Prof. Sanjeev Sanghi  
*Head of Department, Applied Mechanics*

“The Applied Mechanics department offers a unique combination of courses for its UG & PG programs. The students get a firm grounding in the fundamentals related to the areas of Design, Solid Mechanics & Fluid Mechanics along with rigorous training in the use of current analytical, experimental and computational tools. This equips them to analyze complex engineering systems and undertake their design with proficiency.”

Prof. Sawan S Sinha  
*Faculty Coordinator, Applied Mechanics Dept*

“The students graduating from our department are among the brightest in the nation and are well trained in various cutting-edge technology domains. They have achieved top positions in various leading organizations in the past and are always highly sought-after by leading organizations worldwide owing to the level of skills they acquire at IIT Delhi. I welcome the recruiters for the campus placement, and I am confident that you will find exceptionally talented engineers for your organization.”
Bachelor of Technology
Engineering in Computational Mechanics

- **Admission Criteria**: Top ranked students qualifying JEE-Advance entrance examination

Master of Technology
Engineering analysis & Design

- M.Tech. program has two-thirds of the credits for the course work & one-third of credits for project work.
- **Admission Criteria**: Students with a minimum of 99 percentile in GATE are shortlisted followed by a separate written exam

MS-Research, Applied Mechanics

- Masters level research program
- MSR program has two-thirds of the credits for the project work & one third of credits for course work
- **Admission Criteria**: Students with a minimum of 99 percentile in GATE are shortlisted followed by a separate written exam

PHD, Applied Mechanics

- Doctoral level research program
- **Admission Criteria**: Students who have qualified GATE are shortlisted followed by a written test & interview session
Catering to Industry Needs

- Our curriculum is synchronized with industrial needs
- Courses such as:
  a. FEA & CFD: cater to core industry needs
  b. Machine learning & AI: cater to growth of industry
  c. Data Structure & algorithm: Provides necessary coding skills

Interdisciplinary Backgrounds

- Our PG students come from diverse UG backgrounds
- Backgrounds generally involve Mechanical Engineering, Civil Engineering, Production & Industrial Engineering, Electrical Engineering

Interdisciplinary area of research

- Our projects are from varied interdisciplinary domains. In fact, we have Naval construction wing in collaboration with Indian Navy where Naval officers pursue PG diploma.
- Domains include: Solid Mechanics, Fluid Mechanics, Design, Structural engineering, Artificial Intelligence, Biomechanics, Nanotechnology, Naval construction
Important Core courses

- Advanced Solid mechanics
- Product Design
- Multi scale Modelling and Computation
- Dynamics of Mechanical System
- Advanced Fluid mechanics
- Computational Fluid Dynamics
- Experimental Techniques in Fluid and Solid
- Finite element Methods
- Heat Transfer
- Engineering Thermodynamics
- Experimental Methods
- Machine Learning in Mechanics

Special Courses

- Soft Robotics
- Aero Elasticity and Aircraft Structures
- Digital Image Processing
- Deep Learning for Mechanics
- Principles of Artificial Intelligence
- Digital Twins
- Parallel Processing in computational Mechanics
- Advanced design of Machine elements
- Design Optimization and Design Theory
- Human Computer Interface
- Continuum Mechanics
- Reliability Engineering
- Hydrodynamic stability and Turbulent flow Physics
- Smart Materials and Structures

Programme Linked Core Courses

- Data Structure and Algorithm
- Digital Electronics
- Numerical Method and Computation
- Computer Aided Design
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<tr>
<th>Product Design</th>
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<th>Machine Learning</th>
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<td>Product Design &amp; Feasibility</td>
<td>Finite Element Methods</td>
<td>Machine learning in mechanics</td>
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<td>Product Reliability &amp; Maintenance</td>
<td>Advanced Solid Mechanics</td>
<td>Deep Learning In mechanics</td>
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<td>Modelling and Analysis of Mechanical Systems</td>
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Impact analysis of composite helmet

Isosurfaces with vorticity

Design of metamaterials using Deep learning

Modelling of open ocean convection
Analysis of vibration of composite structures

Modelling Nanoindentation at 0K
GLIMPSE OF SOME PROJECTS

Vortex shock interaction

Fluid structure interaction modelling of Wind Turbine

Multiscale modelling of crystal plasticity
M.TECH PROJECTS IN PRODUCT DESIGN

**PROJECTS**

**Machine Learning & Artificial Intelligence**
- ML based reliability analysis of nuclear graphite
- Magnetostrictive Energy Harvester
- Topics in soft robotics and design with application of reinforcement learning
- Unsupervised machine learning

**Simulation based on commercial FEA, CFD package**
- Design and Analysis of composite vertical axis wind turbine blades
- Magnetostrictive Energy Harvester
- Development of numerical model for erosion damage of ductile materials
- Automated room conditioning
- Design Optimization of Shower head
- Design and analysis of ballistic helmet
- Exploring failure mechanism/criteria in growing bodies

**Experimental & Fabrication**
- Design and fabrication of remotely operated underwater water vehicle
- Extraction of energy from vortex induced vibrations
- Design and performance evaluation of Gas Flowmeter

GLIMPSE OF SOME PROJECTS
M.TECH PROJECTS IN ENGINEERING ANALYSIS OF SOLIDS & FLUIDS

PROJECTS

Simulation based on commercial FEA, CFD package
- Multiscale modelling of fatigue & creep mechanisms in metals & alloys
- RANS simulations of a wing tip vortex
- Image based CFD for non-invasive and personalized vocal tract pathologies.
- Turbulent flow in microfluidics

Machine Learning & Artificial Intelligence
- Machine learning relationship between permeability and pore geometry in simplified porous media.
- Deep learning for detection, diagnostics, and prognostics
- Imaging based machine learning for crack detection in solid
- Soft robotics control using reinforcement learning
- Machine learning application in fluid flow

Simulation based on self written codes
- Finite element simulation of slender structures using helical elements.
- Buckling analysis of smart composite structures
- Buckling and Post buckling analysis of Porous Composite Plates
MS-RESEARCH PROJECTS

Simulation based on commercial FEA, CFD package
- Biomechanical studies of foot and hip
- Design, Development and Fabrication of a Textile Pneumatic Actuator for Exoskeleton suit
- Dust dispersion due to vehicular movement
- Flux Enhancement using Shear Free Surfaces

Simulation based on self written codes
- Modelling & Analysis for vibration & buckling of Delaminated composites
- Modelling and simulation of Chronic traumatic brain encephalopathy with gradient enhanced continuum damage mechanics

Machine Learning & Artificial Intelligence
- Physics informed multiscale deep learning framework for flows in random media
- Machine learning for turbulent forced plume in stratified medium
- Design, Development and Fabrication of a Textile Pneumatic Actuator for Exoskeleton suit
PHD PROJECTS

Simulation based on commercial FEA, CFD package

- Experimental and Numerical study of Vertical Axis Wind Turbine (Wind Tunnel Testing and CFD)
- Influence of Large-Scale Antarctic Orography and Ice Sheets on Atmospheric Circulation and Energy Transport

Simulation based on self written codes

- Locomotion of flexible slender bodies in fluid media
- Hygrothermal analysis of curvilinear fiber based piezolaminated energy harvester
- Quasi-Static Response of Viscoplastic Solids
- Frictional flaw fracture in quasi-brittle natural composites
RESEARCH FACILITIES

- Computational Fluid Dynamics Laboratory
- Fluid Mechanics Laboratory
- Strength of Materials Laboratory
- 3D Printers
- Laser Cutter Machine
- Gas Dynamics Laboratory
- Experimental Method and Analysis Laboratory
- Impact Mechanics Laboratory
- Computational Laboratory
- Well-equipped Workshop
- Stress Analysis Laboratory
Students of the department are quite active in developing technologies helpful for the society and many of them have been patented.

- Multi functional bed to assist bedridden individuals for side turning and postural adjustment
- Integrated 8 Stationed Open Gym
- Channelized, pneumatic controlled cushion mattress for prevention of bed-sores
PROFICIENCY IN SOFTWARE

SOFTWARES

SKILL SET
PAST RECRUITERS
COLLABORATIVE PROJECTS WITH INDUSTRY

Nokia
सी डैक
CDAC
Volvo
GE
इसरो
ISRO
A Navratna Company
Larsen & Toubro
Hero
Mahindra
HP
CIDCO
we make cities
BHEL
DRDO
ONGC
Indian Navy
GAIL
IndianOil
NTPC
NHPC
SAIL
NOTABLE ALUMNI

Gautam Acharya, General Manager & PCP Head, Godrej Properties Limited
2005, M.Tech

Anil Sharma, Joint Director, Ministry of Defence
2001, M.Tech

Aashish Bhatia, President, Visteon India
2000, M.Tech

Dr AS Prakash, Executive Vice President, MoldTech Technologies Ltd
1997, M.Tech & PhD

Salju Aravind, Founder & CEO, EduBrist (Etech)
1995, M.Tech Naval Construction Wing

Praveen Agrawal, Director, Sulzer Tech India Pvt Limited
1991, M.Tech

Dr KG Bhatia, CEO, D-CAD Technologies
1984, PhD

Sushil Gupta, CEO, Smaac Net Solutions P. Ltd.
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