd. was the Chief Guest.

Institute Fellow 2021

S. No.	Name	Association with IIT Kanpur	Current position
1.	Professor H.C. Verma	(MSC2/PhD/ PHY/ 1978/1980)	Former IIT Kanpur faculty, Physics Dept.
2.	Professor S.C. Srivastava	Former faculty, Electrical Engineering	Director of the IIT Kanpur-La Trobe University Research Academy and Distinguished Visiting Professor at IIT Kanpur

Distinguished Alumnus Award 2022

S. No.	Name	Association with IIT Kanpur	Current Position
1.	Mr. Rajendra Bhattarai	BT/CE/1976	President, Clean Water Strategies, University of Texas, Austin, USA
2.	Mr. Ranodeb Roy	BT/CSE/1990	Co-founder, CEO & Chief Investment Officer, RV Capital Management, Singapore
3.	Professor Sanjay Ranka	BT/CSE/1985	Distinguished Professor, Dept. of Computer & Information Science & Engineering, University of Florida, USA
4.	Mr. Aloke Bajpai	BT/EE/2001	Co-founder & Group CEO, ixigo
5.	Mr. Deepak Dev Raj	BT/EE/1970	Founder & MD, Raj Associates, New Jersey, USA
6.	Professor Ratnesh Kumar	BT/EE/1987	Palmer Professor, Electrical & Computer Engineering Dept., Iowa State University, USA
7.	Dr. Ruchir Puri	MT/EE/1990	Chief Scientist, IBM Research, New York, USA

8.	Professor Vivek Sarkar	BT/EE/1981	Chair, School of Computer Science, Stephen Fleming Chair for Telecommunications, College of Computing, Georgia Institute of Technology, USA
9.	Dr. Smita Hashim	BT/EE/1986	Vice-President, Microsoft, USA
10.	Dr. Anil Rajvanshi	BT/MT/ME/1972/1974	Director, trustee & Hon. Secretary, Nimbkar Institute, Maharashtra
11.	Professor Deepak Dhar	MSC2/PHY/1973	Distinguished Professor, IISER, Pune

Distinguished Services Award 2022

S. No.	Name	Affiliation with IIT Kanpur	Current Designation
1.	Mr. Srikant Sastri	BT/CHE/1983	President, TiE, Delhi/NCR
2.	Mr. Rajiv Swarup	BT/EE/1973	Founding President (Retd.), Shiv Nadar University

Young Alumnus Award 2022

S. No.	Name	Affiliation with IIT Kanpur	Current Designation
1.	Dr. Mohit Kumar Jolly	BT/MT/BSBE/2010/2012	Assistant Professor, Centre for Biosystems Science & Engineering, IISC, Bangalore
2.	Dr. Deepak Pathak	BT/CSE/2014	Assistant Professor, School of Computer Science, Carnegie Mellon University, USA

Satyendra K. Dubey Memorial Award 2022

S. No.	Name	Affiliation with IIT Kanpur	Current Designation
1.	Ms. Neha Verma	BT/CHE/1998	Director, energy & Environmental Management Division, Ministry of Steel, Govt. of India

Alumni engagement is a crucial aspect of fostering lifelong connections, strengthening institutional support, and promoting IIT Kanpur's branding. Following are the initiatives undertaken by the institute in FY 2022-23.

US IIT Karavaan

Our alumni are our greatest strength. Uniquely placed to help their alma mater, their inputs can guide us on the path to excellence. In view of this, having a continuous dialogue and exchange of views with the alumni is of priority for the overall growth of the Institute. To facilitate the continuous dialogue with the vast alumni based in the United States of America, IIT Kanpur delegation 'IITKarvan' visited USA in May 2022 and held US roadshow networking events in four major cities, namely New York, Washington DC, Chicago, and San Francisco. The events were attended by about 600+ alumni.

In addition to alumni networking events, IITKarvan also visited some of the US universities. Namely,

- NYU Tandon School of Engineering & NYU Langone Medical - Grossman School of Medicine,
- Georgia Institute of Technology,
- Johns Hopkins University,
- University of Illinois, Urbana-Champaign,
- State University of New York – Buffalo, and
- University of California Santa Cruz.
- Fruitful dialogues were initiated to strengthen existing academic and research partnerships as well as to form new partnerships.
- A multi-institute agreement (IITK, IITB, IITD, IITJ and Ashoka University) was also signed for faculty and student exchange with University at Buffalo, the SUNY - The State University of New York.

IIT Karavaan Australia

IIT Kanpur held Alumni Networking dinner in Melbourne and Sydney, Australia on 15th & 17th March 2023 to foster and strengthen alumni-institute relations. The events were attended by more than 100 alumni, and it gave them an

opportunity to network and chart out the future roadmap of IIT Kanpur.

The alumni engagement activities carried out by IIT Kanpur in 2022-23 successfully fostered a strong sense of community, enabled valuable networking opportunities, and enhanced the institute's image. These initiatives played a crucial role in strengthening the bond between alumni and IIT Kanpur, resulting in increased support, engagement, and philanthropic contributions.

Reunions (Nov 2022 – Mar 2023)

Reunions are the most awaited alumni engagement events of the institute. Held on campus two years after the pandemic, IIT Kanpur witnessed an overwhelming response and participation from its alumni. The institute successfully held 15 reunions that saw the reunion of the Class of 2010, the youngest class to celebrate its 10th reunion, and the Class of 1968, the Frontier batch to celebrate its 55th reunion. These reunions served as a significant platform to reconnect, reminisce, and strengthen the bonds with IIT Kanpur, thereby fostering lifelong connections and supporting the growth of the institute. Milestones such as 10th, 20th, 25th, 30th, 25th, 40th, 45th, 50th, and 55th reunions, provided opportunities for classmates to reconnect, share memories, and celebrate their achievements. They offered an opportunity for IIT Kanpur to share its achievements, advancements, and future plans with its alumni. It also gave an opportunity to our alumni to get involved with the various activities, such as fundraising campaigns, mentorship programs, and other initiatives of the institute. IIT Kanpur held various activities and events to engage its alumni during the reunions, such as gala dinners, networking sessions, panel discussions, and campus tours. Reunions have a significant impact on the growth of IITK as they help build stronger alumni relations, opportunity of knowledge sharing and collaboration along with active involvement in fundraising and campaigns.

Alumni Day

In a one of its kind initiatives, IIT Kanpur held its the first Alumni Day on 25th Dec. 2022. The institute saw the enthusiastic participation of 150+ alumni from across India and abroad. It was nostalgic as alumni from different batches (junior, seniors & batch mates) interacted with each other and recollected fond memories of their Alma mater.

INSTITUTE FACULTY

RECRUITMENT

In the past one year, the Institute has offered 45 faculty positions against a rigorous selection from 927 applicants 58 new faculty members have joined the Institute. These joining also include candidates selected during the previous round of selections held in the academic year 2021-22. The appointments per department are mentioned below:

Department	Number of new faculty
Aerospace Engineering	03
Biological Sciences and Bioengineering	04
Chemical Engineering	02
Chemistry	02
Civil Engineering	02
Computer Science and Engineering	04 (out of this 01 resigned)
Department of Design	01
Earth Sciences	02
Economic Sciences	02
Electrical Engineering	05 (out of this 01 resigned)
Humanities and Social Sciences	01
Industrial and Management Engineering	04
Materials Science and Engineering	02
Mathematics and Statistics	05
Mechanical Engineering	06
Physics	06
Space Science and Astronomy	02
Sustainable Energy Engineering	05

During this period, we have also made 140 offers of post-doctoral fellowships and 37 offers of visiting faculty.

Awards and Honors

Our faculty has played a significant role in pushing the frontiers of knowledge. This has been duly recognized in the form of various awards and honors, including fellowships of professional societies and editorships of international journals.

I am extremely happy to share with you the wonderful news that Professor Rajat Moona (CSE) has been appointed the new Director of the Indian Institute of Technology Gandhinagar. Professor Dhirendra Katti (BSBE) has been awarded the prestigious TATA Innovation Fellowship by the Department of Biotechnology, Government of India. Professor Ashutosh Sharma (CHE) was selected as the President of the Indian National Science Academy in June 2022. He has also been awarded the "Dr B. P. Godrej lifetime achievement Award" by the Indian Institute of Chemical Engineers (IIChE).

Professor Gautam Biswas (ME) has been awarded the "2023 ASME (American Society of Mechanical Engineers) Heat Transfer Memorial Award" for sustained and outstanding scholarly contributions to thermal science and engineering. Professor Ashok Kumar (BSBE) has been selected for the "Dr. Nandagudi Suryanarayana Rao Academic Award" of the National Academy of Medical Sciences (NAMS) for 2023. Professor Jayant K. Singh (CHE) has been awarded the prestigious "NASI (National Academy of Sciences)-Reliance Industries Platinum Jubilee Award" for the year 2022. Professor Shalabh (Maths) has been selected for the "Distinguished Statistician Award" of the Indian Society of Probability and Statistics (ISPS) for 2022. Professor Sandeep Verma (CHM) has been awarded the "SMC Gold Medal-2022" by the Society of Materials Chemistry at Bhabha Atomic Research Centre, Mumbai. Professor Avinash K. Agarwal (ME) has received the "WSSET (World Society for Sustainability Energy Technology) Innovation Award-2022" in "Renewable Energy Systems" category.

Professor Yogesh M. Joshi (CHE) has been elected as Fellow of the Indian Academy of Sciences and the Society of Rheology. He along with Professor S. Ganesh (BSBE), Professor Arun Shukla (BSBE) and Professor Javed N Malik (ES) is also elected to the Fellowship of the Indian National Science Academy (INSA). Professor Krishanu Biswas (MSE) has been elected as Fellow of the Royal Society of Chemistry (FRSC). Professor Nitin Saxena (CSE), Professor Santanu K. Mishra (EE), Professor J. Ramkumar (DES), Professor Monica Katiyar (MSE) and Professor Jayant K. Singh (CHE) have been elected to the Fellowship of the Indian National Academy of Engineering (INAE) 2022.

STUDENT AWARDS

The prestigious scholarships and awards received by our students have been a matter of pride and pleasure for us. Goutam Das, Antriksh Gupta, Harsh Bihany, Siddhant Suresh Jakhotiya, Antreev Singh Brar, and Mayank Gupta received the Aditya Birla Scholarship. Manan Kalavadia, Rishi Rakesh Agrawal, Srajan Jain, and Divyanshu Narang received the O.P. Jems scholarship. 127 students received the Inspire Scholarship.

The full lists of awards received by the faculty and students are given at the end of the report.

INSTITUTE COUNSELLING SERVICE

Overview and Team Strength

The Institute Counselling Service (ICS) primarily provides psychological, academic, or financial assistance to students. The ICS aims to bring a human touch in a highly competitive academic environment and lends a helping hand to the students in need, thereby trying to create a home away from home.

ICS consists of a Head, a team of professional counsellors, psychiatrists, a group of student volunteers dedicated to the welfare of the student community and staff members. Currently, there are 6 professional counsellors and 3 psychiatrists who conduct consultations at regular intervals. The student team comprises an undergraduate (UG) wing and a postgraduate (PG) wing. The UG wing has 5 coordinators, 12 core team members (operations), and 11

core team members (Academics). The UG wing has 221 student guides and 165 academic mentors, whereas the PG wing has 8 core team members, 45 academic mentors, 35 student guides, and 100 orientation team members.

Counsellor and Psychiatrists Sessions

Students typically meet the counsellors in two modes. Either they approach the counsellors on their own volition, or they are referred to the ICS by their friends, faculty members, psychiatrists, or the doctors at the health centre. Students with academic difficulty are also encouraged to meet counsellors to develop strategies to cope with distress. In cases of emergencies, where a student needs urgent psychiatric help, the Counselling Service coordinates with the psychiatrist clinic to ensure the student receives timely and appropriate care. Counselling Service has taken several initiatives in the direction of the well-being of students' mental health like initiating Tele-psychotherapy sessions to aid students during the pandemic which is still in practice.

In the academic year 2022-23, the ICS had a total number of 2781 psychotherapeutic sessions. Out of which 2567 were in-person psychotherapeutic consultations and 214 were Tele-counselling sessions.

Activities

The team organized various events throughout the year like:

- Open Session with Counsellors to provide a common platform for the students to share their views and talk freely about mental health in the student community.
- A Talk on World NO-Tobacco Day by Professor Prabhat Chand, Psychiatrist, NIMHANS to spread awareness on the physical and psychological implications of substance use.
- A talk on the occasion of World Suicide Prevention Day, to raise awareness about suicide prevention and the importance of mental health. It was conducted by Dr. Kalim Ahmed, a renowned psychiatrist in Kanpur.
- Various inspiring events on the occasion of World Mental Health Day to bring attention to the Mental health wellness. A Mental health awareness open interaction session between the institute counsellors and the campus community was conducted. Here participants shared their thoughts and discussed the importance of mental health in a person's life. The session was followed by a movie screening - "The Perks of Being a Wallflower" and a 5 km Run and Walk event with the theme "Run and Walk for a Cause".
- An event named 'Hakuna Matata' was organized on Diwali. The celebration started with a rangoli competition in collaboration with the Fine Arts Club, and prizes were distributed to the top participants. The day of Diwali ended with students flying Sky Lanterns and decorating the ground with divas, marking the festival of lights.
- A two-day Gatekeeper training program in association with Suicide Prevention India Foundation (SPIF), Bangalore was facilitated for IITK students, staff, and faculty members. Participants were trained to identify the signs and symptoms related to suicide, methods to approach and provide initial aid along with referral to mental health professionals for early intervention and support. The event also included an Open Session on mental health.
- A 5 km Run and Walk Event was organized on the occasion of Republic Day. It was based on the theme "Engineering a stronger mind" to promote building mental resilience through physical fitness.
- A talk on "Unlocking the power of clutter-free space" by Gayatri Gandhi, a renowned Kon Mari method consultant was organized. It provided practical tips and techniques on the art of tidying your space and its benefits for mental clarity.
- Several Blogs to raise awareness about mental health issues and suicide prevention were uploaded on social media platforms. A two-part medium blog series on suicidal thoughts was appreciated by many students.
- Social media posts such as Motivation videos for placements and Internship Comic Series were shared with the student community.
- Financial Assistance was also provided through the Students Benevolence Fund (SBF), in the form of scholarships. It was given to those students, who were unable to acquire any other financial assistance from the institute. The SBF scholarship is Rs. 1,500 per month and is given for 9 months. Apart from this, SBF Loans are also available to those who are in dire need of money.

STUDENT ACTIVITIES

Games and Sports Council

Various events like the Sports Arena, Indoor Arena and PG Orientation were organized by the Council for the incoming Y22 batch. Through these sessions, the council gave essential insights into the bountiful sporting opportunities and the world-class sporting infrastructure present at the disposal of the IITK students.

Workshops

- The council organized a 3-day squash workshop to encourage squash among the female students.
- Dussehra camp, October 1 - 9, 2022, provided a conducive environment for the Inter-IIT teams and coaches to get accustomed to coordination within the team and hence provide a better boost to their final IISM (Inter IIT Sports Meet) preparation.
- A Kabaddi workshop was conducted at the Yoga Hall, New Sports Complex. A professional coach associated with UP Kabaddi Association was invited to train the students on the fundamentals of the sport.

Intra IITK sports events

- A wall-climbing competition open to all students/faculty/staff and their relatives was conducted for the first time at IIT Kanpur.
- IBL (badminton league) was a team event conducted by the Council with the mandatory format of a team of 4 boys and 1 girl.
- Institute Phatta League was a thrilling event organized by the Council that filled everyone with a wave of enthusiasm and excitement.
- The Panenka, a Football Penalty Shoot Tournament saw a huge turnout, with 24 teams of 5 to 7 players each.
- Enthusia Volleyball League was a tournament organized exclusively for the PG student community of IIT Kanpur.
- Institute volleyball league was conducted in a league format and was conducted for both the men and women category.
- The Institute Cricket Team organized its first-ever Institute Cricket Championship (ICC) for all batches, including UGs and PGs.
- Institute Panja League was conducted for various weight categories for both men and women.

The winners were awarded certificates, medals, and trophies.

Felicitation

- "Graduating Batch Sports Appreciation and Felicitation Ceremony" was organized by the Council on 30th June 2022 to acknowledge the contribution of the senior contingent members towards IITK Sports.

As a mark of love and respect for the beloved coaches, the council members organized the Teachers' Day Celebrations.

UDGHOSH 2022

The Council played an integral part in the successful conduct of Udghosh by ensuring a flawless arrangement of the event's logistics. The Council made a dedicated effort to ensure that Udghosh stood tall on everybody's expectations. The event served as a great source of rejuvenation and recreation for the campus community. The official contingent jersey was released on 11th October.

Inter IIT Aquatics Meet

The meet was held from 4th-9th October at IIT Delhi. The IITK team performed creditably and managed to secure multiple medals in the variety of events held, hence bringing up the tally to close in at Silver for the Women's Swimming team and 4th place for the Men's Swimming team.

Inter IIT Sports Meet 2022

The IITK contingent continued their stellar record in sports such as volleyball (women) gold, table tennis (women) bronze, athletics (men) bronze, aquatics (men) 4th, and aquatics (women) silver by grabbing medals and presenting an excellent show of sportsmanship.

INFERNO 2022

The Council organized INFERNO (The Sporting Event of the General Championship) for the campus community to revive the sporting rivalry among all the halls of residence. A total of 16 games and sports were incorporated in INFERNO this year, ranging from Volleyball, Hockey, Powerlifting, Tug of War, etc. The official Logo was also designed and revealed for the first time. Freshers' inferno was organized from 6th-8th January exclusively for the Y22 batch. The event was organized in 11 different sports for the men's category and 9 sports for the women's category.

Screenings

The Live Screening of 'F1 Australian Grand Prix', UEFA Champions League final and IPL '22 final was a huge success which brought the student community together through love of sports.

Media and Cultural Council

Cultural Extravaganza

Various events like Dance Extravaganza, Musical Extravaganza, Dramatics Eve, Humor Hour etc. were organized over the weekend from 13th-17th April 2022 by different clubs.

Treasure Hunt' 22

The Council organized a Treasure Hunt for the Y21 batch on 17th June and for the Y22 batch on 24th December. The events had two stages: The Scavenger Hunt and The Treasure Hunt. Each of the events witnessed the participation from 700+ students.

Mafia Night

It was organized for the Y21 batch on 5th August. The event was a huge success with a large participation.

ALFAAZ

The Council, in association with Shivani Centre, hosted the first Literary Festival, Alfaaz. The event was held over 3 days, starting from 9th September.

Yaanam Movie Screening

As part of the Azadi Ka Amrit Mahotsav event, the Council organized the first-ever science documentary screening in

the Sanskrit language, Yaanam, which recounts the unique and challenging aspects of the Mangal Mission. Mr. Vinod Mankara (Director of the movie) also visited IITK at the time of screening.

CHEF IT UP

The first ever culinary event was conducted for the campus junta. It attracted a huge participation and helped in preparation for Inter IIT Cult Meet 5.0.

Participation Visits

- Inter IIT: After a gap of two years, Inter IIT CULT MEET 5.0 was held at IIT Madras, and a 230+ member IITK contingent participated with the utmost enthusiasm.
- Thomso: IITK contingent participated in Thomso, the annual cultural festival of IIT Roorkee.

Freshers Weekend

The Freshers' weekend was organized from 9th-11th December 2022. It started with a bang with the Freshers' Night, played through with the music with the DJ Night and was concluded with a touch of serenity and relaxation with a movie night.

THC House party

This is a one-of-a-kind cultural event aimed at bringing the best of hip-hop to the campus - inviting performances from reputed hip-hop artists all over the country.

GALAXY

The 38th edition of Galaxy, the annual Inter-pool Media and Cultural Competition, was organized successfully from 30th March to 9th April 2023. The event brought together students from various pools, who displayed their talents and competed in a variety of events, fostering an atmosphere of enthusiasm and camaraderie.

Science and Technology Council

Team Recruitments

- Summer project recruitment for the Y21 batch took place in the month of May.
- Team recruitment was conducted for the Y22 batch in March-end. Approximately 110 Y22s were inducted as Junior members.

Makerspace Initiative

The Council proposed an initiative for building MakerSpace, which is aimed at providing a common workspace for various teams and entities of the Council. The Class of 1991 has committed a sum of Rs. 2.2 crore for the MakerSpace initiative, out of which a sum of approximately Rs. 90 lakhs have already been raised.

SnT Summer Camp 2022

The Council successfully conducted the SnT Summer Camp 2022 during May - August. A total of 2033 students applied for the SnT Summer Projects, out of which 943 students were ratified finally across a total of 52 projects spanning across 12 entities in the Council.

SnT PAVILLION

The Council organized the SnT Pavillion, where freshers were acquainted with the activities of all the entities of the SnT Council. The event was organized in a completely offline mode for the UG Y22 batch after a period of 3 years spanning over 4 days.

KPIT SPARKLE HACKATHON

The SnT Council organized a guest talk on 27th September 2022 aimed to introduce the campus community to the esteemed KPIT Sparkle Hackathon. The lecture was delivered by Mr. Sant Ranjan, who currently serves as the Principal System Architect and the CTO of KPIT Technologies Pvt. Ltd.

Performance In Inter IIT Tech Meet 11.0

IIT Kanpur secured the 3rd position in the 11th Inter IIT Tech Meet conducted in hybrid mode. This year, the Tech Meet was hosted by IIT Kanpur. IIT Kanpur bagged 3 Gold medals, 2 Silver medals, and 5 Bronze medals in the Tech Meet this year.

TAKNEEK

Takneek was conducted for the first time in 3 years, in fully offline mode in the month of April over a period of 10 days. Problem statements:

- Aakash: PSes with 5-7 days of preparation.
- Vayu: PSes with 2-4 days of preparation.
- Jal: On-the-spot PSes.
- Agni: Our flagship event, SnT Code.

Academics and Career Council

The UG Academics Wing helped the freshers to kick start their academic journey through the academic orientation, mentor assignment, department guide booklets, comprehensive course guidance (CCG) kits, AnC booklet, project reviews through the Instagram page, etc. The Wing also conducted a MATLAB workshop, which covered various topics like introduction to MATLAB, overview of curve-fitting, introduction to machine learning with MATLAB, building apps with MATLAB, introduction to image processing and deep learning.

The PG Academics Wing conducted a PG Academic orientation to familiarize the students to an unknown campus environment, its faculties and infrastructure. The wing also hosted an informative talk session about the "Prime Minister Research Fellowship Scheme (PMRF)" for PhD students. The speakers from different disciplines were Mr. Varad Jayant Daoo, Mr. Vikas Tiwari, Ms. Bhavana Dwivedi, and Mr. Pratik Samal, who are PMRF fellows themselves. They shared their experiences and insights about the scheme, which was valuable for the attendees.

The Career Development Wing: The activities of the wing are:

- Internship Sessions were conducted to spread awareness about the preparation and preparation resources for the internship season, aimed at the Y19 batch.
- A Group Discussion Marathon event broken up into a number of different sessions took place in the month of July.
- AnC Discussion Forum is a virtual platform designed to assist students in engaging in academic debates relating to their future careers.
- The seniors showed great enthusiasm to help their juniors through the Intern Mentorship Program. 70+ mentors were matched to the students from different profiles and experiences based on the preferences filled by the mentees.
- A Resume Making Session was organized to help students create an effective resume and navigate the placement season with confidence.
- Data Structure and Algorithm course was conducted along with the Mock Tests and Mock Interviews. Programming Pathshala, a social enterprise helping students learn to code and become industry-ready, collaborated for this event.
- Mr. Animesh Mishra (Y15 batch), a Venture Capitalist at Eximius Ventures, and Adarsh Srivastava, Co-Founder at ZK Labs gave a talk on Off-campus Opportunities.
- A session was conducted on Internship Programs for Women was aimed to provide an overview of various mentorship and sponsorship programs available for women in the tech industry. Speakers at the event were Ms. Akanksha Singh, Ms. Avishi Taneja, Ms. Gitika Mittal, and Ms. Sweta Kumari of Y20 Batch.
- Placement Preparation session conducted with Cantilever Labs was aimed to train graduate students in Software, Quant, Data Science, Finance, Consulting, and Product Management profiles, along with GD, case, and interview preparation.
- Placement Buddy Talks for PG Students had been instrumental in helping PG students gain valuable insights into the job market and build their professional network.
- Career Connect was organized from 10^{th}-12^{th} February 2023. This annual flagship event aimed to encourage undergraduate and postgraduate students to explore and equip themselves to make informed and wise choices in their professional, social, and personal endeavors.
- Passion To Profession was a featured panel discussion with two of our distinguished alumni, Mr. Abhishek Dhandharia, a filmmaker and director of the popular web series "Physics Wallah," and Mr. Samarth Bansal, a journalist who has worked in journals like The Hindu, Hindustan Times, and The Wall Street Journal.
- At an informal talk session, Alumni Connect with two Y76 alumni, Mr. Sandeep Tiwari, and Mr. Suresh K. Lodha provided great insights into the prospects of academic and industrial opportunities in the US.
- Mastering Money was a special session on personal finance specifically tailored to college students.
- The session Women in Tech was held on 12^{th} February to highlight women's rise in technology and engineering. Our guest speakers for the session were Ms. Anu Meena Malhotra, founder of Agrowave, Forbes 30 under 30 Asia, and Ms. Shefali Vijayawargia, brand manager of Amul, Forbes 30 under 30 India.
- Cracking the Code organized in collaboration with Programming Pathshala aimed to educate attendees on the journey from learning to code to facing programming interviews. The guest speakers were Mr. Anup Garg, co-founder of Programming Pathshala, and Mr. Bharat Khanna, a former employee of Tower Research.
- Bridging the Gap was held on Saturday, 11^{th} February. The session was hosted by Mr. Arijit Bhattacharyya, a seasoned expert with over 24 years of experience in entrepreneurship, technology, finance, education, and innovation.
- The guest speaker at Building Better You was Mr. Divas Gupta, a certified public speaking coach and 3x Tedx speaker.
- At How to Improve Your Research Skills Professor Sundararajan emphasized that carrying out good research involves developing multiple skills simultaneously, such as deep thinking, a questioning mind, and lateral thinking. Additionally, researchers should be fully aware of ethical practices before starting their journey.
- An exclusive online session for senior PhD students was conducted on 25^{th} February 2023 on Postdoctoral Fellowship Opportunities. The speaker for the interactive session entitled "Find your way in the world of postdoc research" was Dr. Akash Choudhary, a Humboldt postdoc fellow at the Institute of Theoretical Physics, Technische Universität (TU) Berlin.

Research Wing

Institute Research Symposium 2023

The Council celebrated the research work of the institute with featured talks by Professor Shalabh and Professor Siddharth Panda, the Deans of Academic Affairs and Student Affairs, respectively. The event was graced by the presence of Chief Guest Professor Abhay Karandikar, Director of IIT Kanpur, and was organized by Professor Nisanth N. Nair as the organizing chair along with Professor Ark Verma as the faculty advisor of the Academic and Career Council. Other members of the organizing team included Professor Ashoke De, the Associate Dean of Academic Affairs, Mr. Shreyank Goel, the general secretary of PG AnC, and Mr. Manit Ajmera, the general secretary of UG AnC. Several professors

from different departments of the institute also presented their work during the event.

5TH National Students' Research Convention

The Convention on Healthcare and MedTech was held from 3rd-5th March at IIT Kanpur. The convention was organized in collaboration with the Gangwal School of Medical Sciences and Technology and the Indian Council of Medical Research. Over 140 participants took part in the convention, making it a truly massive event.

Talks

- An interactive Session on 'Research in STEM for India' with Professor Ashutosh Sharma was organized on 4th November 2022.
- On 15th February 2023, the Council organized a talk by Professor Biman Bagchi on the book "Vignettes for Success in Academia."

International Relations Wing

- **SemEX101:** A detailed course on the process of semester exchange and was covered via 3-4 sessions over the weekends to increase the awareness and knowledge of the campus community.
- **Language Learning Groups:** We encouraged to help the campus community discover and interact with people who are proficient or enthusiastic to learn a particular language.
- The Wing assisted in the Duo-India Fellowship Program.
- Foreign Training Program and Alumni Connect was initiated in association with the Research Wing, AnC Council.
- Organization of a get-together and orientation for foreign students in collaboration with the office of international relations. The Wing briefed them about the academic structure at IIT Kanpur and the facilities on campus.
- Allocation of a point of contact (representatives from the academics and career council) to each foreign student to help them with all the needs and provide necessary help and guidance.
- Hosted a delegation from top US institutes, led by Professor Nikhil Gupta from NYU Tandon School of Engineering and Prof Mritunjay Doddamani, under USA- India Summers Program a flagship event of New York University-International Research Experience for Students (NYU-IRES).
- Organized the Diwali celebration event along with the OIR office for the foreign nationals, which included movie screening and traditional Diwali rituals to help them understand the Indian culture.
- An Informative Session on DAAD-KOSPIE Scholarship was organized. The speaker was Mr. Raghav Mundra, Ph.D. student in Materials Science and Engineering at IITK. In the session, he discussed the eligibility criteria, grants, funding, and the future of the scholarship program.
- Another informative Session on QUAD Fellowship was organized, where the speaker was Mr. Sharun Kuhar, member of the first cohort of Quad Fellows for 2023.

Entrepreneurship Cell

Campus Hangouts

They are informal and interactive discussion sessions on entrepreneurial matters targeting the campus students. Hangout-1 conducted on 11th June, covered topics like Web3, NFTs, Decentralization, VC investing, etc. Hangout-2 was conducted on 19th June, which saw a participation of 100+ students and an insightful talk by Mr. Nikhil Kurele, Co-founder and CEO, Noccarc.

Pitchers' Venture

The event was conducted on World Entrepreneurs' Day, 21st August. The competition focused upon ideating a solution to a relevant problem and then presenting it in the form of a pitch before the judges who will further help you in thinking and pitching better.

IIT KANPUR Combinator

It is an ecosystem which brings together students, professors, and alumni of IIT Kanpur from different parts of the startup journey. Here they can help each other grow, connect, and foster entrepreneurship. The event was launched on 2nd October and the first session was held on 29th - 30th October.

UPSTART 2022

It saw an overwhelming response from startups, with over 250+ registrations from in-and-around Bangalore, Hyderabad, and Delhi with great potential to carve the future with their solutions and services. 42 startups got to pitch in front of investors from top-notch Investment firms- Indian Angel Network, IvyCamp, Atal Incubation Centre - CCMB, Chiratae Ventures, Ankur Capital, Orios Venture Partners, IAN Fund, Hyderabad Angels, Blume Ventures, SucSEED Ventures and many more. The final pitching and on spot funding opportunity was concluded at the E-Summit 22, IIT Kanpur.

E-SUMMIT'22 (13th-15th January)

E-Summit, an annual flagship event of IIT Kanpur, was started with the intention of fostering entrepreneurial initiatives and activities on the campus and accomplishing IIT Kanpur's mandate of nurturing India's future technopreneurs. E-Summit' 22 consisted of events like Upstart Finale, Decrypt, Be an Angle, talks, panel discussions, and workshops on a diverse range of topics.

Gymkhana Initiatives & Operations

Gymkhana Day

A Gymkhana Day for the graduating batch of 2022 was organized at the Outreach Auditorium on 30th June 2022.

Mementos were given to the students by the Director and a farewell dinner was organized by the Gymkhana.

Inter-IIT Tech Meet 11.0

Inter-IIT Tech Meet 11.0 was hosted by IIT Kanpur on 10th-12th February. The event was successfully conducted. Logistics were handled by forming a three-tier team with President, Students' Gymkhana being the Chief Executive. Funds were utilized as a GFR, part of the President's Office budget.

General Championship 2022-23

The General Championship 2022-23 was organized in a short span of 11 days, with three major events, Galaxy, Takneek & Inferno.

STUDENTS' PLACEMENT OFFICE (SPO)

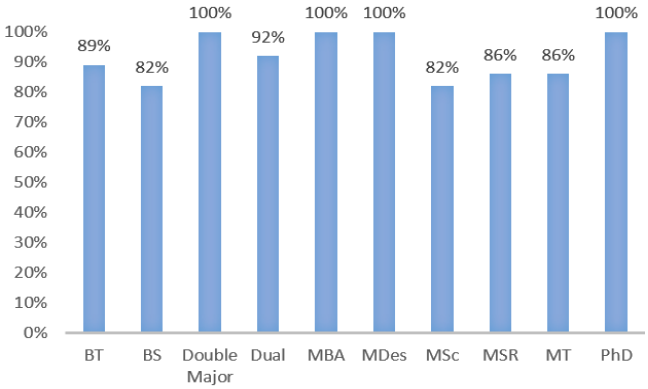
CAMPUS PLACEMENT OFFICE (SPO)

"*One student one job*" policy (single offer acceptance policy) was continued to ensure equal opportunity to all students registered with SPO this year. Recruitment drive for the academic year 2022-23 was held in two phases. The Phase-1 of recruitments officially started on 1st December 2022 and continued till 15th December 2022, though the preparations and shortlisting activities for campus placements started in July. About 300+ recruiters participated to hire students for full time employments. In Phase-1 placement season 2022-23, a total of 59 top-tier firms with 93 different profiles from various sectors conducted interviews on Day 1, an unprecedented 317 job offers were extended, and 287 of those were accepted by IIT Kanpur students. The recruitment drive was conducted in hybrid mode for the internships and campus recruitments. The Phase-2 recruitment started in January 2023 and continued till May 2023.

Based on hiring numbers, the top recruiter for this placement season is Rakuten Mobile which hired 37 students. Other top recruiters of the season are American Express, PwC, Intel, Microsoft India, Qualcomm etc.

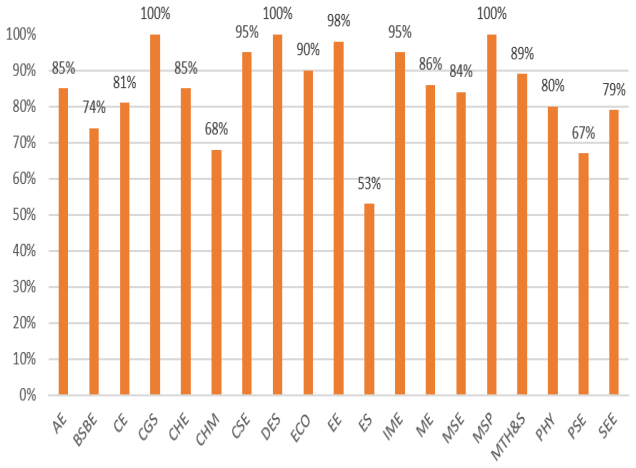
A total of 393 organizations registered in the campus placements. A total of 1215 students out of the 1382 registered students were placed through SPO during the academic year 2022-23. This includes students in both undergraduate and postgraduate courses. This year SPO achieved new heights in number of placements, highest international and domestic package, number of international offers, and number of Pre-Placement Offers (PPOs). More than 60 companies extended 208 PPOs, which is a 33% increase as compared to the last year. So far IITK students have received 81 international offers out of which 73 are accepted. This year's highest domestic package is INR 1.9 crore, and highest international base package is HKD 2250000. The overall placement stood at 87.9%, which commends the dedicated efforts of the entire SPO team including the students, staff, and faculty coordinators.

A summary of program-wise placement record for the current season is shown in the following Figure.



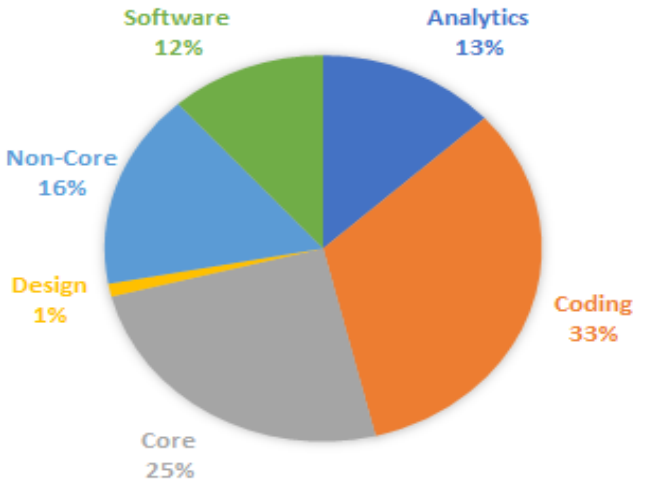
Placement statistics of various degree programs at IIT Kanpur during placement season 2022-23.

Among the various departments, CSE, MSP, IME, EE, DES, ECO, CGS recorded *student placement percentage of above 90%* (The percentage calculations presented above are derived based on the number of graduating students who had registered with the placement office). A good number of graduating students do not register for placements as they are interested in pursuing higher studies or entrepreneurship options. In addition, an appreciable number of IIT Kanpur students pursue Civil Services jobs or take-up career options in public sector companies and, therefore, abstain from participating in the recruitment process. A summary of department wise placement record for the current season is shown in the following Figure.



Department wise placement statistics at IIT Kanpur during placement session 2022-23.

Students of IIT Kanpur continued to demonstrate a strong commitment to their core educational background in their choice of employment. The Placement drive witnessed highest participation from coding and software firms which accounted for 45% of the total placements, whereas 25% of the total placements comprised core firms. Some of the top recruiting firms that visited IIT Kanpur for hiring students in core engineering sectors include Intel, Microsoft India, Oracle India Pvt Ltd, PwC, Qualcomm, Rakuten Mobile, Reliance Industries Limited, SAP Labs, Sprinklr, Texas Instruments etc. This trend observed in the last few years seems to have taken strong roots at IIT Kanpur. A summary of sector wise placement record for AY 2022-23 is shown in the following figure.



Sector wise placement statistics of IIT Kanpur during the placement season 2022-23

Some of the prominent recruiters who participated in the Campus Recruitment Drive 2022-23 include Air India, American Express, Axtria, CapitalOne, EXL, Intel, J. P Morgan & Chase, Microsoft India, Oracle India Pvt Ltd, PwC, Qualcomm, Rakuten Mobile, Reliance Industries Limited, SAP Labs, Sprinklr, Texas Instruments etc.

New Initiatives:

Samvardhan:

This year SPO successfully conducted the first-ever industry-academia connect 'SAMVARDHAN'. Over 15+ companies from various industries, offering an array of activities to help students navigate their career paths, participated in Samvardhan. To provide practical guidance and hands-on experience to the students, leading companies conducted many interactive workshops, panel discussions, keynote speeches and Hackathons. Samvardhan 2023 was not just an opportunity for students to connect with potential employers but also to network with peers from different organizations. The event provided a platform for the students to exchange ideas, learn from each other's experiences, and build their professional networks.

Special Placement Drives for Differently Abled Students:

SPO worked closely with different companies and alumni contacts to provide placement and internship opportunities to our differently abled students and were able to achieve 73% placements. 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.

Toastmasters International Club:

We thank our generous donor Mr. Suresh Bazaj, an IITK Alumnus for his support to start Toastmaster Club at IIT Kanpur. To cater to the needs of the students in the domain of communication and leadership skills, we have started and been successfully running three Toastmaster Clubs. Every weekend the club members conduct meetings. These meetings address skills such as listening, planning, motivating, and team building and give members the opportunity to practice them. More than 500 students have so far experienced the toastmasters club environment through various workshops conducted with veteran Toastmasters and industry leaders. As of now, 110 students have officially joined the clubs. In the coming year, we will have a few more Toastmaster clubs.

EPILOGUE

Dear students,

On this splendid occasion of fifty-sixth convocation, I want to extend my heartfelt congratulations and admiration to each and every one of you for your impressive achievements. I also want to offer my best wishes to the entire graduating class of 2023. I applaud your remarkable accomplishments, which serve as a testament to your strong commitment to excellence. You have faced challenges head-on, overcome obstacles, and emerged victorious. Your journey at this institution has shaped you into exceptional individuals you are today, and I have no doubt that you will continue to thrive in the future.

It is imperative to bear in mind that your esteemed institution will always be there to support you and provide guidance whenever needed, ensuring your unstoppable march towards success. From now on, you will become an integral member of an elite group of IIT Kanpur alumni, who have achieved great success in various fields. I wish you the best as you embark on the next phase of your journey, and I look forward to hearing about your future accomplishments. Use your knowledge and skills to make a positive impact on humanity and strive to bring a profound transformation in the lives of others.

Our revered institution, poised to become a leading national and international centre of knowledge, will undoubtedly draw inspiration from your impressive achievements and triumphs in the days to come. It is your duty to give back to, not just to your parents and loved ones, but also to the country that shaped you into the person of velour and distinction that you are today.

The IITs, far beyond being institutions that provide excellent engineering expertise, also serve as crucibles that forge visionary leaders who propel the nation forward. Under your leadership, we hope this nation can reach even greater heights. As you navigate your professional paths, let the principles upheld by your alma mater—integrity, discipline, and excellence—guide every aspect of your life. These principles will steer you in all aspects of your life and empower you to have a positive influence on the world

around you. This esteemed institution is progressing towards becoming an exceptional national and international establishment, and your achievements and triumphs in the future have the potential to elevate it even further. Regardless of your location or the role you occupy, always cherish your Alma Mater as the place where it all began and endeavor to extend your support to this institute in every conceivable manner in the years to come. I hope you become true exemplars and ambassadors of this institution. Work diligently to give back to the society and the nation that has nurtured and propelled you to great heights. May this auspicious moment mark the inception of a splendid new

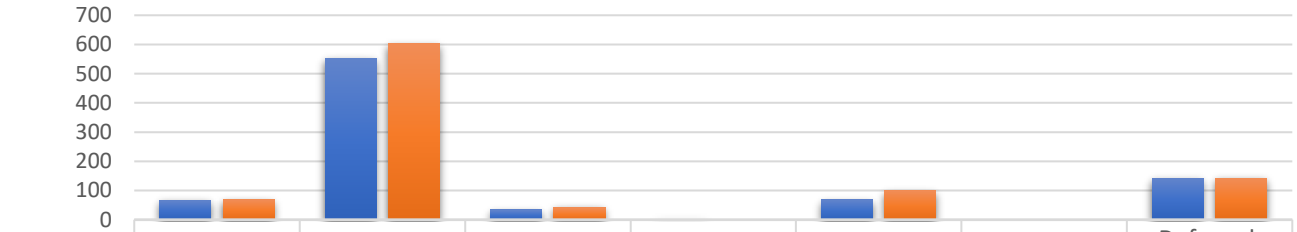
chapter in the annals of your lives. "Dare to be free," Swami Vivekananda stated, "dare to go as far as your thought leads and dare to carry that out in your life."

Please visit the following link for Book Published, Appointment, Editorship/Membership, Student Awards, Software developed and Technology developed during the year 2022-23

https://web.iitk.ac.in/july14dordn/data/Annual-Report-2022-23/Books_Published_Fellowship_Award_and_Honors.pdf

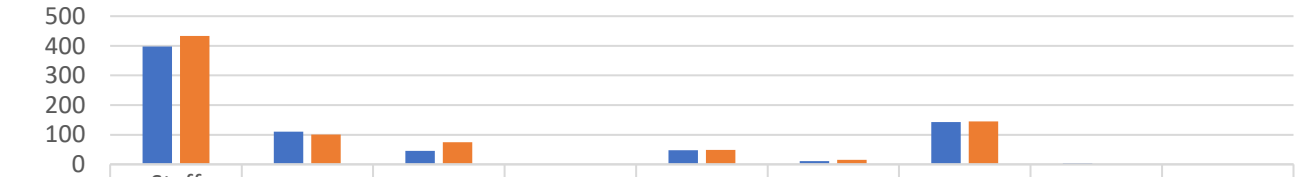
Institute at a Glance

Details of Income (Rs. in Crore)

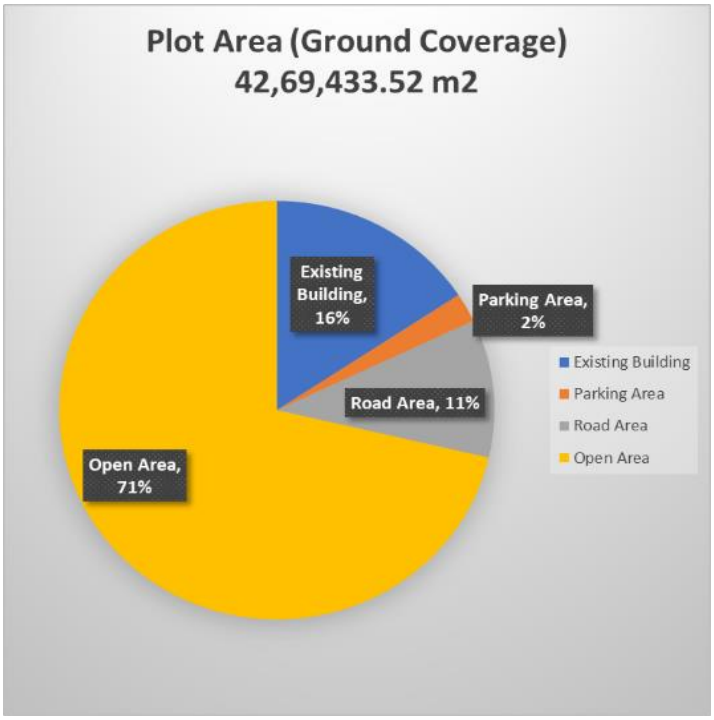


	Academic receipt	Grants / Subsidies	Income from Investments	Interest earned	other income	Prior period income	Deferred Revenue Income
2021-22	66.82	552.03	34.71	2.2	68.55	0.003	141.87
2022-23	69.15	601.83	42.29	0.02	99.55	0.005	142.9

Details of Expenditure (Rs. in Crore)



	Staff Payments & Benefits (Establishment…	Academic Expenses	Administration and General Expenses	Transportation Expenses	Repairs & Maintenance	Finance Costs	Depreciation	Other Expenses	Prior period expenses
2021-22	397.57	110.49	45.06	0	47.97	11.03	142.63	4.67	0.0077
2022-23	433.53	100.7	74.51	0.03	48.29	15.56	144.89	0.06	0.004



Organization

Board of Governors

1st April, 2022 to 31st March, 2023

CHAIRMAN

Dr. K. Radhakrishnan
Charman, BOG, IIT Kanpur
Antriksh Bhavan
New B.E.L. Road
Bengaluru – 560 231

Members:

Prof. Abhay Karandikar
Director
Indian Institute of Technology, Kanpur
Kanpur – 208016

Council Nominees:

Shri Rakesh Ranjan (Ex-officio)
Additional Secretary (Technical Education)
Ministry of Human Resource & Development
Shastri Bhawan, New Delhi – 110001

Dr. Saurabh Srivastava
Former Chairman, NASSCOM
Founder Chairman, Indian Angel Network
C-482, Defence Colony, New Delhi- 110024

Shri Pradeep Goyal
Chairman & Managing Director
Pradeep Metals Ltd.
Navi, Mumbai – 400 701

Dr. Manoj Gonuguntla
Senior Materials & Corrosion Engineer
Shell Technology Centre, Bangalore
26, 19th Cross, Laljinagar
Bangalore – 560 030

State Government Nominee:

Dr. Mahesh Gupta
Chairman & Managing Director
Kent RO Systems Ltd.
E-6, 7 & 8, Sector 59
Noida (UP) – 201 309

Senate Nominees:

Prof. Bishakh Bhattacharya
Department of Mechanical Engineering
Indian Institute of Technology, Kanpur
Kanpur – 208016

Prof. Manas K. Ghorai
Department of Chemistry
Indian Institute of Technology, Kanpur
Kanpur – 208016

Secretary:

Shri K.K. Tiwari [upto 14 March, 2023]
Registrar
Indian Institute of Technology Kanpur
Kanpur – 208016

Prof. Braj Bhushan [w.e.f. 15 March, 2023]
Officiating Registrar
Indian Institute of Technology Kanpur
Kanpur – 208016

Finance Committee

1st April, 2022 to 31st March, 2023

CHAIRMAN

Dr. K. Radhakrishnan
Chairman, BOG, IIT Kanpur
Antariksh Bhavan
New B.E.L. Road
Bengaluru – 560 231

MEMBERS

Prof. Abhay Karandikar
Director
Indian Institute of Technology, Kanpur
Kanpur – 208016

Shri Rakesh Ranjan (Ex-officio)
Additional Secretary (Technical Education)
Ministry of Human Resource & Development
Shastri Bhawan, New Delhi – 110001

Smt. Darshna M. Dabral
Joint Secretary & Financial Adviser
GOI, Department of Higher Education
Ministry of Human Resource Development
Shastri Bhawan, New Delhi – 110 001

Dr. Saurabh Srivastava [w.e.f. 17 November, 2021]
Former Chairman, NASSCOM
Founder Chairman, Indian Angel Network
C-482, Defence Colony, New Delhi- 110024

Prof. Manas K. Ghorai
Department of Chemistry
Indian Institute of Technology, Kanpur
Kanpur – 208016

Secretary:

Shri K.K. Tiwari [upto 14 March, 2023]
Registrar
Indian Institute of Technology Kanpur
Kanpur – 208016

Prof. Braj Bhushan [w.e.f. 15 March, 2023]
Officiating Registrar
Indian Institute of Technology Kanpur
Kanpur – 208016

Building & Works Committee

From 1st April, 2022 to 31st March, 2023

CHAIRMAN

Prof. Abhay Karandikar
Director
Indian Institute of Technology, Kanpur
Kanpur – 208016

MEMBERS

Prof. S. Ganesh
Deputy Director
Indian Institute of Technology, Kanpur
Kanpur – 208016

Prof. Bishakh Bhattacharya
Department of Mechanical Engineering
Indian Institute of Technology, Kanpur
Kanpur – 208016

Shri Sarvagya Kumar Srivastava
Retd. Chief Engineer, CPWD
370, Asiad Village Complex
Srifort, New Delhi – 110 049

Dr. Ranjana Mittal
Retd. Professor, SPA New Delhi
A, 14/7, Vasant Vihar
New Delhi – 110 057

Dr. Sudip Paul
General Manager (Structural Department)
Engineers India Limited
5th Floor, Tower-I, EIL Office,
Gurugram Complex (Sector-16)
Gurugram (Haryana) – 122 001

Prof. Samit Ray Chaudhuri
Dean of Infrastructure & Planning
Indian Institute of Technology, Kanpur
Kanpur – 208016

Secretary:

Shri K.K. Tiwari [upto 14 March, 2023]
Registrar
Indian Institute of Technology Kanpur
Kanpur – 208016

Prof. Braj Bhushan [w.e.f. 15 March, 2023]
Officiating Registrar
Indian Institute of Technology Kanpur
Kanpur – 208016

THE FACULTY

Recruitment

In the past one year, the Institute has offered 45 faculty positions against a rigorous selection, out of these, 57 new faculty members have joined the Institute. The appointments per department are mentioned below:

Department	Number of new faculty
Aerospace Engineering	03
Biological Sciences and Bioengineering	04
Chemical Engineering	02
Chemistry	02
Civil Engineering	02
Computer Science and	04
Department of Design	01
Earth Sciences	02
Economic Sciences	02
Electrical Engineering	05
Humanities and Social	01
Management Sciences	04
Materials Science and	02
Mathematics & Statistics	05
Mechanical Engineering	06
Physics	06
Space, Planetary &	02
Sustainable Energy Engineering	04

During this period, we have also made 111 Post Doctoral Fellowships, 29 Visiting Faculty, 07 Professor of Practice and 01 Adjunct Faculty offers.

Please visit the following links for department wise list of faculty members and publication of books during the year 2022-23 respectively:

https://web.iitk.ac.in/july14dordn/data/Annual-Report-2022-23/Faculty_list.pdf

https://web.iitk.ac.in/july14dordn/data/Annual-Report-2022 23/Publication_of_Books_department_wise.pdf

ACADEMIC PROGRAMS

EDUCATIONAL GOALS

Education in the Engineering Stream should produce trained manpower for maintaining and advancing technological growth. The scope of engineering education should evolve based on the evaluation of technological growth for its relevance to the prosperity of the country. The educational strategy in this context should help to develop a knowledge industry and the systems involved in this endeavor should strive for furtherance of knowledge.

The academic goals of the Indian Institute of Technology Kanpur from the viewpoint of its teaching programme are as follows:

- To prepare the students for the highest level of excellence in science and technology and to produce competent, creative and imaginative scientists and engineers.
- To promote a spirit of free and objective inquiry in different fields amongst the students and motivate them for higher studies and research.
- To foster an inter-disciplinary approach, and promote the concept of virtual research departments by bringing together faculty and students into activities of mutual interest.

TEACHING PROGRAMMES

The Institute offers instruction in various science and engineering disciplines at undergraduate (UG) and postgraduate (PG) levels. These programmes are planned and implemented by the Academic Senate of the Institute. Micro-management of these programmes is carried out by the Senate Undergraduate Committee (SUGC) and the Senate Post-graduate Committee (SPGC). The development of these programmes is monitored by the recently introduced Senate Curriculum Development and Monitoring Committee (SCDMC). Apart from this, the programmes are subject to a comprehensive review once every 10 years by the Academic Review Committee (ARC) constituted for this purpose.

The latest recommendations have been implemented for UG programmes from 2022 and PG programmes in 2023.

Undergraduate Programme

The Institute offers the following undergraduate programmes:

- Four-year BTech Programmes in Aerospace Engineering, Biological Sciences and Bio-engineering, Chemical Engineering, Civil Engineering, Computer Science and Engineering, Electrical Engineering, Materials Science and Engineering, and Mechanical Engineering.
- Four-year BS Programmes in Chemistry, Earth Sciences, Economic Sciences, Mathematics and Scientific Computing, and Physics.

The four-year undergraduate programme consists of two parts, having a duration of about four semesters each. The first part is primarily the Core Programme common to all students and is carefully planned to give the students a strong base of basic education in Mathematics, Physics, Chemistry, Technical Arts, and Humanities and Social Sciences. The second part of the undergraduate programme consists of Professional Courses and a project in the chosen branch of specialization.

Two-Year MSc Programme

The Institute also offers Two-year MSc Programmes in Physics, Chemistry, Economics, Mathematics and Statistics, where students with undergraduate backgrounds are admitted through an all-India entrance examination known as JAM (Joint Admission Test to Master of Science). These programmes have been largely responsible for creating scientific manpower in Indian research institutes and universities.

Postgraduate Programme

The postgraduate programme is intended to prepare students to enter their professions with a perspective and breadth of knowledge related to the principal areas in their respective fields of specialization through courses as well as specialized research experience. A postgraduate student is typically enrolled for three or four courses each semester until he/she advances to a point where the principal requirements of the programme left to be fulfilled are research and thesis.

MTech Programme

The MTech Programmes are available in all the core Engineering Branches of Aerospace Engineering, Biological Sciences and Bio-engineering, Chemical Engineering, Civil Engineering, Computer Science and Engineering, Electrical Engineering, Materials Science and Engineering, and Mechanical Engineering. In addition, there are MTech Programmes in interdisciplinary areas such as Photonics Science and Engineering, Materials Science, Nuclear Engineering and Technology, and Environmental Engineering and Management. The MTech students are chosen through an all-India examination known as GATE, and further written tests/interviews are conducted in some cases.

MBA Programme and Post Graduate Programme for Executives

The MBA Programme is offered by the Department of Management Sciences (DOMS). The students admitted to this programme are selected through an all-India examination known as CAT followed by the interview and group discussions. The department also offers Post Graduate Program for Executives for Visionary Leadership in Manufacturing.

MDes Programme

The MDes Programme is offered by the Interdisciplinary Programme in Design. The students are selected through the all-India examinations, CEED and/or GATE, followed by the written test/interview.

Doctor of Philosophy (PhD)

The academic programmes leading to the degree of Doctor of Philosophy (PhD) exist in all the Engineering Departments, and the Interdisciplinary Programmes (IDPs) of Cognitive Science, Design, Environmental Engineering and Management, Nuclear Engineering and Technology, and Photonics Science and Engineering, The PhD Programmes are also offered in the Departments of Chemistry, Earth Sciences, Economic Sciences, Mathematics & Statistics, Physics, and Humanities and Social Sciences (English, including Literature, Linguistics, and Language Teaching, Fine Arts, Philosophy, Psychology, and Sociology).

The PhD programme culminates in research on a selected topic, leading to a thesis submitted in partial fulfillment of the requirements for the degree.

MS By Research

The Institute also offers a Postgraduate Programme known as MS (By Research) in the following disciplines: Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Science and Engineering, Electrical Engineering, Environmental Engineering and Management, Mechanical Engineering, and Photonics Science and Engineering. The objective of this programme is to promote research at the Masters level, including industry-sponsored research.

MS-PhD Dual Degree

The Department of Physics offers a MSc-PhD Dual Degree Programme. The admission is through JAM (Joint Admission Test to Master of Science), and the MSc students migrate to the PhD Programme after completing their MSc Programme.

MTech and PhD Joint Degree

The Institute has initiated the award of additional Masters with PhD, whereby an additional MTech/MDes degree is awarded to students with the PhD degree subject to the fulfillment of certain specified academic requirements. This provision has been introduced for candidates who join the PhD programme directly after BTech/BS and other bachelor's programmes.

The MTech, MDes, MS (R), and PhD students receive financial support through research/teaching assistantships.

eMasters Programme

The Institute has initiated the eMasters programme for working professionals. It is an online programme offered by the departments and faculty from the same or more than one academic department. It is offered for working professionals who can continually upgrade their knowledge and keep up with the latest developments in diverse fields to be effective and remain relevant.

RESEARCH ENVIRONMENT

IIT Kanpur has demonstrated its excellence in research in many areas. To cite a few areas: Finite Element Methods Using Domain Decomposition, Flow Induced Vibrations, Wind Tunnel Testing of Large Scale Prototypes, Computational Chemistry, Nano-materials and Nano-technology, Geometric Optimization of Large Organic Systems, Genomics and Bio-Informatics, Electronic Structure Calculations, Aggregation and Etching, Molecular Dynamics, Thin Film Dynamics, Optical / EM Field Calculations, Computational Fluid Dynamics and Heat Transfer, Computer Aided Design and Rapid Prototyping, Tomography, Robotics, Multi-Body Dynamics, Geo-seismic Prospecting, Stress Analysis and Composite Materials, Vibration and Control, Semiconductor Physics, Photonics, Neural Networks and Genetic Algorithms, Earthquake Engineering, Spin Fluctuations in Quantum Magnets, Quantum Computation and so on.

Some of the more recent research initiatives include Alternative Energy, 5G Telecom Technology, Real Time Data Transmission, Air Quality Monitoring Systems, Development of Indigenous Blockchain Platform, Unmanned Aerial systems, Aerospace Materials, Biodegradable Materials, Aircraft Engine Combustion Design, Wind Turbine Design, Waste Water Treatment, Supramolecular Chemistry, Catalysis, Two Dimensional Materials, High Performance Computing, Corrosion, Himalayan Glaciers, Biomaterials, New Drug Delivery Systems and so on.

CONTINUING EDUCATION AND OUTREACH ACTIVITIES

National Programme on Technology Enhanced Learning (NPTEL), a joint initiative of the MHRD, IITs and IISc Bangalore, has 121 of its 600 courses developed by the faculty members at IIT Kanpur. NPTEL Phase IV has proposed several new activities that are in tune with the Central Sector Scheme (CSS) of MHRD and are compliant with the Massive Open Online Courses (MOOC) initiative. The CSS and MOOC-compliant e-content under NPTEL IV is expected to play an important role in an affordable and high-quality online and open-access education drive of MHRD. The Mookit, developed from the ground up, is a lightweight MOOC management system with several innovations. It comes in multiple versions, including an offline version where the MOOC can be distributed over SD cards. More than 20 MOOCs have been delivered on it, and more than 2,00,000 students from around 100 countries have learnt from it. The project CSS-MOOCs aims to facilitate the competitiveness of Indian Industry in the global markets by improving the quality and reach of education. The operational objective of CSS-MOOCs is to make high-quality learning material available to students from different institutions across the country. The target group for this project consists of students and faculty members of institutions offering Undergraduate/Postgraduate education in India.

Under MHRD's Swayam Prabha initiative of taking education Directly to Home (DTH), thirty-two DTH channels have been started, out of which IIT Kanpur is currently managing two channels. These channels broadcast the NPTEL course contents 24 by 7 in Mechanical Engineering, Humanities and Social Sciences, and Management.

Please visit the following link for admission and Convocation data:

https://web.iitk.ac.in/july14dordn/data/Annual-Report-2022-23/Admission_and_Convocation_Data.pdf

RESEARCH AND DEVELOPMENT

IIT Kanpur has registered steady growth in its research and development activities this year. The number of externally funded ongoing projects during 2022-23 has reached 1483 with a total sanctioned amount of Rs. 1449.39 crore. During 2022 - 2023, the Institute received sanctions for 298 sponsored projects worth Rs. 139.08 crore and 191 consultancy projects of value Rs. 82.73 crore.

Some of the major sponsoring agencies during the year 2022-23 are National Security Council Secretariat (NSCS) with the total sanctioned amount of Rs.26.07 crore, Science & Engineering Research Board with the total sanctioned amount of Rs. 24.20 crore, Department of Science and Technology with the total sanctioned amount of 14.98 Crore, Ministry of education with the total sanctioned amount of Rs. 8.97 Crore and ICMR with the total sanctioned amount of Rs. 6.90 crore.

Some of the major industries which have funded projects this year include Vedanta Ltd., Tata Steels, Mekon Ltd. Ranchi, Waveteck Microelectronics and Shell.
During the year 2022-23, 114 IPR's were filed by the Institute including 91 Patents, 20 Design Registration, 1Trademark application and 2 Copyright, 121 previously filed IPRs were granted and 6 technologies were licensed to industry partners.

Till date, 940 IPRs have been filed, out of which 464 have been granted so far along with 129 technologies licensed for commercialization.
A total of 136 companies are currently incubated at Startup Innovation and Incubation Centre (SIIC), IIT Kanpur and 151 have graduated so far.

Please visit the following link for IPR filed during the year 2022-23

https://web.iitk.ac.in/july14dordn/data/Annual-Report-2022-23/IPR_filed_during_the_year_2022-23.pdf

OUTPUT STATUS OF MHRD PROJECTS

Output Status of MHRD Projects
Project Number: MoE/STARS-1/248
Project Title: Calcium permeable onco-TRP channels as diagnostic markers and therapeutic targets for cancer
Project Investigator: Dr. Appu Kumar Singh
Co-Investigator(s): NA
Industry Collaborators (if any): NA
Project Initiated on: May 1, 2020

Project Objectives:

- Develop molecular models of TRPV6 and TRPC1 inhibition
- Development and design of inhibitory monoclonal antibodies and nanobodies targeting the cancer cells overexpressing TRPV6 and TRPC1

Progress Report:

Cloning, expression, and purification of pathogenic putative thermoTRP channels:

We cloned full-length human TRPV6 and TRPC1 genes into a pEG BacMam vector, or pFastBac vector with the C-terminal thrombin cleavage site (LVPRG) followed by the streptavidin affinity tag (WSHPQFEK) as we have done previously for TRPV3 (Fig 1). We are focusing our research effort on optimization of their expression and purification using FSEC, which requires only a small amount of sample to perform detergent and lipid screening. Preliminary detergent screening using FSEC resulted in the good biochemical behavior of the protein as evidenced by the tetrameric peak, typical for the functional TRP channels. Indeed, we have successfully performed expression, purification, and preliminary cryo-EM studies on human TRPC1 ion channels for which currently there is no structure information available, and thereby hampering the structure-based therapeutic design (Fig 2). Therefore, the cryo-EM structure of TRPC1 will advance our knowledge about the pharmacological modulation to treat associated diseases such as those of diverse cancers. In near future, we will perform electrophysiology and lipid bilayer experiments to understand their function in detail. Preliminary detergent screening using FSEC resulted in the good biochemical behavior of the Drosophila TRPV6 and TRPC1 protein as evidenced by the tetrameric peak, typical for the functional TRP channels. Indeed, we have successfully performed expression, purification of human TRPC1 ion channels for which currently there is no structure information available, and thereby limiting how this ion channel gating is modulated by different compounds. These studies will advance our knowledge about these channels role in cancers and would be greatly useful to develop pharmacological modalities to tackle associated pathological conditions such as cancer. We will now optimize different protocols for whole-cell patch-clamp recordings and establish reliable and reproducible procedures for monitoring TRPV6 and TRPC1 functional activity. We plan to set up the Orbit mini and use it to get the first single-channel activity recordings.

Highlights:

We successfully engineered human TRPC1 constructs so that we can purify this ion channel to carry out structural and functional studies related to its involvement in cancer. FSEC screening was incredibly useful for optimizing the biochemical behavior to obtain a tetrameric peak of these channels in Digitonin detergent and going forward from here, we will execute structural studies using an in-house cryo-EM facility to define

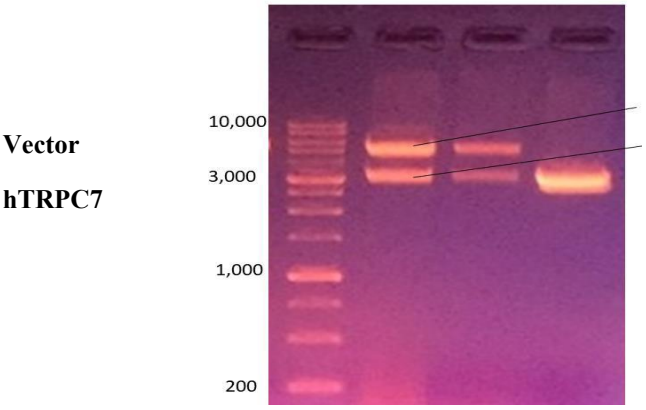


Figure 1. Cloning of TRP channels. TRPC1 construct has been successfully cloned in pFastBac vector as indicated by the restriction digestion assay of ligated product. We will confirm the clone by nucleotide sequencing.

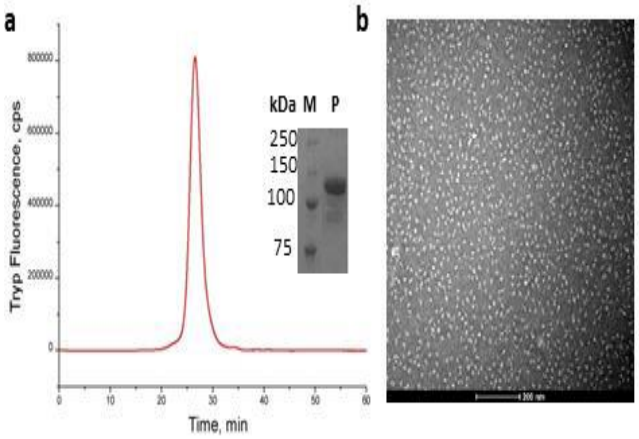


Figure 2. Biochemical characterization of thermoTRP channels TRPC1from human. (a) This protein elutes as a single peak followed by tryptophan fluorescence and migrates as a single band (P) on SDS-PAGE (inset). M designates a molecular weight marker. (b) Representative of negative stain cryo-EM micrographs.

Project Number: MHRD/ES/2019522
Project Title: Flood Risk Assessment in Tropical Rivers in The Anthropocene and Under Climate Change Scenario Using Hydro-Geomorphic Modeling
Project Investigator: Prof. Rajiv Sinha
Co-Investigator(s): NA
Industry Collaborators (if any): NA
Project Initiated on: May 15, 2020

Project Objectives:

Our aim is to develop a process-based hydro-geomorphic model for flood hazard assessment and developing flood hazard management strategies in the Ghaghra river basin, India. The specific objectives of this study are as follows:

- To understand the hydro-geomorphic processes and their variability using hydrological and morphometric analysis in the Ghaghra basin.
- To assess the spatio-temporal channel planform dynamics/morphodynamics to establish form-process linkage and its influence on flooding.
- To perform flood inundation modeling and flood hazard mapping using a hydro-geomorphic approach.
- To integrate all data to comprehensively assess the flood hazard in the Ghaghra river basin.

Progress Report:

Combining objectives 1 and 3, we have performed the hydrological data analysis, highlighted the importance of stage data for flood studies, and performed flood inundation mapping using high-resolution digital elevation model derived from UAV at four selected windows (figure 1). For this we acquired two data sets- (1) at-site-measured water discharge and water levels, and (2) data derived from the Unmanned Aerial Vehicle (UAV).

The historical discharge (10-daily average) and water level (10-daily average) were collected from Central Water Commission (CWC) India. The UAV survey was done in June 2022 using a "DJI phantom 4 pro quadcopters". The UAV survey was accompanied by Real Time Kinematics - Global positioning system (RTK-GPS) survey to improve the positional and altitude accuracy of the UAV-derived data using Trimble R12 GNSS.

We used the 10-daily stage vs. 10-daily discharge relationships and developed rating curves to show the observed discharge variability at different water levels (stages). The results indicated that these stations are susceptible to flood hazard conditions at relatively low discharge values. Surprisingly, we observed many instances when the danger levels were crossed by relatively low discharge values.

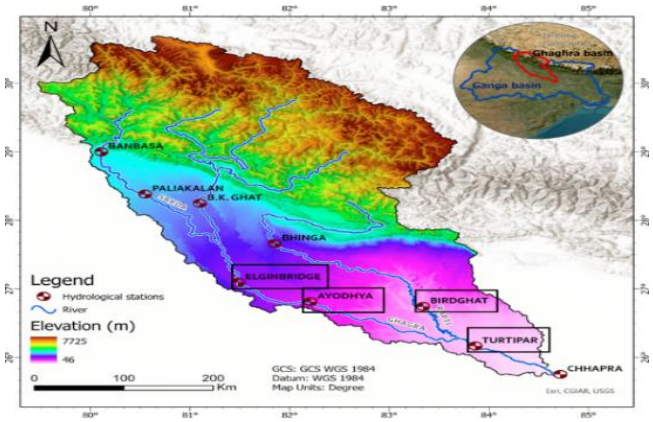


Figure 1: Location of Ghaghra basin showing Ghaghra river and its major tributaries, Sarda and Rapti. This study is focused around four hydrological stations: namely Elginbridge, Ayodhya, Turtipr and Birdghat.

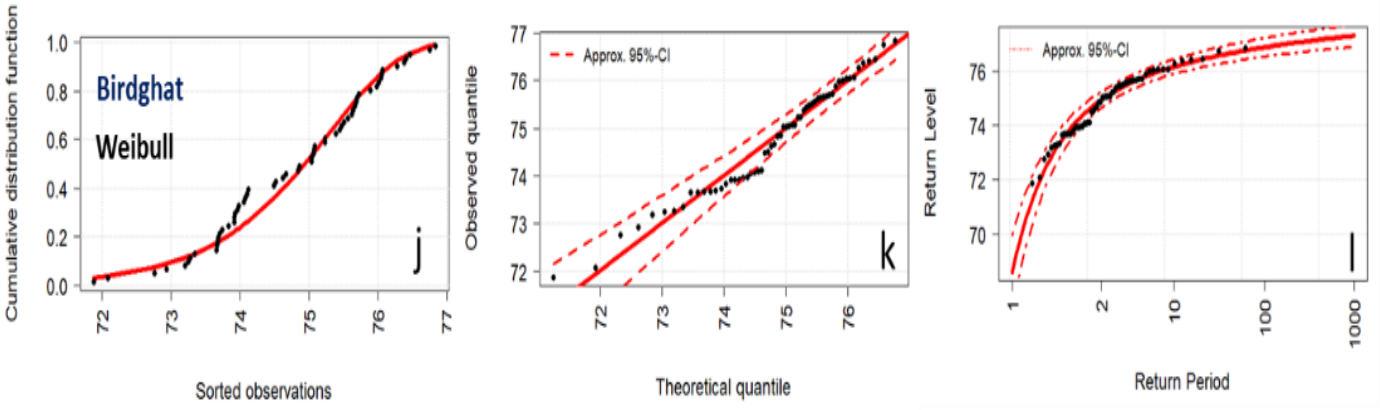


Figure 2: Fitting distributions to peak stage level: CDF plots, Quantile–Quantile plot and return level corresponding to different return periods

We performed the stage-based flood frequency analysis (FFA) for the given hydrological stations. The advantage with stage data is that it is measured frequently and is likely to be more accurate than discharge data. The selection of the best-fit distribution/model on peak annual stage (Smax) was made using Akaike Information Criterion (AIC) (figure 2). Based on the AIC values, we identified that Log normal is the best-fit distribution for stations present in Ghaghra river. However, at Turtipar station in Rapti River, Weibull is identified as the best-fit distribution.

Using these models, we calculated the stage data for different return periods. This data was further used to prepare 1st order flood inundation maps for different return periods using an accurate DEM derived from UAV.

We generated high-resolution orthophoto and DEM, which were further used in flood inundation (figure 3).

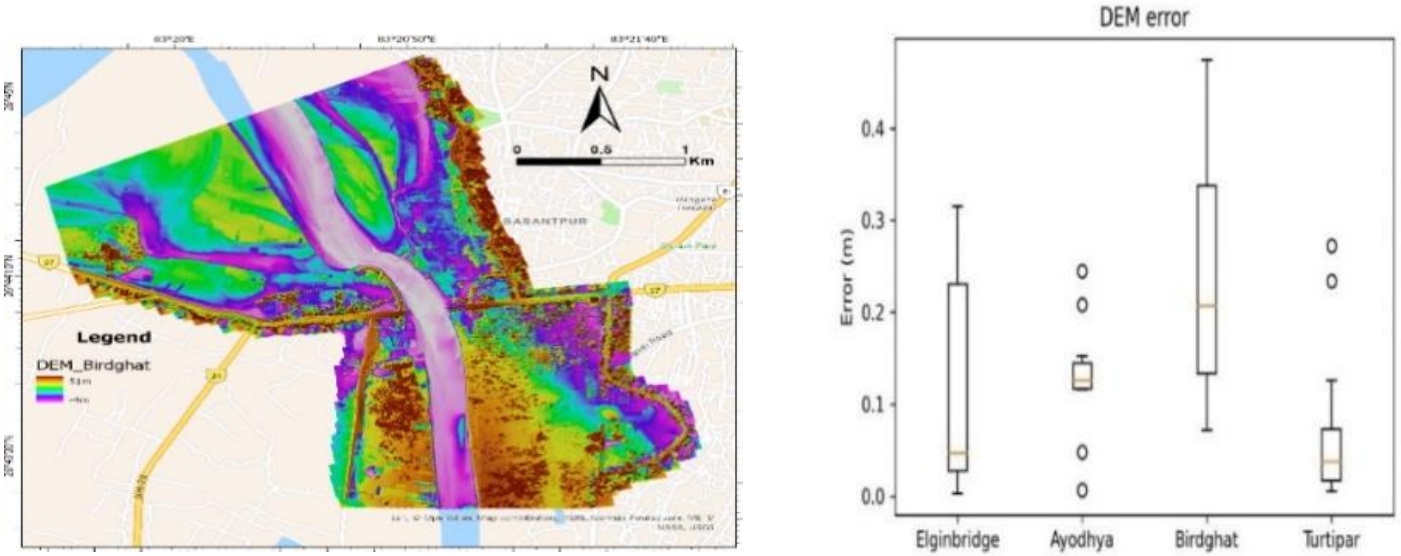


Figure 3: DEM of the Birdghat on left and accuracy of the DEM corresponding to the ground control points on the right.

Our generated DEMs have pixel size of 5-6 cm. The vertical accuracy (RMSE) of DEM was between 6cm to 16 cm for stations in Ghaghra while at Birdghat in Rapti the vertical accuracy was 26cm (figure 4). The flood inundation maps were generated at 10-, 20-, 50- and 100-year return intervals. Figure 3 (left) shows the flood inundation map of Birdghat which also contains flood depth information.

Highlights:

- Highlighted the importance of stage data for flood studies.
- Performed stage-based flood frequency analysis to predict the return period of different stage levels.
- Generated high-resolution DEM for selected windows.
- A rapid flood inundation technique without using any sophisticated hydraulic model.

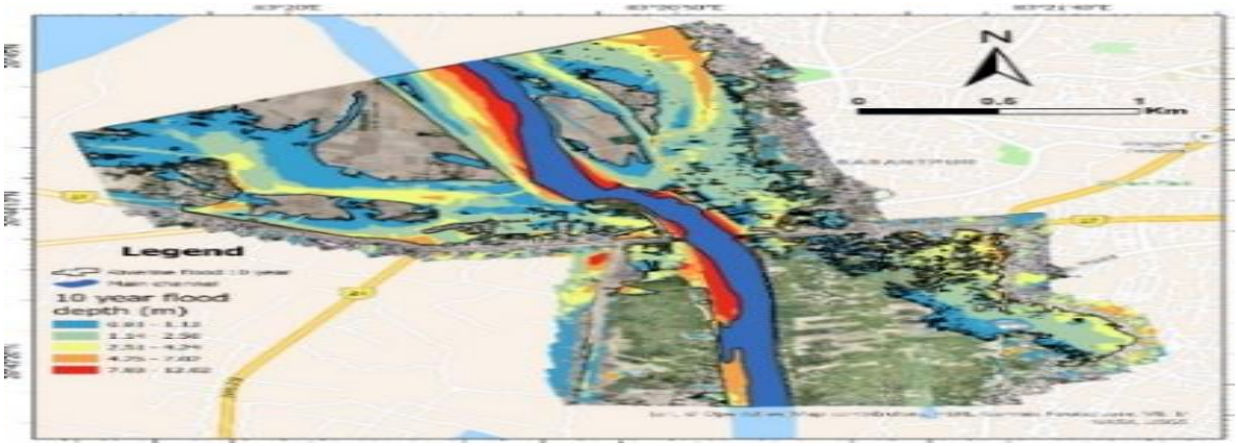


Figure 4: Susceptible flood areas along with the depth information.

Project Number: MoE/STARS-1/257
Project Title: Photocatalysis Employing Combination of Plasmonic Nanoparticle and Molecular Catalyst: Probing Spatiotemporal Interfacial Charge/Energy Transfer Dynamics
Project Investigator: Vishal Govind Rao
Co-Investigator(s): NA
Industry Collaborators (if any): In the final stage of starting a collaboration with TATA Steel
Project Initiated on: June 09, 2020

Project objectives:

In this project, we aim to use plasmonic metal nanoparticles and molecular catalysts to develop plasmonic nanocomposites that can absorb in the visible range via localized surface plasmon resonance/antenna effect. The nanocomposites should transfer the plasmon energy to a molecular catalyst layer which can then carry out catalysis, such as CO2 reduction. Plasmonic metal nanoparticles, combined with appropriate catalytic materials, serve as

platforms for manipulating the flow of electromagnetic energy at the nanometer length scale. We first designed Au-Pt and Au-Pd core-shell plasmonic photocatalysts where plasmonic energy stored in the core can be directed to the shell and the adsorbate hybrid states upon plasmon decay, thus providing molecular control of the energy flow and excited charge carrier generation in these systems. We also extended the objective to use lead halide perovskites to direct the charge carriers to ferrocene molecule functionalized with various functional groups to understand the binding and charge transfer process at the interface of the perovskite nanocrystal and the redox relay molecule. This work opens avenues for exploring anchoring moieties in facilitating charge transfer across the perovskite interface, thus, impacting its photocatalytic applications.

Progress Report:

We first designed Au−Pt nanocubes (Au−Pt NCs), where Au plasmonic core is coated with a thin Pt shell that imparts dual, i. e., plasmonic and catalytic activity, at the Au−Pt interface. The plasmon decay-generated hot charge carriers at the interface could be transferred to the Pt catalytic sites, driving selective chemical reactions on Au−Pt NCs. Further, investigating Au−Pt NCs as plasmonic catalysts, we show direct, visual evidence of plasmon-assisted cascade reduction of nonfluorescent resazurin (Rz) dye to nonfluorescent dihydroresorufin (DHRf) via a highly fluorescent resorufin (Rf) intermediate form.

We have grown anisotropic Pd over Au nanocubes (NCs) to engineer Au–Pd core–shell nanoparticles (Au–Pd CS NPs). The Au–Pd CS NPs showed a high conversion rate for nicotinamide adenine dinucleotide hydrogen (NADH) regeneration under visible light irradiation, while their activity in dark conditions remained limited. Moreover, only Au NCs or Pd seed nanoparticles under the same reaction conditions show no significant NADH regeneration, highlighting the synergistic effect of the plasmonic core and catalytic shell. Our study expands the current domain of catalysts involved in the β-NAD+ reduction and provides a mechanistic insight for plasmon-driven catalysis, which is necessary to improve catalytic efficiency.

In our work with perovskites, we covalently linked ferrocene (Fc) with amino acid residues to design three molecular redox relays differing in the ratio of –COOH to Fc units. We employed them to probe the hole transfer dynamics in $CsPbBr_3$ perovskite nanocrystals (NCs) for photocatalytic applications. Our findings and a recent report on an $FcTc_2$-functionalized perovskite solar cell that achieved a PCE of 25% assure us that a careful selection among various functionalities to be engineered with the Fc core holds great potential in the future of perovskite solar cells as well.

Highlights:

- We published six papers in peer-reviewed journals.

  1. "Engineering Water Stable Perovskite and Plasmonic-Perovskite Nanocomposites: A Step toward Unleashing the True Potential of Perovskite Catalysis", P. Aggarwal, M. Ahlawat, and V. G. Rao ***Adv. Mater. Interfaces*** **(2023)**, 10, 2202029.

  2. "Perovskite photocatalysis: realizing long-lived charge-separated states at the interface of $CsPbBr_3$ nanocrystals and functionalized ferrocene molecules", S. Singh, D. Mittal, V. Gurunarayanan, A. Sahu, R. Ramapanicker, and V. G. Rao* ***J. Mater. Chem. A*** **(2022)**, 10, 21112.

  3. "Photocatalytic NADH Regeneration Employing Au–Pd Core–Shell Nanoparticles: Plasmonic Modulation of Underlying Reaction Kinetics", S. Singh, S. Kumari, M. Ahlawat, and V. G. Rao* ***J. Phys. Chem. C*** **(2022)**, 126, 15175–15183.

  4. "Recent Progress and Challenges in Plasmon-Mediated Reduction of CO_2 to Chemicals and Fuels", D. Mittal, M. Ahlawat, and V. G. Rao* ***Adv. Mater. Interfaces*** (**2022**), 2102383.

  5. "Efficient extraction of energetic charge carriers from engineered plasmonic nanocomposite to perform cascade reaction", M. Ahlawat, A. Roy, and V. G. Rao* ***ChemNanoMat*** (**2022**), 8, e202100416.

  6. "Plasmon-induced hot-hole generation and extraction at nano-heterointerfaces for photocatalysis", M. Ahlawat, D. Mittal, and V. G. Rao* ***Communications Materials - Nature*** (**2021**), 2, 114.

- We tested our designed plasmonic catalyst for CO_2 reduction and found it to be active in reducing CO_2 to CO. However, we don't have access to an online GC system to quantify the yield. So, currently, we are exploring lead halide perovskites to direct the charge carriers to ferrocene molecule functionalized with various functional groups to understand the binding and charge transfer process at the interface of the perovskite nanocrystal and the redox relay molecule.

- Our work with perovskites opens avenues for exploring anchoring moieties in facilitating charge transfer across the perovskite interface, thus impacting its photocatalytic applications. The perovskite catalysts have also been shown to catalyze CO_2 reduction. So, in the future, we will be using these catalysts to reduce CO_2.

Project Number: MHRD /ME /2020051
Project Title: On some challenging boundary-value-problems arising in vibro-acoustical study of Indian musical instruments
Project Investigator: Prof. Anurag Gupta
Co-Investigator(s): None
Industry Collaborators (if any): None
Project Initiated on: February 24, 2020

Project objectives:

The objective of the project is to develop rigorous mathematical models for studying acoustics of several Indian musical instruments, in addition to developing numerical procedures to solve the resulting boundary-value-problems and designing simple experimental procedures to verify the obtained numerical results.

Progress Report:

We are currently investigating the vibro-acoustic problem of bifacial Indian musical drums (such as pakhawaj, mrdangam, dholak, dhol, iddakka, etc.). This involves coupling of structural elements, including two membranes and the axisymmetric shell, with the acoustic environment, both inside and outside the drum. Our interest is to develop a general mathematical model, accompanied by a suitable numerical framework, which can be used to understand the acoustics of the large variety of Indian bifacial drums. Towards this end, we have a model at hand and our numerical framework is in advanced stages of completion. We have successfully modelled the structure-acoustics coupling but assuming the shell to be rigid. We are currently extending our work to include shell vibrations in our numerical framework. We are writing our own codes, which can be suitably modified to study all classes of drums. We have also initiated some simple experimental work which will be used to very our numerical results.

Project Number: MoE/STARS-1/672
Project Title: "Understanding the mechanism of Mg^{2+} mediated "SOS" induction in *Mycobacterium tuberculosis* to decipher its role in antibiotic resistance and survival in macrophages"
Project Investigator: Prof. Saravanan Matheshwaran
Co-Investigator(s): None
Industry Collaborators (if any): None
Project Initiated on: 2020

Project objectives:

1. Molecular, biochemical and biophysical characterization of LexA and RecA, the master regulators of "SOS" response

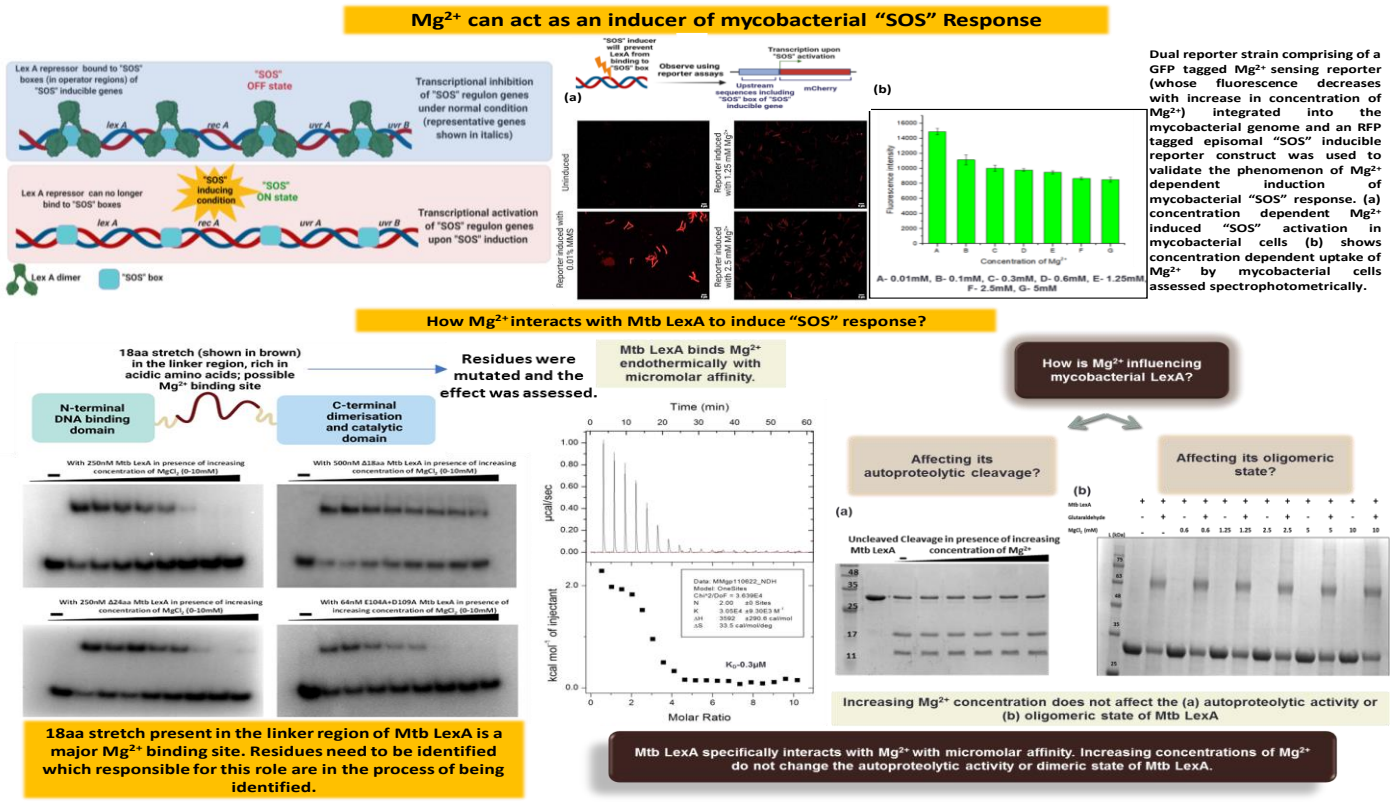
    - IA: Cloning, overexpression, and purification of Mtb RecA, Mtb LexA, and their variants.
    - IB: Thermodynamics, kinetic analyses of LexA-DNA interaction (with all variants), and autoproteolytic activity of LexA and its variants.
    - IC: Biophysical characterization of Mtb RecA, Mtb LexA and its variants and assessment of the crosstalk between Mtb RecA and Mtb LexA.

2. Elucidation of *in-vitro* and *in-vivo* roles of Mg^{2+} in the induction of "SOS" response and development of antibiotic resistance

    - IIA: Development of colorimetric and fluorescence-based reporter constructs to record "SOS" induction levels during antibiotic and Mg^{2+} induced "SOS" conditions.
    - IIB: Characterization of phenotypic changes associated with Mg^{2+} mediated "SOS" induction in wild-type and RecA deleted *M. smegmatis* strain and in Mtb H37Ra.
    - IIC: Transcriptome profiling of Mtb in response to Mg^{2+} induced "SOS" activation in wild-type and RecA deleted *M. smegmatis* strain and in Mtb H37Ra.
    - IID: Antibiotic mediated activation of mycobacterial "SOS" response and analysis of mutation frequencies in presence and absence of Mg^{2+} in wild-type and RecA deleted *M. smegmatis* strain and in Mtb H37Ra.
    - IIE: Elucidating the role of Mg^{2+} in phagosomal infection, survival, persistence, and clearance of Mtb.

Progress Report:

- The first part of the study as detailed in the Mid-term report provides insights into the real-time kinetics of the interaction between Mtb LexA and its target "SOS" boxes, improving our understanding of mycobacterial "SOS" regulation (***published in Bioscience Reports,***



2021). Moreover, Mtb LexA has been biochemically characterized to gain a functional understanding of the repressor.

- To validate our preliminary observation of Mg^{2+} mediated "SOS" response activation in mycobacterial cells, confocal microscopy was performed with a fluorescence-based reporter, whereby cells treated with 2.5mM Mg^{2+} showed increased fluorescence as compared to the control. This was observed with a concomitant increase in uptake of Mg^{2+} using reporter strains.
- To elucidate the mechanism explaining the afore-mentioned observations, the major Mg^{2+} binding site in Mtb LexA was identified. Mg^{2+} was found to bring about conformational changes of Mtb LexA in a concentration dependent manner, reducing its affinity to bind DNA, without affecting its dimerization or autoproteolytic cleavage properties. We have obtained kinetic parameters of metal-protein interaction using isothermal calorimetry. Mutations in the linker region (which is majorly responsible for Mg^{2+} binding) have been generated and are being tested for their effect. Future studies will further reveal the underpinnings of this novel mode of mycobacterial "SOS" activation.

Highlights:

- The kinetic parameters of WT Mtb LexA interaction with Mg^{2+} have been determined.
- We're now on the lookout of crucial residues in the linker region of the protein which upon mutation can compromise the binding of the protein to Mg^{2+}. We have mutated residues in the linker region of the protein which may form a major Mg^{2+} binding site as deduced from our preliminary observations.
- Mg^{2+}-induced activation of mycobacterial "SOS" response has been elucidated inside the cells and has been supported by our *in-vitro* studies. A concomitant increase in "SOS" activation has been observed along with Mg^{2+} uptake by mycobacterial cells using dual reporter strains.

Project Number: MoE/STARS-1/626
Project Title: Improving pulse (Chickpea and soybean) production and nitrogen content of the soil by nano iron pyrite seed treatment
Project Investigator: Dr. Mainak Das
Co-Investigator(s): NA
Industry Collaborators (if any): NA
Project Initiated on: Sanctioned on September 2019 and initiated in February 2020

Project Objectives

Studying the fruit yield, root-shoot growth, soil fertility, and rhizobium population during 2 years of field and greenhouse trial in legumes (chickpea and soybean); while growing them by pre-treating them with nano iron pyrite and comparing the results with water treated controls.

- Root growth, elemental analysis of the root, Root nodule formation, soil fertility testing following harvesting of the crop a. Analyzing the root architecture following seed treatment b. Quantifying the elemental composition of the root c. Quantifying root nodule growth and nitrogenase activity d. Testing the soil nitrogen at the end of the crop cycle

- Shoot growth, chlorophyll content, elemental analysis of the shoot, Fruit yield and nutritional analysis of the fruit a. Analyzing the shoot growth b. Quantifying chlorophyll a and b content in the leaves c. Elemental analysis of the shoot and fruit d. Quantifying the fruit yield e. Nutritional evaluation of the fruits

- Studying the physiological effects on the 2nd generation of the seeds to verify whether first generation seed treatment has any carry-over effect on the 2nd generation fruits a. Evaluating whether the germination and growth potential of the second generation of seeds shows any improvement; in other words, 'does the seed treatment effect is carried over to the next generation?'

Progress Report

N_2-fixing bacteria symbiotically dwell inside the root nodules of the legume and convert atmospheric N_2 to NH_3. Unlike high temperature–pressure Haber's process, this conversion in the nodule is orchestrated by nitrogenase: an enzyme with Fe-S, Fe-Mo, Fe-V cofactor; at its heart. Strategies to increase the nodule population could reduce nitrogen fertilizer use.

We discovered that pre-treating the chickpea seeds with nano FeS_2 (iron pyrite) resulted in a denser root network with larger root nodules. It improved the shoot system and resulted in a higher yield. We observed a higher Fe, Mo, Mg, P, Ca, Mn, K in the roots: possibly emulating nitrogenase.

Further, the nano pyrite-based seed treatment strategy is translatable to wheat grown in nutrient- deficient soil; without using any fertilizer. We found that the grain production for the test samples was higher as compared to the control. We quantified the skillet and root area and found

Fig. 1 Representative pictures of the control and the test plants at maturity

it to be higher in the test samples. Higher root areas indicated better root foraging and helping the plants to draw more nutrients from the soil. Eventually, the accumulation of more nutrients leads to a higher yield and biomass.

Fig. 2 Large root nodule formation is shown by the white arrow in the test group. Such substantial root nodule growth was not observed in the control group.

Highlights

Peer Reviewed Journal publications, book chapter and Ph.D thesis

Jangir, H., Bhardwaj, A. & Das, M. *Larger root nodules increased Fe, Mo, Mg, P, Ca, Mn, K in the roots and higher yield in chickpea grown from nano FeS_2 pre-treated seeds: emulating nitrogenase.* Appl Nanosci 10, 445–454 (2020).

Jangir, H., Bharadwaj, A., Srivastava, G., Das, M. *Fertilizer-free cultivation of wheat in nutrient-deficient soil by treating the seeds with nanopyrite.* Nanotechnol. Environ. Eng. 5, 9 (2020).

Jangir, H., Das, M. *A journey of nano iron pyrite from the chemosynthetic world of hydrothermal vents to the photosynthetic world of agricultural fields: A new class of seed and root bio-stimulant* 1st Edition, Nanotechnology in Sustainable Agriculture, Edited By: M. Anwar Mallick, Manoj K. Solanki, Baby Kumari, Suresh Kumar Verma; ISBN 9780367369408; July 9, 2021 Forthcoming by CRC Press (Taylor and Francis) Book Chapter: Release date July 9, 2021.

Jangir, H. *Exploring sulfides to design strategies for sustainable agriculture and green energy* PhD (July 2018-July 3 2020), Design Program, IIT Kanpur Doctoral Thesis: *Outstanding PhD Thesis Award for the year 2020*.

Nanotechnology applications can boost agricultural output in emergencies;
https://india.mongabay.com/2020/05/nanotechnology-applicationscan-boost-agricultural-output-in-emergencies/
Press coverage of our present work under STARS, MHRD

N_2-fixing bacteria symbiotically dwell inside the root nodules of legume and converts atmospheric N_2 to NH_3. Unlike high temperature–pressure Haber's process, this conversion in the nodule is orchestrated by nitrogenase: an enzyme with Fe-S, Fe-Mo, Fe-V cofactor, at its heart. Strategies to increase the nodule population could reduce nitrogen fertilizer use. Here we discovered that pre-treating the chickpea seeds with nano FeS_2 (iron pyrite) resulted in a denser root network with larger root nodules. It improved the shoot system and resulted in a higher yield. We observed a higher concentration of Fe, Mo, Mg, P, Ca, Mn, K in the roots of chickpea: possibly emulating nitrogenase.

Project Number: MOE/MEDC/2022401
Project Title: Central Sector Scheme For MOOCs-Complaint e-content creation (**NPTEL Phase IV)**
Project Investigator: Prof. Satyaki Roy
Co-Investigator(s): Prof. Vimal Kumar
Project Initiated on: 31st August,2016

Project objectives:

The broad aim of the project CSS-MOOCs is to facilitate the competitiveness of Indian Industry in the global markets by improving the quality and reach of education. The operational objective of CSS-MOOCs is to make high quality learning material available to students of different institutions across the country. The target group for this project consists of students and faculty members of institutions offering Undergraduate/Postgraduate education in India.

Progress Report:

Since 2014, IIT Kanpur has completed 344 courses. In the current ongoing semester (JANUARY-APRIL'23), we offered 71 courses of which 12 were new. Now, we are in the final stage of publishing the results and generating the e-certificates. In the next semester, we are offering 82 courses of which 17 are new. There are close to 5550+ local chapters today with identified expert faculty members of these institutions serving as local mentors for the students enrolled in NPTEL courses.

Highlights:

NPTEL+: NPTEL has launched the new portal NPTEL+ to expand the variety of offerings and courses for learners. At present, 3 types of training programs are proposed:

- NPTEL courses in self-paced mode: NPTEL is now offering self-paced courses where learners may progress through the course and complete assignments at their own pace. Once a learner joins these courses, they may watch video lectures, and complete assignments as per their convenience. Learners may also choose to write a remote proctored online exam from the comfort of their homes and earn a certificate.

- Short term training programs from the IITs/IISc: Short term training programs which might involve fully live lectures coupled with hands-on training or a blended mode of learning (recorded videos and live lectures) are planned to be offered. These would primarily be by the faculty of various IITs, IISc, etc. and would be on fixed dates with fixed timings for the sessions.

- Other programs: These programs include courses from institutes/organizations that are partnering with NPTEL. The contents are targeted towards specialized courses in an emerging technology or complementing the existing NPTEL courses with dedicated hands on content to equip the learners to be industry ready.

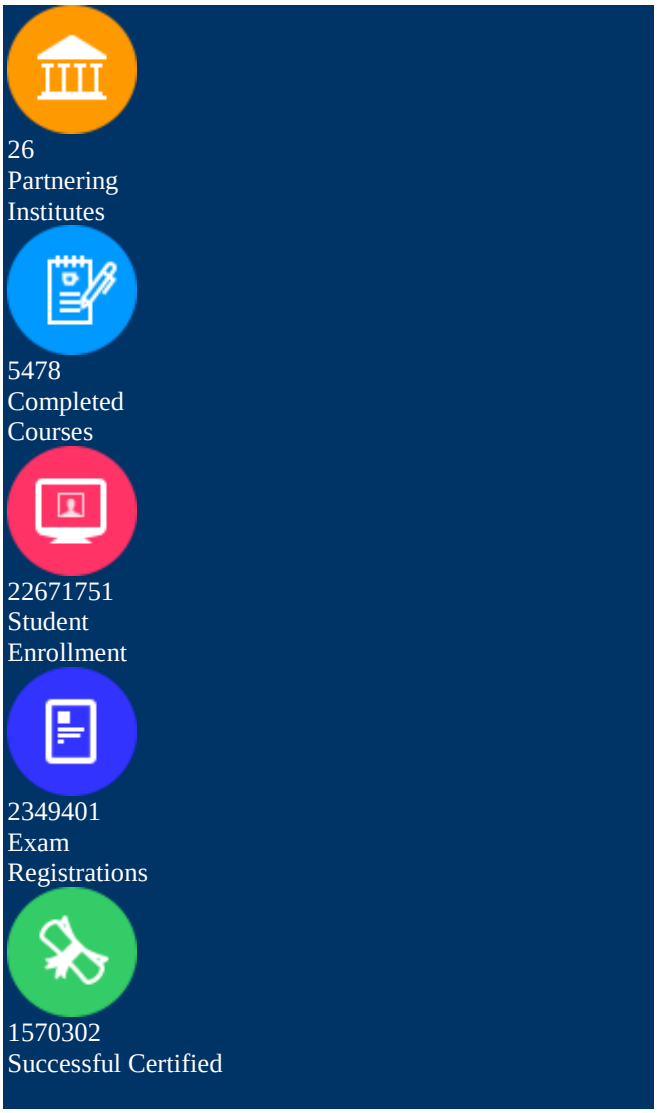
International NPTEL Learners:

NPTEL is setting up
modalities to conduct in-person exams in as many countries as possible. Currently, we conduct in-person exams in the following cities outside India.

- UAE - Dubai, Sharjah, Abu Dhabi
- Bahrain - Manama
- Sri Lanka - Colombo, Jaffna
- Kuwait – Salmiya

Also, we actively conduct remote proctored examination for students residing in other countries.

Statistics:



Largest online repository in the world of courses in engineering, basic sciences, and selected humanities and social sciences subjects

Online web portal http://nptel.ac.in – more than 471 **million+ views**
YouTube channel for NPTEL – most subscribed educational channel, **1.5 million+ channel subscribers, 819 million+ views, 50000+ Video Hours.**
More than **54000+ hours** of video content, transcribed with subtitles

Most accessed library of peer-reviewed educational content in the world.

URL's for reference listed below:
NPTEL Portal: https://nptel.ac.in/
NPTEL Local Chapter: https://nptel.ac.in/localchapter
NPTEL GATE Portal: https://gate.nptel.ac.in/
NPTEL Domain Certification: https://nptel.ac.in/domains
NPTEL+: https://elearn.nptel.ac.in/
SWAYAM Central Portal: https://swayam.gov.in/
NPTEL Online Certification (NOC) Presentation: https://drive.google.com/file/d/1NODOHtunh8l-0CjZ709TvW9iNblIaAEZ/view

Project Number: MHRD/AE/2018357
Project Title: Aircraft engine Combustor design for improved operability, durability, pattern factor and emissions
Project Investigator: Prof. Abhijit Kushari
Co-Investigator(s): Prof. Vaibhav K Arghode
Industry Collaborators (if any): GE Aviation, Bangalore, India
Project Initiated on: September 14, 2018

Project objectives:

- Design and development of an annular combustor rig to optimize conflicting requirements of operability, durability (profile/pattern factor) and emissions.
- Detailed studies of gas turbine combustors to propose design guidelines for improved combustors by incorporating changes in the geometry of the dilution air holes at high pressures & temperatures
- Explore how shape and size of the dilution holes impact the velocity and temperature field in the combustor
- Optimization of shape, size, location of these holes through detailed measurements and simulations

Progress Report:

Detailed design of the test rig has been completed along with the procurement of various components for the test rig and state of the art instrumentation. The test setup is realized and the shake down test has been completed after conducted multiple high-pressure tests to ensure desired safety standards are maintained. Three-cup combustor sections have been designed and manufactured. The combustor sections have been instrumented and the instrumented combustors are tested for design validation in the test rig. Ignition test has been performed with two of the combustor sections. Tests have been conducted for an airflow rate upto 0.7 kg/s at 2.5 bar pressure. All the sub-systems including the compressors, the heaters, the fuel supply system, the bypass path and the exhaust cooling system has been tested to ensure the operation of the combustor with the desired operating conditions and within the desired safety limits. The test data obtained from these tests are currently being analyzed and further safety features are being installed in the test bed to take the combustor to higher pressure and temperature, representative of cruise condition for an Aero engine. Furthermore, the optical measurement systems are being setup for the detailed analysis of the flow, temperature and species field to understand the complex flow process of cup-to-cup interaction and emissions.

Highlights:

- A complex test bed involving 4 compressors, 3 online heaters, water cooled combustor plenum and water-cooled exhaust line is realized
- State of the art instrumentation for the measurement of flow, temperature and species field has been installed
- Multiple combustor sections have been designed, manufactured, instrumented and tested

Project Number: MoE/STARS-1/261
Project Title: Short and Long-term Fog Predictions using Data Science
Project Investigator: Prof. Arnab Bhattacharya
Co-Investigator(s): Profs. Shivam Tripathi, Mahendra K Verma
Industry Collaborators (if any): None
Project Initiated on: June 15, 2020

Project objectives:

- To provide two-to-three-hour warning for the onset of fog, and predict its duration and intensity.
- To forecast onset, duration and intensity of fog with up to 7 days lead time.
- To identify predictors for fog forecasting using a literature survey, and from the results of feature selection and sensitivity analysis of trained models.
- To develop a coherent fog dataset by integrating data from ground sensors, satellites, and mass and social media.
- To operationalize the developed models at an airport and railway station, and disseminate the results using a website and radio.

Progress Report:

The project has three major components:

- Understanding of variables and factors for fog prediction
- Training data science models for fog prediction
- Dissemination of results

An extensive literature survey has been carried out to understand fog characterization, identify the factors for fog formation, and study the application of data science models for fog prediction. The fog events for the north Indian cities were first characterized based on their formation, duration, persistence and intensity. Next, visibility observations (a proxy for fog) and meteorological parameters relevant for predicting fog were collected from historical weather data.

Various data science models (such as ANN, RF, Adaboost, GBDT, LSTM, ARIMA, HMM, etc.) were then trained using these data for short-term fog prediction (from 30 minutes to 6 hours) as well as medium-term fog prediction (from 1 day to 7 days).

A Bayesian Neural Network (BNN)-based model is developed that uses multispectral observations of the INSAT-3D satellite to detect fog at ground stations. Half-hourly data of wintertime observations from 2017 to 2022 for 18 North Indian cities are used to train and validate the proposed model. The model performs better in terms of critical success index (CSI) and probability of detection (PoD) than the INSAT-FOG, the derived fog product developed by the Indian Space Research Organization

A free public website (https://fog.iitk.ac.in/) has been developed to show the real-time status of fog and disseminate fog prediction results for various north Indian cities. When a particular location is selected, it displays observed visibility for a chosen time interval (by default, past 24 hours), and the predicted visibility for the next 6 hours. The website gives an option to revisit past predictions as well. It also displays various meteorological parameters such as temperature, humidity, wind, etc., and has facilities to compare visibility across cities.

The website also shows live data captured by various sensors stationed at IIT Kanpur. These include visibility, soil moisture, particulate matter, and meteorological sensors. For more details scan

Highlights

- A free public website (https://fog.iitk.ac.in/) has been developed to show the real-time status of fog and disseminate fog prediction results for 11 north Indian cities.
- Various sensors have been installed at IIT Kanpur, and data are displayed on a real-time basis in the website.
- Multiple data science models have been developed for short-term and medium-term prediction of fog. Models are being developed for long- and medium-term prediction.

Figure 1. Sensors installed at IIT Kanpur – (a) visibility sensor, (b) soil moisture sensor and (c) automatic weather station

Project Number: **MHRD/MET/2018064**
Project Title: VIRTUAL LABS PROJECT (PHASE-III EXTENDED)
Project Investigator: Prof. Kantesh Balani
Co-Investigator(s)/Collaborators (if any): N/A
Project Initiated on: 24/04/2018

Project Objectives

The main objectives of the Third Phase of the Virtual Labs project are: to develop a methodology for the fast development of new lab experiments by identifying gap areas with the involvement of all stake holders and to host the newly-developed experiments on a Central Server.

Progress Report

A total of 50 experiments are to be developed by IIT Kanpur for Phase III Virtual Lab, wherein IIT Kanpur had developed 25 experiments and other experiments are under development/review. The review process of experiments that are developed is in progress and these experiments are hosted in the Beta-hosted link (status of lab updated in ***Annexure 1***)

In Addition to this,

- Proposals for the development of 22 proposals (~200 experiments) were submitted. Out of which 17 proposals (~170 experiments) were approved and development of these labs have been initiated.
- English to Hindi conversion of virtual lab has been done in which "*Material Response to Microstructural, Mechanical, Thermal and Biological Stimuli Virtual Lab*" was translated to the Hindi language.
- Migration of lab from Phase 2 to Phase 3 template in which "*Material Response to Microstructural, Mechanical, Thermal and Biological Stimuli*" lab. Virtual Lab has been transferred to Phase 3 template which is now centrally hosted.

Overall summary:

After affiliation with AKTU, we are doing very well in recruiting the nodal centers. Herein, REC Banda and PSIT Kanpur have been renewed to regional nodal centers which have thrusted forward the pace of popularizing Virtual Labs. The development of 50 experiments is in progress and 25 experiments that are developed has been hosted in beta hosting link in GitHub which are under review with domain experts. Migration of lab from Phase 2 to Phase 3 template is done and English to Hindi conversion of one virtual lab has been done an one is in under conversion.

Highlights:

- 50 Virtual Lab experiments were committed, but already 25 experiments are being developed and are in process of reviewing by the reviewer and currently beta hosting is done on the website.
- Migration of Phase 2 labs to Phase III template and Hindi conversion of one Virtual lab is done and one is in under conversion.
- Over 46 Lakh views nation-wide of virtual labs across the consortium (out of which 280.7K views are from IIT Kanpur) are marked by google analytics (since Apr. 2022) as labs are getting included to provide the demographic distribution of virtual labs.

Annexure 1.1: List of Labs and experiments that have been developed and others are under development.

S. No.	Lab Name	Name of Experiment	Status
1.	Mechanical Metallurgy Lab	Tensile Test and Stress Strain Curve of Steel	Beta-hosted
		Stress-Strain Curve of Various Materials	Beta-hosted
		Instrumented Indentation of Materials	Beta-hosted
2.	Food Chemistry Lab	Analysis of water for potable and food purposes	Beta-hosted
		Non-enzymatic browning reactions and its determination	Beta-hosted
		Determination of free fatty acid content in fats and oils	Beta-hosted
		Detection and estimation of oxidative rancidity in fats/oils	Beta-hosted
		Determination of heat stability of vitamin C	Beta-hosted
3.	Basics of Physics-II Lab	Determine the wavelength of sodium light by Newtons ring experiment.	Beta-hosted
		Calibration of ammeter and voltmeter by potentiometer.	Beta-hosted
		To study the resonance condition of a series LCR circuit	Beta-hosted
		To study Hall effect and determine hall coefficient carrier density and mobility of a given semiconductor material using hall effect Set up.	Beta-hosted
		Variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.	Beta-hosted
		Determine the electrochemical equivalent of copper	Beta-hosted
4.	Basics of Electrical Engineering Lab	Study of Instrumentation Amplifiers	Beta-hosted
		Plot V-I characteristics of SCR.	Beta-hosted
		To study running & speed reversal of a 3-phase	Beta-hosted

		induction motor and record speed in both direction	
		Calibration of AC voltmeter and AC ammeter.	Beta-hosted
		To Plot V-I Characteristic of Triac	
		Connection and measurement of power consumption of a fluorescent lamp (tube light).	Beta-hosted
		Verification of Superposition and Thevenin's Theorem	Beta-hosted
		Measurement of power and power factor in a single-phase ac series inductive circuit and study improvement of power factor using capacitors Theory Power:	Beta-hosted
5.	Physical Pharmaceutics II	Angle of repose and effect of lubricants/ glidants on flow property of powder.	Beta-hosted
		Bulk Density and Tapped Density Determination of Pharmaceutical Powders	Beta-hosted

Annexure 1.2: List of Labs and experiments that have been successfully centrally hosted and reviewed by lab domain experts.

S. No.	Lab Name	Expt. ID	Name of Experiment	Status
1.	Python For Basic Arithmetic Operations	1403	Arithmetic Operations	Central -hosted
		1404	Built-in Functions	Central -hosted
		1405	Loops	Central -hosted
		1406	Data Types	Central -hosted
		1407	Strings	Central -hosted
		1408	Classes and Objects	Central -hosted
		1409	Built-in Modules	Central -hosted
		1410	Constructors and Inheritance	Central -hosted
		1411	File Operators	Central -hosted
2.	Electron Microscopy for Beginners	1439	Feature Size measurement: Porosity, Grain, and Reinforcement	Central -hosted
		1440	Effect of Beam voltage on conducting and insulating samples	Central -hosted
		1442	Basic operations of Transmission Electron Microscope (Imaging and Diffraction Pattern)	Central -hosted
		1443	Bright Field Imaging and Dark Field Imaging	Central -hosted
		1444	Electron Diffraction for various materials	Central -hosted
		1445	Indexing of Diffraction Patterns (Ring Pattern & Spot Pattern)	Central -hosted
		1446	Sample Preparation for TEM analysis (Bulk metal, Powder sample, Brittle material)	Central -hosted
		1447	Cross-sectional Sample Preparation	Central -hosted
		1438	Basics of Scanning Electron Microscopy: Secondary Electron and BSE imaging mode	Central -hosted
		1441	Elemental mapping: Spot, Line and Area Analysis	Central -hosted
3.	Basics of Physics	1400	Energy Band Gap of Semiconductor	Central -hosted
		1401	Radiation with Temperature Change Using Stefan's Law	Central -hosted
		1402	Finding Viscosity of Liquid by Rotating Cylinder Method	Central -hosted
		1432	Measurement of the wavelength of monochromatic source of light with the help of Fresnel's Bi prism	Central -hosted
		1433	Measurement of focal length of the combination of the two lenses separated by a distance	Central -hosted
		1434	To measure specific rotation of cane sugar using Polarimeter	Central -hosted
		1435	Measurement of high resistance by the method of leakage of condenser	Central -hosted
		1436	To study polarization of light using He-Ne Laser	Central -hosted
		1399	Carey Foster's Bridge to Measure Specific Resistance of Material	Central -hosted
		1437	Measurement of Numerical aperture and attenuation constant of optical fiber	Central -hosted

Project Number: **MHRD/MET/2014258**
Project Title: Virtual Lab – Phase II
Project Investigator: Prof. Kantesh Balani
Co-Investigator(s)/Collaborators (if any): N/A
Project Initiated on: November 07, 2014
Project objectives:

In the Phase-II of Virtual Lab, idea is to make all the developed labs into an open-source repository that is available to community/academic institutes, whether in India or abroad, for use and development. The idea was to convert all the licensed content into a platform that is independent of any licensed software. Further, a target of creating nodal centers and achieving a target participation of 54,000 users in the current year.

Progress Report:

A usage count of 280.7K is obtained (page-views). A total of 200+ workshops have been conducted till now. A total of 113 nodal centers (***Annexure 2.3***) have been created with affiliation to IIT Kanpur till Mar. 31, 2023, and **41 nodal** centers are re-enrolled (***Annexure 2.2***) in FY 2022-2023 with IIT Kanpur. Also, 36 workshops are conducted in nodal centers (***Annexure 2.1***). The total workshop usage is **25,790 (+280.7K** usages in website hits).

Target of achieving required users is achieved, and 100+ nodal centers are linked. Overall summary:

- Phase II of Virtual Lab has started (since Oct. 2014).

- The target of taking 3 labs to level six was decided (which was extended to 8 additional labs, making a total of 9 labs to FOSS level-6 and 2 labs in FOSS level-5). The list of current stats of virtual labs is provided in ***Annexure 3*** (targets achieved).
- Two project engineers, two project associates, two assistant project manager and two project technicians are available for the project development.
- The undertaking for integration of all labs (worked upon by IIIT Hyderabad) at common platform is being supported by IIT Kanpur.

Highlights:

- 11 labs have been hosted and 9 labs have achieved FOSS level 6, and also two others have achieved FOSS level of 5 (The commitment was for only three labs to reach FOSS level 6). The undertaking for integration of all labs (worked upon by IIIT Hyderabad) at common platform is being supported by IIT Kanpur.
- 8 project employees hired and many interns hired for the development.
- Currently, the number of nodal centers is 113. The usage count (of 280.7K + 25790 workshop usages) has substantially exceeded the annual targeted count of 54,000.

List of Workshops Conducted:

- Half day workshop on Virtual labs organized by REC Banda (December 17, 2022)
- Chaudhary Charan Singh University, Meerut, January 16, 2023
- Two days seasonal school in Functional nano materials and its applications in sensor and
- Storage applications, December 12-13, 2022, IIT Kanpur
- One Day Online Workshop on Development of Virtual Labs, January 04, 2023
- One Day Online Workshop on Development of Virtual Labs February 06, 2023, Ramgarh Engineering College, Jharkhand
- Galgotias College of Engineering & Technology, Greater Noida (U.P) Feb. 27, 2023

Annexure 2.1: List of workshops conducted (Apr-2022 to Mar-2023)

S. No.	College Name	Date
1	IIT Kanpur	06-06-2022
2	PSIT, HBTI and Vision college students	28-06-2022
3	IIT Kanpur	15-07-2022
4	IIT Kanpur	24-11-2022
5	PSIT Kanpur	24-11-2022
6	PSIT Kanpur	04-12-2022
7	PSIT Kanpur	12-12-2022
8	PSIT Kanpur	13-12-2022
9	REC Banda	17-12-2022
10	REC Banda	04-01-2023
11	ITS Ghaziabad	07-01-2023
12	PSIT Kanpur	13-01-2023
13	Chaudhary Charan Singh University, Meerut	16-01-2023
14	PSIT, Kanpur	29-01-2023
15	PSIT, Kanpur	30-01-2023
16	Ramgarh /engineering College, Jharkhand	06-02-2023
17	ITS Ghaziabad	07-02-2023
18	ITS Ghaziabad	08-02-2023
19	ITS Ghaziabad	09-02-2023
20	ITS Ghaziabad	10-02-2023
21	Subharti Institute Meerut	13-02-2023
22	ITS Ghaziabad	14-02-2023
23	ITS Ghaziabad	16-02-2023
24	ITS Ghaziabad	22-02-2023
25	TMU Moradabad	20-02-2023
26	Ramgarh /engineering College, Jharkhand	23-02-2023
27	Indus Institute of Technology and management, Kanpur	23-02-2023
28	Subharti Institute Meerut	24-02-2023
29	Subharti Institute Meerut	25-02-2023
30	DSATM Bangalore	25-02-2023
31	Galgotias College of Engineering & Technology, Greater Noida	27-02-2023
32	REC Banda	01-03-2023
33	REC_Banda	02-03-2023
34	Dr. Ambedkar Institute of Technology, Bengaluru	10-03-0203
35	Amity College	14-03-2023
36	Katihar Engineering College, Katihar	18-03-2023

Annexure 2.2: List of Total Nodal Centers

S. No.	College	Date	Contact Person
1	Dr. Ambedkar Institute of Technology for Handicapped, Kanpur	Apr. 16, 2014	cpverma.2007@rediffmail.com
2	Global Group of Institutions, Lucknow	Feb. 19, 2015	dean@ggi.org.in
3	Hindustan Institute of Technology and Management, Agra	Apr. 17, 2015	directorhitm@sgei.org, manishgupta.hitm@sgei.org
4	Pranveer Singh Institute of Technology, Kanpur	Apr. 21, 2015	aparna.dixit@psit.ac.in
5	Saraswati Gyan Mandir Inter College, Indira Nagar, Kanpur	Apr. 21, 2015	sopanbajpai@gmail.com
6	Kendriya Vidyalaya, IIT Kanpur	Apr. 27, 2015	kviit@iitk.ac.in

7	Babu Banarasi Das University, Lucknow	May 06, 2015	seethalk07@gmail.com
8	Krishna Engineering College, Ghaziabad	July 16, 2015	director@krishnacollege.ac.in
9	Bharat Institute of Technology, Meerut	July 17, 2015	dg@bitmeerut.edu.in
10	JSS Mahavidyapeetha, Noida	July 24, 2015	hodcse@jssaten.ac.in,principal@jssaten.ac.in
11	KV Cant, Kanpur	Aug. 17, 2015	kvkcantt@gmail.com
12	Seth Anandram Jaipuria, Kanpur	Aug. 24, 2015	sajsknp@rediffmail.com,
13	Vidya College of Engineering, Meerut	Oct. 13, 2015	vce@vidya.edu.in, info@vidya.edu.in
14	Puran Chandra Vidya Niketan, Kanpur	Oct. 31, 2015	principalpcvn@gmail.com
15	Kanpur Institute of Technology, Kanpur	Oct. 31, 2015	vd@kit.ac.in
16	Disha School, Raipur	Dec. 24, 2015	principal.dishaschool@dishamail.com
17	Maharana Pratap Group of Institutions, Kanpur	Feb. 16, 2016	Mohit1003@yahoo.co.in
18	Government Industrial Training Institute Girls College	Feb. 20, 2016	ru.gitinlr@gmail.com
19	CSJMU (UIET), Kanpur	Aug. 01, 2016	jainrenu@gmail.com
20	Saraswati Vidya Mandir Inter College, Fatehpur	Aug. 08, 2016	ramvidyamandirc@gmail.com
21	Rama University, Kanpur	Aug. 16,2016	info@ramauniversity.ac.in
22	College Of Engg. Science & Tech., Lucknow	Aug. 20,2016	Jprasad3859@yahoo.in
23	Creative Convent Inter College, Lucknow	Aug. 24, 2016	sachanyogendra@gmail.com
24	Lucknow Convent Public Inter College, Lucknow	Sep. 06, 2016	Kumaravinash10july@gmail.com
25	Amal Jyothi College of Engineering, Kerala	Oct. 10, 2016	principal@amaljyothi.ac.in
26	Rohini College of Engineering and Technology, Tamil Nadu	May. 13, 2017	principal@rcet.org.in
27	CIPET, Lucknow	Oct. 30, 2017	Cipetlko2@gmail.com
28	Shambhunath Institute of Engineering and Technology, Allahabad	Nov. 27, 2017	director@siet.in
29	Ajay Kumar Garg Engg. College, Ghaziabad	Mar. 03, 2018	akgecor@akgec.org
30	Raj Kumar Goel Institute of Technology, Ghaziabad	Mar. 03, 2018	akagrfpo@rkgit.edu.in dr.puneet@rkgit.edu.in
31	Integral University, Lucknow	Mar. 14, 2018	info@iul.ac.in, rhfatima@iul.ac.in, dpr@iul.ac.in
32	Atma Ram Sanatan Dharma College, New Delhi	Mar. 20, 2018	principal.arsdcollege@gmail.com
33	Allenhouse Institute of Technology, Kanpur	Mar. 26, 2018	director@allenhouse.ac.in, me.avinash@allenhouse.ac.in
34	Rajkiya Engg College, Kannauj	Mar. 27, 2018	viveksrivastavakash@gmail.com, rajeev@reck.ac.in
35	Christ Church College, Kanpur	Jun. 07, 2018	rkdwivedi1963@gmail.com
36	Galgotias Educational Institutions, Greater Noida	Jul. 05, 2018	director@galgotiacollege.edu
37	Rajkiya Engineering College, Banda	Oct. 30, 2018	ashutosh.tiwari0885@gmail.com
38	Axis Colleges, Kanpur	Nov. 23, 2018	abhayshukla@axiscolleges.in aitmvlab@axiscolleges.in
39	Teerthanker Mahaveer University, Moradabad	Nov, 27, 2018	jayshree2004@gmail.com
40	Swami Vivekanand Subharti University, Meerut	Nov. 29, 2018	registrar@subharti.org, supratim.saha2000@gmail.com
41	Invertis University, Bareilly	Nov, 29, 2018	info@invertis.org
42	Madan Mohan Malaviya University of Technology, Gorakhpur	Nov. 30, 2018	dean_ug@mmmut.ac.in, rkvme@mmmut.ac.in,
43	The Millennium School, Lucknow	Dec. 05, 2018	dubeydhatri@gmail.com
44	Vishveshwarya Group of Institutions, Greater Noida	Dec. 05, 2018	deanresearch@vgi.ac.in
45	Aligarh College of Engineering & Technology, Aligarh	Dec. 06, 2018	thenuamahesh76@gmail.com
46	ITS Ghaziabad	Dec. 10, 2018	itsmn@its.edu.in
47	Shri Krishna college of Engineering and Technology, Tamilnadu	Dec. 13, 2018	info@skcet.ac.in
48	CIPET Bhopal	Dec. 10, 2018	Cipet.bhopal@gmail.com
49	Anand Engineering College Technical Campus, Agra	Jan. 03, 2019	director.aec@sgei.org
50	Saraswati Dental College, Faizabad Road, Lucknow	Jan. 07, 2019	smdc@saraswaticolleges.com
51	Green Valley Sr. Sec. School, Bhopal	Jan. 22, 2019	greenvalley5529@gmail.com
52	Army Public School, Bareilly	Feb. 23, 2019	apsbareillycantt@gmail.com, armyschool_2007@rediffmail.com
53	Delhi Public School, Agra	Mar. 05, 2019	office@dps.ac.in,qc@dps.ac.in
54	KL International, Meerut	Mar. 13,2019	info@klischool.com, principal@klischool.com

55	Kamla Nehru Institute of Technology, Sultanpur	April. 24, 2019	arvind@knit.ac.in,Director@knit.ac.in
56	Katihar Engineering College, Katihar	May. 22, 2019	arbind.geit@gmail.com
57	RustamJi Institute of Technology, Gwalior	Jun. 01, 2019	ussharma001@gmail.com
58	Buddha Institute of Technology, Gorakhpur	Jun. 21, 2019	bodhgayabitengg@gmail.com
59	Raja Balwant Singh Engineering Technical Campus, Agra	Jul. 03, 2019	tu04@rediffmail.com
60	IPS Academy, Indore, Madhya Pradesh	Jul. 04, 2019	director.ies@ipsacademy.org
61	BD College, Patna	Jul. 11,2019	Principalbdcpatna@gmail.com
62	Rajdhani Engineering Collage, Bhubaneshwar, Orissa	Jul. 18, 2019	rec_bbsr@yahoo.co.in
63	Gandhi Institute for Technology, Orissa	Jul. 19, 2019	principal@gift.edu.in
64	AKS University, Satna	Jul. 20, 2019	psiitd@yahoo.com
65	Swami Vivekanand University, Sagar	Jul. 26, 2019	rajesh.dubey118@gmail.com
66	Shobhit University, Meerut	Jul. 22, 2019	mail@shobhituniversity.ac.in
67	RD Engineering College, Meerut	Aug. 02, 2019	info@rdec.in
68	National Institute of Science and Technology, Odisha	Aug. 24, 2019	
69	Motihari College of Engineering, Bihar	Aug. 31, 2019	
70	Hindustan Institute of Management & Computer Studies, Mathura	Sep. 05, 2019	director.himcs@sgei.org
71	SATI Engineering College, Vidisha, Madhya Pradesh	Sep. 26, 2019	director@satiengg.org, jsccivil@rediffmail.com
72	Vananchal College of Science, Garhwa, Jharkhand	Oct. 03, 2019	vcs_garhwa@rediffmail.com
73	IET, Dr. Ram Manohar Lohia Avadh University, Faizabad	Apr. 17, 2020	directorietfzd@gmail.com srivastava_anoop@rediffmail.com
74	Kali Charan Nigam Institute of Technology, Banda	Apr. 22, 2020	kcnit2002@rediffmail.com
75	Bundelkhand Institute of Engineering & Technology, Jhansi	Apr. 23, 2020	sayub@bietjhs.ac.in
76	BN College of Engineering and Technology, Lucknow	Apr. 25, 2020	director@bncet.ac.in
77	RR Institute of Modern Technology, Sitapur Road, Lucknow	Apr. 28, 2020	ersaurabhdixit1987@gmail.com,
78	Madan Mohan Malaviya University of Technology, Gorakhpur	Apr. 28, 2020	rkvme@mmmut.ac.in
79	Rajkiya Engineering College, Bijnor	Apr. 28, 2020	suneelkm17@gmail.com
80	Goel Institute of Technology and Management, Lucknow	Apr. 28, 2020	dr.devendra@goel.edu.in
81	Rajkiya Engineering College, Mainpuri	May. 03, 2020	pks.cse13@gmail.com
82	Buddha Institute of Technology, Gorakhpur	May. 04, 2020	abhinav514@bit.ac.in
83	IIMT College of Engineering, Greater Noida	May. 11, 2020	research.iimtgn@iimtindia.net Hodme_gn@iimtindia.net
84	Pandit Prithi Nath (PG) College, Kanpur	May. 18, 2020	satish0402@gmail.com
85	Institute of Technology and Management, Gorakhpur	May. 27, 2020	hodme@itmgkp.edu.in
86	Meerut Institute of Engineering & Technology, Meerut	May. 31, 2020	arvind.pandey@miet.ac.in
87	BITT Polytechnic, Ranchi	Jun. 01, 2020	principalbittp@gmail.com
88	Feroze Gandhi Institute of Engineering and Technology, Raebareli	Jun. 04, 2020	sharmarameshfgiet@gmail.com
89	School of Management Sciences, Lucknow	Jun. 06, 2020	hemantsingh@smslucknow.com
90	SR Institute of Management and Technology, Lucknow	Jun. 06, 2020	dharmesh2809@gmail.com
91	Chaibasa Engineering College, Jharkhand	Jun. 11, 2020	Arijitdutta351@gmail.com Principal.gecc@gmail.com
92	DAV College, Kanpur		chauhanrasmi@gmail.com
93	MJP Rohilkhand University, Bareilly	April. 25,2020	drarchana.physics@gmail.com
94	Shree Narayan Inter College, Auraiya		Dixit.brajesh58@gmail.com
95	Greater Noida Institute of Technology, Greater Noida	Jun. 25, 2020	priyesh@gniot.net.in
96	S.V.P College, Bhabua(Kaimur) Bihar	Jul. 01, 2020	rajkg66@gmail.com
97	Dumka Engineering College, Jharkhand	Jul. 14, 2020	psarkar.bit@gmail.com
98	Ram Garh Engineering College, Jharkhand	Jul. 15, 2020	brajesh.nitrkl@gmail.com
99	Dr. Ambedkar Institute of Technology, Bengaluru	Aug, 08, 2020	nandiniks1@dr-ait.org
100	Gramin Mahila (PG) College Sikar Rajasthan	Aug. 06, 2020	kcbhanu@gmsssikar.org
101	HBTU, Kanpur	Aug. 20, 2020	gldevnani@hbtu.ac.in
102	PSIT College of Engineering, Kanpur	Aug. 25, 2020	ec@psitcoe.ac.in
103	PSIT College of Higher Education, Kanpur	Sept.02, 2020	fc18072@psitche.ac.in
104	Lingaya's Vidyapeeth, Haryana	Aug.09, 2021	vimal@lingayasvidyapeeth.edu.in
105	Shri Ram Polytechnic, Madhubani, Bihar	Nov.29, 2021	academic.coordinator@shrirampolytechnic.org

106	Rameshwaram Institute of Technology and Management, Lucknow	Dec.12, 2021	raisulhasan1973@gmail.com, director@ritm.ac.in
107	Adamas University, Kolkata	Feb.14, 2022	sujoy.bhattacharya@adamasuniversity.ac.in
108	Chaudhary Charan Singh University, Meerut	Mar. 28, 2022	anilphy@ccsuniversity.ac.in, anilsaciitb.ac.in
109	School of Basic Science, UIET, CSJM University	June. 08, 2022	anjudixit@csjmu.ac.in
110	Government Degree college, Badaun	Nov. 25, 2022	drsrathore@gmail.com
112	Indus Institute of Technology and Management, Bilhaur	Feb. 09, 2023	Indus350.cse@gmail.com
113	Dayananda Sagar Academy of Technology and Management, Bangalore	Feb. 02, 2023	hodise@dsatm.edu.in

Annexure 2.3: List of Re-enrolled Nodal Centres in 2023

S. No.	College Name	Contact
1	Pandit Prithi Nath (PG) College, Kanpur	satish0402@gmail.com
2	IIMT College of Engineering, Greater Noida	research.iimtgn@iimtindia.net
3	Subhartl Institute of Technology and Engineering, Meerut	supratim.saha2000@gmail.com
4	Ramgarh Engineering College, Jharkhand	sugan.abhi1@gmail.com
5	RustamJi Institute of Technology, Gwalior	ussharma001@gmail.com
6	Sandip Foundation's, Shri Ram Polytechnic, Madhubani, Bihar	academic.coordinator@shrirampolytechnic.org
7	Rajkiya Engineering College, Bijnor	suneel.ee@recb.ac.in
8	Rajdhani Engineering Collage, Bhubaneshwar	hodme@rec.ac.in
9	Vananchal College of Science, Garhwa Jharkhand	kamleshtiwary83@gmail.com
10	UIET, CSJM University Kanpur	vijaykashyap@csjmu.ac.in
11	Dayanand Anglo Vedic (PG) College, Kanpur	kaleem.ahmed19@gmail.com
12	Kali Charan Nigam Institute of Technology, Banda	pradeepkumar228@gmail.com
13	Pranveer Singh Institute of Technology - Kanpur	aparna.dixit@ieee.org, aparna.dixit@psit.ac.in
14	Motihari College of Engineering, Bihar	shaileshranjankumar@gmail.com
15	Institute of Technology & Science, Ghaziabad	varunarora.ka@its.edu.in
16	Institute of Technology and management, Gida Gorakhpur	hodme@itmgkp.edu.in
17	Chaudhary Charan Singh University, Meerut	anilphy@ccsuniversity.ac.in
18	Raj Kumar Goel Institute of Technology, Ghaziabad	dr.puneet@rkgit.edu.in
19	Rajkiya Engineering College Banda	ashutosh.tiwari@recbanda.ac.in
20	School of Basic Science, CSJMU Kanpur	anjudixit@csjmu.ac.in
21	Galgotias College of Engineering & Technology, Greater Noida	jaya.sinha@GalgotiacolIege.edu
22	Rajkiya Engineering College, Kannauj	rajeev@reck.ac.in
23	Katihar Engineering College, Katihar	arbind.itg@gmail.com
24	Allen house Institute of Technology, Kanpur	me.avinash@alenhouse.ac.in
25	Dr. Ambedkar Institute of Technology, Bengaluru	vidyah91.et@drait.edu.in
26	Faculty of Engineering Teerthanker Mahaveer University, MBD	dramit.engineering@tmu.ac.in
27	Axis Institute of Technology and Management, Kanpur	abhayshukla@axiscolleges.in
28	Chaibasa Engineering College, Jharkhand	arijitdutta351@gmail.com
29	IPS Academy, Institute of Engineering and Science, Indore	hod.telecom@ipsacademy.org
30	Indus Institute of Technology and management, Kanpur	indus350.cse@gmail.com
31	Dayananda Sagar Academy of Technology and Management	hodise@dsatm.edu.in
32	Rameshwaram Institute of Technology and Management	raisulhasan1973@gmail.com
33	NIST Institute of Science and Technology, Berhampur	chittaranjan.biswal@nist.edu
34	Government Degree College, Badaun	drsrathore@gmail.com
35	Adamas University, Kolkata	sujoy.bhattacharya@adamasuniversity.ac.in
36	Kanpur Institute of Technology, Kanpur	habib.rahman@kit.ac.in
37	Meerut Institute of Engineering and Technology, Meerut	praveenchakarvarti@miet.ac.in
38	Anand Engineering college, Agra	rahul.saraswat@sgei.org
39	Amity University, Chhattisgarh	nrathore@rpr.amity.edu
40	IET Bundelkhand University, Jhansi	dr.anupam@bujhansi.ac.in
41	Dr. Ambedkar Institute of Technology, Kanpur	cpverma2007@gmail.com

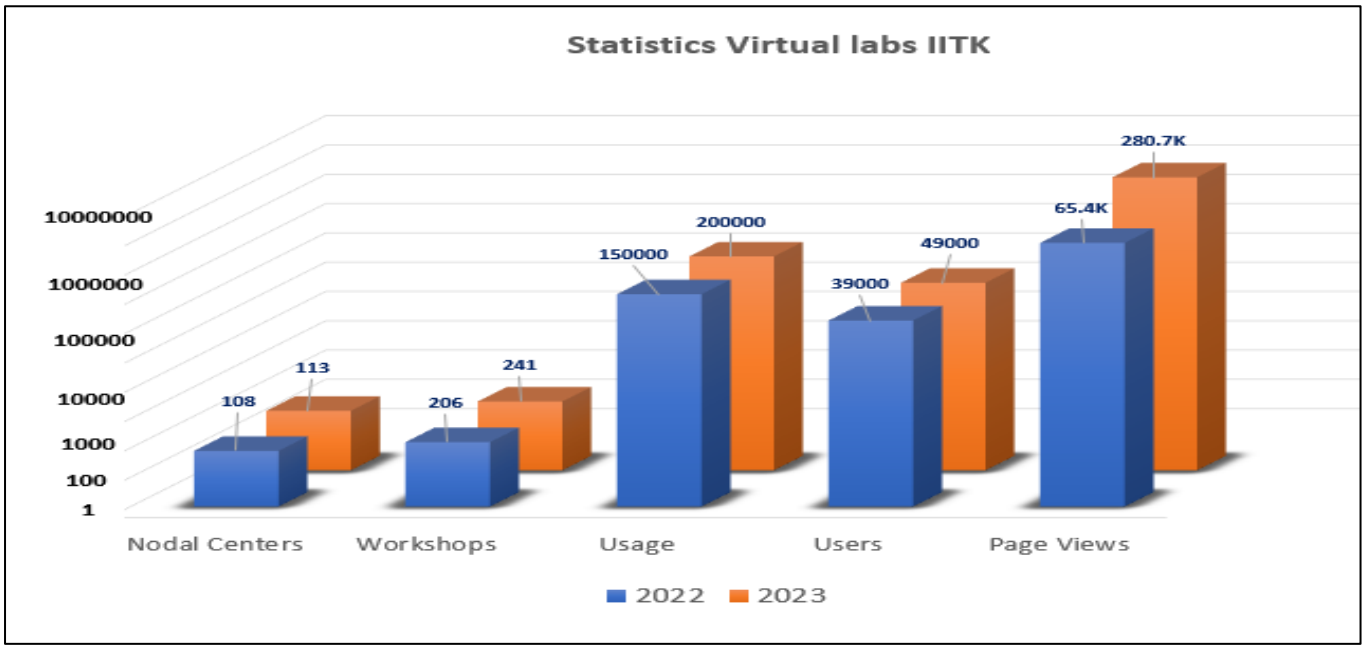
Annexure 3: List of Labs at IIT Kanpur and Analytics (Available only since Apr. 01, 2022)

S. No.	Lab Name	PI Name	FOSS Level
1	Virtual Astrophysics Lab	Dr. P.K.Jain	6
2	Ultrafast Laser Spectroscopy	Dr. D.Goswami	6
3	Material Response to Micro-structural, Mechanical, Thermal & Biological Stimuli	Prof. Kantesh Balani	6
4	Aerospace Virtual Lab	Prof. S.Kamle	6
5	Virtual Combustion and Automization Lab	Prof. D.P.Mishra	6
6	RF and Microwave Characterization Lab	Dr. V. Srivastava, Dr. J. Akhtar	5
7	Transducers and Instrumentation Virtual Lab	Dr. N.K.Verma	5
8	General Purpose Production Simulation Lab	Prof. D. Philip	6
9	Basics of Physics	Prof. Kantesh Balani	6
10	Electron Microscopy for Beginners	Prof. Kantesh Balani	6
11	Python for Basic Arithmetic Operations	Prof. Kantesh Balani	6

IIT Virtual Labs Analytics since Apr 2022

	Lab URL	Users	Pageviews	Avg. User Engagement Duration (hh:mm:ss)
1.	Basics of Physics	18.5K	121.3K	00:02:39
2.	Python Programming Lab	18.8K	98.7K	00:02:03
3.	Electron Microscopy For Beginners	3.7K	18.3K	00:02:33
4.	Material Response to Micro Structural & Mechanical & Thermal and Biological Stimuli	1.6K	5.5K	00:00:49

Cumulative Pageviews	243.8K



FINANCE

The Institute has a decentralized financial management structure, organized largely by the primary source(s) of funds.

FY2022-23 accounts are prepared as per the guidelines of Ministry of Education (MoE), the administrative ministry of the Institute, conveyed vide their letter no. 29-4/2012-IFD dated April 17, 2015. The unaudited accounts were duly adopted by Chairman, Board of Governors (BOG) on July 2, 2023.

The accounts are available with the title 'Un-audited Annual Accounts (2022-23) at the following link:

https://www.iitk.ac.in/new/annual-accounts

Following are the highlights of Institute's FY 2022-23 financials:

* Balance sheet size is of ₹ 4,995 crores, without any valuation added for the IIT brand.

* MHRD released revenue and capital funds of ₹ 601.82 crores and ₹ 83.08 crores respectively under scheme Support to IITs.

* Institute has generated revenue of ₹ 815.62 crores (excluding deferred revenue income w.r.t. depreciation of ₹ 142.90 crores), of which ₹ 683.54 crores was spent towards recurring expenditure and ₹ 62.13 crores towards repayment of HEFA Loan. Income to the tune of ₹ 14.44 crores has been ploughed back as retained earnings for repayment of HEFA loan. In addition to this, institute has incurred expenditure of ₹ 83.08 crores on capital expenditure.

INDIAN INSTITUTE OF TECHNOLOGY KANPUR

INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD ENDED 31ST MARCH 2023

(Amount - ₹)

PARTICULARS	SCHEDULE	CURRENT YEAR 31.03.2023	PREVIOUS YEAR 31.03.2022
INCOME			
Academic Receipts	9	69,15,36,817	66,81,94,364
Grants / Subsidies	10	6,01,82,92,707	5,52,02,60,762
Income from Investments	11	42,29,05,339	34,71,21,099
Interest earned	12	2,74,11,199	2,20,30,809
Other Income	13	99,55,36,802	68,55,25,597
Prior Period Income	14	5,22,060	3,37,122
Deferred Revenue Income	4	1,42,89,79,967	1,41,86,63,368
	TOTAL (A)	**9,58,51,84,891**	**8,66,21,33,121**
EXPENDITURE			
Staff Payments & Benefits (Establishment Expenses)	15	4,33,52,61,196	3,97,57,35,257
Academic Expenses	16	1,00,69,86,246	1,10,49,03,691
Administration and General Expenses	17	74,51,46,205	45,06,27,585
Transportation Expenses	18	2,71,74,541	-
Repairs & Maintenance	19	48,29,21,926	47,96,30,418
Finance Costs	20	15,56,45,906	11,03,15,337
Depreciation	4	1,44,88,79,640	1,42,62,51,913
Other Expenses	21	6,19,03,275	4,66,80,963
Prior Period Expenses	22	4,66,414	77,973
	TOTAL (B)	**8,26,43,85,349**	**7,59,42,23,137**
BALANCE BEING EXCESS OF INCOME OVER EXPENDITURE (A-B)		**1,32,07,99,542**	**1,06,79,09,984**
Utilization Against HEFA Loan		**62,13,00,000**	**57,13,00,000**
Internal Receipts Retained for HEFA Loan		**14,43,98,236**	**16,46,40,357**
BALANCE BEING SURPLUS/(DEFICIT) CARRIED TO CAPITAL FUND		**55,51,01,306**	**33,19,69,627**
SIGNIFICANT ACCOUNTING POLICIES	23		
CONTINGENT LIABILITIES AND NOTES TO ACCOUNTS	24		

PK KELKAR LIBRARY

The P. K. Kelkar Library provides access to resources in all formats to meet the research and teaching needs of the Institute. The library is equipped with RFID technology and facilitates self-check-in/self-check-out and inventory management. Our web catalog enhances the way to search and retrieve resources, enables print options, supports rating, comments, and making of lists, and exports search results in different formats. The library has CCTV for better surveillance & security and high-speed Wi-Fi internet access. The library subscribes to its periodicals in digital form and books in both print and electronic. During the period, Rs. 2022.28 Lacs was spent on new resources.

A. ACQUISITION UNIT

The unit deals with acquiring printed books and e-resources, including e-books, e-journals and databases on the recommendations. All recommended books are procured through a systematic purchase process. All newly acquired books and gratis collections are accessioned and technically processed for labelling, bar-coding, RFID tagging, etc. It also does the database updation and technical processing work for old books. All the books added to the library collection were circulated to the academic community through e-mail on a weekly basis.

During the financial year 2022-23, PK Kelkar Library spent Rs. 2022.28 Lacs on Books and Journals. Expenditure details as per significant collections are given below in Fig. 1.

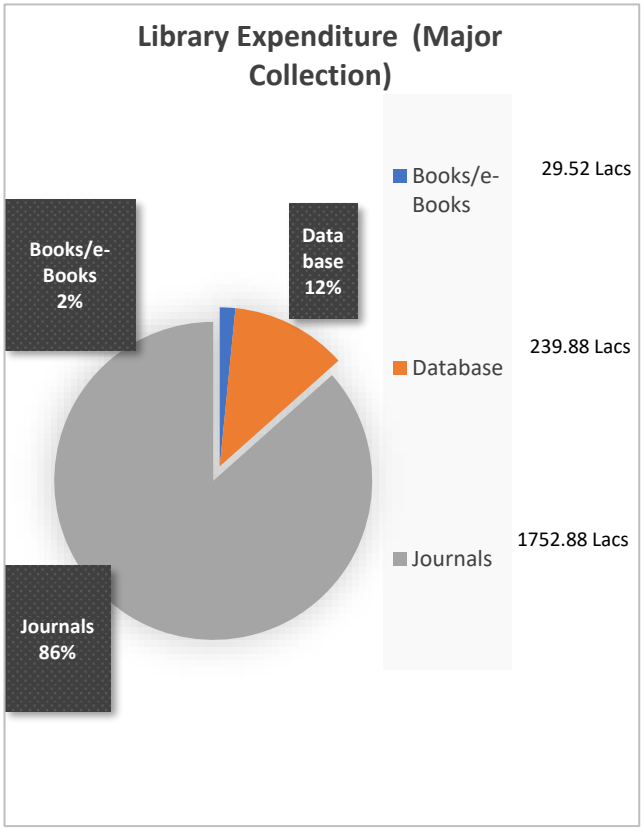


Fig. 1: Library expenditure

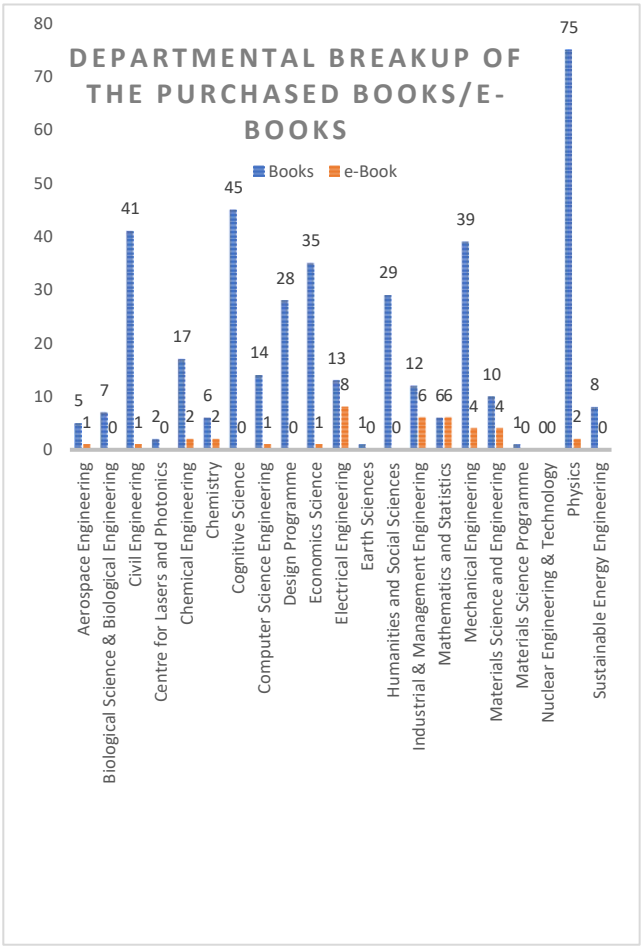
Procurement of Books:

The institute library procures eBooks and print books during FY 2022-23 to facilitate reading materials. During this period, the library procured 442 books (print+ebook) by spending an amount of Rs. 29.52 lakhs, including 404 print books and 38 e-books.

In addition, a total of 155 books added to the collection were through donations. The donors of these gifted books were duly acknowledged.

The library distributes its budget among all departments as per the established budget formula. Subsequently, the library has procured various resources for the departments. The detail of books procurement during this period is presented as below (Fig.2):

Fig. 2: Departmental breakup of the purchased books/e-books



Procurement of Online Resources

The library has subscribed and provided campus-wide access to more than 6103 (eSS) + 5192 (Self Subscribed) peer-reviewed journals and 22 bibliographic, citation, and factual databases.

The expenditure for subscribing to various online resources was Rs.1992.76 Lacs (GST included). The primary subscribed online resources from major publishers and journals number are mentioned below in Table-I.

Sl. No	Publisher	No. of Journals
1	American Association for the Advancement of Science	2
2	American Chemical Society	95
3	American Economic Association	7
4	American Institute of Aeronautics and Astronautics	6
5	American Mathematical Society	11
6	American Physiological Society	12
7	American Psychological Association	120
8	ASTM Digital Library	9
9	Begell House	30
10	Brill Academic Publishers	3
11	Cambridge University Press	142
12	Cell Press	10
13	Centre for Monitoring Indian Economy (CMIE)	4
14	Duke University Press	7
15	EBSCO	5
16	Economist	1
17	Elsevier	3003
18	Epw Research Foundation	1
19	Euromonitor	1
20	European Mathematical Society	2
21	Geological Society of America	2
22	Geological Society Publishing House	1
23	Indiastat	1
24	Informs	14
25	Institute of Electrical and Electronics Engineers (IEEE/IET)	400
26	Institute of Mathematical Statistics	3
27	Institute of Mathematics, Polish Academy of Sciences	4
28	Institute of Physics	81
29	IOS Press	3
30	Johns Hopkins University Press	10
31	Jove	1
32	Mary Ann Liebert, Inc.	4
33	MIT Press	13
34	Nature Publishing Group	37
35	Now Publishers Limited	13
36	Optical Society of America	13
37	Oxford University Press	10
38	Royal Society of Chemistry	55
39	Sage Publications	538
40	SciFinder	1
41	Seismological Society of America	2
42	Société Mathématique De France	2
43	Society of Exploration Geophysicists (Seg)	2
44	Society of Indian Automobile Manufacturers (SIAM)	17
45	Springer	4
46	Taylor And Francis	73
47	Thomas Telford / Ice	25
48	University Of Chicago Press	8
49	University Of Illinois Press	1
50	Walter De Gruyter Gmbh & Co.	10
51	Wiley	247
52	World Scientific	10

Table-I: IITK subscribed online resources

B. AUTOMATION AND ARCHIVES UNIT

The library has its website (https://pkklib.iitk.ac.in) accessible to users, which is maintained by the library team. It provides information and navigation to the resources subscribed by the library, and the contents are updated regularly. The unit also develops and maintains various web-based services, including online search requests for untraceable books, library resource usage statistics, resource manuals, budget details, new arrivals of books, etc.

Archives are an essential part of any institute as they serve as a repository of the Institute's history. The primary functions of the archives unit is to collect, arrange and preserve documents and make them accessible through online modules of the Institute. These documents include photographs, annual reports, brochures, pamphlets, DVDs, and personal records of retired faculty and staff. The unit has an excellent collection of pictures of captured momentous events, functions, and other occasions of the Institute. During this period, it archived four reports. This unit also receives photographs, oral history, video, and audio files related to the Institute's history from various stockholders.

C. CIRCULATION AND MAINTENANCE UNIT

The unit involves various activities like issuing & return reading materials, resolving user queries, binding library books & periodicals, Inter-Library Loans (ILL), archival of electronic Theses and dissertations, and issuing dues clearance. The unit also looks after the maintenance activities of the building, furniture & fittings, and other types of equipment.

Circulation statistics

Transactions	
Number of books checked out & renewed by	
Faculty	3,055
Staff (including Project staff & PDF)	965
Students	46,891
Total Checkout & renewals	50,911
Total Checked in	12,855
Total Transactions	63,766
Lost and replacement of books	
Number of books reported lost	12
Number of books replaced	8
The amount collected as the replacement cost	Rs. 1,11,540
Dues/ Nodues Certificate issued	
Faculty members	17
PDFs	79
Staff members	36
Students	2,011
Total	2,143
Inter Library Loan	
Internal request received	54
External request received	157
Total	211
Theses archived in Institutional Repository (http://etd.iitk.ac.in)	
PhD	219
MS (Research)	21
MTech	358
MDes	17
Total	615

Awards

Mr. Jaiprakash (Sr Library and Information Officer), Mr. Ramakant (Asstt. Library and Information Officer) and Ms. Madhu Agnihotri (Sr. Assistant) are conferred with merit award 2022 for exemplary service with utmost commitment towards their duty.

Finally, I would like to place on record my thanks to all SLC members, library staff, institute administration, students, and security for their help in the smooth functioning of the library. Special mention must be made of the continued support from the Director and Deputy Director, without

which modernization activity would have lost its rigorous and enthusiasm.

DIGITAL INFRASTRUCTURE AND AUTOMATION

Computer Centre (CC) caters to the computational and IT related needs of the academic as well as residential community at IIT Kanpur. Essential services provided by CC include Institute Local Area Network covering academic area, residential area and students' hostels, E-mail facility, High Performance Computing, Computer Labs, Website development and maintenance, purchase, and maintenance of various software for specialized research and general use by the campus. CC provides help and support for purchasing, installing and configuring such hardware and software on-demand basis.

The Centre functions round the clock on a state of art Data Centre divided into various zones that host compute and other servers, parallel clusters for different projects, office automation services and soft switch-based telephony services. All the CC facilities are backed up by a UPS system and diesel generator for 24 hours uninterrupted supply.

The Institute CC has three High-Performance Computing (HPC) setups. The latest one Param Sanganak with a peak computing power of 1.67 Petaflops is designed and commissioned under National Supercomputing Mission (NSM) to cater to the computational needs of IIT, Kanpur, and various Research and Engineering institutes of the region. Two other Institute setups are HPC2013 and HPC2010, which have ranked 369 and 130 in top 500 lists (www.top500.org), in the November 2010 and June 2013 lists respectively. HPC2013 was ranked 118 in the top 500 lists in June 2014 with the addition of extra nodes. Param SANGANAK, HPC2013, and HPC2010 have configured over the InfiniBand network of 100Gbps, 56Gbps, and 40Gbps respectively and have 312 nodes, 893 nodes, and 468 nodes respectively. Together these setups have 1673 computational nodes. These HPC setups are extensively used by students, faculty members, and other researchers of the Institute. Average usage of these facilities is beyond 90%. The HPC facilities had only a very small downtime last year.

IIT Kanpur has an open-source, self-hosted clustered emailing system with a present user count of more than 18000 users on 24x7 availability. Each user accesses their email account via self-hosted webmail solutions and on their devices via SSL/TLS security and centrally authenticated services. Emails are backed up hourly with an easy restoration process. Three spam and virus firewalls are in place to safeguard email accounts. CC also provides a forwarding and bulk emailing facility via fault-tolerant SMTP and relay servers.

The Institute has a fully managed Local Area Network of more than 30,000 wired nodes, connecting all the hostel rooms, offices and residences using 10 Gbps backbone and 1 Gbps access network. The wired network is complemented by an 802.11ac wireless network using more than 3000 Access Points. We have 10 + 4 Gbps connectivity to the Internet via different Internet service providers including NKN. CC provides single sign-on facility for seamless Wi-Fi connectivity within the campus and Eduroam for seamless Wi-Fi connectivity for members travelling to participating academic institutes worldwide. The institute services can be accessed from outside the campus using SSL VPN.

CC runs and manages thirteen Computer Labs having about 625 computers. These are managed under a Facility Management Service being run as an institute funded project. The labs are used to teach core and departmental courses like MTH209A, MTH208A, ELC111A, SPA 604, CHE381, COM200, PHY473A ESC111/112, ESC113, MTH308B and CE687A. The labs are also used to hold examinations like Institute recruitment exam, Mid-semester and End Semester exam of the certain courses, student placement examinations, PhD admission examinations etc. Apart from this, they are used for conferences, workshops and QIP courses. A variety of STEM software like Aspen, Hysys, Matlab, Stata, R-Studio, Octave, AutoCAD, Fusion360, Ansys, Dev C++, Python, Eclipse to name a few are available. The facility is open to all the departments from 8AM to 2 AM on all days. Around 400 students access the labs daily. In case of examinations and other events the usage goes very high and the demand is taken care in multiple shifts. A few desktops in CC, New Core Building and Library are dedicated for the print disabled. These have special software for reading out the screen, back illuminated large print keyboard and touch sensitive monitors.

The institute provides Microsoft Office 365 online services comprising of Azure Active Directory providing Microsoft Account to all faculty, staff and students. This is a single sign-on service which provides tools and features like Office 365 Online, 1TB OneDrive storage (expandable to 5TB on demand), SharePoint and MS Teams for video conferencing, collaboration and classroom management. In addition to this, the users also get a subscription to Azure Development tools for teaching which provides a variety of development software. It also provides facility of Exchange Online mail service to all. This service provides a 50 GB mailbox, Calendar, Contacts, ToDo and many other collaborative tools to the users which seamlessly synchronize on desktop and mobile devices, thus considerably increasing productivity of the users.

The Office Automation (OA) division was established in 1992 and currently it functions under the Dean of Digital Infrastructure and Automation (DDIA). The primary objective of OA is to automate various activities of different department and units in the Institute. The OA team involves design, development and implementation of software, enhancements, and user training. OA has a team of personnel dedicated for software design, development, and deployment. There are few dedicated personnel for system administration, database administration and web server administration.

As of now there are approximately 150 services which have been deployed and in-use by various departments and sections in the institute in 24x7 mode. These services are being used in departments like Accounts, Pension, Provident Fund, Payroll, Income Tax, DORD, DOFA, DOSA, DOAA, DORA, DOAD, ADMIN, COW, REG, RTI, Recruitment Section, Counselling Service, VH, Stores and Purchase, Health Centre, Estate Office, Hostels, IWD, ID cell, OA portal, Security unit, Telephone directories, VLFM and CCE(SURGE) etc.

In the recent past, OA has implemented secured online Grade Management System for both regular and e-Master students, Student Dues Clearance System, Student Thesis Management system, Accommodation Portal, thesis Evaluation portal, Convocation portal, Graduation System, Institute Entry/Exit Portal, VH-Online Booking, APAR information system, GFR-10 (Online Write-Off) and Mission Recruitment Drive. We have also implemented Online Payment Gateway for different applications like Staff recruitment, Student/Applicants Accommodation, convocation portal, New UG Student registration. using Payment Gateway.

In 2015, another online automation portal “Pingala” was developed at the institute. The stakeholders of Pingala include the students, faculty, and campus residents. This online automation aims to provide ease in automation, easy report generation, and cross-platform portability. Through Pingala, the users can access the functionaries of prominent departments like DOAA, DOFA, DOSA, and other facilities like IWD and library with ease.

The institute service covered under Pingala include administrative modules, academic modules, research project management systems, external connect systems, and E-payment gateways. Pingala not only caters to the students and faculty network but also all the campus residents through modules like complaint management system (CMS). As of now, Pingala is running 37 modules having sophisticated functionalities like faculty and postdoc recruitment, student registration, add/drop of courses, admissions and many more. Other essential services available on the online platform include employee leave system, address book, online survey, and faculty information system (FIS).

Pingala is available 24x7 for its users from every nook and corner of the world to access its elaborate functionalities and modules and aims to become more prevalent eventually with the pace of time. In the year 2022, new initiative is taken to develop 160+ modules to expand the scope of Pingala and serve to all the departments of the institute.

The Telephone Exchange at IIT Kanpur provides Analog and IP telephone services to the entire campus. The Alcatel IP PBX installed in the Telephone Exchange supports up to 5000 Analog extensions and up to 2000 IP extensions. For outside connectivity, there are two PRI lines, one from BSNL and one from Tata Telecom. The exchange provides 12X7 operator service, 8X6 maintenance services and 24x7 support for critical and emergency services. The telephone communication within the campus can be through a four-digit extension number and direct inward dialing from outside has to use a 259/679 prefix.

The ID Cell is the first point where a new faculty/staff/student will visit to obtain the ID card and Medical Booklet of the institute. Details are entered to the database of the system and a Smart Card is issued by the division. ID card for other visitors/ service providers are also provided by the cell.

CENTRE FOR CONTINUING EDUCATION

The Centre for Continuing Education was established for the purposes of coordinating the various activities connected with development of curricula, preparation of resources, administering the continuing education programme and providing in-service training to the teachers of engineering colleges. This Office is located in the Outreach Building, First Floor, Room No. 207.

The activities are organized under two different cells, namely;

1. Quality Improvement Programme (QIP)
2. Continuing Education Cell (CEC)

This write-up describes the various activities of the above two cells:

1. QUALITY IMPROVEMENT PROGRAMME

Since its inception, in 1971, the Quality Improvement Programme of the Ministry of Human Resource Development, Department of Education, Government of India, has strived for development of technical education in the country, primarily by upgrading the teaching curricula and enhancing qualifications of teachers of engineering colleges/institutions recognized by All India Council for Technical Education (AICTE). The main facets of QIP include.

(A) Degree awarding programme

Master's Degree Programme (M.Tech.)

Under M.Tech. programme (4 semester) the teachers are sponsored by the engineering colleges/institutions recognized by the AICTE. After the selection of the teachers by the Central Committee of the QIP Coordinator, the admission letters to the selected candidates are issued by the respective Head of the Department of the Institute. The State Governments/Institutions sponsoring the teacher are required to treat them as on deputation and bear their normal salaries and other allowances during the period of their sponsorship. In addition to the above the Government of India provides each candidate a scholarship and a contingency grant. The present rates of scholarship and contingency grant are as follows:

Scholarship : Rs. 4,000 per month (24 months)

Contingency grant: Rs. 5,000 per annum

Doctoral Programme (Ph.D.)

Under this programme the serving teachers who already possess Master's degree and are sponsored by the State Government/Engineering Institutions recognized by AICTE are eligible for selection. The Doctoral Programme under QIP is for three years duration.

The present rates of fellowship and contingency grants are as follows:

Fellowship: Rs. 15,000/- per month for three years

Contingency Grant: Rs. 15,000/- per annum

(B) Short Term in-Service Training Courses (AICTE Sponsored)

The short-term in-service training courses sanctioned under Quality Improvement Programme are specifically designed for improving the competence of serving teachers of engineering colleges in specific areas according to their requirements. The different short term courses which will be conducted during the year are announced once in a year. Short term courses for various durations are as follows:

One-week Course
Two-week Course

The faculty members of various disciplines are requested to submit proposals for the conduct of short term courses under QIP in the month of December every year. These proposals are put up to QIP Coordinator for approval. About 20 course proposals are approved under this scheme every year.

2. CONTINUING EDUCATION CELL (CEC)

(A) SELF-FINANCED SHORT-TERM COURSES

Faculty members are also encouraged to run short-term continuing education courses for industry on a self-financing basis. An overhead of 20% of the gross receipts of the course is chargeable by CCE on all such courses whether run at IIT Kanpur or elsewhere, and also on industry-sponsored courses whether run at IIT Kanpur campus or elsewhere. Proposals for all such course must be submitted to CCE for approval by the Deputy Director.

Further, SURGE, FLP and Vigyan Jyoti also run under the aegis of CCE.

(a) **SURGE:** Students-Undergraduate Research Graduate Excellence (SURGE) program, is an approved internship Program of IIT Kanpur, which runs under the aegis of Centre for Continuing Education (CCE), IIT Kanpur. This program provides an opportunity to undergraduate and M.Sc first year students of IITK, Non-IITK and also to the students of SAARC countries, with an objective of giving in-hand experience of technical learning in their field of research.

(b) **FLP:** The Foreign Language Programme was established in the early years of IIT Kanpur and acquired a more formal structure during the 1970s. For more than 50 years of now, our wide variety of language courses have been helping students to widen their intellectual horizons and get better integrated within an international working environment.

(c) **Vigyan Jyoti Program:** IIT Kanpur organizes Vigyan Jyoti programme, supported by Department of Science and Technology (DST). This is a holistic program to encourage and inspire female students to pursue higher education and thereby become self-reliant and independent in their future life. The primary aim of this program is to create gender enabling environment and strengthen the eco-system. As early grooming reaps huge rewards, promoting interest in science and technology amongst the girl students in their early education years will definitely be very beneficial for them.

Besides the above programmes, the CCE will also be approving for conduction of various activities comprising Courses/Workshop /Seminar/ Conferences/ Symposium/ Training programme throughout the year.

Summary of various activities during the year 2022-2023

1. **QIP Students**

   (a) M. Tech. Candidates admitted – Nil

   (b) Ph.D. Candidates admitted - 01

2. Short term courses conducted under QIP – Nil

3. Short term self-financed courses conducted - 69

4. Workshops/ Conferences/ Seminars conducted – 36

MEDIA TECHNOLOGY CENTRE

The Media Technology Centre (MTC) at the Indian Institute of Technology Kanpur (IIT Kanpur) is a specialized center dedicated to the development of education-based content for various national initiatives of e-learning sponsored by different government bodies as well as non-governmental organizations. The Centre provides a platform to students of IIT Kanpur to explore the creative potential of different audio-visual and other sensory media.

Here's a brief overview:

1. Educational Initiatives: MTC develops in house education content with the faculty members of IIT Kanpur as well as collaborates with other educational institutions, to develop teaching learning materials for catering to MOOC (Massive Open Online Courses) initiatives in India. This can encompass a wide range of multimedia content, from online courses and e-learning modules to interactive educational tools. These initiatives enhance the quality of education through multimedia resources.

2. Media Production Facilities: The Centre boasts state-of-the-art production facilities, including well-equipped studios, advanced video editing suites, and high-quality audiovisual equipment. These resources allow for the creation of professional-grade multimedia content.

3. Content Creation: MTC actively engages in content creation projects. This can include producing documentaries that showcase research endeavors, training videos for educational purposes, promotional materials for IIT Kanpur and its initiatives, and various other audio-visual content for a wide range of audience.

4. Technical Expertise: Within MTC, there is a team of technical experts who possess specialized skills in media production. These professionals are proficient in video editing, animation, sound design, multimedia programming, and other critical aspects of multimedia content development.

Media Technology Centre different programs

SWAYAM NPTEL

Project Title: Central Sector Scheme for MOOCs-Complaint e-content creation (NPTEL Phase IV)

Project objectives: The broad aim of the project CSS-MOOCs is to facilitate the competitiveness of Indian Industry in the global markets by improving the quality and reach of education. The operational objective of CSS-MOOCs is to make high quality learning material available to students of different institutions across the country. The target group for this project consists of students and faculty members of institutions offering Undergraduate/ Postgraduate education in India.

Progress Report

Since 2014, IIT Kanpur has completed 336 (both NPTEL and NOC) courses, of which 257 are NOC unique courses. In the last semester (January-April'23), we offered 71 courses of which 9 were new. In the current semester (July to November), we are offering 83 courses of which 16 are new. There are close to 5800+ local chapters today with identified expert faculty members of these institutions serving as local mentors for the students enrolled in NPTEL courses. Web Portal (http://nptel.ac.in): This platform has garnered over an astounding 471 million+ views, making it a hub for educational content seekers.

NPTEL's YouTube channel holds the title of being the most subscribed educational channel with over 1.5 million channel subscribers and an impressive 819 million+ views. It has accumulated a vast library of 50,000+ video hours. NPTEL offers a staggering 54,000+ hours of video content, complete with transcriptions and subtitles.

NPTEL is recognized as the world's most accessed library of peer-reviewed educational materials.

NPTEL's extensive reach and educational offerings have made it a global leader in online education, providing valuable resources to millions of learners worldwide.

Here are the key production activities of Swayam NPTEL that are carried out by the Media Technology Centre at IIT Kanpur.

1. Content Creation: The process begins with the development of course content, including lectures, study materials, assignments, and assessments. Subject matter experts and educators from prestigious institutions like the Indian Institutes of Technology (IITs) and the Indian Institute of Science (IISc) are typically involved in creating the educational materials.

2. Video Production: Swayam NPTEL courses include video lectures. These lectures are professionally recorded in dedicated studios or locations equipped with cameras, lighting, and audio equipment to ensure high production quality.

3. Editing and Post-Production: After recording, video and audio editing takes place. This includes adding graphics, animations, captions, and other visual enhancements to make the content engaging and informative.

4. Quality Control: Thorough quality checks are performed to ensure that the content meets educational standards. This includes reviewing video and audio quality, content accuracy, and alignment with course objectives.

5. Platform Integration: The content is integrated into the SWAYAM platform, making it accessible to learners across India. This involves uploading videos, study materials, and assessments to the online platform.

6. Assessment Development: The creation of assignments, quizzes, and exams is a crucial part of course production. These assessments are designed to evaluate learners' understanding and progress.

7. Technical Support: Ongoing technical support is provided to both educators and learners. This includes assistance with platform navigation, troubleshooting, and addressing technical issues.

8. Learner Engagement: Courses are designed to foster learner engagement through discussions, assignments, and collaborative activities. Educators often facilitate these interactions to ensure a dynamic learning experience.

9. Certification Process: The certification component involves setting up and proctoring exams for learners who wish to earn certificates. This includes organizing examination centers, adhering to examination guidelines, and evaluating learners' performance.

10. Feedback Loop: Continuous feedback from learners is gathered to evaluate the effectiveness of courses and make improvements based on learner input.

11. Accessibility: Efforts are made to ensure that the content is accessible to individuals with disabilities by providing subtitles, transcripts, and other accessibility features.

12. Archiving: Archived course content is maintained for future reference and for learners who wish to access past courses.

NPTEL Local Chapters

NPTEL has offered self-study courses across engineering, humanities, management, and science for over two decades. Since March 2014, NPTEL has offered online certification for its courses, the highlight being the certification exam through which the student can earn a certificate from the IITs!

To take this initiative forward and to encourage more students across colleges to participate in this initiative, from March 2015 onwards, the establishment of the SWAYAM-NPTEL chapter in colleges began.

It is under the headship of a college faculty member, called a Single Point of Contact (SPOC). We keep the SPOC updated about all the latest NPTEL initiatives and give them information to disseminate among the students and faculty. They can identify suitable mentors for various courses who ensure that students are active in a course, submit their assignments on time, and clarify their doubts.

Today, there are close to 5800+ local chapters, with identified expert faculty members of these institutions serving as local mentors for the students enrolled in NPTEL courses.

NPTEL has been proactive in supporting its Local Chapters, and these initiatives have been further enhanced with the involvement of the Media Technology Centre (MTC) at IIT Kanpur.

Here's an expanded overview:

1. Soft Skill Training: NPTEL, with support from MTC, provides soft skills training programs for both students and faculty associated with its Local Chapters. These programs aim to enhance the employability and interpersonal skills of participants.

2. Internship Opportunities: MTC collaborates with NPTEL to offer internship opportunities to students through Small and Medium-sized Enterprises (SMEs). This hands-on experience allows learners to apply their knowledge in real-world settings.

3. Certificate Courses: NPTEL, in association with MTC, offers certificate courses in partnership with organizations like ANSYS and Microsoft. These courses enable students to gain valuable industry-specific skills and certifications.

4. Placement Assistance: NPTEL, with MTC's support, facilitates placement assistance for students through industry associations. This includes connecting students with potential employers and career opportunities.

5. Conference Support: MTC contributes to NPTEL by providing conference support for Single Points of Contact (SPOCs) and other stakeholders. This support may include organizing conferences, workshops, and seminars related to educational technology and media.

6. Translation and Quality Control: MTC's expertise in media and technology extends to translation and quality control (QC) of educational content. This ensures that NPTEL's courses and materials are accessible to a broader audience and maintain high quality.

7. Awareness Workshops: NPTEL, in collaboration with MTC, conducts awareness workshops. These workshops are designed to inform faculty members and stakeholders about NPTEL's various initiatives, features, online certification courses, and the concept of NPTEL Local Chapters. This helps create maximum awareness and engagement within the academic community.

A glimpse of a one-day NPTEL Awareness Workshop conducted at Manav Rachna International Institute of Research and Studies, Faridabad, Haryana, on 13th May 2022.

SPOC Felicitation cum Awareness Workshop conducted by IIT Kanpur on 16th July 2022.

SPOC Felicitation cum Awareness Workshop conducted by IIT Kanpur on 19th Feb 2023

The combined efforts of NPTEL and MTC result in a comprehensive support system for Local Chapters, ensuring that students and faculty members have access to a wide range of resources, training, and opportunities for personal and professional growth in the field of education and technology.

eMaster's Program

The eMasters program at IIT Kanpur offers working professionals an exceptional opportunity to enhance their skills while continuing their careers. With a well-structured curriculum, renowned faculty, and flexible learning options, it's highly sought after. The program specializes in various fields, from wireless technologies to economics, and follows a blended learning approach, combining online lectures, tutorials, and practical sessions.

The eMasters program from IIT Kanpur is specifically designed to achieve the following objectives:

- Provide flexible and accessible postgraduate education to working professionals.
- Offer comprehensive domain-specific knowledge and practical skills.
- Enable career progression and enhance employment prospects.
- Foster a culture of lifelong learning and continuous professional development.

Expected Benefits:

- Under the eMasters program, participants can expect a range of benefits, including:
- Access to high-quality education from a renowned institution like IIT Kanpur.
- Flexibility to pursue the program while continuing their professional commitments.
- Opportunity to network and collaborate with industry professionals and subject matter experts.
- Enhanced skill set and knowledge, leading to better job prospects and career growth.

The Media Technology Centre (MTC) plays a vital role in creating digital content for several programs within the eMasters program.

Here's a list of programs and courses for which MTC has created digital content:

Communication Systems:

- Wireless Communication
- Probability and Random Processes
- Applied Linear Algebra for Wireless Communication
- Estimation for Wireless Communications
- Simulation-Based Design of 5G-NR Wireless Standard
- Digital Communications
- Detection For Wireless Communication
- Simulation Techniques for Modern Wireless
- Digital Communication Systems
- Machine Learning For Signal Processing
- Advanced Wireless Transceiver Processing Techniques
- Convex Optimization in SPOM
- RF Systems for Communications
- Advanced ML Techniques for Wireless Technology
- Deep Learning for Communications

Cyber Security:

- Introduction to Cryptography
- Operating System Principles
- Computer Networking I
- Computer Networking II

Economics:

- Pricing
- Economics and Financial Data Analysis

- Introducing To Financing And Accounting
- Game theory and Strategy
- Applied Microeconomics
- Money and Banking
- Machine Learning Applications
- Contemporary Issues in Indian Economy
- Global Economy and International Finance
- Advanced Financial Econometrics

Industrial and Management Engineering:

- Optimization Methods for Analytics

These courses, supported by MTC's digital content, contribute to the success of the eMasters program by providing high-quality educational materials to online learners, enhancing their knowledge and skills in various domains.

SWAYAM PRABHA

Swayam Prabha Channels, a group of 40 DTH channels, have been instrumental in broadcasting high-quality educational content around the clock via the GSAT-15 satellite. IIT Kanpur has played a significant role in this initiative, previously managing two channels and recently acquiring three more, for a total of five channels under its supervision. These channels, launched in alignment with the vision of the Prime Minister and supported by the Ministry of Education, are dedicated to reaching underserved communities, particularly in rural, tribal, and remote areas. They offer an innovative approach to learning through virtual classrooms and digital resources available on the Swayam Prabha portal.

Channel Allocation:

IIT Kanpur manages channels 24, 25, 26, 27, and 28, each dedicated to broadcasting courses from specific departments:

Channel 24: Aeronautical Engineering

Channel 25 (Previously Ch-16): Humanities and Social Sciences

Channel 26: Management, Law, Economics, Business Analytics, Communication, Cooperative Management

Channel 27 (Previously Ch-11): Mechanical Engineering, Engineering Design, Manufacturing Engineering & Technology, and Allied subjects

Channel 28: Visual Communication, Graphic Design, Media Technology

Educational Impact:

Since 2017, IIT Kanpur's channels have delivered over 9000 hours of educational content. In the last academic year (2022-2023), they developed 42 new courses, totaling 710 hours, to enhance the learning experience.

Academic Coverage:

Channel 25 (Previously Ch-16): Offers courses in Humanities, Social Sciences, Economics, Literature, Linguistics, Philosophy, Political Science, History, Sociology, Visual Arts, Design, Psychology, and Management studies.

Channel 27 (Previously Ch-11): Presents courses related to Mechanical Engineering, including Engineering Thermodynamics, Fluid Mechanics, Engineering Mechanics, Heat Transfer, Manufacturing System Technology, Finite Element Analysis, Kinematics and Dynamics of Machines, as well as topics from Metallurgy, Material Science, Product Engineering, and Engineering Design.

The production of Swayam Prabha involves a systematic process to create and broadcast high-quality educational content for viewers across India.

Here are the key production activities of Swayam Prabha that are carried out by the Media Technology Centre at IIT Kanpur.

1. Content Development: The production process begins with the development of educational content. This content covers a wide range of subjects and topics, including courses in science, engineering, humanities, and more. Subject matter experts and educators collaborate to create the course materials.

2. Studio Setup: Swayam Prabha typically uses dedicated studios equipped with cameras, lighting, and audio equipment. These studios are set up to ensure high-quality recording of educational content. The studio environment is designed to minimize distractions and ensure the focus remains on the subject matter.

3. Recording: Lectures, demonstrations, and presentations are recorded in the studio. Skilled professionals, including subject matter experts and video production teams, are involved in this process to ensure accuracy, clarity, and production quality. Multiple takes may be necessary to achieve the desired quality.
4. Editing: Post-production involves video and audio editing. This step includes adding graphics, animations, captions, and other visual enhancements to make the content visually engaging and informative. It's also the stage where errors or inconsistencies are corrected.

5. Quality Control: Thorough quality checks are performed to ensure that the content meets the educational standards and broadcast requirements. This includes reviewing video and audio quality, as well as content accuracy. Any issues are addressed before broadcasting.

6. Broadcast Scheduling: The prepared content is scheduled for broadcast on the Swayam Prabha DTH (Direct-to-Home) channels. This scheduling ensures that a diverse range of educational programs is available to viewers at specified times.

7. Transmission: The finalized content is transmitted via satellite to reach a wide audience across India. This ensures that the educational programs are accessible to learners in remote areas with limited internet access.

8. Interactive Elements: Some programs may include interactive elements like quizzes or assignments. These are integrated into the content to engage learners and assess their understanding. The production team ensures that these elements function smoothly.

9. Monitoring and Feedback: Continuous monitoring of broadcast quality and viewer feedback is essential. This helps in making improvements to the production process and content quality. Viewer feedback can also inform the selection of future course topics.

10. Archiving: Archived content is maintained for future reference and for viewers who wish to access past broadcasts. This archive serves as a valuable resource for learners and educators.

In summary, IIT Kanpur's involvement in the Swayam Prabha DTH Channels has led to significant strides in expanding access to quality education, particularly in challenging-to-reach areas. The channels continue to evolve, introducing new courses and reaching a broader audience with a diverse range of educational content.

JAIVIK YATRA

Jaivik Yatra is a documentary series undertaken by the Media Technology Centre at IIT Kanpur, in collaboration with Prasar Bharti, Government of India. The primary objective of this project is to explore and showcase organic and natural farming practices adopted by farmers in India. The series also aims to understand the challenges faced by these farmers and features discussions with experts in the field of organic farming, focusing on non-chemical methods employed by farmers. The initiative encompasses an extensive exploration, with initial attention on Uttar Pradesh and Uttarakhand.

The process commenced with an extensive recce across the two states, meeting for than 350 farmers, agro-entrepreneurs, researchers, and scientists and other stake holders of Organic Farming and other chemical free agricultural practices to get a clarity on the subject as well as to shortlist the stakeholders who would feature in the first 26 episodes Dr. Ashok Kumar Yadav, Retd. Director of National Centre for Organic and Natural Farming (NCOF) and now a senior consultant at the Ministry of Agriculture, was selected as the host for the series.

Key highlights of the Jaivik Yatra Annual Report for 2022-23 include:
Scope: While the project ultimately aims to cover organic farming practices across the entire country, it initially focused on the states of Uttar Pradesh and Uttarakhand.

Shortlisting of Farmers: After conducting extensive research and visits to nearly 350+ stake holders, a select group of farmers was shortlisted based on their expertise, experience, innovative practices, crops grown, value chains, supply chains, and the various methods employed on their farms.
Script Development: Scripts for the documentary series were developed both in English and Hindi.

Host: Dr. Ashok Kumar Yadav, Retd. Director of the National Centre for Organic and Natural Farming (NCOF) in Ghaziabad, was chosen as the host for the documentary series.

Filming Locations and Episodes:

- **Joshimath**: Two women farmers, Janki Devi and Basanti Devi, who supply organic rose petals for the extraction of rose water and oil, were featured.
- **Rudraprayag**: The father-daughter duo of Lakhsman and Kanchan, who prepare Chaulai ke laddoo as prasad for Kedarnath and Tunganath, were highlighted.
- **Rishikesh**: Vijay Jardhari, a renowned figure in the Chipko Movement and the Beej Bachao Andolan, was interviewed.
- **Majhgaon**: The story of the Farmer Producer Company (FPC) named Sewa Sambhav, led by Yashodhara Joshi, was covered. This FPC has promoted organic agriculture and reversed migration.
- **Bareilly**: The journey of Nihal Singh, an agripreneur who established the successful company Pavitramenthe by supplying menthe oil and crystals to a US-owned company, was documented.
- **Bulandshahr**: Padmashree Bharat Bhushan Tyagi shared insights on the challenges faced by farmers when transitioning to non-chemical agricultural practices.
- **Hapur**: Aparna Rajagopal, a former Supreme Court lawyer who turned to organic farming, discussed her experiences and success in building a food forest.

Future Plans: The Jaivik Yatra team plans to continue its activities in the upcoming months, further exploring and showcasing organic farming practices and interviewing individuals who have made significant contributions to sustainable agriculture.

The documentary series serves as a valuable resource for promoting organic and natural farming practices in India and documenting the journeys of individuals who have made a difference in this field.

MTC IIT Kanpur has also initiated the invoicing process and has sent an invoice to Prasar Bharati. Currently, the disbursement of the first installment is in progress.

The Jaivik Yatra team has dedicated the past twelve months to these activities and will continue this journey in the coming months.

- Pre-production: Extensive research, farmer selection, scriptwriting, and host engagement.
- Host Familiarization: Dr. Ashok Kumar Yadav's on-screen comfort ensured smooth hosting.
- Storytelling: Highlighted individual farmer journeys and their contributions to organic farming.
- Location Shoots: Visits to various regions, capturing organic farming practices and interviews.
- Cinematography: Captured visually appealing scenes of organic practices.
- Post-production: Editing and finalizing episodes for submission to Prasar Bharti.
- Documentary Series Structure: Organized into episodes for broadcast on DD Kisan.
- Ongoing Project: Commitment to continued exploration and storytelling in the realm of organic farming across India.

FM 90.4 Community Radio

In line with the objective of Community Radio, IITK Community Radio, FM 90.4 strives to serve and interact with the local community in and around the campus. Our objective is to broadcast content, which is interesting, relevant, and useful to our listeners. We encourage people through our programs on health and hygiene, art and culture, science, education, agriculture, and in several other areas through our content.

In the year 2022-2023 IITK community radio station aired programs on –

- Agriculture -Krishi charcha- (Phoolon ki kheti kaise kare- A detailed program series on how flower farming can be done on a large scale,

- Educational programmes - Vigyan ke Anmol Ratan (Program based on the life of Scientists) English for middle school (Program on English conversation) Pathshala (Teaching Physics to middle school children -NCERT syllabus)

- Programs on Music -Sangeet Sansaar (Information on classical and semi classical musical).

- Ghazal Gayaki (Program on genre Ghazal-semi classical)

- Film Sangeet Ke Sitare – (Program on Contribution of famous music directors of Indian films – Violin).

- Other Programs –

  Hauslon Ki Udaan (Program based on Inspirational People), Hamare Sahityik Kavi (Programme on Hindi poets)

  Bharat ke Ajoobe (Program based on Wonders of India)

  Important days (Information about Special Days)

  Fashion ki mutthi mein duniya (Finding eco-friendly options to save environment and promote growing fashion.

- Community Participation -Opportunity school workshop – (An interactive session with students and teachers);
  Interview with Dr. D. L. Yadav on International Yoga Day, IITK.
  Interview on Environment Day with experts.

Approach cell IITK – (Activities, programs and interviews of faculty members and artists).

- Health Programs - Interviews with Doctors and Health workers

Other interviews and coverage of events in and around the campus of faculty members, students, community members and locals are aired to provide inspiration to our listeners which in turn leads to increased community participation and listenership.

A team of active and dedicated members aim at generating interest in the minds and hearts of our listeners and raise awareness on issues of local and global importance to meet the real objective of community radio.

INTERNAL COMPLAINTS COMMITTEE

The Internal Complaints Committee (ICC), IIT Kanpur, first constituted under the Office Order No. DIR/IITK/2016/OO-04, dated March 9, 2016, has been undertaking its investigations under the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013, the IIT Kanpur (Prevention, Prohibition and Redressal of Sexual Harassment of Students) Rules, 2017 and the Indian Institute of Technology Kanpur (Inquiry into Complaints of Sexual Harassment of Women at Workplace) Rules, 2021.

During the period April 1, 2022 to March 31, 2023, the ICC received the 9 complaints. In each of these cases the Complainant was either a Ph.D. student, BS-MS student, M.Tech. student or a B.Tech. student and the Respondent was either a B.Tech. student, BS student, M.Tech. student, Ph.D. student or a member of the Faculty.

1. A complaint from a BS-MS student against a B.Tech. student. In this case the allegation of harassment constituted unwanted physical contact, which was established. The ICC recommended that Respondent submit an unconditional written apology addressed to the Complainant and that the award of the Respondent's degree be deferred by two months.

2. A B.Tech. student submitted a complaint alleging sexual assault against another B.Tech. student. However, none of the allegations of non-consensual sexual acts between the Complainant and Respondent could be established hence the case was dismissed.

3. A complaint alleging online stalking, harassment and verbal abuse was submitted by a M. Tech. student against another M.Tech. student was established. In this case the ICC recommended that

the award of the degree to the Respondent be delayed by a period of six months.

4. A complaint alleging unsolicited and unwanted physical contact without seeking prior consent was submitted by a Ph.D. student against another Ph.D. student. The allegations were established, and the ICC recommended that the following punitive measures: 1. The Respondent submit an unconditional written apology addressed to the Complainant. 2. The Respondent enroll in an awareness program for sexual harassment. 3. The Respondent undertake community service by working for the Persons with Disability Cell for six hours a week for three months.

5. A complaint alleging unwanted physical contact, making sexually colored remarks and unwelcome verbal and non-verbal conduct of sexual nature was submitted by a Ph.D. student against a member of the Faculty of IIT Kanpur (the Ph.D. thesis supervisor of the Complainant). The allegations were established, and the ICC recommended that appropriate punishment be awarded to the Respondent by the Disciplinary Authority as per the Statutes of IIT Kanpur and Compulsory retirement was awarded to the Respondent.

6. A complaint alleging unwelcome physical contact and verbal conduct of sexual nature was submitted by a Ph.D. student against another Ph.D. student. The allegations were established and the ICC recommended the following punitive measures: 1. Respondent is directed to work for the Persons with Disabilities (PWD) Cell of IIT Kanpur for 6 Hours a week for a period of three months. 2. The Respondent is directed to attend an awareness session on sexual harassment conducted by the Women's Cell, IIT Kanpur.

7. A complaint alleging unwanted physical contact of sexual nature as well as stalking was submitted by a Ph.D. student against another Ph.D. student. The allegations were established, and the ICC recommended the following: 1. The respondent be deregistered from the Ph.D. program till the end of the summer term, 2023. 2. The registration of the Respondent in the Ph.D. program after the summer term be contingent upon the Medical Board of IIT Kanpur certifying that he is fit to continue with the Ph.D. program. 3. The Respondent volunteer to work for the Women's Cell, IIT Kanpur for a period of six months following his registration in the Ph.D. program.

8. A complaint was submitted by a B.Tech. student against a BS student alleging unwanted physical contact. During the pendency of the Inquiry the Complainant requested for withdrawal of the complainant and hence the inquiry proceedings were terminated by the ICC.

9. Two Ph.D. students alleged another Ph.D. student of sharing of an offensive meme containing a photograph of the Complainants portraying them in a negative light. The allegations were established, and the ICC recommended that 1. The Respondent be barred for a period of six-months from participating in any sports, cultural or academic competition/event within IIT Kanpur or outside where the Respondent represents IIT Kanpur. 2. That the Respondent be sensitized through attending an awareness session on sexual harassment and gender related issues conducted by the Women's Cell, IIT Kanpur.

WOMEN CELL

Following is the report of activities of the committee during this period:

a. A 5 km Run and Walk Event with the theme: Do not be a bystander: Stand up against Sexual Harassment on 9th April 2022.

b. Awareness session on "Gender Sensitization and Sexual Harassment" for students and members of faculty of the Economics Sciences department was held on 30-6-2022.

c. Awareness session on "Gender Sensitization and Sexual Harassment" was held for newly admitted Y22 postgraduate students (summer admission) on 20-7-2021.

d. An orientation session on issues related to sexual harassment and gender discrimination was held for the newly admitted Y22 undergraduate students on 30th October, 2022.

e. An information session on the mandate and activities of the Women's Cell as a part of the Student Guides Workshop organized by the Counselling Service, IIT Kanpur, was conducted on 29th October, 2022.

f. 25th November was observed as the "International Day for Elimination of Violence Against Women". A relevant movie named, "Provoked" was screened at an auditorium inside the campus in the evening.

g. A gender sensitization workshop was held on 7th December,2022 for the staff members of four important administrative units of the institute.

h. An orientation session on issues related to sexual harassment and gender discrimination was held for the newly admitted Y22 postgraduate students (winter admission) on 4th January, 2022.

i. New updated posters regarding awareness on sexual harassment have been circulated throughout the campus in February 2023.

j. Orientation session for new members of the faculty was held on 4th March, 2022. During this session, the new members of faculty were made aware of the mandate and the activities of the Women's Cell of IIT Kanpur. Further they were informed about the following policy of the Institute: *Policy on Romantic or Sexual Relationships between Individuals in*

Positions of Authority and Student/Employee of the Institute 2020.

k. On the occasion of International Women's Day, on 8th March 2023, a relevant movie named, "Erin Brockovich" was screened at an auditorium inside the campus in the evening.

SC/ST/OBC CELL

Implementation of reservation orders:

The effective date of implementation of reservation for **SC**s and **ST**s in the direct recruitment is **5th September 1974** in this Institute and the implementation of reservation for **OBC**s and **PwD**s are w.e.f. the year **1995** and **1996**, respectively**.**

Maintenance of rosters/ Percentage of reservation:

The Board of Governors had approved, in its meeting held on July 27, 1995, maintenance of 120 points vacancy-based roster for Group A [other than exempted posts (Points reserved in favour of SCs-20, STs-9, OBCs-31)] & B posts; and 100 points roster for Group C & D posts (Points reserved in favour of SCs-21, STs-1, OBCs-27) for direct recruitment at the Institute.

On the basis of Judgment passed by the Constitution bench of Supreme Court, the Government of India, Deptt. Of Per. & Trg., issued O.M. 36012/2/96-Estt.(Res.) dated July 02,1997 vide which the above vacancy-based rosters have been revised into post-based rosters for the different category of employees in direct recruitment. The Board

after due consideration accorded its approval, in its 1997/5th meeting held on December 05, 1997 for maintenance of post-based rosters.

Further, the Board of Governors of the Institute (in its meeting held in May 2004, vide item no. 2004.2.13) has considered and **approved** the proposal for grouping of staff for the purpose of reservation and separate grouping of technical and non-technical posts. The proposal was as follows – the posts under Group-A, B, C & D would be grouped separately for technical and non-technical posts. However, there would be a single group under Group-D.

Under this dispensation, there would be seven groups in all and as far as possible efforts would be made to provide adequate representation of SCs/STs/OBCs/PwDs to each post under the group.

The proposal was approved in the context that grouping of posts would provide greater leverage for purpose of securing adequate representation for SCs/STs/ OBCs/PwDs in the Institute.

The Modified Assured Career Progression Scheme (MACPS) is in operation at present.

Concessions/ Relaxations:

(a) Regular employees of IIT Kanpur who are educationally qualified and otherwise eligible can be considered for the recruitment upto a maximum of 50 years of age for Group-B & C posts, 55 years of age (upto Level-12) and 57 years of age (Level-13 & above) for Group-A posts. The due relaxation in upper age is made available for SC/ST/OBC/ PwD and Ex-servicemen candidates as per Central Govt. Rules;

(b) Age relaxation for Project Employees working in IIT Kanpur will be as per the Office Order No. DIR/IITK/2019/OO-73 dated July 04, 2019.

(c) SC/ST/PwD and Female candidates are fully exempted from payment of application and registration fees;

(d) To and fro TA is being paid to the candidates of all categories out of Kanpur to attend the interview [for Group-A- AC-II rail fare (Rajdhani Exp. also) / Chair car in Shatabdi Exp., or actual fare incurred whichever is less by shortest route on submission of tickets in original.

(e) To and fro TA is being paid to the candidates of all categories out of Kanpur to attend the interview [for Group-A- AC-II rail fare (Rajdhani Exp. also) / Chair car in Shatabdi Exp., or actual fare incurred whichever is less by shortest route on submission of tickets in original.

Employment notification etc.:

During the period of report, the **detail of Advertisement** issued through Recruitment Section is as under:

Sl. No.	Advt. No.	Name of the post(s)	No. of Vacancies							Published in
			SC	ST	OBC	PwD	EWS	UR	Total	
1	**Advt. No. 1/2022**	Junior Assistant	15	2	34	6	11	51	**119**	All Editions of Times of India (Ascent), The New Indian Express Dainik Jagran (Nai Rahein + iNEXT + Mid day Mumbai), The Indian Express + Financial Express + Loksatta + Jansatta, Employment News/ Rozgar Samachar and University news
1	**Advt. No. 2/2022**	Assistant Executive Engineer	1	1	-		-	2	**4**	
2		Assistant Registrar [P K Kelkar Library]	-	-	-	-	-	1	**1**	
3		Assistant Registrar	-	-	1	1	-	1	**3**	
4		Medical Officer	1	-	1	-	-	1	**3**	
5		Junior Engineer	-	1	4	-	1	4	**10**	
6		Junior Technical Supdt (DoIP)	-	-	2		-	2	**4**	
7		Physical Training Instructor	-	-	-	-	-	2	**2**	
8		Staff Nurse	-	1	3	-	-	-	**4**	
9		Junior Technician	20	1	29	4	10	36	**100**	
		TOTAL	37	6	74	11	22	100	**250**	

The recruitment for all academic posts of Institute is made through the press/ professional journals/ circulars to educational institutes etc.

Inclusion of SC/ST/OBC and Minority Community Member:

One SC/ST/OBC member of comparable status and if minority candidates are short-listed for selection process then one member of Minority Community is included in the Selection Committee as a full member. For the period of report, the detail of Selection Committee meetings held through Recruitment Section is given below:

For Selection	Total 0**4** Selection Committee meetings: **03** S/C meeting, wherein SC and OBC representative included

Existing Strength of Non-Academic Staff as on 01.04.2023

Recruited through Recruitment Section

Group	SC %age		ST %age		OBC %age		GEN	Total	Mode of Selection		
									Contract	Regular	Deputation
A	**7**	14.89%	**2**	4.26%	**9**	19.15%	**29**	**47**	-	*47*	-
B	**46**	17.10%	**12**	4.46%	**61**	22.68%	**150**	**269**	-	*269*	-
C	**63**	24.71%	**1**	0.39%	**65**	25.49%	**126**	**255**	-	*255*	-
TOTAL	**116**	20.32%	**15**	2.63%	**135**	23.64%	**305**	**571**	-	*571*	-

CELL FOR DIFFERENTLY ABLED PERSONS (CDAP)

Beginning of CDAP

The Cell for Differently Abled Persons (CDAP) was established with the purpose to provide a range of services and resources to differently-abled students to enhance their quality of life. We aim to provide personalized support that caters to the unique needs and preferences of each individual. We work towards breaking down barriers and

promoting inclusion in all aspects of society by creating awareness and advocating for the rights of differently-abled individuals. We believe in fostering a culture of respect, empathy, and inclusivity towards all individuals, regardless of their abilities.

Call letters for Interviews/ Appointment letters:

1. To ensure that the appointment letters to the selected candidates are received by the candidates (including reserved category candidates) well in time – the appointment letters are being sent through registered post or courier and also through email to ensure the delivery and call letters to the short-listed candidates are being sent through email only.
2. Normally, a minimum of three weeks' time for call letters via email for written/ practical test or interviews and for appointments a minimum of one month's period of interval is being provided.

CDAP Timeline

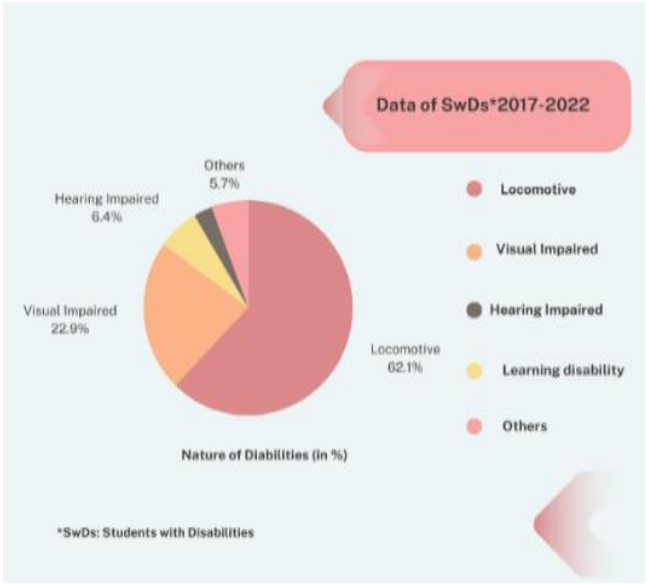
CDAP has grown leaps and bounds from the day it was established as the Person with Disability Cell in February

2017. We have been organizing Disability Day, Orientation Day and Sports Day regularly for our students. We also organized various Virtual events during the Covid-19 Pandemic. We are proud to announce that this year we organized our Annual Day in January.

Our students

The number of students with disabilities has steadily increased in the past few years and is expected to continue growing. Currently, there are 140 students with disability in IIT Kanpur. Out of these students, 87 are faced with locomotive disability, 32 with visual impairment, 9 with hearing impairment, 4 with learning impairment and 8 with other types of disabilities.

The figure below shows a graphical representation of the same:



Highlights of the year

Mobility services for Students with Disabilities (SwDs)

The initiation of an E-rickshaw facility for Students with Disabilities on campus is a significant achievement for the CDAP. This facility has made the campus more accessible for SwDs, who may have previously faced challenges getting around campus independently. This has helped to promote inclusivity and has created a more welcoming environment for every SwD.

*This service was initiated with support from alumni (Mr. Ranodeb Roy, BT/CSE/1990). CDAP team is very thankful to him.

Sports Event for Employees with Disabilities (A new initiative)

The Secretary Staff Gymkhana (Dr. Naveen Kumar Gude) organised the first sports event for employees with disability in August 2022. This event gave a great opportunity for the differently abled staff to show their talent. Various sports such as Badminton and Volleyball were played by the participants.

Activities & Events 2022

Orientation

We organise multiple sessions of our Orientation Program that aims to introduce and familiarise every student with the office of the Cell for Differently Abled Persons. Through this event, we try to raise awareness about the challenges faced by our students and sensitise the public about the same. By introducing ourselves to the students, we try to garner support for increasing accessibility of our students.

We also aim for collaboration from different facets of society for further reform in our system.

We have three orientation sessions every year for various purposes:-

- A session for all **Student Guides**- Awareness and sensitization for the students who would be the guides to the incoming batch of students
- A session for **Parents of SwD** - Introduction session for the parents regarding the resources and activities at their wards' disposal
- A session for all **Newcomers** - Introduce CDAP and apprise students of the available resources at their disposal on campus

Annual Day

The annual day was held on 14 January 2023 for all the differently abled students. The event was inaugurated by our Director Prof. Abhay Karandikar, who addressed the audience. After the inaugural speech, there were cultural activities from the students of Dr. Ambedkar Institute of Handicapped, Kanpur. These were followed by various talks given by influential personalities.

Mr. Prashant Naik (Manager Union Bank, Maharashtra) was welcomed as the Chief Guest for the event, and he spoke about the employment opportunities in the Banking sector for differently abled students. Mr. Pawan Patel (Project Manager, Morgan Stanley) gave a special talk on Learning from challenges faced on campus. Mr. Armaan Ali (Executive Director, NCPEDP) also shared his thoughts on the discrimination he faced in various places due to his disability. These talks encouraged the audience to be inclusive in their thoughts and also motivated the students to be diligent in their day-to-day life. The event ended on a high with prize distribution for the cultural activities. There was also a research showcase of assistive technologies which was organized parallel to the event.

A Sports Event: UDAAN 2022

UDGHOSH: UDAAN commenced in 2018 at IIT Kanpur as a unique opportunity for our differently-abled students to showcase their talent in sports. It is an inclusive sports event specially organized by the Udghosh sports committee. UDAAN aims to promote inclusivity among students of all abilities. Various sports such as Badminton, Cricket, Chess, Athletics, etc. are organized. As a progressive society, through UDAAN, we try to encourage members with varying abilities to achieve goals they may have previously deemed improbable.

Additionally, UDAAN also conducts motivational talks by a national-level sports personality. A motivational talk was given by **Vijay B. Munishwar (Arjun awardee)** on 15th October 2022 as a part of UDGHOSH: UDAAN, 2022.

CDAP represented IIT Kanpur at the Fifth Empower 2022 conference organized at the IIT Madras Research Park, Chennai in October 2022. The conference focuses on the challenges surrounding the development, manufacturing, and distribution of assistive technology solutions.

The proceedings also include keynote addresses, papers presentations, posters, user forums, panel discussions and a product exhibition. EMPOWER, thus provides opportunities for discussions over current solutions and also seeds ideas for research.

Acknowledgements

CDAP expresses their heartfelt gratitude and thanks for the unwavering support and cooperation we have received from the offices of DOAA, DORA, DOSA, SPO and the other entities of IITK.

STUDENTS' PLACEMENT

Indian Institute of Technology (IIT) Kanpur is known for its academic excellence and is often the 'first stop' for top-ranked industries and research organizations to meet their hiring requirements. Students' Placement Office (SPO) functions as a facilitator for the placement activities and helps recruiters and students in making the best hiring decisions. The services rendered by SPO include recruiter registration, pre-placement training, facilitating the conduction of screening tests, scheduling and conducting job interviews, hospitality, etc. for both internship and recruitment processes. Our hiring partners range from consulting firms to Fast-Moving Consumer Goods (FMCGs) to core industries, software giants, e-commerce and engineering companies. SPO is actively engaged in building and maintaining long-term relationships with the corporate sector and constantly working towards building illustrious and rewarding career options for IIT Kanpur students.

Activities of the Students' Placement Office is coordinated by the "Student Placement Committee (SPC)" which is an advisory body constituted of faculty representatives from all the departments and inter-disciplinary programs. SPC is headed by the Chair, SPO with the support from Vice-Chair, SPO and Career Development Officer. Execution of all the SPO activities is done by the SPO staff and student team comprising of Overall Placement Coordinators (OPCs), Assistant Coordinators (ACs), Department Placement Coordinators (DPCs) and student volunteers who coordinate all placement activities organized by the SPO. Representatives from the student gymkhana also participate in SPC meetings as guests and contribute to the decision-making process. A team of PhD placement coordinators consisting of PhD student representatives from all the

departments has been actively helping our PhD scholars in their job pursuit. SPO@IIT Kanpur also encourages innovations and entrepreneurship ventures.

Placement Office Activities:

SPO activities in 2022-23 can broadly be divided into three sectors: (1) facilitating the hiring of current students for internships (academic and industry), (2) organizing professional training for interview preparations, and (3) coordinating recruitment process for graduating students through Campus Recruitment Drive. In the first quarter of 2022-23, the focus of the SPO team was on attracting potential employers for participation in placement and internship processes. Potential recruiters were identified based on inputs from the SPO team, departmental recommendations, and student feedback from previous placement seasons. Shortlisting of potential employers was carried out based on pre-defined screening criteria (in accordance with SPO guidelines), and the recruiters were invited to campus for student–employer interactions through Pre-placement Talks (PPTs). Efforts of the SPO team were instrumental in bringing in a total of 88 *new* recruiters for internship and full-time hiring during the placement season of 2022-23.

Internships for Current Students

SPO encourages pre-final year students to participate in summer internship programs. IIT Kanpur boasts of a well-structured internship programme that carries the reputation of earning post-internship/pre-placement offers (PPOs) for a large percentage of students. A total of 471 internships were offered during the internship season 2022-23. Some of the prominent recruiters who participated in the 2022-23 internship program include Adobe Systems, Amazon, American Express, Bain & Company, Boston Consulting Group, Dr. Reddy's Laboratories, ITC Limited, Microsoft India Pvt Ltd, Oracle India Pvt ltd, Goldman Sachs, Qualcomm, Samsung, Texas Instruments, SLB, JSW, Jaguar Land Rover India Limited, JP Morgan Chase, etc.

Placement Preparations

SPO has revamped its placement preparation programs which now provides 360-degree career solution for students, which are organized in coordination with Career Development Cell (CDC) along with support from IIT Kanpur Student Gymkhana. Through these training sessions, SPO provides guidance and support to students in their job pursuits through career counselling sessions, resume preparation workshops, soft skill development programs, providing learning materials for placement preparations, organizing professional training services, providing assistance in offer finalization, documentation etc. Training and career orientation programs were intended towards developing professional ethics among students and guiding them in making educated career decisions. Students were also encouraged to pursue their careers in respective sectors of interest which often vary from core engineering sector to IT, Financial, Banking, Analytics, Consulting jobs, Research and Development, Academia etc.

SPO in association with CDC organized numerous professional training sessions during academic year 2022-23 for the students participating in placement and internship processes. Various training sessions were conducted by many professional bodies including M/s. Prepleaf Private Limited, M/s Focus 4D Career Education Pvt Ltd, M/s My Analytics School, Ms/ Coding Ninjas throughout the academic year. SPO team also organized training sessions intended towards improving resume writing, conducted multiple practice/guidance sessions for aptitude tests, group discussions and personal interviews at the beginning of placement season. SPO team along with faculty members, volunteers from Student Gymkhana also conducted personal guidance and soft skill enhancement sessions for selected student groups in improving personality and interpersonal skills required for job interviews. Discussions/ career awareness workshops/talks by invited alumni members working in various sectors were also organized as part of placement preparations. For higher study aspirants, overseas sessions were conducted by AECC global, The Princeton Manya group, Galvanize Global Education, DP club learning i.e. ETS India. The following preparation activities were conducted for placement season 2022-23.

- Career counselling by professional agencies/experts towards soft-skills development, professional-communication, and personality-development.
- Resume writing workshops for assistance on preparation of professional resumes.
- Collecting corporate feedback on employee expectations for different job sectors.
- Feedback on companies and interview experiences from students who participated in last year placement for use as orientation/information material for current students.
- Student sessions on internship experiences at various industry sectors.
- Career awareness talks by invited Alumni and sharing their corporate working experience.
- Sessions on group discussions and personal interviews as part of placement preparations by invited alumni members (last 4 years). Relevant study materials (video, links, PPT etc.) were uploaded on preparation portal for future references.

Campus Recruitment Drive

"*One student one job*" policy (single offer acceptance policy) was continued to ensure equal opportunity to all students registered with SPO this year. Recruitment drive for the academic year 2022-23 was held in two phases. The ***Phase-1*** of recruitments officially started on 1st December 2022 and continued till 15th December 2022, though the preparations and shortlisting activities for campus placements started in July. About 300+ recruiters participated to hire students for full time employments. In Phase-1 placement season 2022-23, a total of 59 top tier firms with 93 different profiles from various sectors conducted interviews on Day 1, an unprecedented 317 job offers were extended, and 287 of those were accepted by IIT Kanpur students. The recruitment drive was conducted in hybrid mode for the internships and campus recruitments. The ***Phase-2*** recruitment started in January 2023 and continued till May 2023.

Based on hiring numbers, the top recruiter for this placement season is Rakuten Mobile which hired 37 students. Other top

recruiters of the season were American Express, PwC, Intel, Microsoft India, Qualcomm etc.

A total of 393 organizations registered in the campus placements. A total of 1215 students out of the 1382 registered students were placed through SPO during the academic year 2022-23. This includes students in both undergraduate and postgraduate levels. This year SPO achieved new heights in number of placements, highest international and domestic package, number of international offers, and number of PPOs. More than 60 companies extended 208 Pre-Placement Offers, which is a 33% increase as compared to the last year. So far, IITK students have received 81 international offers out of which 73 are accepted. This year's highest domestic package is INR 1.9 Cr, and highest international base package is HKD 2250000. The overall placement stood at 87.9%, which commends the dedicated efforts of the entire SPO team including the students, staff and faculty coordinators.

Among the various departments; CSE, MSP, IME, EE, Des., ECO, CGS recorded *student placement percentage of above 90%* (The percentage calculations presented above are derived based on the number of graduating students who have registered with the placement office).

In UG (B. Tech, B.S. & D.M.) programs, 684 out of 774 registered students (approx. 88.3%) are placed during the season. In PG programs, 531 out of 608 registered students (approx. 87.3%) are placed during the season. A summary of program wise placement record for the current season is shown in Figure 1

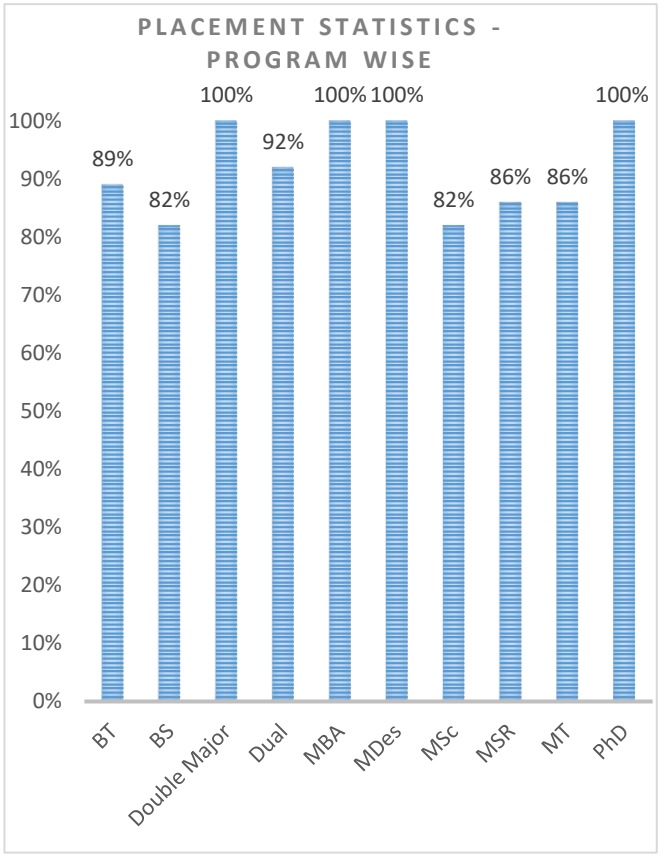


Fig. 1: *Placement statistics of various degree programs at IIT Kanpur during placement season 2022-23*

A good number of graduating students do no register for placements, as they are interested in pursuing higher studies or entrepreneurship options. In addition, an appreciable number of IIT Kanpur students pursue Civil Services jobs or take-up career options in public sector companies and, therefore, abstain from participating in the recruitment process. A summary of branch wise placement record for the current season is shown in Figure 2.

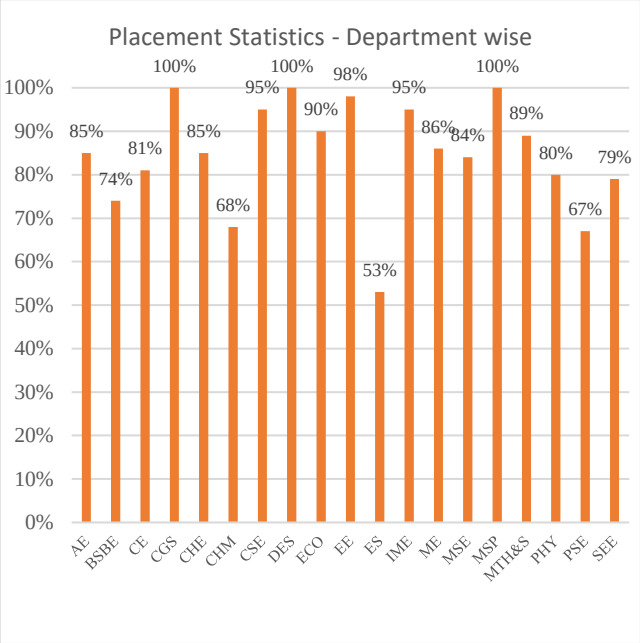


Fig. 2: *Placement statistics of various branch wise at IIT Kanpur during placement season 2022-23*

Students of IIT Kanpur continued to demonstrate a strong commitment to their core educational background in their in choice of employment. The Placement drive witnessed highest participation from coding and software firms which accounted for 45% of the total placements, whereas 25% was comprised of core firms.

Some of the top recruiting firms that visited IIT Kanpur for hiring students in core engineering sector include Intel, Microsoft India, Oracle India Pvt Ltd, PwC, Qualcomm, Rakuten Mobile, Reliance Industries, Limited, SAP Labs, Sprinklr, Texas Instruments etc. This trend observed in the last few years seems to have taken strong roots at IIT Kanpur. A summary of sector wise placement record for AY 2022-23 is shown in Figure 3.

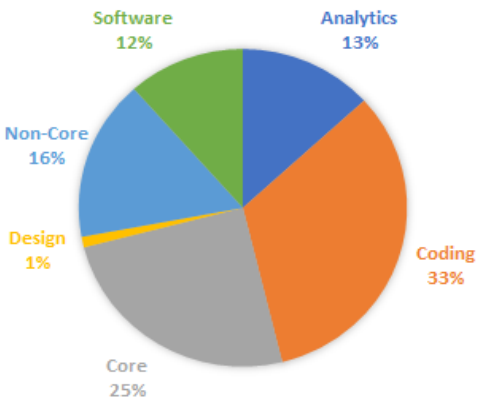


Fig. 3: *Sector wise placement statistics of IIT Kanpur during the placement season 2022-23.*

Some of the prominent recruiters who participated in Campus Recruitment Drive 2022-23 include Air India, American Express, Axtria, CapitalOne, EXL, Intel, J. P Morgan & Chase, Microsoft India, Oracle India Pvt Ltd, PwC, Qualcomm, Rakuten Mobile, Reliance Industries, Limited, SAP Labs, Sprinklr, Texas Instruments etc.

New Initiatives:

Samvardhan: This year SPO successful conducted first-ever, industry-academia connect 'SAMVARDHAN'. Over 15+ companies participated from various industries, offering an array of activities to help students navigate their career paths. To provide practical guidance and hands-on experience to students, leading companies conducted many interactive workshops, panel discussions, keynote speeches and Hackathons. Samvardhan 2023 was not just an opportunity for students to connect with potential employers but also to network with peers from different organization. The event provided a platform for students to exchange ideas, learn from each other's experiences, and build their professional networks.

Special Placement Drives for Differently Abled Students: SPO worked closely with different companies and alumni contacts to provide placement and internship opportunities to our differently abled students and were able to achieve 73% placements. Along with this, SPO-IITK have teamed up with IIT Madras placement team to organize a special joint drive for unplaced differently abled students. This joint drive is a collaborative effort between the placement team IIT Kanpur & IIT Madras with an objective to provide a unique platform for differently abled students, apart from the Placement drives - both Phases, to showcase their skills and talents to prospective employers. 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.

Toastmasters International Club: We thank our generous donor Mr. Suresh Bazaj, an IITK Alumnus for his support to start Toastmaster Club at IIT Kanpur. To cater the needs in the space of communication and leadership skills of students, we have started and been successfully running three Toastmaster Clubs. Every weekend the club members conduct meetings. These meetings address skills such as listening, planning, motivating, and team building and give members the opportunity to practice them. More than 500 students have so far experienced the toastmasters club environment through various workshops conducted with veteran Toastmasters and industry leaders. As of now 110 students have officially joined the clubs. In the coming year, we will have a few more Toastmaster clubs.

Acknowledgements

SPO expresses its sincere gratitude to the institute administration for providing financial and infrastructural support for the successful execution of various placement activities. SPO also sincerely thanks the members of various institute offices, viz DOAA, DOSA, DORA, IITK Foundation, Cell for Differently Able Persons (CDAP), Computer Centre and allied facilities and various sections of Institute Works Department for their help and support in organizing these events. SPO takes the opportunity to thank Career Development Centre and Student Gymkhana for the technical inputs and unparalleled support in coordinating and managing various SPO events. Services of OPCs, SPCs, ACs, DPCs, volunteers, and SPO office staff are sincerely acknowledged.

SERVICES AND AMENITIES

Please visit the following link for activities carried out during the year 2022-23 in Campus School, Estate Office, Health Centre, Institute Works Department, Physical Education Section, Safety Report, Store & Purchase and Visitors Hostel and Allied Facilities.

https://web.iitk.ac.in/july14dordn/data/Annual-Report-2022-23/Services_and_Amenities.pdf