

SHIV NADAR

INSTITUTION OF EMINENCE DEEMED TO BE  
UNIVERSITY

DELHI NCR

DEPARTMENT OF  
**MECHANICAL  
ENGINEERING**



# Why Shiv Nadar University?

Shiv Nadar University, is a multidisciplinary research university established in 2011 by Mr. Shiv Nadar, one of Asia's foremost philanthropists and a pioneer of the technological revolution in India. The four Schools at the university offer undergraduate, postgraduate, and doctoral degrees in Engineering, Natural Sciences, Humanities and Social Sciences, and Management & Entrepreneurship. It is the youngest university recognised to be an **Institution of Eminence** by the Government of India. The Institution of Eminence is a distinct category of higher education institutions that "strive to become the top hundred Institutions in the world over time". In the government's National Institutional Ranking Framework (NIRF), the university has been the youngest institution in the 'Top 100 Overall List' for the last five years.

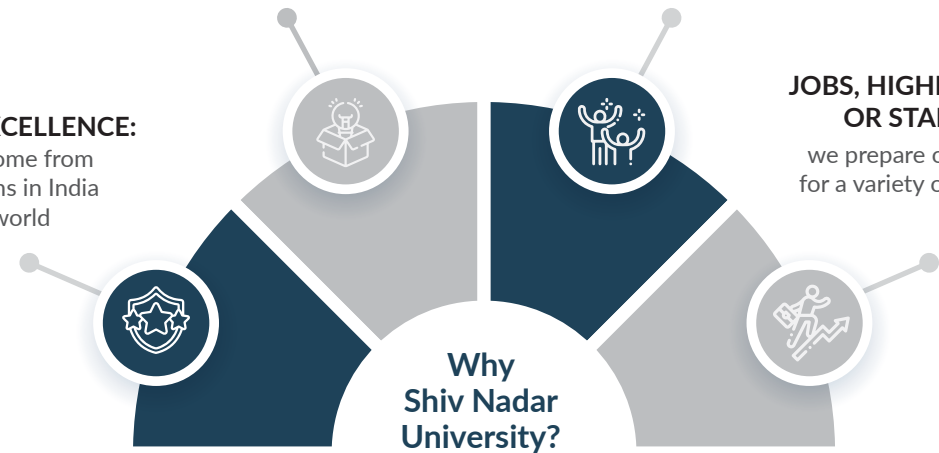


**ANALYTICAL THINKING, CREATIVITY, PROBLEM-SOLVING**  
with research programs, internships, entrepreneurial opportunities, and more, our curriculum teaches essential skills

**PHYSICAL AND EMOTIONAL WELL-BEING**  
a vibrant campus life on our 286-acre green campus is designed just for that

**ACADEMIC EXCELLENCE:**  
our faculty come from top institutions in India and the world

**JOBS, HIGHER STUDIES OR START-UPS**  
we prepare our students for a variety of aspirations



## Why Study Mechanical Engineering at Shiv Nadar University?

Mechanical engineering is a versatile engineering discipline. It deals with solid and fluid mechanics, design, materials, and manufacturing principles. It also provides a flavour of other fields like chemical, electrical, civil, aerospace, and computer science. This multidisciplinary skill set enables a mechanical engineer to design and develop systems for various applications like hybrid and electric cars, power generation using renewable energy sources, robots, bio-medical devices, aerospace, etc.



# Highlights of Mechanical Engineering Department

- The department has dedicated faculty members with excellent academic backgrounds. The current student-to-faculty strength ratio is ~ 17:1.
- The department has state-of-the-art research facilities. The departmental research labs include mechatronics, robotics, surface engineering, and advanced manufacturing labs, to name a few.
- Undergraduate students are encouraged to participate in research projects from the second year. They also work on sponsored research projects by DST, DRDO, CSIR, and Dassault Systèmes, among others.
- Students benefit from minor degrees. Popular minor degree options are Management, Computer Science & Engineering, Electrical/Electronics & Communication Engineering and Physics.
- Students have access to the 3DEXPERIENCE platform package at the Shiv Nadar IoE Dassault Systems Center of Excellence (SDC).
- Our placement percentage has been consistently over 90% for many years.
- Every year, our students secure masters/PhD admissions with funding from leading universities in India and worldwide.
- The Department runs multiple student clubs for active participation in global competitions by the American Society of Mechanical Engineers (ASME), Society of Automotive Engineers (SAE), etc. Some of the key achievements include:



## Year 2023-24

1. The student's chapter of ASME SNU has been awarded in two categories:
  - a. ASME India Most Significant Membership Growth Award
  - b. ASME India Faculty All-Star Supporter Award (Dr. Sumit Tiwari)

## Year 2022-23

1. In the ASME E-fest, the SDC team got a National Rank of 1, the university's IAM3D Team got a National Rank of 2, and Team D. A. B. A. was named among India's Top 5 finalists teams.
2. **Scholarships**  
Two Mechanical Engineering UG students in the ASME team received prestigious scholarships:
  - a. Abhishek Kishor (ME-2024 batch): Garland Duncan Scholarship (\$5,000), ASME Foundation Scholarship (\$2,000).
  - b. Sanjana Ashok Iyer (ME-2024 batch): ASME Foundation Variable Scholarship (\$2,000).

## Year 2021-22

In the ASME E-fest, the university teams excelled some noteworthy achievements include:

1. IAM3D Team: Global Rank of 2
2. SDC Team: Global Rank of 7, National Rank of 2
3. HPVC Team: 14th rank globally.

## Year 2020-21

In the ASME E-fest, the university got:

1. The SDC secured 1st rank Globally.
2. In IAM3D, we got a special mention for Best Design Report and secured 7th rank Globally with ranked #1 Nationally, and HPVC secured 14th rank Globally

# Interdisciplinary Aspect

Interdisciplinary research is at the core of the Mechanical Engineering Department. Our primary aim is to devise environment-friendly and sustainable solutions for engineering systems to address rising environmental concerns and deterioration of natural resources. These solutions require an interdisciplinary approach owing to the complex interlinkages of these issues. One of the groups in the department is working on a highly interdisciplinary research theme: High-performance energy storage and conversion devices through severe physical deformation. The research aims to design and develop electrochemical energy storage devices, including supercapacitors, batteries, and fuel cells. In addition, the group is also actively working on developing highly efficient catalysts for green hydrogen production through electrochemical water splitting. Another group works on environmental protection via bioinspired approaches and green technologies. Different technological challenges this group addresses include the development of self-cleaning solutions through environment-friendly technologies and waste products, designing and developing a desalination process using clean/green energy and machine learning to solve fluid-based energy optimisation problems.



Another group of faculties from design specialisation works on aerospace applications, biological systems, use of artificial intelligence (AI) and machine learning (ML) towards assimilating large data sets. Indeed, one of the central focus of this group has been towards the non-linear dynamic analysis of aeroelastic systems, and in turn, augmenting a safe design and operational paradigms for the same. Interestingly, non-linear dynamics of aeroelastic systems are also well-suited to describe several biological/physiological applications, such as leaf flutter and dynamics of vocal folds, and have also been gaining focus over recent times. Similarly, the mechanics of advanced functionally graded materials (FGMs) have also been a focal topic of research, wherein the applications range from traditional mechanical systems to augmenting very slender wing structures for wind turbine blades and micro aerial vehicles (MAVs) and medical applications like implant/stent design. All of the above, from non-linear dynamical analysis to FGMs, require enormous data sets and depend on massive computational efforts or demanding experimental techniques. To address this concern, we've been devoting attention towards using ML or AI algorithms for both (a) to augment the understanding behind the physics of the problem and (b) towards prognostics and similar engineering applications.



# Curriculum

The Department of Mechanical Engineering at Shiv Nadar University has a dynamic curriculum and is revised regularly to incorporate recent industry and research developments. Great emphasis is to the objective-based learning and hands-on training with a core motive to develop and improve students' skill sets.

Currently, the department successfully runs the B. Tech. and Ph.D. programs.

## Specialisations

The department offers specialisation in the following areas:

1. Computational Techniques
2. Energy Technology
3. Robotics and Automation



## State-of-the-art Laboratories/Research Facilities

The Department of Mechanical Engineering has developed several state-of-the-art laboratories with sophisticated instruments. Domain expert faculty members head each laboratory with a supportive and efficient laboratory technical staff. The department has a high teacher-to-student ratio, enabling the faculty members to mentor each student toward achieving excellence in learning.



- Field Emission Scanning Electron Microscope (FESEM)
- Nanomaterials Lab
- Production Lab
- Advance Manufacturing Science Lab
- Manufacturing Process Lab
- Fluid Machinery Lab
- Materials Science and Engineering Lab
- Mechatronics Lab
- Theory of Machine & Vibration Lab
- Surface Science & Tribology Lab
- Bio-Inspired Robotics and Design Lab (BIRD)
- Advanced Materials and Synthesis Lab
- Graphics Lab
- IC Engines & Automobiles Lab
- Heat & Mass Transfer/Refrigeration & Air-conditioning Lab
- Energy Systems Lab
- CAD Lab
- Composite MFC Lab

# Department of Mechanical Engineering Faculty



## DR. HARPREET SINGH

Professor and Head, Ph.D., Indian Institute of Technology Ropar, India  
**Areas of research:** Energy Storage Devices; Catalysis; Supercapacitors; Surface Engineering; Friction Stir Processing, Bulk Metallic Glasses (BMGs); High Entropy Alloys (HEAs); Corrosion



## DR. HARENDER SINHMAR

Associate Professor, Ph.D., Indian Institute of Technology Madras, India  
**Areas of research:** Solar Energy, Power Tower Plants, Solar Still, Water Desalination, and Alternative Fuels.



## DR. SANTANU MITRA

Professor, Ph.D., Indian Institute of Technology Kharagpur, India  
**Areas of research:** Biomimetic Robotics, Intelligent Systems and Vehicles, Sustainable Energy Engineering and Technologies



## DR. RAMESH GUPTA BURELA

Associate Professor, Ph.D., Indian Institute of Science (IISc), Bangalore India  
**Areas of research:** Multifunctional composites, High Altitude Airship (HAA), Dimensional reduction of structures using VAM, Multi-flexible body-dynamics, Auxetic material modeling, Nonlinear non-classical effects, Nonlinear Finite Element Analysis, Biomechanics



## DR. DIVYA SHRIVASTAVA

Associate Professor, Ph.D., Indian Institute of Technology Delhi, India  
**Areas of research:** Reliability Engineering, Operations Management, maintenance management, Statistical Quality control



## DR. HARPREET SINGH GREWAL

Associate Professor, Ph.D., Indian Institute of Technology Ropar, India  
**Areas of research:** Surface modification techniques (thermal spraying, microwave processing, micro/nano-patterning), Tribology (macro/micro/nano), Wetting, Contact mechanics, Biomimetics



## DR. GANESHTHANGARAJ PONNIAH

Associate Professor, Ph.D., Jeju National University, South Korea  
**Areas of research:** Humanoid and biomimetic robotics. Quadruped robot. Industrial Automation and Non-linear control, Fuzzy logic.



## DR. SUMIT TIWARI

Assistant Professor, Ph.D., Indian Institute of Technology Delhi India  
**Areas of research:** Solar thermal (Hybrid solar systems namely, PVT air collector, PVT greenhouse, PVT solar dryer, Green buildings, PVT biogas system, Agrivoltaics, etc.), Solar cooling, Heat Transfer



## DR. SATHI RAJESH REDDY

Assistant Professor, Ph.D., IIT Hyderabad, India  
**Areas of research:** Computational Fluid Dynamics, Multiphase flows, High fidelity simulations, and GPU computing



## DR. MEHA BOGRA

Assistant Professor, Ph.D., Applied Physics Theoretical Sciences Unit, JNCASR, Bangalore India  
**Areas of research:** Mechanical Deformation of Materials, Flexibility of crystals, Crystal-to-amorphous transitions, Thermal transport at nano-scale, Thermodynamics of multi-component alloys



## DR. ANKIT GUPTA

Assistant Professor, Ph.D., Indian Institute of Technology Mandi, India  
**Areas of research:** Computational mechanics, Nonlinear material models, Composite Structures, deformation theories, Imperfection sensitivity, Linear and nonlinear finite element analysis.



## DR. VISAKH VAIKUNTANATHAN

Assistant Professor, Ph.D., Indian Institute of Science, Bangalore India  
**Areas of research:** Multiphase flows, with a specific focus on droplet systems encountered in liquid sprays

# OUR Program

The university proudly runs its flagship research program for undergraduate students, known as "Opportunities for Undergraduate Research" (OUR). This is a year-long project wherein the faculty mentor students on a research project. Students in the department are encouraged to utilise this opportunity. Over the years, our students have done phenomenal work as a part of OUR program and published research articles in highly reputed journals. Some of the OUR project titles are given below as a reference:

- Design and Analysis of Compliant Deployable Mechanisms using Composite Tape-Spring Hinges.
- Four-legged Robotic Dog
- Investigating the Interplay between Wetting and Droplet Friction
- Computational investigation of various influencing parameters in metal welded joints

- Computation and experimental analysis of Microwave Cured Composite Materials
- Computational investigation on the structure responses of Functionally Graded Nanocomposites
- Heat and Mass Transfer Analysis of Parabolic Trough Collector Integrated Solar Water Purifier
- Design & analysis of shape-changing structures using 4D printing technology for various applications
- Development of advanced machine for biodegradable-eatable cutlery
- Nano-textured electrodes for high performance Super capacitors



## Pathway to Progress

The knowledge, skill set, and overall learning experience gained by our students enable them for an enriching career. Mechanical engineering students can find employment in both public and private sectors. Some of the key public sector employers for Mechanical Engineers include Bharat Heavy Electricals Limited (BHEL), Oil and Natural Gas Corporation (ONGC), Hindustan Petroleum Corporation Limited (HPCL) and National Thermal Power Corporation (NTPC), Defence Research and Development Organization (DRDO), among others. Students can join government jobs and PSUs through the Graduate Aptitude Test in Engineering (GATE) and UPSC (ESE) exams.

Many of our students have gone to pursue M.S., Ph.D. & post-doctoral research in global universities such as the University of Texas at Dallas, University of California San Diego, Deakin University, Missouri University of Science and Technology, State University of New York, Buffalo, University of Minnesota, University College Dublin, upon graduating from Shiv Nadar University.



# Student Outcomes

Over the years, the department has attracted a talented cohort of undergraduate and graduate students. Many of our graduated students have got admission and fellowships for Masters in reputed universities around the world, such as University of Texas at Dallas, University of California San Diego, Deakin University, Missouri University of Science and Technology, State University of New York, Buffalo, University of Minnesota, University College Dublin, Ireland etc. Many of our bachelor students also got job offers from industrial giants such as Larsen & Toubro (L&T) Construction, Schindler, Honda, TVS Motor, DCM Shriram Ltd, Ericsson India and Cognizant GenC Elevate, among others.



# Admissions Eligibility

## Bachelor of Technology

Program	Selection Criteria	Class 12 <sup>th</sup> Eligibility
Mechanical Engineering	Route 1 - JEE Mains 2024/ 2023	Aggregate of Physics, Chemistry and Maths must be $\geq 65\%$
	Route 2 - SNUSAT Score + APT	
	Route 3 - CUET 2024 Score + Interview	
	Route 4 - Valid College Board SAT Score + Interview	
	Route 5 - Valid ACT Score + Interview	

Scan Here For More Details:





# Contact Details

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## **DR. SATHI RAJESH REDDY**

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## **DR. HARPREET SINGH**

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