“Since five decades a team of thoroughly knowledgeable faculty members are committed to nurture young innovative engineers into professionals who provide optimal solution to industrial challenges. Students are exposed to academic excellence along with extracurricular activities to inculcate competence in impactful R&D/technical activities and to work as a leader in highly esteemed companies worldwide.”

“The post graduates from our department are ambitious and youthful group of innovative technologists who will carve a niche for themselves in the world of technology by the virtue of their zeal for excellence and hard work. It is an honour for us to invite the recruiting corporates for the campus placement and we are confident that you will leave the campus equally privileged.”
About Us

Mechanical Engineering Department is one of the oldest and biggest departments of the institute. Being an exemplary environment where new ideas flourish, the masters program transforms bright students into technically skilled and industry oriented engineers who are globally the best. Having 29 different laboratories that are well equipped with cutting-edge technology catering to various fields of mechanical engineering, the students are well exposed to industry trends and the latest technological practices.

Only those students who have cleared the highly competitive GATE (Graduate Aptitude Test in Engineering) with a minimum of 99 percentile and a written test organized by the institute are admitted into the program. This two-stage rigorous selection process ensures that only the very best and the brightest make it to the department.

The masters or PG program includes both Master of Technology (M.Tech) and Master of Science (Research) (MS(R)) programs and are offered under 4 subject disciplines, namely:

Thermal Engineering | Production Engineering | Mechanical Design | Industrial Engineering

Previous Recruiters
Thermal Engineering

In Thermal Engineering, we analyse and design fluid flow applications and energy conversion processes on all scales, to obtain high performance with minimal use of resources. Hands-on learning in research labs makes us handy with computational software and programming languages. Whether automobiles or aeroplanes, smartphones or satellites, power generation or utilization, oil pipelines or turbines, air conditioning or combustion there are endless applications we are equipped to deal with.

Production Engineering

The Production Engineering (PE) course curriculum and academic research projects are not only industrial driven, but also covers aspects such as analysis, design, simulation and automation in addition to conventional manufacturing technologies. The program is committed to nurture able professionals in the fields of optimization of manufacturing process, processes and product planning, Supply chain optimization, Mathematical & physical modelling of manufacturing processes additive manufacturing and the like.

Industrial Engineering

Industrial Engineering (IE) is a highly specialized techno-managerial area which integrates the entire organization as a single entity. Industrial engineers are system integrators who focus on end to end solutions and use specialized knowledge and skills in the mathematical, physical, and social sciences, together with the principles of engineering analysis, to predict and evaluate the results obtained from systems and processes. Broad areas of application are in manufacturing systems, supply chains, analytics, machine learning, forecasting, logistics, transportation, e-commerce, finance, services, health care and other major industrial operations.

Mechanical Design

Mechanical Design focuses on the mechanical aspects and modern practices of design. This PG program comprises of highly demanding coursework followed by a rigorous research project. It mainly deals with the analysis, design, simulation and control of mechanical equipment/process emphasizing on application based course projects and practical sessions including both experiments and simulations.

Strengths:

- Strengths:
  - Fluid Flow Analysis
  - Thermal Design
  - Power Generation
  - Combustion Analysis
  - Propulsive Technology
  - CFD Simulations

- Production Engineering
  - Strengths:
    - Data Analytics
    - Statistical Analysis
    - Supply Chain Analytics
    - Simulation & Modeling
    - Machine Learning
    - Inventory Management
    - Scheduling
    - Techno-managerial skills
    - Life cycle costing

- Strengths:
  - Computer Aided Design
  - Finite Element Analysis
  - Vibration Engineering
  - Machine & Mechanisms
  - Robotics and control

- Strengths:
  - Product ion Planning
  - and Scheduling
  - Automation
  - Simulation
  - Additive Manufacturing
  - Finite Element Analysis
  - Composites
Thermal Engineering

**Major Courses:**
- Advanced Fluid Mechanics
- Computational Heat Transfer
- Thermal Design
- Design of Wind Power Farms
- Gas Dynamics
- Combustion
- Advanced Power Generation systems
- Heating, Ventilation and Air Conditioning
- Applied Mathematics for Thermo fluids
- Introduction to Microfluidics
- Advanced Heat Transfer
- Advanced Thermodynamics

**Ongoing PG Projects**

**Applied Fluid Dynamics | Heat Transfer**

Study of continuous deposition of liquid thread onto a moving substrate.

Innovative techniques to capture PM2.5.

Effective friction factor of zero shear stress surfaces.

Effect of wind gust on the Aerodynamic

Solidification/ Heat transfer in continuous casting

**Thermal Design | Optimization**

Design of air/water cleaning device by bubbles.

Development of dynamic lift and drag models for wind turbine.

Design and fabrication of an experimental test Rig for combustion dynamics studies.

**Renewable Energy | Fluids | Heat Transfer**

Modelling of Joule-Thompson Miniature Coolers.

Modelling and Analysis of Electric Hybrid Vehicles running on Indian Urban Driving Cycle.

Development of a flameless burner.

**CFD | Experimental | Combustion**

Pressurized Drop Tube Furnace (PDTF) experiments and simulations to study combustion of Indian coal and coal blends.

Study on combustion of a swirl based dual fuel combustor.

Numerical model for analysis of Lithium-Sulfur batteries

Numerical stimulations of Electrodynamic jetting.

Numerical modelling of atomization of injectors.

Experimental analysis of deformation and breakup of droplets under electric field.
Production Engineering

Major Courses:
- Mechanics of Composite materials
- Additive Manufacturing
- Finite Element Method
- Computer Aided Manufacturing
- Computational methods
- Automation in Manufacturing
- Welding Science and technology
- Metal Forming Analysis
- Machining Process and Analysis
- Metrology
- Industrial Engineering Systems
- Operational Planning and Control

Ongoing PG Projects

Automation | Fabrication

- Development of Machine OS for Smart Manufacturing.
- Development of Cyber Physical Robotic Welding System.

Composites | Simulation | Fabrication | FEA

- Fabrication and testing of bullet and blast resistant solutions.
- Development of high aspect ratio structures on quartz for bio sensing applications.
- Laser machining of thin metals and polymers for biomedical applications.
- Finite element analysis of deep drawing of Al-Mg alloys using different hardening models.

Nano Mechanics | Surface Engineering

- High speed end milling of super alloys using Nano fluids.
- Microcellular Extrusion/ injection molding of polymers - for light weight industrial solutions
- Diffusion bonding with potential interlayers.

Additive Manufacturing

- Design and Fabrication of functionally graded material.
Mechanical Design

Major Courses:
- Design & Optimization
- Vibration & Noise Engineering
- Design of Precision machines
- CAD & FEA
- Designing with advanced materials
- Experimental Modal Analysis
- Robotics & Multibody Dynamics
- Advanced mechanisms
- Analytical Dynamics
- Automotive design
- Control Engineering
- Rotor Dynamics

Ongoing PG Projects

CAD| Finite Element Analysis | Simulation
- Impact behavior of automotive joints.
- FE model updating with experimental natural frequencies data.
- Estimating Energy absorbed in a deformed mesh (FE based reconstruction of crashes).
- Kinematic studies on a novel thrust vectoring Nozzle (TVN).
- Heavy Vehicle Steering Simulation.

Experimental | Design and Optimization
- Studying blast injuries for lying down vs. standing persons & Experimental study of effectiveness of blast mitigation materials.
- Sub micron accuracy air bearing stage and Actively controlled magnetic bearing systems-design and fabrication.
- Development of an in-situ bone loading device.

Vibration & Noise | Robotics and Control
- Analytical Study | Computational Code
- Gearbox health monitoring (Funded by ARDB).
- Design and Development of Hold-Down Mechanism for vibration isolation(ISRO).
- Health Monitoring of a Railway bogie
- Flexible body dynamics of robotic manipulators.
- Study of gait change post knee replacement.
- Grasp response of smooth objects.

Software & Tools:
- Hyperworks
- MATLAB
- Autodesk Inventor
- Abaqus
- Solidworks
- PTC Creo
- LS-DYNA
- RecurDyn
- Madymo
- Adams
- ANSYS
Industrial Engineering

Major Courses:
- Stochastic Modelling & Simulation
- Probability & Statistics
- Operations Research
- Advanced Operations Research
- Supply Chain Management
- Project Management
- Industrial Engineering Systems
- Operations Planning & Control
- Maintenance Planning & Control
- Reliability, Availability & Maintainability
- Entrepreneurship
- Project Management
- Value Engineering & Life Cycle Costing
- Logistics

Ongoing PG Projects

Analytics
- Data driven analysis of the Indian Judicial System using Mathematical Modelling and Machine Learning Techniques
- Revenue Management in the hotel industry
- Provide Support to the Food Corporation of India (FCI) and State of Uttarakhand in Supply Chain Optimization

Transportation
- Dynamic Route allocation and scheduling of Electric buses with fixed depot by Optimizing operating, fixed, user (overcrowding, waiting) costs
- Creation of heuristic for reducing computational time for electric bus route allocation model
- Optimization of the existing schedule of BMTC buses by reducing overlapping in schedules and including consistent headway
- Finding the weightage of attributes that contributes to bus service by using AHP and to find relative importance of these attributes by using logit model for different socio economic and demographic categories

Scheduling & Optimization
- Election schedule optimization modelling
- Simulation Modelling of liver allocation and transplantation
- Optimization of kidney allocation policies and transportation system

IE Tools:
- Value Stream Mapping (VSM)
- Analytic Hierarchy process (AHP)
- Lean Six Sigma
- 7 QC Tools
- SWOT Analysis
- Theory of Constraints
- Poka-Yoke
- BPR
- S & OP
- DDMRP
- IBP
- KaiZen
- Kano’s Model
- Kanban

Skills learnt: Automated Data Downloading, Data Cleaning and Preparation, Data Basing, Data Visualization, Data Analysis & Exploration, Modelling, ML techniques & Statistics, Dashboards & Reporting, Transportation Optimization, Linear/Non-linear/Integer Programming, Discrete Event Simulation, AHP, Writing & Documentation Skills, Problem-Solving Skills.

Applications:
- Data Analytics
- Supply Chain Management
- E-Commerce
- FMCG
- Transportation
- Logistics
- Operation Management
- Project Management
- Quality Management
- Health Care
- Production & Manufacturing
- Banking Sector

Software:
- Excel
- Python
- R
- SQL
- MATLAB
- IBM CPLEX
- Java, HTML
- Anylogic
- Tableau
- Power BI
- AWS/Cloud Computing
- Hadoop
- Minitab
- SPSS

Analytics: Data driven analysis of the Indian Judicial System using Mathematical Modelling and Machine Learning Techniques

Logistics: Revenue Management in the hotel industry

Entrepreneurship: Provide Support to the Food Corporation of India (FCI) and State of Uttarakhand in Supply Chain Optimization

Value Engineering & Life Cycle Costing: Automation of the existing schedule of BMTC buses by reducing overlapping in schedules and including consistent headway

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The department houses over 25 different lab facilities that are equipped with the latest cutting edge technology and encompasses all aspects of mechanical engineering.

**Mechanical Design**
- Vibration & Instrumentation Lab
- Design Research Lab
- Dynamic Impact Lab
- Mechanism Lab
- Mechatronics Lab
- Impact simulation Lab
- Vibration Research Lab
- CAD and Graphics Lab
- Mechanics & Materials Characterization Lab
- Program for Autonomous Robotics Lab

**Thermal Engineering**
- Combustion Research Lab
- Heat Transfer Research Lab
- I.C. Engines Lab
- Micro and Nano Fluidics Lab
- Thermo-fluids and Energy Systems Lab
- Refrigeration and Air Conditioning Lab
- Cool-Tech (Cooling Technologies) Lab
- Fire Project Lab
- Mechanical Core Lab

**Production Engineering**
- Production Engineering Lab
- Automation Lab
- Flexible Smart Manufacturing Lab (Industry4.0)
- Rapid prototyping Lab
- Computer Aided Graphics Interface Lab
- CNC Lab
- Design Manufacturing Lab
- Machine Tool Lab
- Welding Lab
Placement Procedure

Interested companies contact professor-in-charge or placement officer, Training and Placement Cell for a Job Notification Form (JNF) at placement@admin.iitd.ac.in.

JNF requires the companies to fill in mandatory details of the job profile – role offered, pay package, place of posting, eligible departments.

Once the filled-in-JNF with all the required details is received, companies are assigned username/password to access their online account on T&P website.

Companies are also assigned space on the server on which they may upload any presentation, videos, data or other information they want the students to see.

The JNF has to be frozen on the T&P website by the company till a deadline, after which the students shall be able to view all the details, and the eligible students may apply.

After the application deadline for the students, the resumes are visible to the company. The company submits shortlist on its online account before a deadline.

Shortlisted students get notified. The placement office allots the dates for the campus interviews.

After the completion of the selection procedure on campus, company is required to announce the final list of the students on the same day itself.

If a student is selected, the job is registered against him/her and he/she would not be allowed to appear for more interviews as per placement policy.

Looking forward to fruitful professional relationship.........Welcome to Campus!
Contact Us

Department Website: mech.iitd.ac.in
Placement Office: placement@admin.iitd.ac.in.

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