Department of Mechanical Engineering
Indian Institute of Technology Kanpur

SESSION 2020-2021

The Recruiter's Guide

Placement Brochure

Students' Placement Office,
Indian Institute of Technology Kanpur

VISIT US AT https://www.iitk.ac.in/me
It is my pleasure to welcome you for the placement session of our institute for this year. I take this opportunity to thank you for visiting us with the aim of employing the very best from among the talent pool available in the country.

Indian Institute of Technology Kanpur (IITK) takes pride in not only its rigor and quality of teaching, but in overall development of its students. We have done pioneering work in the delivery of holistic education in the past and continue our rich traditions to bolster the engineering and technology education canvas of our country. Our recently concluded Golden Jubilee reminds us of our continued commitment for achieving excellence on all frontiers of our activities.

I am very happy to present before you this batch of young and vibrant mechanical engineers, trained by us in the last four years. As you may be aware, our curriculum lays a strong emphasis on basic sciences, engineering, as well as humanities. This pioneering combinational approach is an integral part of our pedagogical philosophy, which has consistently proved to be effective in producing competent engineers and scientists, not only leaders in their specialization, but sensitive and concerned for human values and their environment.

The Student Placement Office (SPO) strives to provide an interactive platform to facilitate interaction between our students and potential employers. We believe in an open atmosphere so as to establish the connect, where goals, objectives, and aspirations of all stakeholders’ match. We understand the vital role of human resources in an organizational ecosystem and are sure that you will find the most suitable candidate, from among our pool of highly trained mechanical engineers. We are confident that our students will further the objectives of your organization in terms of products, services, and technology, at the national as well as international markets.

We are proud of the past placement records of our department; the data is a testimony to the continued faith that the worldwide employers have on our graduates. I am sure you will go back completely satisfied from our campus and our flag bearers, your future employees, will shine in your respective organizations, in turn, providing us the necessary strength to continue our journey of achieving excellence in human resources development.

Welcome to IIT Kanpur!

PROF. SAMEER KHANDEKAR, FNAE
Head of Department
Department of Mechanical Engineering
Indian Institute of Technology Kanpur
The Department of Mechanical Engineering at IIT Kanpur is one of the founding departments with a legacy of its own and played a leading role in evolving the 'Engineering Spectrum' 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 ground breaking research work in the country. Nurturing the best minds of the nation, both in the form of faculty and students, is the key motto of the department. The professional program of the department includes a deeper study on a number of engineering, theoretical, and experimental solutions to physical problems, and design of systems relevant to the contemporary industrial world.

ABOUT US

Category: Engineering - Mechanical

42 Faculty
500+ UGs
300+ MTechs
200+ PhDs
100+ Books
150+ Journal Publication*
30+ Advanced Laboratories

*For Academic Year 2019-20
MAJOR DEGREE PROGRAMS
MECHANICAL ENGG., IITK

B. TECH
4 YEAR / 5 YEAR PROGRAM
4 Year - Regular Program, 5 Year - Double Major
Deep Study of number of engineering courses
where students are introduced to core
curriculum relevant to contemporary industries.

BT-MT DUAL
5 YEAR PROGRAM
Both B.Tech and M.Tech degrees awarded at the
end of five years. Students are introduced to
core curriculum in bachelors and then they
contribute towards research for an year.

M.TECH
2 YEAR PROGRAM
Comprises of rigorous coursework followed by
an year of research. Courses often include
advanced level group projects and/or individual
research project.

M.S.(R)
2 YEAR PROGRAM
Similar to M.Tech, with more emphasis on
research. Involves fewer course credits and more
research/thesis credits. Besides fundamental
research, students work on many challenging
industrial oriented projects.

PH.D
5 YEAR PROGRAM
Highest degree awarded by the department for
students interested in research careers. Its focus,
unlike other degrees, is more towards generating
new knowledge than learning extant knowledge.

IMAGE: ACADEMIC AREA - AERIAL VIEW
Credits: Aditya Raghav Trivedi
MAJOR BRANCHES
FLUID AND THERMAL SCIENCES

Besides the traditional research areas in thermodynamics, fluid dynamics, heat transfer, multiphase flows, turbulence and combustion, this group is engaged in a broad range of research activities in experimental fluid dynamics, computational fluid dynamics and heat transfer, flow in porous media, turbomachinery, electrochemical energy conversion, IC engines, alternate fuels, laser diagnostic techniques, microfluidics and heat transfer, boiling heat transfer, condensation, heat pipes, thermal management, sprays, turbulent combustion, hydrodynamic instabilities, vortex dynamics, energy storage materials, atomic scale computation, etc.

ALTERNATE FUEL AND INTERNAL COMBUSTION ENGINES

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 utilisation, which aim to meet the urgent challenge of a safe, reliable and sustainable energy solutions in the face of ever-growing demand.

GAS TURBINES ENGINEERING AND TECHNOLOGY

The objective is to keep pace with the recent technological advancement in the field of fluid mechanics and Gas Turbine. Besides emphasis on simulations and measurements, the researchers are also involved in development of micro gas turbines.

SOFTWARE SKILLS

MATLAB, COMSOL, OpenFOAM, Fluent, Mathematica, Solidworks, PTC Creo, Maple

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.

RESEARCH AREAS

- CFD applied to Turbomachinery
- Renewable energy resources: solar, biomass-to-fuel via thermal conversion techniques
- Heat transfer during boiling and condensation
- Geophysical flows
- Li-ion batteries, battery thermal management
- LES/DNS for complex transitional and turbulent flows.
- Solar-assisted water-splitting for H2 generation: prototype development
- PEM Fuel cell
- Combustion in Gas Turbines and IC Engines, Alternative Fuels, Biodiesel Research
- Engine Noise and Vibration, Laser Ignition
- Computational fluid dynamics and heat transfer
- Experimental fluid dynamics and heat transfer
Major Branches
Solid Mechanics

Research covers all aspects of dynamics and vibration, nonlinear dynamics, rotor dynamics, continuum and granular mechanics, plastic instability, robotics, intelligent control systems, microsensors and actuators, CAD, machine dynamics, smart structures, active and passive vibration control, composite materials, non-destructive testing, finite element method, multiscale modelling of solids, acoustics and noise control, mechanics of fracture, functionally graded composites, mechanics of biological membranes, mechanics of nanomaterials, and mechanical behaviour of polymers.

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.

CAD and Optimization

Our focus is to analyse and comprehend diverse designs in nature that are time tested and robust and to implement as simulated concepts for optimal design in engineering problems.

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.

Research Areas

- Linear and nonlinear modeling of electrodynamic systems
- Effect of nonlinearities on the system behavior
- Vibration characteristics of continuous systems
- Machine-tool vibrations
- Time-delayed systems
- Reduced order modeling
- Domain Mapping for surface modelling, motion planning
- Protein docking through shape complementarity of molecular surfaces
- Applied Mechanics
- Computational Mechanics
- Mechanics of Defects and Heterogeneities
- Mechanics of Materials
- Smart Materials, Structures and Systems

Software Skills

Matlab, COMSOL, OpenFOAM, Fluent, Mathematica, Solidworks, PTC Creo, Abaqus, LabVIEW, MoldFlow
MAJOR BRANCHES
MANUFACTURING SCIENCE

"Research is focused on the following key areas: manufacturing systems, manufacturing processes, advanced machining processes, micro/nano fabrication and finishing, nanotechnology, bioengineering, nano-composites, MEMS, laser/plasma surface coating technologies, large deformation systems, CAM of advanced engineering materials, polymer processing and rheology, lab on chip, vibration control of machine tools, adaptive control system, unconventional machining, solid-liquid phase change (melting/solidification).

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 used for prosthetics, implants, nuclear reactors, etc.

MEMS FABRICATION

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

METAL REMOVING AND FORMING

Experimental investigations are performed on the effect of different single and multiple layers of materials on cemented carbide inserts and optimum conditions of machining are evolved for a high level of surface finish.

SOLIDIFICATION AND PHASE CHANGE ENERGY SYSTEMS

In this area, the multi scale phenomena of micro structure and chemical compositions formation in solidification processing (casting, welding) are studied.

SOFTWARE SKILL

Matlab, COMSOL, OpenFOAM, Fluent, Mathematica, Solidworks, PTC Creo, LabVIEW, CutPro-Modal Analysis, Maple

MICRO/NANO-TEXTURING

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

RESEARCH AREAS

- Micromachining of channels using ECDM processes, nanofinishing using MRAFF, and MAF processes
- Utilization of coated tool inserts for optimized machining
- Optimization of die shape in hot/cold extrusion
- Estimation of residual stresses in rolling and forging
- Modeling of multi-pass rolling by including anisotropy
- Prediction of Earing and optimization of initial blank shape for the prevention of earing
- Prediction of flange wrinkling in deep drawing using a bifurcation criterion
- MEMS fabrication for microfluidics and integrated micro/ nano sensing
- Microtexturing on metals, polymers and semiconducting surfaces through Laser processes and using CVD growth
- Solidification processing, thermal spray coating, and solid-liquid phase change energy systems.
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. Overall, our research spans the following areas: humanoid robots, intelligent control systems, flexible manipulators, mechanism theory, microsensors and actuators, and compliant mechanism. We focus on enabling technologies that necessitate novel design solutions in terms of development of new methods of synthesis, analysis & optimization of novel robots and mechanisms.

RESEARCH AREAS

- Analysis, synthesis and motion planning of robots and mechanisms
- Biped Locomotion: Design and experimentation of optimal energy efficient biped robots with compliance at foot, knee joints, etc.
- Exoskeleton: Human motion based design and development of a three finger 10 DOF exoskeleton robot hand for rehabilitation of stroke patients.
- Intelligent control systems: Design, development and path planning of 14 DOF Lunar rover on 3D terrain.
- Kinematics and redundancy resolution for performing tasks with arm on rover.
- Smart compliant mechanisms

SOFTWARE SKILLS

Matlab, Simulink, Maple, COMSOL, Mathematica, Solidworks, PTC Creo, Arduino-IDE, Abaqus
The Department maintains the following laboratories for instruction and research: Experimental Stress Analysis, Vibration and Control, Material Testing, Machines and Mechanisms, Fluid Mechanics, Energy Conversion, Heat Transfer, Refrigeration and Air Conditioning and Manufacturing Science. Besides this, the faculties are actively involved in many advanced research laboratories written below.

- Acoustics Laboratory
- Advanced Fluid Mechanics Laboratory
- Advanced Nano Engineering Materials Laboratory
- Applied Solid Mechanics Laboratory
- CAD and RP Laboratory
- CAM & Manufacturing Science Laboratory
- CFD Laboratory
- Compliant and Robotics Systems (CARS) Lab
- Computational Manufacturing Systems Laboratory
- Center for Mechatronics
- Combustion and Energy Conversion Systems Laboratory
- Computational Mechanics Laboratory
- Computational Turbomachinery Laboratory
- Divya Drishti
- Energy Conversion and Storage Laboratory
- Engine Research Laboratory
- Gas Hydrate Research Laboratory
- Gas Turbine Heat Transfer Laboratory
- Manufacturing Laboratory
- Metrology Laboratory
- Micro systems Fabrication Laboratory
- Micro-scale transport laboratory
- NDT Lab
- Nonlinear Mechanics Laboratory
- Phase-change Thermal Systems Laboratory
- Robotics Laboratory
- SEM Laboratory
- Smart Materials & Structures Lab
- Solidification Laboratory
- Tribology and Surface Engineering Lab
- Vibration Laboratory
Research activities in the Department of Mechanical Engineering, both fundamental and applied research, are at the forefront of innovation, advancing knowledge and technological developments in the multifaceted disciplines of mechanical engineering, and several cognate areas.

Ongoing Sponsored Projects

- Design and Prototyping of Machinery for Achieving Cleaner Habitat Environment. (DST)
- Pilot Project on Development and Implementation of Industry 4.0 Protocols for Rail-Coach Design & Manufacturing at Modern Coach Factory Raebarely. (Indian Railways)
- Loop Heat Pipes for Avionics and Terrestrial Applications (Indo-French Center for Promotion of Advanced Research (Industry-Academia Collaboration Program)
- Fabricating of Copper with Carbon Nanotube Reinforcement for Loop Heat Pipe Application. (ISRO)
- Studies on Heat Transfer during Condensation of Steam-Hydrogen Mixtures inside Closed Containments. (BARC)
- Development of Integrated Heat Pipe based Passive Thermal Management Platform with Stress Free Mountings (ISRO)
- Local Heat Transfer Coefficient during Film Condensation of Steam Hydrogen Mixtures. (BRNS, BARC)
- Dynamics and Stability of Circular Sawing: Experimental Characterization, Modelling and Control (DST)
- Structure Integrated Sensors and Actuators to Monitor and Renew Machine Tool Performance (MHRD)
- Finish Machining of Hardened Steels with Textured Tools (SECO Tools India (P) Ltd.)
- Development of Pressurized Dual Fluidized Bed Gasifier for High-Ash Indian Coal. (MHRD and Ministry of Coal)
- Decentralized Power Generation using Micro Gas Turbines. (MHRD and Ministry of Power)
- Lean Premixed Prevaporized Combustion of Diesel and Biofuels in a Laboratory-scale Gas Turbine Combustor. (MHRD-SPARC)
- Design and Development of Nanostructured Gas Sensors for Automotive Applications, National Program on Micro and Smart Structures (NPMASS)
- Design and Development of a Completely Autonomous Ground Vehicle. (Boeing)
- Design and Development of 3-D Printed Structures for Acoustic Damping for Aerospace Applications. (Boeing)
- Design and Development of Gas Sensors for Space Applications in Inflatable Antenna Systems. (ISRO)
- Design & Retrofitment for Development Methanol Fuelled Large Bore Engine (EMD 710: 4500hp) for Locomotive Marine & Power Generation Application. (DST)
- Micro-Poro-Mechanical Modelling of Shale Anisotropy and Permeability. (ONGC)
- Development of High-Performance Cooling Systems for High Power Electronics, LED and Accelerated Life Cycle Models. (BRICS-DST)
- Design And Development of Adaptive Intelligent PHMR for Fuel Transportation Systems (MHRD/UAY)
- Experimental and Numerical Investigation into the Longitudinal Compressive Failure of Carbon Fibre Reinforced Composites. (SERB, DST)
**FORMULA BHARAT F-18**
Top Speed: 120 kmph  
Total Weight: 219 kg  
0 to 100 kmph: 3.5 s  
Engine: KTM RC 390  
Peak Power: 43 HP  
Peak Torque Output: 36 N-m

**MEGA ATV CHAMPIONSHIP B-19**
Top Speed: 65 kmph  
Total Weight: 158 kg  
0 to 40 kmph: 5 s  
Engine: Briggs and Stratton Model 19  
Peak Power: 10 HP  
Peak Torque Output: 19.6 N-m

**ON-GOING PROJECTS**

**PRAGUN**
Top Speed: 40 kmph  
Expected Weight: 40 kg  
Motor: 300 W, 48 V BLDC Motor  
Battery: 48 V, 1kWh Li-Ion Battery  
Expected coefficient of drag: 0.1

**FORMULA ELECTRIC**
Top Speed: 133 kmph  
Expected Weight: 260 kg  
Motor: 70kW, 114V Induction Motor  
Battery: 114V, 6 kWh Li-Ion Battery  
0 to 100 kmph: 3.5 s
Over past years, team AUV has witnessed close collaboration between students coming and sharing ideas; creating a small yet strong network of people eagerly looking for a low-cost solution to large-scale problems. Team AUV, IITK has successfully designed and fabricated two robust autonomous underwater vehicles, namely, VARUN and ANAHITA. We have successfully developed a system capable of navigating in unknown untrapped environments, performing acoustic localisation and identifying objects using computer vision.
TEAMS

TEAM ROBOCON

Team ROBOCON at IITK is a team of dedicated students, sharing a channelized aim of competing at the prestigious robotics contest “ABU ROBOCON”. Our think tank includes innovative members, with a concrete vision for approach and execution. We have hands on experience in multitude of electro-mechanical apparatus and equipment. We are always in pursuit of creative thinkers and designers, with a view to expanding and refining the troupe.
Mr. Sanjiv Puri  
Chairman & Managing Director,  
ITC Limited

Dr. Pawan Kumar Goenka  
Managing Director & Chief Executive Officer,  
Mahindra & Mahindra

Dr. Anil Rajvanshi  
Founder and Director  
Nimbkar Agricultural Research Institute (NARI)

Late Mr. Anil Agarwal  
Former Director,  
Centre for Environment, New Delhi

Mr. Gautam Khanna  
Chief Executive Officer,  
PD Hinduja Hospital and Medical Research Centre

Mr. Dinesh Kumar Jain  
Chief Secretary,  
Maharastra Government

Mr. Deepak Garg  
Founder,  
Rivigo

Mr. Kuldeep Narayan  
Private Secretary, MoS  
Ministry of Health and Family Welfare, Govt.of India

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Optym

Mr. Gunjan Bagla  
Founder & Managing Director,  
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Mr. Saurabh Kumar  
Indian Ambassador,  
Republic of the Union of Myanmar

Dr. Sanjay G. Dhande  
Former Director,  
Indian Institute of Technology Kanpur

Mr. Shantanu Srivastava  
Technical Consultant for India-Vietnam economic relation to Govt. of India

Mr. Rakesh Gangwal  
Co-Founder,  
IndiGo Airlines

Mr. David B.K. Thomas  
Chairman & Chief Functionary Officer,  
India Nirman Sangh (NGO, women empowerment)

Mr. Yashwant Kanetkar  
Entrepreneur & Pioneer  
IT Education in India

Late Mr. Lalit Kishore Chaudhary  
Plant Director,  
Fairfield Atlas Limited

Dr. Ravi Sethi  
President  
Avaya Labs

Dr. Arun Shukla  
Distinguished Professor,  
University of Rhodes Island

Mr. Vikas Vaibhav  
DIG, Anti-Terrorism Squad  
Bihar Police, Govt. of Bihar

Mr. Mahesh Gupta  
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