



भारतीय प्रौद्योगिकी संस्थान कानपुर
Indian Institute of Technology Kanpur

THE IIT KANPUR ADVANTAGE

ENGAGE WITH
EXCELLENCE



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65 YEARS OF EXCELLENCE

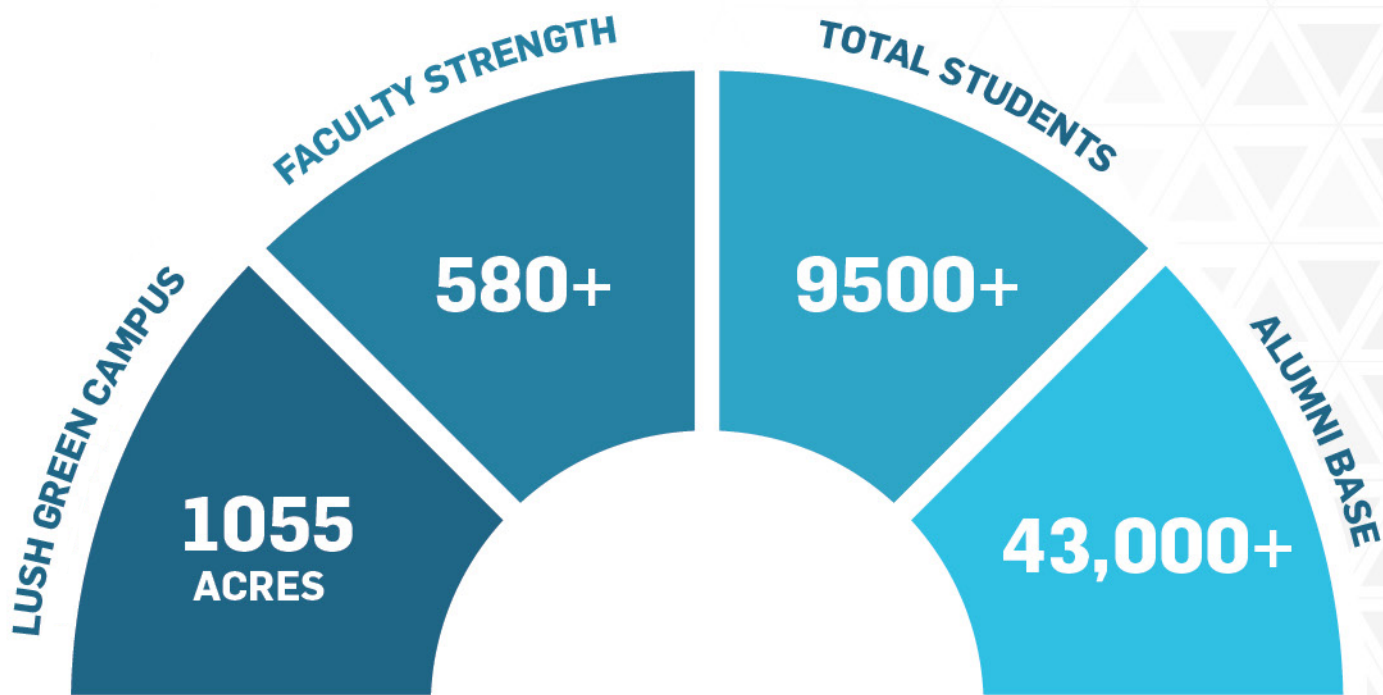
Established in 1959, the Indian Institute of Technology Kanpur stands as one of India's foremost engineering institutions, renowned for its academic excellence and research contributions. As one of the first IITs, it was created to advance education in science and technology, and it has consistently fulfilled this mission over the decades. IIT Kanpur has produced a remarkable array of alumni who have excelled in various sectors, including academia, industry, and entrepreneurship, significantly influencing both national and global landscapes.

IIT Kanpur's legacy is built on a strong foundation of research and innovation. The institute boasts state-of-the-art laboratories and research centers, enabling groundbreaking work in fields ranging from engineering to social sciences. It has played a pivotal role in advancing technology and has been instrumental in several key initiatives that shape India's technological framework.

Looking to the future, IIT Kanpur's vision is to emerge as a global leader in higher education and research, fostering a culture of innovation and sustainability. The institute aims to deliver premium education while promoting interdisciplinary collaboration to address complex global challenges. By nurturing creativity and critical thinking among its students, IIT Kanpur seeks to empower the next generation of leaders.

The vision emphasizes several core principles: academic excellence, transformative research, global outreach, and commitment to sustainability. Through these goals, IIT Kanpur aspires to not only enhance its educational framework but also contribute meaningfully to societal development, ensuring that its graduates are equipped to make impactful contributions in this dynamic world.

IIT KANPUR AT A GLANCE



INDIA RANKINGS 2024



OVERALL



ENGINEERING



INNOVATION



IIT KANPUR RANKED AMONG THE TOP

100

GLOBAL UNIVERSITIES IN 4 SUBJECTS

INSIGHTS FROM THE LEADERSHIP



Professor Manindra Agrawal

Director, IIT Kanpur

"Harnessing the transformational power of technology innovation has played a critical role in addressing global challenges since time immemorial. While academia nurtures fundamental research ideas with potential translational possibilities, industry-academia partnerships facilitate the conversion of research topics with innovative ideas to products with meaningful societal impact. With the everchanging global landscape and demography, it is increasingly evident that there is a need for fostering more stronger industry and academia collaborations. Given this, the Institute is organizing IITK-Samanvay, an exclusive initiative focused on fostering industry-academia collaboration.

IIT Kanpur has a well-established incubator, Startup Incubation and Innovation Center (SIIC) IIT Kanpur, which guides our aspiring entrepreneurs into the startup incubation process. The institute also houses the Research and Technology Park or technopark@iitk which facilitates industry-academia collaborations. Going forward, we are also instituting the Office of Translational Research which would further enhance the industry-academia collaborations and greatly accelerate the process of translational research at the institute.

'IITK Samanvay' aims to bring together leading industry representatives with the nation's top researchers and scientists, creating a unique opportunity for meaningful interaction. Participants will learn about the cutting-edge research being conducted at IIT Kanpur campus and discover collaboration opportunities. It will also be an opportunity for them to engage with distinguished faculty and students to gain valuable insights into the institute's expertise and capabilities. It will also serve as a platform to address the existing gaps between the industry and academia, fostering stronger connections and collaborations that not only drive innovation but also add to the economic growth of the country.

I am confident that, the event will offer critical insights into the strategic partnership that can be promoted between academia and industry and would also help in identifying opportunities and challenges and driving innovation to solve real-world problems. It will also foster dialogue among industry leaders, academicians, and researchers for further collaboration and realizing the vision of Viksit Bharat.

Jai Hind!"



Professor Amey Karkare

Dean of Resources and Alumni, IIT Kanpur

"Dear Stakeholders,

IIT Kanpur offers a dynamic and supportive environment that fosters innovation and entrepreneurship through its incubation centers, state-of-the-art research facilities, and extensive collaborations with industry leaders, government bodies, and international institutions. The institute's programs, such as the Innovation and Incubation Program (IIP), encourage students to develop innovative solutions to real-world problems, often leading to successful startups. Consistently ranked as a top institution for innovation by NIRF, IIT Kanpur's vibrant ecosystem not only nurtures young talent but also significantly contributes to addressing societal challenges through innovative solutions.

Our partnership with CSR organizations and industry partners has been instrumental in driving impactful research and development projects that have the potential to transform industries and improve the quality of life for millions of people. By leveraging our expertise in cutting-edge technologies and interdisciplinary research, we aim to create a sustainable and inclusive future that benefits all stakeholders.

Your generous donations have not only enabled us to maintain state-of-the-art facilities and offer support to many deserving students but have also allowed us to undertake ground-breaking projects with lasting societal impact. We are deeply grateful to Kotak Mahindra Bank, Philip Morris India, NMTronics, ITC Ltd., J.K. Fenner, Citibank, HDFC, and many others who have shared our vision of a brighter future through their partnership with IIT Kanpur.

In this fast changing world, it is imperative that we continue to collaborate and innovate to address the complex challenges facing society. We invite you to join us in our mission to create a better tomorrow through cutting-edge research, innovative solutions, and impactful collaborations. Together, we can make a difference and shape a brighter future for generations to come.

We look forward to your continued support and partnership in our journey towards excellence and societal impact."

OVERVIEW OF THE DEPARTMENTS

DEPARTMENT OF AEROSPACE ENGINEERING

The Aerospace Engineering Department, established in 1964, is a leading center for teaching and research, specializing in aerodynamics, propulsion, aerospace structures, and computational mechanics. It features a unique flight laboratory with powered aircraft, gliders, and a 1,000-meter runway. The department collaborates with major agencies like ISRO, DRDO, and HAL, developing advanced facilities such as wind tunnels and computational models. Its Gliding and Soaring Center fosters aviation awareness through pilot training programs. The department has also developed excellent collaborative relationships, leading to work on several advanced projects of national importance with a large number of aeronautical establishments, including NAL, ASTE, GTRE, HAL, DRDL, ADE, ARDE, ADA, and ISRO.



Department Strength

32

Faculty Strength

309

Undergraduate Students

200

Postgraduate Students

124

Doctoral Students

Key Research Areas

Aerodynamics
 Flight Mechanics and Control
 Propulsion
 Structures, Structural Dynamics and Aeroelasticity
 Aero-thermodynamics and Thermal Sciences
 Computational Mechanics

High-Impact Patents

- Attitude Control System with Gear-Based Actuation Mechanism for Controlling Actuator Failures in a Spacecraft
- Deformation Tracking and Virtual Speckling Technique to Identify Optimal Parameters for Digital Image Correlation Method
- A System and a Method for Contactless Automated Crack Extension Measurement (ACEM)
- Innovative blade design with flapper for efficient, self-starting turbines with a low cut-in speed
- Fully Passive Flexible Foil Energy Harvesting Device



DEPARTMENT OF BIOLOGICAL SCIENCES & BIOENGINEERING

The Department of Biological Sciences & Bioengineering has been at the forefront in discovering new concepts of biology and creating translational technologies, alike. The Department has made tremendous progress in disseminating knowledge in the form of publications in various top-notch journals of high repute and patenting of many of the concepts, processes and products. The faculty members pursue various complementary research methods for diagnosis and treatment of various pathologies including orthopedic disorders, metabolic disorders, cancer, rare genetic disorders, neurological disorders and infectious diseases.

Department Strength

28

Faculty Strength

460

Undergraduate Students

106

Postgraduate Students

226

Doctoral Students

Key Research Areas

Cell & Molecular Biology | Genomics and Genetics
 Microbiology & Immunology
 Structural Biology and Biophysics | Bioinformatics
 Tissue Engineering & Biomaterials | Gene Therapy
 Medical Devices & Diagnostics | Neuroscience

High-Impact Patents

- Integrated Hybrid Bioartificial Liver Bioreactor Design and Thereof
- Method of Measuring BMP Signaling using BMP Responsive Reported Cell Line
- Highly-stable Therapeutic Protein Antigen having Vaccine Application against Shigellosis, and a Simple and Cost-effective Method for Preparing the same
- Gene Therapy Delivery Vectors and Methods Thereof
- A Musculo-responsive polymer carbon composite for assisting myotubular regeneration (MusCAMLR) and process thereof

DEPARTMENT OF CHEMICAL ENGINEERING

Established in 1959, the Chemical Engineering Department at IIT Kanpur is renowned for its foundational research in core areas like transport phenomena, thermodynamics, and catalysis. Expanding into interdisciplinary fields, its research now includes complex fluids, energy systems, nanoscience, and environmental engineering. The department's collaborations span biosciences, advanced materials, and nanotechnology. It offers comprehensive academic programs, including PhD, MTech, and BTech, with a flexible 5-year dual degree option, fostering innovative and in-depth academic and research engagement.



Department Strength

29

Faculty Strength

418

Undergraduate Students

95

Postgraduate Students

77

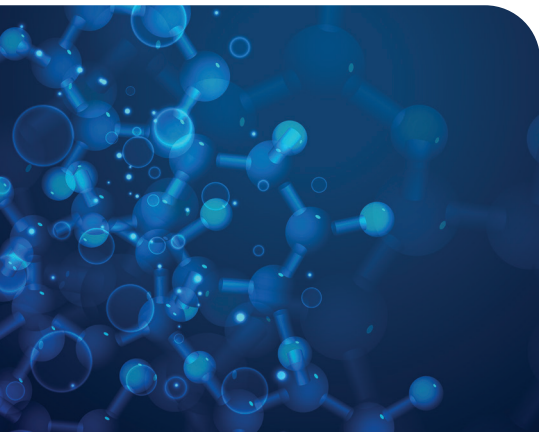
Doctoral Students

Key Research Areas

Materials and Nanotechnology
Complex Fluids and Soft Matter
Catalysis and Reaction Engineering
Energy and Sustainability
Theory, Computation and Machine Learning

High-Impact Patents

- Electrochemical Sensor For Bilirubin Analysis In Human Blood / Serum
- Portable Smart Device for Determination of Soil Nutrients
- Reusable Polymeric Writing Surface or Media and Processes Thereof
- Transdermal Patch for Drug Delivery and Method of Preparation Thereof
- Packed Bed Single Chamber Microbial Fuel Cell (SCMFC) System



DEPARTMENT OF CHEMISTRY

The Department of Chemistry at IIT Kanpur is renowned for its excellence in contemporary research and education. It currently has 40 faculty members working in all major areas of chemistry and its allied disciplines. In addition to fundamental research, the faculty members also focus on industry-relevant problems such as chemical manufacturing, pharmaceutical development, and material applications. Access to state-of-the-art instruments and facilities across the institute enables groundbreaking advancements in chemical sciences.

Department Strength

40

Faculty Strength

143

Undergraduate Students

95

Postgraduate Students

295

Doctoral Students

Key Research Areas

Chemical Biology and Drug Discovery
Natural Products and Asymmetric Synthesis
Organometallic Chemistry and Sustainable Catalysis
Materials, Energy, Spectroscopy, and Imaging
Theoretical and Computational Chemistry

High-Impact Patents

- A Coronary Stent with Nano Coating of Drug Free Polymer and a Process for Preparation Thereof
- Optical Enhancement of Two-photon Absorption Process
- Process for the Synthesis of Highly Functionalized Racemic and Non-Racemic Piperidines
- Development of Agar Based Bioplastics by Cross-linking with Diisocyanates
- Green High Energetic Density Materials (HEDMs) and Process for Synthesizing the same

DEPARTMENT OF CIVIL ENGINEERING

Established in 1961, the Department of Civil Engineering has built a strong reputation for producing skilled technical professionals essential for industry, R&D, and academia. With a focus on mastering fundamental principles and fostering creative problem-solving, the department emphasizes interdisciplinary analysis. Students are encouraged to participate in co-curricular activities, promoting team spirit and organizational skills. The faculty engage in high-quality research and consultancy, holding influential academic roles nationally. Notably, the department was ranked among the top 100 global civil engineering programs in the 2024 QS rankings, highlighting its ongoing impact and leadership in the field.



Department Strength

49

Faculty Strength

534

Undergraduate Students

181

Postgraduate Students

172

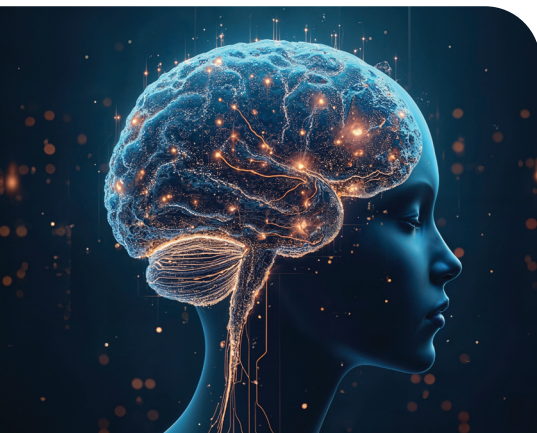
Doctoral Students

Key Research Areas

Environmental Engineering | Geotechnical Engineering
 Hydraulics and Water Resources Engineering
 Infrastructure Engineering and Management
 Transportation Engineering | Structural Engineering
 Geoinformatics

High-Impact Patents

- A passive vibration screening arrangement with bamboo in-filled wave barriers (IB) for mitigating ground-borne vibration
- Automated Integrated Multi-Parameter Recorder and Water Sampling Equipment and a Method Thereof
- A system and method for generating correct 3D geometry of moving object using laser scanning
- Multiple slit nozzle-based high-volume PM 2.5 impactor assembly
- Aluminum core buckling restrained brace for energy dissipation



DEPARTMENT OF COGNITIVE SCIENCE

The department of Cognitive Science was established in December 2020. Cognitive Science is the study of the mind - how it comes to be, what it is, and what it does. Researchers and practitioners in cognitive science come from a variety of conventional academic disciplines. Computer scientists, psychologists, neuroscientists, linguists, philosophers have all contributed to this exciting synthesis of insight into how the mind works. These insights are all the more useful now in trying to construct artificial human-like systems.

Department Strength

7

Faculty Strength

33

Postgraduate Students

26

Doctoral Students

Key Research Areas

Consciousness & Attention
 Perception, Action and, cognition
 Education Technology
 Social and affective cognition
 Translational Neuroscience and Technology

Active Ongoing Research Projects with Industry

- Human Machine Trust, Intention
- Mental Health in Tribal Regions
- Developing a cognitive brain-computer interface to predict treatment outcomes in depression, and suggest appropriate treatment strategies
- Developing a Health Stack
- Digitizing and Automating Pii

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

IIT Kanpur pioneered Computer Science education in India, launching its first computer-related courses in 1963 with an IBM 1620, the country's first "computer classroom." An independent academic program was introduced in 1971, offering Ph.D. and M.Tech. degrees, followed by the establishment of an undergraduate program in 1983 and a formal department in 1984. The Computer Science department at IIT Kanpur has since produced many of India's top computer science experts and educators. Today, it boasts a faculty of 33, covering a broad range of areas in the field, continuing its legacy of innovation and leadership.



Department Strength

36

Faculty Strength

78

Undergraduate Students

50

Postgraduate Students

15

Doctoral Students

Key Research Areas

Algorithms and Data Structures
 Big Data Visual Analytics, Visual Computing, and HCI
 Cyber Security
 Natural Language Processing, Machine Learning and Reinforcement Learning
 Sensing, Communication, and Networking in the age of IoT

Active Ongoing Research Projects with Industry

- Optimized Chip Architecture and RTL Design for PQC and Cryptographic Algorithms
- Hardware Accelerator for Post-Quantum Cryptography
- RAVEN: Faster and Cheaper On-chip Side Channel Evaluation



DEPARTMENT OF MANAGEMENT SCIENCES

Entering its golden jubilee year, the Department of Management Sciences (DoMS) at IIT Kanpur is one of the first in the country to leverage the analytical education of engineers in training management professionals since 1974. The curricula are uniquely designed to blend technology, engineering and analytics in management education with the vision of spawning a new generation of successful techno-managers having significant part of student industry engagement program. The department continues to leverage the underlying technical strength and resources at IIT Kanpur for applications in the contemporary business environment.

Department Strength

28

Faculty Strength

297

Student Strength

314

E-Masters

Key Research Areas

Data Science & Business Analytics
 Quantitative Finance & Economic Modelling
 Industrial Engineering and Decision Sciences
 Manufacturing Strategy and Total Quality Management
 OB, HR & Marketing Management

Active Ongoing Research Projects with Industry

- Centre of Excellence for Defence Corridor
- Power Sector Reforms (PSR) Programme & Energy Analytics
- Syndicate Bank Entrepreneurship Research & Training Centre
- Design, Development, Testing, & Deployment of 35-40 kg Fixed-Wing Hybrid VTOL UAV
- A System-Wide Model of Start-Up Facilitation Using Encrypted Networking in an Entrepreneurial Ecosystem (EE)
- Personalized Recommender System for Airline Industry

DEPARTMENT OF DESIGN

The Department of Design is dedicated to real-world problem-solving through a collaborative, student-centered approach. It emphasizes learning through experimentation, collaboration, and innovation, aiming to develop designers capable of leading and providing impactful solutions for industry and society. The Academic programs are designed to cultivate world-class quality in students, enhancing skills in research, creativity, critical thinking, prototyping, and leadership. With a multidisciplinary curriculum that intergrates design thinking, science, technology, user experience, communication, business, and sustainability, the department fosters creativity, human-centered values, and analytical skills. Applications are invited for doctoral and master's programs from candidates aspiring to be design leaders.



Department Strength

8

Faculty Strength

60

Postgraduate Students

43

Doctoral Students

Key Research Areas

Automotive UI
AR/VR/MR/XR Interaction
Industry 4.0 and IIoT
Flexible and Hybrid Manufacturing Process
Human Machine Interaction
Robotics Interaction

High-Impact Patents

- Algorithm for the working of Home-Based Oxygen Concentrator
- Unmanned Aerial Vehicle
- Orthopedic Device for Alleviating Pain of A Body Part and Method Thereof
- Jaw Rehabilitation Device And Controlling Method Thereof
- Device For Breaking Ampules And Method Thereof



DEPARTMENT OF EARTH SCIENCES

The Department of Earth Sciences at IIT Kanpur is one of the youngest, most vibrant, and highly interdisciplinary departments. It focuses on Earth's evolution, internal dynamics, and processes, emphasizing environmental changes and sustainable development, with research activities spanning spatial and temporal scales from micrometers to planetary and days to billions of years. We offer BS-MS, M.Tech, and PhD programs designed to produce industry-ready and research-oriented professionals, contributing to various fields within Earth Sciences.

Department Strength

17

Faculty Strength

129

Undergraduate Students

39

Postgraduate Students

74

Doctoral Students

Key Research Areas

Water Resources Management: Groundwater, Hydrology, Glaciology, Flood Hazards
Petrology, Geochemistry, & Mantle Dynamics
Planetary & Terrestrial Remote Sensing
Structural Geology & Rock Mechanics | Applied Geophysics
Earthquake Physics & Earthquake Cycle Modelling

Active Ongoing Research Projects with Industry

- Mineralogical Characterization of Bauxite Sample- Dindori Block
- Declaration for Testing Charges for Analysis of Mercury Level in Seam Wise Coal Samples in 10 Opencast Mines of NCL
- Remote Sensing for Forest Renewal Ecosystem Services and Sustainable Hydrological Management
- GIS/GPS Mapping of Waqf Properties in the state of Gujarat and Andhra Pradesh
- Development of a hybrid CNN – SOM based workflow for enhanced Seismic Fault Detection

DEPARTMENT OF ECONOMIC SCIENCES

The Department of Economic Sciences has 26 permanent faculty members with research and teaching interests that cover a broad range of fields. In addition to strengths in traditional areas like microeconomics, macroeconomics, and econometrics; the department has expertise in agricultural economics, Bayesian econometrics, behavioral economics, development economics, efficiency and productivity analysis, environmental economics, financial economics, health economics, industrial economics, international trade, labor economics, law and economics, optimization theory, political economy, family economics, and public policy. We also have strong research and teaching expertise in the area of data analysis, in keeping with the needs of the hour.



Department Strength

26

Faculty Strength

200

Undergraduate Students

40

Postgraduate Students

47

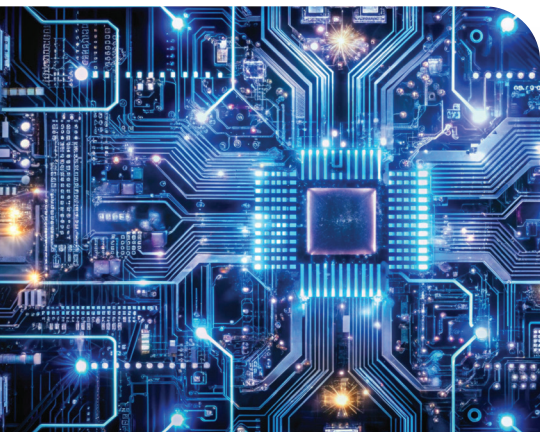
Doctoral Students

Key Research Areas

Microeconomic Theory
Financial Economics
Public Finance
Public Policy
Econometric Theory

Active Ongoing Research Projects with Industry

Health Impact Study: Understanding the impact of micronutrient supplements on health, particularly anemia in Bihar. By procuring the micronutrient supplement from the ICDS mission and providing it to young children and pregnant mothers. There is a wide impact of this research on policies related to micronutrient deficiencies and how the government can address this issue.



DEPARTMENT OF ELECTRICAL ENGINEERING

The Department of Electrical Engineering is one of the first five departments with which IIT Kanpur started in 1960. The department of EE is currently the largest multidisciplinary Department at IIT Kanpur and covers practically all sub-disciplines in Electrical and Communication Engineering including Power Systems, Power Electronics, Microwaves, RF techniques, Microelectronics, VLSI, Photonics, Control Systems, Robotics, Speech and Audio Processing, Computer Vision, Artificial Intelligence, Machine Learning, Wireless Communication, Computer Networks.

Department Strength

59

Faculty Strength

717

Undergraduate Students

458

Postgraduate Students

290

Doctoral Students

Key Research Areas

Control Applications in Power Electronics
Microwave and RF Technology
Communication and Signal Processing
Semiconductor devices and IC Design
Machine Learning and Photonics

Active Ongoing Research Projects with Industry

- GaAs/GaN Low Noise and Power Amplifier Design
- Design of MIMO systems for 6G Cellular system
- AI Based Ambient Acoustic Analysis System
- Adaptive Beamforming for Multi-source Speech Separation
- Microwave Absorbing Metamaterial-based Wearables

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

IIT Kanpur pioneered integrating humanities and social sciences into the engineering curriculum, emphasizing that technology operates within socio-cultural and economic contexts. The Department of Humanities and Social Sciences comprises thirty-two faculty members offering courses in English, Fine Arts, Philosophy, Psychology, and Sociology. Faculty members engage in teaching, thesis supervision, and conducting workshops for broader educational outreach. They also undertake research and consultancy projects for various organizations, contributing to numerous publications in esteemed national and international journals. This approach provides students with diverse perspectives, recognizing that not all societal issues have purely technical solutions.



Department Strength

32

Faculty Strength

125

Doctoral Students

Key Research Areas

- **English:** Literature | Linguistics | ELT
- **Fine Arts:** Visual Arts | Craft | Art History
- **Philosophy:** Analytic Philosophy | Continental Philosophy
Indian Philosophy
- **Psychology:** Health Psychology | Cognitive Neuropsychology
Cognitive Psychology
- **Sociology:** Economic Sociology | Environmental Sociology
Social Demography | Human Rights

High-Impact Patents

- Assistive Application for Children with Dyslexia and Dysgraphia
- Spatia
- Aligno, a multi layered physical map
- Two Shades - A collaborative/ cooperative board game
- Katha



DEPARTMENT OF MATERIAL SCIENCE & ENGINEERING

Established in 1960, the Department of Materials Science & Engineering at IIT Kanpur emphasizes broad-based education and strong fundamentals. It regularly updates its curriculum to meet contemporary needs, resulting in successful alumni in prestigious organizations worldwide. The department has significantly impacted basic and applied research, particularly in ferrous and nonferrous metallurgy, mineral engineering, and powder metallurgy, contributing to India's space and defense initiatives. To keep pace with rapid advancements, the department actively recruits young faculty in cutting-edge research areas. Current research spans traditional metallurgy and modern fields, including electronic materials, ceramics, polymers, biomaterials, and other functional materials.

Department Strength

29

Faculty Strength

309

Undergraduate Students

73

Postgraduate Students

127

Doctoral Students

Key Research Areas

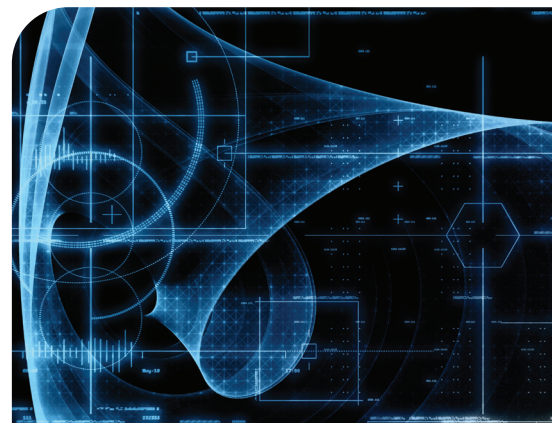
Biomaterials | Computational Material Science
Electroceramics | Extractive Metallurgy
Flexible and Organic Electronics | Manufacturing Processes
Material Degradation | Mechanical Behavior of Materials
Nanomaterials and Nanotechnology | Physical Metallurgy

High-Impact Patents

- Checko: Anti-Counterfeiting Labels
- Anti-Corrosive Paint Coatings
- Multifunctional Biomaterials and Wound Dressings
- Multicomponent High Entropy Alloys

DEPARTMENT OF PHYSICS

The department of Physics at IIT Kanpur is recognized for its excellence in teaching and research, making it one of India's most prestigious physics departments. It engages in a broad spectrum of modern theoretical and experimental research while maintaining a balance between exploration and investigation. The department promotes a vibrant academic atmosphere through colloquia, seminars, and discussions with eminent physicists. With 50 regular faculty members, 5 visiting faculty, over 238 Ph.D. students, and 15 postdoctoral fellows, it offers various programs, including B.S., M.Sc, and dual degree courses. The department boasts a legacy of exceptional alumni who hold esteemed positions worldwide.



Department Strength

50

Faculty Strength

152

Undergraduate Students

94

Postgraduate Students

238

Doctoral Students

Key Research Areas

Complex Systems
 Condensed Matter Experiment
 Condensed Matter Theory
 Ion Beam, Plasma and Nuclear Solid State
 Photonics and Quantum Technologies
 High Energy Physics

High-Impact Patents

- Broadband Uniform-Efficiency Orbital Angular Momentum Detector for Quantum Technologies
- Wavefront Rotator with Near-Zero Mean Polarization Change
- Modular System for Determining Fluid Flow Field and Method Thereof
- A Tunnel Diode-based Device for Real-Time Monitoring of Steel Quality and Method Thereof
- Hall Sensor Based Local Vibration Detector (HSLVD) for Monitoring Vibrations in a Structure



DEPARTMENT OF SPACE PLANETARY & ASTRONOMICAL SCIENCES & ENGINEERING

The newly formed Department of Space, Planetary & Astronomical Sciences & Engineering (SPASE) is dedicated to teaching, research and development in space instrumentation, planetary science and observational astronomy. Ph.D. and M.Tech. programs are operational with B.Tech and M.Sc. programs to follow. We have several training laboratories in various domains of Space Science & Engineering. We are presently involved in several major space engineering projects that includes Radio: SWAN, GRAPES3, Square Kilometer Array; Optical: Thirty-meter telescope; Space Technology & manufacturing.

Department Strength

7

Faculty Strength

8

Postgraduate Students

21

Doctoral Students

Key Research Areas

Space and Astronomical Instrumentation
 Planetary Science and Cartography
 Astronomy & Astrophysics
 Space Technology

Active Ongoing Research Projects with Industry

- Development of Lunar and Mars Regolith Simulants

DEPARTMENT OF SUSTAINABLE ENERGY ENGINEERING

The Department of Sustainable Energy Engineering (SEE) at IIT Kanpur, established in December 2020, focuses on delivering high-quality academic and continuing education programs and pioneering & advanced research in energy sustainability. The department aims to drive technological innovation, support prototyping and commercialization, and contribute to the national vision of energy sustainability through education, research, and impactful outreach initiatives.



Department Strength

16

Faculty Strength

61

Postgraduate Students

54

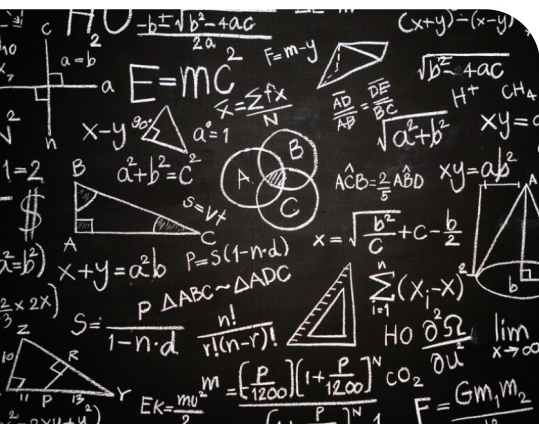
Doctoral Students

Key Research Areas

Generation: Solar PV | Solar Thermal | Green Hydrogen
Storage: Batteries | Hydrogen Storage | CO₂ storage & sequestration
Conversion & Recovery: CO₂ to Fuels | Waste to Energy
System Integration: Smart-Grid, Electric Vehicles
Energy & Built-Environment: Energy Efficiency | Net-Zero & Smart Buildings

High-Impact Patents

- Carbon Quantum Dot-Based UV Filter for Enhancing UV and Photostability of Perovskite Solar Cells
- Process for Ruthenium Doping of a Sodium-Superionic-Conductor Ceramic in Sodium-Ion Batteries
- EV Chargers and EV Charging
- Method and System for Optimum Usage of Ammonia by Generating Power using Coupled Heat Exchanger
- Crossflow hybrid hydrokinetic turbine for riverine system with a self-start



DEPARTMENT OF MATHEMATICS AND STATISTICS

The Department of Mathematics and Statistics, IIT Kanpur, is one of the very few departments in the country that has faculty with expertise in the fields of pure mathematics, scientific computing as well as statistics and data sciences. The hallmark of the programs is a balance between theoretical rigour and computational and practical training, and the dynamic nature that accommodates emerging research areas in the curricula.

Department Strength

52

Faculty Strength

199

Postgraduate Students

98

Doctoral Students

Key Research Areas

Analysis, Topology, and Geometry
 Algebra, Number Theory, and Mathematical Logic
 Numerical Analysis, Scientific Computing,
 Differential Equations, Fluid Dynamics
 Probability and Statistics

DEPARTMENT OF MECHANICAL ENGINEERING

Mechanical Engineering is a fundamental engineering branch from which much of modern technological innovation and products originate. Beyond conventional areas like manufacturing, thermal plants and automobiles, mechanical engineers routinely find themselves at the forefront of biomedical, climate, defense, energy, robotics, nuclear and geotechnical research. The department of mechanical engineering at IIT Kanpur develops highly trained technical manpower, provides solutions to societal and industrial challenges, and engages in the research and development of futuristic technologies.



Department Strength

42

Faculty
Strength

629

Undergraduate
Students

179

Postgraduate
Students

194

Doctoral
Students

Key Research Areas

Advanced and Green manufacturing (additive, micro-/nano-texturing, MEMS, nano-composites, tool vibration & control)
Computational modeling (Fluid Dynamics / Heat Transfer / Mechanics)
Applied mechanics (acoustics, vibrations, control, CAD, optimization, structural integrity and stability)
Nuclear Technology
Robotics (compliant mechanisms, bipeds, exoskeleton, quadrupeds)

High-Impact Patents

- Identification of Vascular Deformation
- Seed Sowing Boot for Grain and/or Granular Fertilizer
- Angular Momentum Device for Stabilization and Control for Tailless Aircraft
- A Nanofluid for CO₂ Sequestration via Hydrate Formation and Process of Synthesizing Thereof
- A Device for Providing Assistance and Rehabilitation During Flexion and Extension Movement of Fingers

OVERVIEW OF THE CENTRES



CYBERSECURITY AND CYBERSECURITY OF CYBER-PHYSICAL SYSTEMS (C3I HUB)

C3iHub aims to become India's central hub for cybersecurity R&D, focusing on protecting the nation's critical infrastructure, particularly in Operational Technology (OT) security. The initiative seeks to develop secure applications across multiple sectors and provide specialized cybersecurity expertise to defense and intelligence agencies. Additionally, C3iHub is fostering an ecosystem for indigenous cybersecurity products, supporting domestic innovation, and advancing India's self-reliance in the cybersecurity domain. Through these efforts, C3iHub is committed to nurturing the next generation of cybersecurity professionals, ensuring robust defenses and expertise to address evolving security challenges at both national and international

Focus Areas

- Develop Security Solutions
- Provide security services
- Establish cyber-security ecosystem
- Create next-gen cybersecurity professionals
- Co-develop security solutions with industries



CENTER FOR DEVELOPING INTELLIGENT SYSTEMS (CDIS)

CDIS is an R&D Center within IIT Kanpur dedicated to the rapid development and prototyping of intelligent software systems, aimed at solving problems arising within the Indian ecosystem.

CDIS operates as a unique hybrid of an academic center with a central translational focus. We focus on filling the gap between conceptualization and deployment of intelligent systems — by hosting equipment and experts that can rapidly convert cutting-edge concepts into working prototypes for clients of the center, both from within and outside IITK.

Focus Areas

Although CDIS undertakes a wide range of projects across both the public and private sectors, some of its key focus areas include:

- Healthcare optimisation
- Fraud prevention
- Automated auditing
- Traffic optimisation & emissions reduction
- Smart grievance management systems



CENTRE FOR ENERGY REGULATION

The Centre for Energy Regulation (CER) at IIT Kanpur was established with seed funding from UK's Foreign, Commonwealth & Development Office (FCDO) under the Power Sector Reforms (PSR) Phase I. Further research ongoing through additional support under PSR Phase. CER promotes regulatory research, capacity building, and development of knowledge based solutions for the power sector.

The Centre for Energy Regulation (CER) at IITK is now an internationally known as knowledge based think tank.

Focus Areas

- Regulatory and Policy Analysis for all major sector initiatives form CERC, SERCs, MoP, MNRE, CEA etc
- Business modelling for EV Charging infrastructure, Renewables, Green Hydrogen and Storage
- Tariff Determination Framework for Generation (including RE), Transmission and Distribution
- Tariff analysis for electricity generation plants and distribution utilities based on in-house database
- Performance Benchmarking for Electricity Distribution Utilities



CENTER FOR LASERS AND PHOTONICS

CELP is an interdisciplinary center of excellence that combines cutting-edge technology from engineering and theoretical advances in science to create new horizons in the field of photonics science and engineering. The faculty in CELP belong to six different parent departments (EE, ME, AE, PHY, CY, and CE) and pursue research in the fields of medical applications of Lasers, laser spectroscopy and ultrafast phenomena, fiber-optic communications, quantum optics and other emerging areas in photonics.

Focus Areas

- Laser Spectroscopy and Ultrafast Phenomena
- Fiber Optic Communications
- Quantum Optics
- Interferometric Tomography
- Laser-Plasma Studies



CENTER FOR NANOSCIENCES

The Centre for Nanosciences (CNS) has several state-of-art fabrication and characterization facilities such as E-Beam Patterning, Maskless Lithography, FESEM, Micro-Raman, AFM, XRD, FTIR, Surface 3D Profilometers, Nanoimprint Lithography etc., all of which are housed in a 10,000-class clean room environment with about 3000 square feet of clean spaces. Currently, major research themes of the CNS exploiting CNS research resources and expertise to academia as well as industry users are listed below.

Focus Areas

- Applications of micro-nanofabrication routes to fabricate devices and composite structures in smart functional nanomaterials such as Polymers, Carbon and ceramics
- New methods and creative combinations of micro-nanofabrication with an emphasis on multi-scale materials and devices in the context of energy, environment and biological applications
- Flexible and wearables micro nano sensors
- Development of Nano-bio-platforms for early diagnostics of chronic diseases
- Collaborations and training with other institutions & corporate R&Ds in this emerging area, thereby creating an expert base which does not currently exist in our country



CENTRE FOR RAILWAY RESEARCH

The Centre for Railway Research (CRR) at IIT Kanpur was setup for advancement of technologies relevant to Indian Railways and help in developing a technically strong and qualified manpower to support Railways' objectives. CRR has been assigned with the research domain of Loco Research & Propulsion Technologies, Traction Installation/OHE.

Focus Areas

- Heavy Haul Technologies
- Advanced fuel-efficient systems
- Alternate Engine Propulsion Technologies
- Advanced signaling and Fog Vision
- Automatic rolling stock condition motoring way side and onboard



ADVANCED CENTRE FOR MATERIALS SCIENCE

Advanced Centre for Materials Science was created in 1978 with a view to make available major materials preparation and characterization facilities under one-roof. These state-of-the-art research facilities are regularly upgraded, and maintained by suitably trained competent staff. The centre has been serving the needs of the materials community from the institute as well as other academic and industrial establishments for over thirty-five years. For every laboratory there is a users' committee consisting of members drawn from various departments of the institute. We are committed to providing consultancy and testing services of global standard to the materials scientists. Non IITK users from academic institutions and industries are encouraged to contact the concerned staff members or conveners of respective laboratories or Head, ACMS.

Focus Areas

- Scanning Electron Microscope (W-SEM, FEI, FEG-SEM, EPMA)
- Powder XRD, Two-Circle/Four-Circle Diffractometer
- X-ray Photoelectron Spectroscopy(XPS) with Auger Electron Spectroscopy(AES)
- Instrumented Indentation (Universal/Micro/Nano)
- Advanced High Sensitive Spectral Confocal and Multiphoton Microscope System for Live Cell Imaging
- X-Ray Fluorescence Spectrometer, Stable Isotope Ratio Mass Spectrometer(IRMS), Glass Bead Making



ADVANCED IMAGING CENTRE

Advanced Imaging Centre (AIC) at IIT Kanpur, offers a critical mass and outstanding expertise in the wide range of state-of-the-art electron microscopy and respective specimen preparation techniques available for materials characterization down to atomic scale. This facility is intended to bring together multidisciplinary expertise to drive synergy and amplify our characterization capabilities which support continuous fundamental research, innovations, brainstorming, and global interactions with academia and industry.

Focus Areas

- Equipped with EDX and HAADF detectors for comprehensive chemical composition and elemental mapping
- Advanced specimen holders allow for diverse imaging conditions, including heating, cooling, and double-tilt capabilities
- The FEI-Tecnai G2 12 Twin 120 kV TEM enables analysis of various materials, including hard materials and biological samples, at room and cryo temperatures
- AIC has a dedicated TEM sample preparation lab with essential tools such as the Vitrobot, Ultramicrotome, and Ion-Mill
- The lab supports the preparation of different sample types, from soft materials to biological specimens, for imaging in various thermal conditions



CELL FOR DIFFERENTLY ABLED PERSONS (CDAP)

For the past seven years, the CDAP cell has been dedicated to enhancing accessibility and inclusion across academic and residential areas on campus. It addresses diverse student needs by implementing key protocols, such as arranging special tutors, providing temporary transportation, and coordinating with counseling services for accommodations. CDAP also assists with new student orientations and collaborates with campus entities like the placement office. Upon arrival, it completes a facilitation form to outline necessary resources. Additionally, CDAP engages in national outreach by connecting with leading educational institutions, participating in the EMPOWER conference, and supporting the Ministry of Education's Capacity Building for Staff initiatives.

Focus Areas

- To provide Accessible learning resources, Assistive software and Tools, Indian Sign Language Interpreters for Educational Support
- Research and Innovation in Disability Support
- Skill Development and Empowerment
- Policy Advocacy
- Accessibility and Infrastructure



DRDO INDUSTRY ACADEMIA (DIA)

The Defence Research & Development Organization (DRDO) is tasked with developing advanced weapon systems and technologies to bolster India's defense capabilities. In September 2021, DRDO introduced the Long Term Directed Research Policy, focusing on collaborative research through DRDO Industry Academia Centres of Excellence (DIA CoEs). This policy aims to leverage the strengths of academia, students, researchers, technology industries, and DRDO scientists to accelerate innovation and research for future defense systems. By promoting multidisciplinary and multi-institutional collaborations, the initiative seeks to advance self-reliance (Atma-Nirbharta) in meeting India's defense technology needs. The goal of directed research under this policy is to produce relevant, tangible solutions and services for the Indian armed forces.

Focus Areas

- Printing on Flexible Substrates
- Advanced Nanomaterials
- Accelerated Material Design and Development
- High Energy Materials
- Bio-Engineering



ENERGY ANALYTICS LAB

The Energy Analytics Lab (EAL), set up by CSR funding from the Indian Energy Exchange Ltd., is an industry-supported academic initiative of the Department of Management Sciences (DoMS), IIT Kanpur. The EAL aims at building a power sector/market database, and developing learning, visualization and modeling tools for decision-making.

Focus Areas

- Power Market, Power System and Smart Meter Data Analytics
- Resource Adequacy for Distribution Utilities
- Long-term Demand Forecasting and Power Procurement Planning
- Market Design and Modeling: Market Based Economic Dispatch, Security Constrained Economic Dispatch & Ancillary Services Market
- Power System Flexibility: Storage and Demand Response
- RE Integration Modeling
- Power Market Derivatives



JUST TRANSITION RESEARCH CENTRE

The Just Transition Research Centre (JTRC) at IIT Kanpur, founded by Prof. Pradip Swarnakar in 2021, is a first-of-its-kind academic think tank conducting state-of-the-art research on energy and climate policy. JTRC, conducts field-based research, identifying policy gaps to generate tailored policy recommendations for the government and industries ensuring an equitable transition towards a sustainable society.

Focus Areas

- State of The Art Research
- Stakeholder Engagement
- Capacity Building
- Policy Integration



MEDTECH

The MedTech Facility at IIT Kanpur works to create new medical technologies by combining engineering and medical knowledge. Its goal is to develop advanced solutions that improve healthcare and patient care, while working closely with industry partners and healthcare experts.

Focus Areas

- The MedTech Facility focuses on innovation in medical technology, supporting startups in the industry
- It specializes in creating advanced medical devices using techniques such as lasers, fabrication, 3D printing, and additive manufacturing
- The facility offers consulting services to assist in the development of medical technologies
- It is equipped with state-of-the-art laboratories, including a Fine FAB Lab, Wet Lab, and Electronics Lab, to enhance research and development
- The MedTech Facility aims to drive advancements and breakthroughs in the healthcare sector through its resources and support

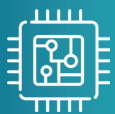


THE MEHTA FAMILY CENTRE FOR ENGINEERING IN MEDICINE

The MFCEM aims to bring together engineers and biomedical scientists to address longstanding challenges in medical sciences. It aims to draw upon the existing strength of IIT Kanpur in the domains engineering and biomedical research, such as, protein engineering, vaccine design, tissue engineering, biomaterials, structural biology, neurobiology and regenerative medicine on the one hand and neural networks, AI/ML based technology, IoT applications, electronics on the other. The MFCEM has three focus areas, namely: Regenerative Medicine, Molecular Medicine, and Digital Medicine.

Focus Areas

- Regenerative Medicine
- Molecular Medicine and Engineering
- Digital Medicine



NATIONAL CENTRE FOR FLEXIBLE ELECTRONICS

The National Centre for Flexible Electronics (NCFlexE) was established in November 2014 with a grant from the Ministry of Electronics and Information Technology (MeitY) and support from IIT Kanpur. It is a platform for a meaningful interaction between industry and academia in the field of Flexible Electronics. An interdisciplinary team advances the frontiers of research in large area flexible electronics and there is synergistic interaction among industries engaged in product development, materials and equipment manufacturing. NCFlexE identifies national and international collaborators to accelerate project execution and sharpen project objectives by identifying partners with complementary strengths.

Objectives

- Conduct research and development in large area flexible electronics by developing partnerships with the industry and with a view that potentially leads to manufacturing
- Incubate small scale industry related to flexible electronics
- Help create ecosystems
- Build strategic partnerships with the goal to establish manufacturing
- Undertake human resource development in relevant areas



NATIONAL CENTER FOR GEODESY

The National Centre for Geodesy (NCG) at IIT Kanpur was established in July 2019 with support from the Department of Science and Technology (DST). It aims to enhance geodesy education, research, and capacity building. It focuses on advanced concepts, creating skilled human resources, fostering collaborations, and contributing to infrastructure development through research and national and international partnerships in geodesy and allied areas.

Focus Areas

- Building capacity and organizing outreach activities through regular short- and long-term training programs, preparing well-trained post-graduate students, developing courses and reference materials, and disseminating relevant information in geodesy and allied areas
- Pursuing state-of-the-art geodetic research
- Acting as the national resource center (laboratory, equipment, training, library, SW, etc.) for supporting students and researchers from various universities and institutions and advising state/central government departments on all projects/initiatives related to geodesy and geospatial science & technology



NATIONAL CRYO-EM FACILITY

The facility, established with support from the Science and Engineering Research Board (SERB), now integrated with the Anusandhan National Research Foundation (ANRF), was inaugurated by Prof. Abhay Karandikar, Secretary, Department of Science and Technology, Government of India, in the presence of Prof. Manindra Agrawal, Director, IIT Kanpur; Dr. Dipti Kakkar Thukral, Scientist G, DST_ANRF; Dr T Thangaradjou, Scientist F, DST_ANRF; and Prof. Shalabh Shalabh, Dean of Academic Affairs, IIT Kanpur, among others.

Focus Areas

- Cryo-EM enables visualization of biological molecules, like proteins and viruses, in near-native states at high resolution
- Focuses on membrane proteins, key drug targets for various diseases and infections by pathogens
- The facility aims to lead in drug discovery and development in India
- Located at IIT Kanpur, it supports India's Atmanirbhar Bharat vision for self-reliance in life sciences
- One of four advanced Cryo-EM facilities in India, strategically positioned for structural biology research



NATIONAL WIND TUNNEL FACILITY (NWTF)

The National Wind Tunnel Facility is a state-of-the-art wind tunnel facility at IIT Kanpur. It consists of movable test sections equipped with turn tables, robotic arm and moving belt. It is equipped with state-of-the-art measurement systems like PIV. It is used for various subsonic aerodynamic testing.

Focus Areas

- Aerospace- space vehicle, ship, fighter aircraft, missile, UAV, Decelerator
- Civil structures- Bridge, Building, Chimney, NDCT
- Miscellaneous- Solar panel, Pantograph, High mast, Antenna, Wind Turbine



RANJIT SINGH ROZI SHIKSHA KENDRA

The RSK Centre was established in November 2021 with the dual mission to provide free and high quality education to all rural children, and skilling rural youth for their employability. IITK student volunteers teach rural school children online through the platform of Online Rural Education Initiative (OREI). RSK has trained 600+ youth and records with an employment rate exceeding 80%. The other activities are design development intervention with artisans and value addition of farm produce.

Focus Areas

- Online Education of Secondary school rural children
- Skilling through Sewing Machine Operator and Leather Stitcher courses
- Design Development of handmade items including pottery and handmade paper
- Value addition of surplus fruits and vegetables through solar dehydration



SCIENTIFIC GLASSWARE FABRICATION & SPECIAL WATER FACILITY

The SGF & SWF shop provides support to the faculty and researchers. The facility's primary mission is to design and fabricate prototypes of special laboratory equipment as well as repair existing types of glass apparatus and equipment. Types of glass routinely used include borosilicate (Pyrex), fused quartz, alumina, silicate and some soft glass as well as heavy glasses such as silica glass. This section takes up challenging jobs from other institutions as well.

Focus Areas

- Fabrication and Modification of various types of glass apparatus as per diagram/design
- All types of condensers, like reflux, distillation, single and double jacket coil condenser
- Dewar flask with silver coating
- Soxhlet Extraction Apparatus
- Reaction vessel with flat flange and Jacketed vessel



STARTUP INCUBATION AND INNOVATION CENTRE

Founded in 2000, the Startup Incubation and Innovation Centre (SIIC) at IIT Kanpur is one of India's oldest technology business incubators, nurturing over 200 startups across diverse sectors. In 2018, SIIC's operations were streamlined under the Foundation for Research & Innovation in Science & Technology (FIRST), a Section-8 company promoted by IIT Kanpur. Over the past two decades, SIIC has fostered a dynamic incubation ecosystem, bridging the gap from ideation to commercialization.

Focus Areas

- Government Product Development Grant Programs
- Access to a global network of Industries
- IP Tech & Transfer, Legal and compliance support
- Access to residential and Co-Working spaces at Noida & Kanpur
- Investment Support



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

Technopark@iitk is an independent not-for-profit Section 8 company registered on February 7, 2019 under the Companies Act 2013, governed by an independent board of eminent people. The vision is to foster industry-academia collaboration by co-developing cutting-edge technologies and innovations in line with national priorities and knowledge-based wealth creation by leveraging the core competence of IIT Kanpur.

Focus Areas

Verticals

- Defence and Aerospace
- Healthcare
- AgriTech
- Transportation
- Infrastructure



KEY INITIATIVES

GANGWAL SCHOOL OF MEDICAL SCIENCES & TECHNOLOGY

IIT Kanpur is establishing the “Gangwal School of Medical Sciences and Technology,” to converge its technology and innovation competencies with medical sciences to catapult the Institute into the league of global institutions that are driving advancements in human biology and healthcare through technology interventions. This will be achieved through eleven ‘Centers of Excellence’ on biomedical research as part of the School and a Super-Specialty Hospital as an extension of these Centers.

Focus Areas

Train and nurture next-generation engineering-driven medical professionals with a strong foundation in technology:

- Biomedical Devices & Robotics
- Digital Health & AI
- Engineering-driven Medical Education
- Connecting with Armed Forces / Global Medical Schools
- Driving Innovation in Medical Practice

Proposed Impacts

Revolutionize healthcare delivery by integrating engineering and medical sciences to develop innovative, affordable medical technologies. Flagship projects initiated towards the objective:

- Left Ventricular Assist Device (LVAD)
- Cardiac Digital Twin and PVAD
- Smart Wheelchair
- 3D printed interbody spacer
- Single optical fiber-based endoscope
- Technology platform for bacteria eradication by plasmonic heating

Enhance healthcare accessibility across the state of UP through targeted engineering solutions and devices. MoU signed towards the objective:

- UP Digital Health Stack
- Armed Forces Medical Services
- Joint degree program with IIM Lucknow

Establish GSMST as a hub in translational research, significantly improving healthcare outcomes worldwide. MoU signed towards the objective:

- Faculty of Medicine, Dentistry, and Health Sciences, University of Melbourne
- Global Consortium of Innovation and Engineering in Medicine, Carle Illinois College of Medicine
- Samsung R&D Institute

Train a new generation of medical professionals.

FIRST-OF-ITS-KIND INSTITUTION IN INDIA

DRIVING BIOLOGICAL ADVANCEMENTS THROUGH TECHNOLOGICAL INTERVENTIONS



SUSTAINABILITY

KOTAK SCHOOL OF SUSTAINABILITY

The Kotak School of Sustainability at IIT Kanpur aims to excel in sustainability education, research and innovation, technology development, entrepreneurship, and outreach. The school will spearhead the development of holistic end-to-end technology solutions for sustainable development for a healthy planet and species.

Focus Areas

- **Sustainability in Education:** Integrate sustainability across disciplines, develop new courses, and expand to national curricula
- **Community & Innovation:** Foster local solutions, encourage innovation through startups, and promote collective well-being
- **Research & Technology:** Advance clean air, water, and waste management using AI, drones, and sensor networks
- **Policy Impact:** Translate research into policy, with data-driven recommendations and field evaluations

Active Ongoing Research Projects with Industry

- AICPMU IIT JAMMU, Center of Excellence in Artificial Intelligence for Sustainable Cities
- Dynamic Hyper-Local Source Apportionment For Real-Time Policy Action
- To Support the Rural Air Quality Monitoring Project
- Utilization of sugarcane bagasse in clay brick production – A sustainable approach for waste management
- A sustainable energy storage solution based on earth-abundant organic materials

KOTAK MAHINDRA BANK AND IIT KANPUR UNVEIL INDIA'S FIRST SCHOOL OF SUSTAINABILITY



CENTER FOR ENVIRONMENT SCIENCE & ENGINEERING

The Centre for Environmental Science & Engineering at the Indian Institute of Technology, Kanpur is conceived with the specific objective of creating an interdisciplinary research facility integrating the fields of engineering, science and medicine to address environmental issues.

The Centre for Environmental Science & Engineering building has been conceptualized, designed and constructed as a "building in the garden" that is sustainable and environment friendly. The facility has obtained a 5 star TERI-GRIHA Green Building certification. The mission of Centre for Environment Science and Engineering is to carry out high quality interdisciplinary research, leading to technology development and competency building in various areas related to environmental problems, thereby providing solutions to Indian industry, medical professionals and policy makers.

Focus Areas

- Develop a new generation of sensors for efficient and quick in situ detection of environmental conditions including emissions / discharges
- Develop new catalysts and adsorbents for removal of contaminants in air, soil and water environments
- Study the impact of environmental pollution on human health
- Develop environment - friendly technologies for abatement of pollutants
- Establish a tripartite relationship between industry, academia and government agencies to nurture and support growth of environmental science and technology

CENTER FOR GANGA RIVEN BASIN MANAGEMENT AND STUDIES (cGANGA)

cGanga is a think tank formed under the aegis of NMCG, with one of the objectives to make India a world leader in river and water science. The Centre is headquartered at IIT Kanpur and has representation from most leading science and technological institutes of the country. cGanga's mandate is to serve as a think-tank in implementation and dynamic evolution of Ganga River Basin Management Plan (GRBMP) prepared by the Consortium of 7 IITs. Recently cGanga has also been given the responsibility of leading river basin management planning for major Indian rivers, namely Mahanadi, Narmada, Godavari, Krishna, Cauvery and Periyar through six such centers (cMahanadi, cNarmada, etc.) established at twelve institutions spread over ten states and a union territory.

Focus Areas

- River Health
- Land and Water Resources
- Historical, Mythological, Social and Cultural Aspects
- River High Impact Activities
- Waste Management

CHANDRAKANTA KESAVAN CENTRE FOR ENERGY POLICY AND CLIMATE SOLUTIONS CENTRE

Chandrakanta Kesavan Centre works towards developing climate solutions through clean energy technology development, relevant policymaking, and engagement with different stakeholders. Its vision is to spearhead the development of these solutions to help India and the world combat climate change. An important aspect of the Centre's mandate is to spearhead the technology and policy communication to different stakeholders.

Focus Areas

- Developing clean energy technologies and policy documents for climate solutions
- Development of low carbon energy technologies (Next-generation solar photovoltaic materials and devices; new chemistries and materials for batteries, clean fuels)
- E-Masters program on Renewable Energy and E-mobility for working professionals
- Strengthen and promote outreach, communication, grassroot engagement in different aspects of energy and climate change
- Help the IIT Kanpur campus to become NetZero

NATIONAL CENTER FOR EXCELLENCE FOR AI FOR SUSTAINABLE CITIES

IIT Kanpur was recently selected to run the National Center for Excellence for AI for Sustainable Cities, with a budget of Rs 310 cr sanctioned by the Ministry of Education over the next four years. The Center's mandate is to develop and roll out technology solutions for urban sustainability challenges, guided by an appreciation of the priorities of our line ministry – the Ministry of Housing and Urban Affairs (MOHUA).

The center has already started operations on a pilot scale, in response to MoE's challenge-based mode of selection, with our activities summarized below:

Energy: IIT Kanpur and Adani Total Gas Limited collaborated to develop high-accuracy models for forecasting piped natural gas demand in Ahmedabad and optimizing CNG refueling schedules in Haryana. A MoU with Adani Electricity Mumbai Limited focuses on power demand forecasting and predictive maintenance.

Air Quality Monitoring: IIT Kanpur developed machine learning techniques for calibrating low-cost air sensors, enabling real-time air quality forecasting, hotspot identification, and source apportionment. Collaborating with TCS, the institute created algorithms to detect waste and plastic burning episodes in near-real-time.

Civic Governance: Partnering with the eGov Foundation, IIT Kanpur developed AI middleware for the DIGIT platform, used by 1500+ urban local bodies, to enhance grievance redressal systems. The technology, already deployed across all Central Government Ministries, serves citizens nationwide.

Urban Mobility: IIT Kanpur created AI algorithms for monitoring, forecasting, and analyzing vehicular behavior using city-wide safety camera data. Complementing this, the IIIT-Delhi startup Charter deployed AI algorithms for dynamic multimodal transit planning, demonstrated in pilot projects for corridor and city-level applications.





OUR FUTURE VISIONARIES

TALENT BEHIND TOMORROW'S TECH: STUDENT CLUBS



TEAM AERIAL ROBOTICS IITK

A student-driven team focused on developing innovative aerial robotic systems for various applications. The team specializes in designing, building, and testing autonomous drones, participating in international competitions, and advancing research in aerial robotics.



TEAM AUTONOMOUS UNDERWATER VEHICLE (AUV) IITK

AUV IIT Kanpur is a student-led team dedicated to advancing underwater robotics technology. The team designs, builds, and tests fully autonomous underwater vehicles capable of performing complex tasks in challenging marine environments. They participate in prestigious international AUV competitions.



TEAM IITK MOTORSPORTS

IITK Motorsports is a student-driven team focused on designing, fabricating, and racing high-performance Formula-style race cars. The team actively participates in national and international competitions, applying engineering principles to real-world automotive challenges.



TEAM HUMANOID

Team Humanoid at IIT Kanpur is a research-driven student team developing humanoid robots capable of performing human-like tasks. Their work focuses on robotics, artificial intelligence, and biomechanics to create robots that can operate in dynamic environments.



TEAM EQUIPE DE ROBOTIQUE AUTONOME (ERA) IITK

Team ERA at IIT Kanpur is a research-driven student team developing Autonomous ground robots capable of performing localization, mapping & communicating tasks. Their work focuses on robotics, vision, and swarm to create robots that can operate in dynamic environments.



IITK ROCKETRY AND SPACE XPLORATION TEAM

RaSET is a team of passionate engineering students applying classroom principles to real-world challenges in space tech. The team works together to build cutting-edge rockets, gain hands-on experience, and compete in global events like the Spaceport America Cup and INSPACe Model Rocket Competition.



CSR ALIGNED INITIATIVES



COMMUNITY WELFARE & EDUCATION INITIATIVES

IIT Kanpur is committed to uplifting society through impactful community welfare and educational initiatives. By leveraging technology and innovation, the institute collaborates with organizations to enhance education quality, accessibility, and employability. From digital learning resources to vocational training in IT, robotics, and entrepreneurship, IIT Kanpur empowers underprivileged and marginalized communities. Through outreach programs like educational campaigns and science fairs, it nurtures young minds and drives community development, reflecting its dedication to creating a positive societal impact.

Community Welfare

Scholarship Programmes

PadhAi - LikhAi: Advanced Innovative (AI) Lab

Multi-modal LLM's to Improve Infrastructure for Teachers

Education

Opportunity School

Prayas 'Education for All'

Shiksha Sopan (NGO)



DISABILITY

IIT Kanpur is dedicated to fostering an inclusive environment by ensuring campus accessibility and offering assistive technologies and adaptive learning resources. The institute develops tools such as screen readers and speech-to-text software to support visually and hearing-impaired students. Regular workshops and seminars are conducted to raise awareness and promote empathy within the campus community about the challenges faced by differently-abled individuals. Scholarships and financial aid are provided to ensure equal opportunities for education and personal growth. Additionally, IIT Kanpur actively engages in research to innovate solutions and technologies that enhance the lives of differently-abled individuals. These initiatives underscore the institute's unwavering commitment to creating a supportive and inclusive space for all.

Cell for Differently Abled Persons (CDAP)

Design and Development of a Hybrid Assistive Device for Transfer Mobility and Rehabilitation

AI for Developing Sign Language Technologies: Towards Empowering & People Suffering from Deafness

Infrastructure Support to Students with Physical Limitations on Campus



ENVIRONMENT & SUSTAINABILITY

IIT Kanpur's CSR sustainability initiatives aim to tackle environmental and societal challenges through cutting-edge research and innovation. Collaborating with industry, the institute develops clean energy solutions, including solar and wind energy projects, to reduce carbon footprints and promote renewable energy adoption. It also advances waste management through recycling and waste-to-energy technologies, fostering sustainable urban living. Addressing water scarcity, IIT Kanpur undertakes projects on water conservation, rainwater harvesting, and efficient management practices. Its focus extends to sustainable farming, precision agriculture, and organic farming technologies to enhance food security while minimizing environmental impact. The institute also champions green building design, incorporating energy-efficient materials and technologies to reduce ecological footprints. Through workshops, seminars, and campaigns, IIT Kanpur raises awareness about sustainability and encourages community participation in eco-friendly practices. These initiatives embody the institute's commitment to advancing sustainability through innovation, research, and collective action, aligning with global sustainability goals.

Kotak School of Sustainability

Ambient Air Quality Monitoring Over Rural Areas (Using Indigenous Technology)

Autonomous Water Quality Monitoring and Active River Cleaning System



HEALTHCARE

IIT Kanpur is deeply committed to advancing healthcare through innovation, research, and development. The institute focuses on creating affordable and accessible medical technologies, including medical devices, diagnostic tools, and therapeutic solutions. Collaborating with healthcare institutions, government bodies, and industry partners, IIT Kanpur ensures that groundbreaking research is effectively translated into real-world applications. Through its technology incubators, such as the Startup Incubation and Innovation Centre (SIIC), it nurtures healthcare-focused startups by providing mentorship, funding, and access to cutting-edge facilities. These efforts underscore IIT Kanpur's dedication to leveraging technology to enhance healthcare outcomes, making a significant impact both nationally and globally. Key initiatives include:

Gangwal School of Medical Sciences and Technology

Assistive Technology: For People with Physical Limitations

Affordable Artificial Heart: Left Ventricular Assist Device (LVAD)

AI in Healthcare



INFRASTRUCTURE & DEVELOPMENT

IIT Kanpur has undertaken a series of transformative infrastructure projects aimed at accommodating its growing student community, fostering a culture of innovation, and enriching the overall campus experience. These initiatives include the development of modern academic blocks, equipped with advanced research laboratories and state-of-the-art classrooms, designed to support cutting-edge learning and groundbreaking research. By creating an environment that integrates functionality with innovation, IIT Kanpur continues to strengthen its position as a hub for academic excellence and pioneering discoveries, ensuring that students and researchers have access to world-class facilities that inspire creativity and collaboration.

Hall Renovation & Construction

Supporting New Departments

Existing Lab Upgradation

Gangwal School of Medical Sciences & Technology

Upgradation of Sports Facility



SKILL DEVELOPMENT

IIT Kanpur has long been a forerunner in fostering technical and entrepreneurial skills in India. Through initiatives like the Center for Continuing Education, IIT Kanpur extends its skilling programs beyond its student body. The center offers various short-term courses, workshops, and certificate programs aimed at professionals seeking to upgrade their skills. These programs are meticulously crafted by IIT Kanpur's faculty, often in collaboration with industry experts, to address skill gaps in specific fields.

Digital Literacy | Quality Education

Citizen Science | Surveying & Enumeration

Rural Sports | Skilled Manpower

Sustainable Agriculture

**COLLABORATE
WITH
IIT KANPUR**

IITK COLLABORATION ADVANTAGES

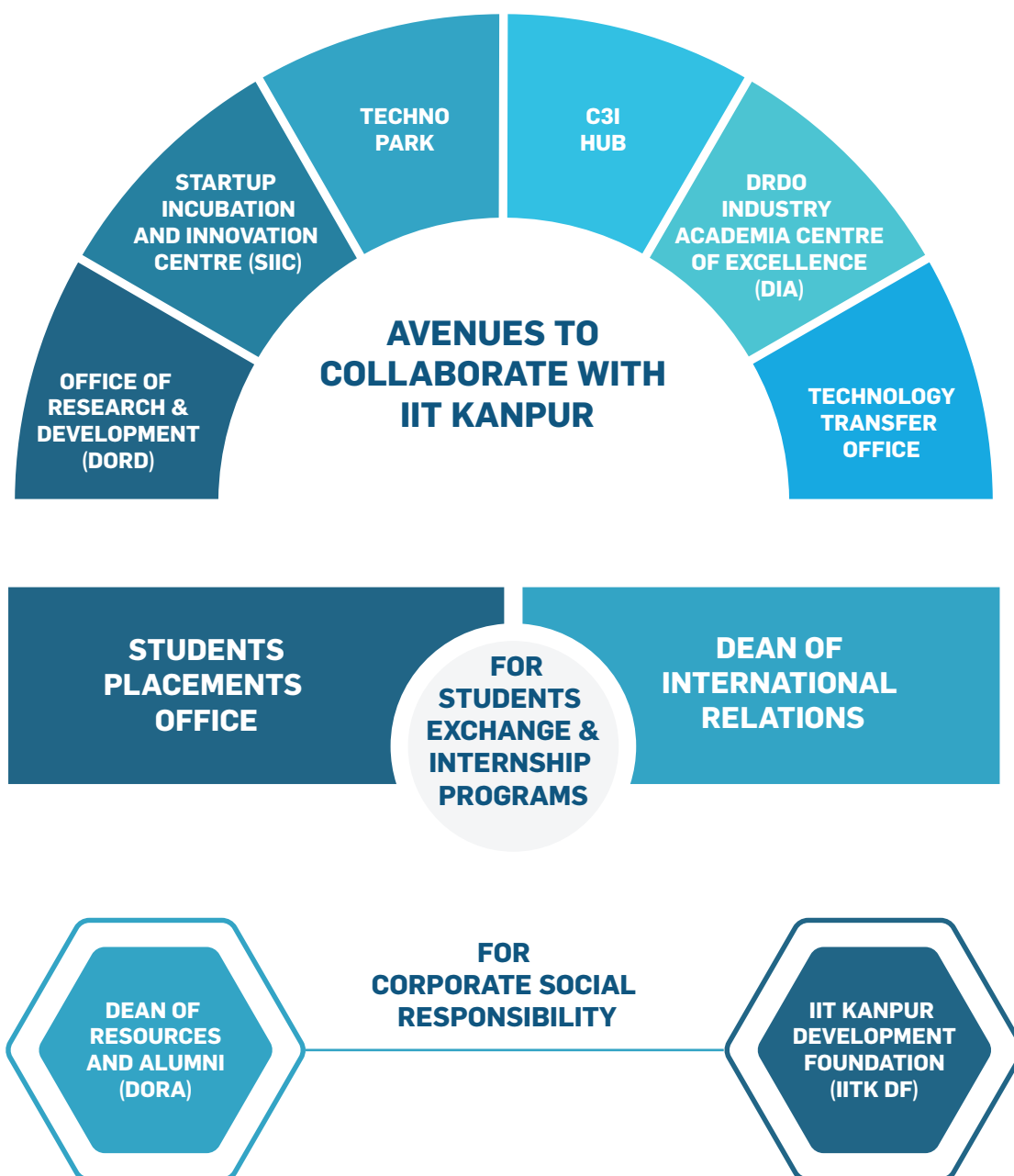
Access to Cutting-Edge Research: Corporations can leverage the latest findings and technological advancements from IIT Kanpur's research initiatives.

Enhanced R&D and Intellectual Property (IP) Development: Joint research initiatives enable industries to explore new ideas, innovate, and solve complex problems by combining academic expertise with practical industry experience. Such partnerships can lead to IP development with the potential for shared ownership or licensing opportunities that benefit both parties.

Cost and Time Efficiency: Corporations can reduce their R&D costs and timelines by utilizing the infrastructure, expertise, and academic resources rather than building these capabilities in-house.

Human-Centered Innovation: Humanities and social sciences offer insights into human behavior, culture, and social trends. Collaborating with our department can drive innovation in product development, marketing, and services by grounding them in a deeper understanding of human needs and values.

Networking Opportunities: Partnerships with IIT Kanpur can enhance industry connections and open doors to new collaborations.



Dear Corporate Partners,

We hope this message finds you well. As we reflect on our collaboration, we want to take a moment to express our heartfelt gratitude for your ongoing support and partnership. Your commitment has been vital to our shared success, and we truly value the strong relationship we've built together.

Over the past year, our joint efforts have led to remarkable achievements, from innovative projects to impactful initiatives that align with our mutual goals. Your expertise and resources have significantly enhanced our capabilities, allowing us to tackle challenges effectively and explore new opportunities.

We appreciate the trust you place in us and the open communication that makes our collaboration so productive. As we look to the future, we are excited about the potential for further growth and innovation together.

Thank you once again for being a valued partner. We look forward to continuing our journey together and achieving even greater success in the coming year.

Best Wishes,

Team IIT Kanpur

INDUSTRY SPEAKS

Dr. A. S. PRASAD

General Manager, Integrated Rack Solutions



Vertiv takes pride in associating with IIT Kanpur and Shiksha Sopan for making a difference in the lives of the underprivileged in the country through our CSR initiative. Education, sustainability and Energy are themes for Vertiv for our CSR funding and we look forward to partnership with IIT Kanpur for further work in all these tracks.

Mr. RAFIQ SOMANI

Area VP India & ASEAN Sales



IIT Kanpur's unwavering focus on social responsibility, deep understanding of the community's needs, and commitment to creating meaningful change have been invaluable in propelling our collaborative journey for CSR activities. Through CSR funding, Ansys has enabled the IITK team to promote and drive systematic and thorough research among postgraduate students in the domains of science, technology, engineering and medicine aimed at promoting Sustainable Development Goals.

Mr. Dheeraj Saxena,

Director, Global Engineering, Portescap, Regal Rexnord



This collaboration with IIT Kanpur is a testament to a shared vision of advancing healthcare solutions through cutting-edge research. Together, we aim to explore new frontiers in medical technology, blending Portescap's industry expertise with the academic rigor and innovative spirit of IIT Kanpur.

THANK YOU PARTNERS



PNC Infratech Limited



and many more...

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