Chairman's Message

As the world marches into the 21st century, India, at the forefront of the developing world needs an increasing lot of intelligent, astute, hardworking and technically proficient minds. Indian Institute of Technology Kanpur (IIT K) well known for its cutting-edge research and teaching programmes prides itself on creating an environment that facilitates in not only the academic but the overall development of the student.

The hallmark of IIT K has always been relentless strive towards excellence and perfection. We expose our students to strong fundamentals in their subject areas and hone their interpersonal skills to develop them as future leaders in their chosen fields of work. The academic curriculum at IITK has a strong emphasis on basic sciences, engineering and humanities, which is successful in producing competent engineers and scientists with a concern for human values and surroundings.

Here at Student Placement Office (SPO), our effort is to provide a platform to facilitate interaction between students and companies so both can find the best match as their aspirations and requirements. Quick on the uptake, with good communication and human relations skills and aware of modern developments, the typical IIT K graduate is expected to play a very important role in organizations like yours wanting to be internationally competitive in terms of products, services and technology.

Our previous placement sessions witnessed the best placement percentage among all IITs, which is a testimony to the increasing faith that the corporate world has put on us.

Our portal is the starting point of our interaction where you will find all necessary information. We will welcome your queries related to recruitment at IITK. Also, write back your ideas that can help us at SPO.

If interested in making an early Pre-Placement Talk, please let us know the preferred date. PPTs are held after class hours, i.e. 6 PM onwards on weekdays & 10 AM onwards on Saturdays up to mid-November leaving out the 4 day period of mid-October which is scheduled for the cultural festival Antaragni.

I take this opportunity to invite you for placements to IIT K.

Dr. Syam Nair
Chairman
Students' Placement Office
IIT Kanpur

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The Mechanical Engineering Department at IIT Kanpur is one of the founding departments with a legacy of its own and played a leading role in evolving the "Engineering Science" based curriculum and served as a model for many engineering institutes in the country. Being one of the most prestigious departments in India, it has an extensive contribution in groundbreaking research works in the country. Nurturing the best minds of the nation, both in form of faculty and students is one of the key mottos of the department. The professional program of the department includes a deeper study on a number of engineering, theoretical and experimental solutions of physical problems, and design of systems relevant to the contemporary industrial world.

The department has:
39: Number of Faculties
400: Number of Undergraduates
77: Number of M.tech. Students
152: Number of Ph.D. Students
17: Books/Monographs Published (2009-2014)
144: Journal Publications (2015)
29: Affiliated Centres Research Laboratories.
Major Degree Programs

B.tech. B.tech.-M.tech. Dual M.tech. M.S.(R) Ph.D.

**B. Tech.** : It is a 4-year program comprising of 8 semesters. The program includes a deep study of a number of engineering sciences to which students are introduced at the core curriculum level relevant to the contemporary industries.

**B. Tech – M. Tech. Dual** : It is a five-year program comprising of ten semesters. Both the degrees are awarded at the end of five years. It has been designed for students to do M. Tech. with just one year of extra effort and contribute to research efforts.

**M. Tech.** : It is a 2-year program comprising of rigorous coursework followed by a full year of research. Courses often include advanced level group projects and/or individual research project.

**M. S. (R)**: It is also 2-year program similar to M. Tech. but with more emphasis given on research or thesis work. It involves fewer course credits and more research/thesis credits. Students work on more challenging industrial oriented problems and sponsored projects.

**Ph.D.** : It is the highest degree awarded by the department and is for students who are interested in research careers. Its focus, unlike regular degrees, is not learning existing knowledge but creating new knowledge.
Major Branches

Fluid and Thermal Sciences

**ALTERNATE FUELS AND INTERNAL COMBUSTION ENGINE**

Alternate Fuels and Internal Combustion Engine
The alternate fuels and internal combustion engine area aim to develop state-of-art experiments related to Internal Combustion Engines and vehicles apart from Emission and engine related Tribological Investigations.

**COMBUSTION AND ENERGY SYSTEMS**

The Combustion and Energy Systems area seeks to focus on technologies for efficient energy conversion, storage, and utilization, which aim to meet the urgent challenge of a safe, reliable and sustainable energy supply in the face of ever-growing demand.

**GAS TURBINE ENGINEERING AND TECHNOLOGY**

The objective is to keep pace with the recent technological advancement in the field of fluid mechanics and Gas Turbine. Emphasis is on simulation and measurement of unsteady flow fields in Gas Turbine environments.

**TRANSPORT PHENOMENA AND MULTI-PHYSICS SIMULATIONS**

Researchers in the Transport Phenomena and Multi-Physics Simulations track work in the areas of theoretical, experimental and numerical methods for fluid flow and heat transfer related applications to provide a deeper insight on the phenomena which are relevant in nature and industry.
Major Branches

Manufacturing Science

ADVANCED MANUFACTURING PROCESSES

In this area, various nano-finishing processes and strategies like Magnetorheological Abrasive flow finishing (MRAFF) is utilized to develop surface finishes less than 100nm which are heavily utilized for prosthetics, implants, nuclear reactors, micro-mirrors etc.

Nanofinishing of knee joint implant (Ti alloy) by MRF

MEMS FABRICATION

The researchers in MEMS fabrication area develop microscale technologies for applications in the physical and biomedical sciences.

Array of craters on silicon material fabricated with Excimer laser machining process

SOLIDIFICATION AND PHASE CHANGE ENERGY SYSTEMS

In this area, the multiscale phenomena of microstructure and chemical compositions formation in solidification processing (casting, welding) are studied.

Dendritic growth during solidification of metal

MICRO/NANO-TEXTURING

The major research focus is on nano/ meso scale patterning in metals and polymers for developing different surfaces which have different wettabilities, adhesion and friction coefficients for tribological applications.
Major Branches

Solid Mechanics and Design

**ACOUSTICS, DYNAMICS AND VIBRATION**

Research expertise of our faculties lies in areas related to structural vibration, vibration control, noise control, acoustics, stability, bifurcation & chaos, pattern formation, non-smooth systems, time-detailed systems.

**MECHANICS OF SOLIDS**

The research activities in this track involve theoretical, experimental and numerical techniques applied to a wide range of materials, composites, metals, polymers, etc.

**CAD AND OPTIMIZATION**

Our focus is to analyze and comprehend diverse designs in nature that are time-tested and robust and to implement assimilated concepts for optimal form design in engineering problems.

**ROBOTICS AND MECHANISM**

The Robotics and Mechanisms area seeks to promote research and develop technologies that enable systems to exhibit intelligent goal-oriented behavior, and developing innovative instruments to monitor, manipulate, and control systems.
Major Undergraduate courses:

Compulsory Courses

Fluid Dynamics
Heat and Mass Transfer
Convective Heat and Mass Transfer
Mechanics of Solid
Advance Mechanics of Solid

Elective Courses

Refrigeration and Air Conditioning
Internal Combustion Engine
Measurement and Control of Flow
Power System
Direct Energy Conversion
Introduction of Tribology
Dynamics of Rotating Machinery
Automation Mechanics
Composite Materials
Manufacturing Design
Energy System I & II

Tool Design
Finite Element Method
Fracture Mechanics
Optimisation Techniques
Analysis and Synthesis of Linkage
Solar Energy Thermal Processes
Interactive Computer Graphics and Design
Computer Aided Manufacturing
Computer Aided Engineering Design
Numerical Control of Machine Tools
Numerical Fluid Flow and Heat Transfer

Design of Machine Element
Dynamics of Vibration in machine
Manufacturing Technology
Automation and Control
Graphics in Machine Design
Theory of Mechanism and Machines

1st year
Basic Science

2nd year
Engineering Science and Projects

3rd year
Compulsory Dept.
Courses, Elective & Interships

4th year (5th year)
Major Postgraduate courses:

Solid Mechanics and Design

- Introduction to Solid Mechanics
- Applied Dynamics and Vibration
- Engineering Acoustics and its Control
- Wave Propagation in Solids
- Optimization of Engineering Design
- Computer Aided Engineering Design
- Finite Element Methods
- Non-Linear Vibration
- Fracture Mechanics
- Theory of Elasticity
- Vibration Control

1st year
Course work and specialization

Manufacturing Science

- Advanced Machining Process
- Solidification and Casting Process
- Computer Aided Manufacturing
- Manufacturing Automation
- Additive Manufacturing
- Machining Dynamics
- Metal Forming
- Machining Science
- Micromachining
- Bio-MEMS

2nd year
Thesis, Research work and Teaching Assistantship

Fluid and Thermal Sciences

- Numerical Fluid Flow and Heat Transfer
- Conduction and Radiation
- Convective Heat and Mass Transfer
- Viscous Flow Theory
- Granular Materials

Fuel Cells
- Experimental Methods in Thermal Science
- Alternative Fuels in IC Engines
- Engine Management
- Advance Theory of Turbo Machinery
- Turbulent Fluid Mechanics
Advanced Laboratory Facilities

4i Laboratory
Control Laboratory
Experimental Stress Analysis Laboratory
Fluid Mechanics Laboratory
Heat Transfer and Refrigeration & Air-Conditioning Laboratory
Mechanical Testing Laboratory
Advanced Nano Engineering Materials Laboratory
CAD and Rapid Prototyping Laboratory
CAM and Computational Manufacturing Systems Laboratory
Centre for Mechatronics
Advanced Laboratory Facilities (cont.)

Computational Fluid Dynamics Laboratory
Computational Mechanics Laboratory
Computational Turbomachinery Laboratory
Advanced Fluid Mechanics Laboratory
Internal Combustion Engines Laboratory
Kanpur Genetic Algorithms Laboratory
Smart Materials Laboratory
Vibration Laboratory
Bio-Medical Research Laboratory
The Institute has a reputation of devout contribution in the field of Research and Development. The following points briefly highlight the area of research activities being carried out here at Department of Mechanical Engineering, IIT Kanpur.

**Sponsored Projects**

- Doe for t-90 barrel.
- Modeling of hydrodynamics-Chemistry interaction during carbon nanotube synthesis in a CVD reactor.
- Vetting of design and drawings of vertical lift gates of Pharai dam in dist. Jhansi (UP).
- Development of compressed air based test bed for pipeline health monitoring robot.
- Development of cabin pressure control system for LCA.
- Technology mission for Indian railways (TMIR).
- Design and development of network management system for national knowledge network.
- A BCI operated hand exoskeleton based neurorehabilitation system for movement restoration in paralysis.
- SANDHI: Scientific study of Indian Knowledge systems.
- Space Technology Cell.
- Development of prosthetic hand for amputees.
- Automated mobile neutron and gamma spectroscopy.
- CSRDM shroud tube hydraulics of control plugin fast breeder reactors.
- Surface texturing on biocompatible titanium alloy for inducing hydrophobicity using ECMM.
- Local heat transfer coefficient during film condensation of steam hydrogen mixtures.
- Vibration control of cryocoolers for satellite applications.
- Innovative thermal energy storage system [inotes].
Students' Practical Exposure

Internships & Projects

Undergraduate students need to undergo a mandatory internship post completion of the sixth semester. The internships are primarily of two types, industrial or academic.

While industrial internships widen students’ knowledge of technological applications in the field and help them try out their knowledge to the real-life applications, academic internships allow an invaluable exposure to the research environment.

Students also actively participate in various prestigious technical competitions on national and international level complementing the theoretical knowledge imparted in classrooms and emphasizing on the practical aspects of engineering.
**DISTINGUISHED ALUMNI**

**Anil K Rajvanshi,**
Director of Nimbkar Agricultural Research Institute (NARI)

**Late Anil Agrawal,**
Former Director of Centre for Environment, New Delhi

**Sanjay G. Dhande,**
Director of Indian Institute of Technology, Kanpur

**Shantanu Srivastava,**
Technical Consultant for promotion of India-Vietnam economic relations

**Rakesh Gangwal,**
President and chief Executive Officer of United States Airways

**David B. K. Thomas,**
Known for his selfless services towards women empowerment

**Yashwant Kanetkar,**
Entrepreneur and pioneer of Information Technology education in India

**Pawan Kumar Goenka,**
Chief Operating Officer of Mahindra and Mahindra

**Ravi Sethi,**
President of Avaya Laboratories

**Late Lalit Kishore Chaudhary,**
Plant Director of Fairfield Atlas

**Arun Shukla,**
Chairman, Mechanical Engineering University of Rhodes Island

**Mahesh Gupta,**
Founder of Kent Water Purification Systems.