



Mechanical Engineering IIT Kanpur

Placement Brochure
2016-17

About Us

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 department in India, it has an extensive contribution in ground breaking research works in the country. Nurturing the best minds of nation, both in form of faculty and students, is one of the key mottos of the department.

The professional programme 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 current streams of study are: Solid Mechanics and Design, Fluid Mechanics and Thermal Sciences, Manufacturing Science and Mechatronics. The department offers degrees at all levels, including Bachelor of Technology (B.Tech), Master of Technology (M.Tech), Master of Science by Research (MS), B.Tech - M.Tech Dual Degree and PhD in Mechanical Engineering.

Major Degree Programs Offered

- **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 Degree** : 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 of 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.** : It is also 2 year program similar to M. Tech. but with more emphasis given on thesis work. Students work on more challenging industrial oriented problems.
- **PhD** : 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.

Research Activities and Industry Interface

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:

Research Topics :

1. Solid Mechanics and Design

- Solid Mechanics
- Finite Element Methods
- Vibration and Dynamics
- Plasticity, Fracture and Fatigue
- Optimization Techniques
- Computer Aided Design
- Bio Mechanics
- Multi-scale Modelling

2. Fluid Mechanics and Thermal Science

- Computational Fluid Dynamics and Heat Transfer (including turbo-machinery)
- Experimental Fluid Dynamics and Heat Transfer
- Internal Combustion Engines and alternative Fuels
- Fuel Cells
- Refrigeration and Air Conditioning

3. Manufacturing Science

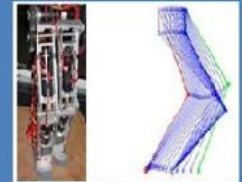
- Advance Manufacturing Process (ECM,EDM,LBMWEDM etc.)
- Computer Aided Manufacturing
- Micromachining
- Solidification and micro casting
- Micro-Nano Finishing
- Traditional Machining Operation



Three finger exoskeleton for Cooperative translation/rotation



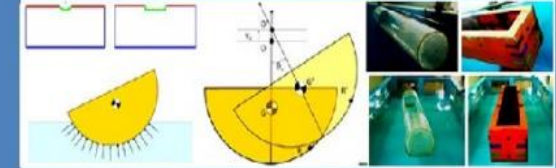
Jugnu IITK Nano-satellite



Foot sole model using FEM



Wheel Impact load detection system



Oscillations of a boat in a tank

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Industries Tie ups:

➤ Indian Railways:

- Wheel Impact Load Detection System (WILD),
- Derailment Detection Devices
- Measuring Wheel Technology,
- Onboard Diagnosis
- Bogie Design

➤ ISRO:

- IITK NanoSat – JUGNU
- Chandrayan II

➤ Projects from DRDO, HAL, MHRD, DST, CDAC, NAL, ADA, Boeing etc.

➤ List of Some sponsored projects:

1. Modelling of hydrodynamics – Chemistry interaction during carbon nanotube synthesis in a cvd reactor.
2. Development of compressed air based test bed for pipeline health monitoring robot.
3. Surface texturing on biocompatible titanium alloy for inducing hydrophobicity using ECMM.
4. Local heat transfer coefficient during film condensation of steam hydrogen mixtures.
5. Vibration control of cyro-coolers for satellite applications
6. Innovative thermal energy storage system [inotes]

Laboratory Facilities

The Department has the best of the laboratory facilities in the nation which provide state of the art facilities to the students and faculty. The laboratories have been designed keeping in mind the crucial aspect of training the students with a modern industry outlook ,as well as, serve the demanding research requirements

ADVANCED LABORATORIES

- 4i Laboratory
- Control Laboratory
- Experimental Stress Analysis Laboratory
- Fluid Mechanics Laboratory
- Heat Transfer and Refrigeration & Air-Conditioning Laboratory
- Materials Testing Laboratory
- Advanced Nano Engineering Materials Laboratory
- CAD and Rapid Prototyping Laboratory
- CAM and Manufacturing Sciences Laboratory
- Centre for Mechatronics

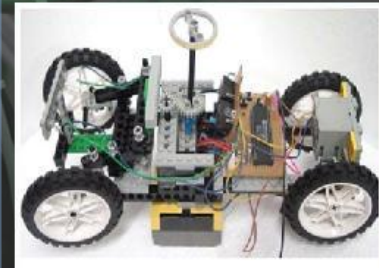


Laboratory Facilities (continued)

The department also has one of the finest institute based advanced laboratorial facilities for off the edge research expertise and to acquaint the students with advanced technical research environment.

ADVANCED LABORATORIES (contd.)

- 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



COURSE CURRICULUM

Major Undergraduate Courses offered:

Major Compulsory Course	Major Elective Courses	
Fluid Dynamics	Refrigeration and Air Conditioning	Introduction of Tribology
Heat and Mass Transfer	Internal Combustion Engine	Dynamics of Rotating Machinery
Convective Heat and Mass Transfer	Measurement and Control of Flow	Automation Mechanics
Mechanics of Solid	Power System	Tool Design
Advance Mechanics of Solid	Direct Energy Conversion	Numerical Control of Machine Tools
Design of Machine Element	Solar Energy Thermal Processes	Computer Aided Engineering Design
Dynamics of Vibration in machine	Numerical Fluid Flow and Heat Transfer	Composite Materials
Manufacturing Technology	Finite Element Method	Manufacturing Design
Automation and Control	Fracture Mechanics	Computer Aided Manufacturing
Graphics in Machine Design	Optimisation Techniques	Energy System I & II
Theory of Mechanism and Machines	Analysis and Synthesis of Linkage	Interactive Computer Graphics and Design

1st Year
Basic Science



2nd Year
Engineering Science and
Projects



3rd Year
Compulsory Dept. Course,
Electives and Internships



4th Year (5th year)
B.tech Projects, Core
Courses, Thesis Work

COURSE CURRICULUM

Major Postgraduate Courses offered:

Solid Mechanics and Design	Fluid and Thermal Science	Manufacturing Science
Introduction to Solid Mechanics	Numerical Fluid Flow and Heat Transfer	Advanced Machining Process
Applied Dynamics and Vibration	Conduction and Radiation	Metal Forming
Engineering Acoustics and its Control	Convective Heat and Mass Transfer	Machining Science
Wave Propagation in Solids	Viscous Flow Theory	Micromachining
Theory of Elasticity	Granular Materials	Solidification and Casting Process
Optimization of Engineering Design	Turbulent Fluid Mechanics	Additive Manufacturing
Finite Element Methods	Advance Theory of Turbo Machinery	Computer Aided Manufacturing
Non Linear Vibration	Engine Management	Bio-MEMS
Fracture Mechanics	Alternative Fuels in IC Engines	Manufacturing Automation
Computer Aided Engineering Design	Experimental Methods in Thermal Science	Machining Dynamics
Vibration Control	Fuel Cells	

1st Year
Specialization and
Electives



2nd Year
Research Work and
Teaching Assistantship

STUDENTS' PRACTICAL EXPOSURES

INTERNSHIPS

- Post completion of the sixth semester, undergraduate students need to undergo a mandatory internship during the summer vacation that spreads over three months. The internships are primarily of two types, industrial or academic.
- Many of the students opt for industrial internships to widen their knowledge of technological applications in field and also try out their knowledge to the real life applications.
- There are many student exchange programmes where several top ranked foreign universities have tie ups with IIT Kanpur which allows an invaluable exposure to research environment.

STUDENT CLUBS and COMPETITIONS

- SAE Club IITK
- Robotics Club
- Aeromodelling Club
- Astronomy Club
- ROBOCON-2016: 2nd Runners-up of ROBOCON-2016, Bangkok among 90 teams.

Departmental Recruitment History



Distinguished Alumna's Profile

1. **Anil K Rajvanshi,**
Director of Nimbkar Agricultural Research Institute (NARI)
2. **Late Anil Agrawal,**
Former Director of Centre for Environment, New Delhi
3. **Sanjay G. Dhande,**
Director of Indian Institute of Technology, Kanpur
4. **Shantanu Srivastava,**
Technical Consultant for promotion of India-Vietnam economic relations
5. **Rakesh Gangwal,**
President and chief Executive Officer of United States Airways
6. **David B. K. Thomas,**
Known for his selfless services towards women empowerment
7. **Yashwant Kanetkar,**
Entrepreneur and pioneer of Information Technology education in India
8. **Pawan Kumar Goenka,**
Chief Operating Officer of Mahindra and Mahindra
9. **Ravi Sethi,**
President of Avaya Laboratories
10. **Late Lalit Kishore Chaudhary,**
Plant Director of Fairfield Atlas
11. **Arun Shukla,**
Chairman, Mechanical Engineering University of Rhodes Island
12. **Mahesh Gupta,**
Founder of Kent Water Purification Systems.

Contact Information

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