Parul® University
NAAC GRADE A++

Supported By
Industries Commissionerate
Government of Gujarat

MICRO - NANO

RESEARCH & DEVELOPMENT CENTER

micronanornd.paruluniversity.ac.in

About Parul University

Situated at the heart of the cultural capital of Gujarat, Vadodara, Parul University is a testament to the fusion of rich cultural heritage history and the contemporary 21st century. Since its inception in 1993 to its recognition as an University in 2015, Parul University has emerged as one of the largest and leading academic institutions. The university is a rich blend of 21 faculties and 38 institutes offering a wide range of diploma, graduate, and postgraduate degree programs in various academic disciplines.

NAAC GRADE A++

ACCREDITED University

QS-I Gauge **TOP 50 NIRF RANKING**

4 Star Rating from MoE, GoI

The PU Advantage

150+
Acres Campus

50,000
Students

3200+
International Students

180+
Startups Incubated

21,000+
In-campus Residency

150 National
Awards & Rankings

2500+
Faculties

160+ Professors from
IITs, NITs, IISc, NIDs, NIFTs

100+ Foreign
Partnerships

About Parul University

Micro-Nano Research & Development Centre

The Micro Nano Research and Development Centre at Parul University, Vadodara, was established in 2024 under the auspices of the Industries Commissionerate, Government of Gujarat. This centre was funded through the Scheme for Assistance for Research & Development Activities, under Gujarat Industrial Policy 2020. It is set to become a leading R&D Centre for cutting-edge research and innovation in micro and nano technologies.

Key Features

Advanced Fabrication and Characterization Facilities :
The Advanced manufacturing and Characterization Facilities are equipped with state-of-the-art techniques and technology to facilitate advanced research in the fields of micro and nano sciences, as well as micro and nanoscale device manufacturing and analysis.

Multidisciplinary Research Capabilities :
Interdisciplinary teams and research projects in nanomaterials, Nanoelectronics, MEMS, and biomedical nanotechnology, comprising collaborative initiatives that span academia, industry, and government.

Educational and Training Programs :
Postgraduate courses, seminars, workshops, and practical training aiming at cultivating proficient workforce in the field of micro and nanotechnology.

The "Micro Nano Research and Development Centre" aspires to be a premier center of innovation and excellence in micro and nanotechnology. This will be achieved by conducting cutting-edge research, fostering a culture of scientific and technological innovation, and developing next-generation materials, devices, and systems that address critical global challenges, improve the quality of life, and bridge the gap between fundamental research and practical implementation. Additionally, the center will train the next generation of scientists, engineers, and entrepreneurs.

VISION

The "Micro Nano Research and Development Centre" is dedicated to the advancement of micro and nano technology by means of innovative approaches, rigorous research, and interdisciplinary collaboration. The objective is to create innovative materials, devices, and systems that address global challenges, improve societal well-being, stimulate economic development, and sustainable and technologically advanced future.

MISSION

Target Research Sectors

- Material Science
- Pharmaceutical Science
- Biomedical and Health Science
- Engineering
- Semiconductor Technology
- Energy

Research Excellence at Parul University

15 Cr+
Research Grants

320+
Ph. D Research Guides

2500+
Scientific Research Paper Published

185+
Patents Filed

60+
Copyrights Filed & Granted

135+
Patents Published

✦ Our Equipments ✦

Scanning Electron Microscope (SEM) with EDS

Model Name
SU3800 Hi-SEM with EDS and Sputter Coater

Company Name
Hitachi High-Tech India Pvt. Ltd.

About :

The Hitachi SU3800 SEM performs high-resolution characterization and analysis, yielding precise nanoscale surface information. It is equipped with advanced optics and detection systems, including SE, BSE, UVD, and STEM detectors. The SEM provides comprehensive information about specimen surface morphology, with an EDS system for elemental composition analysis.

Salient Features:

- Five-axis motorized stage with a maximum specimen size of 200mm in diameter.
- High resolution: 3.0 nm at 30kV (High Vacuum Mode) for SE, and 4.0 nm at 30kV (Low Vacuum Mode) for BSE.
- Unique Ultra Variable Pressure Detector (UVD II) for SE imaging and CL imaging.
- Oxford Xplore EDS system for live elemental mapping.
- Gold sputter coating unit for preparing conducting layers on non-conducting samples.

Applications:

- Materials research, nanotechnology, ceramics, composites, polymeric materials, geology, dental materials, biological and soft materials.

Discover the Nanoscale World with SU3800 SEM. High-Resolution Imaging and ElementalAnalysis at Your Fingertips.

CNC MICRO Machine tool

Model Name : Hyper-15 Table Top Type Integrated Multi-Process CNC Machine Tool

Company Name
Sinergy nano systems

About :

The Hyper-15 Micro-CNC machine tool boasts multi-process capabilities, including Micro Turning, Micro Milling, Micro Drilling, Micro EDM Drilling, and Micro Scanning EDM (EDM Milling). It supports research in both traditional and non-traditional micromachining, targeting applications in metal industries and mechanical work on metals.

Key Features :

- Versatile for rapid prototyping, precision engineering, and small-scale production.
- High precision and efficiency in machining intricate components.

Included Tools :

- End Mill Cutters (Carbide Material): 0.2mm, 0.3mm, 0.4mm, 0.5mm
- Drill Bits (HSS Carbide Material): 0.4mm, 0.5mm
- Electrodes (Copper, Brass, Tungsten Carbide): 0.4mm, 0.5mm, 100mm length

Experience the power of precision and innovation with the Hyper-15 Tabletop CNC Machine. Transform ideas into reality—start machining today!

RF & DC Magnetron Sputtering with Thermal Evaporation System

Model Name : Auto 500 | **Company Name** : HHV Advance Technologies Pvt. Ltd.

About :

The Auto 500 system combines RF and DC magnetron sputtering with thermal evaporation capabilities, enabling the growth or deposition of uniform thin films on substrates. It supports various deposition parameters, such as substrate temperature, environment, deposition rate, power, and substrate-to-target distance.

Salient Features :

- Versatile front-loading coating system with a box chamber.
- Equipped with RF (300W, 13.56 MHz) and DC (1KW) magnetron sources for diverse thin film applications.
- Adjustable substrate temperature from room temperature to 500°C.
- Thin film deposition under Argon and Nitrogen environments.

Applications :

- Anti-reflective coatings, semiconductor industries, photonics research, compound semiconductors, solar cells, and nanotechnology.

Achieve Unmatched Thin Film Quality with Auto 500. Elevate Your Research with Precision Deposition Techniques.

Scanning Probe Microscope (AFM)

Model Name : Core AFM

Company Name : NANOSURF AG Switzerland

About :

- Atomic Force Microscopy (AFM) is a powerful imaging technique used in nanotechnology and materials science. The Core AFM scans a tiny probe over a sample's surface, measuring the forces between the probe and the sample to observe high-resolution topography images.

Salient Features :

- Various operating modes: Contact mode, Tapping mode, Magnetic force microscopy (MFM), Electrical force microscopy (EFM), Force modulation, Standard and Advanced lithography, and spectroscopy.
- Capable of topography image measurement of solid and biological samples.
- Mountain SPIP commercial license image analysis software for visualization and analysis of AFM images.

Applications :

- Surface topography, material properties at the nanoscale, biological samples, surface roughness, electrical property mapping.

Explore the Nanoscale Universe with Core AFM. Unmatched Precision in Surface Imaging and Analysis.

Piezo-based Multicomponent Dynamometer

Model Name : Piezo-based Dynamometer (MLB-PML- PZ500)

Company Name : Medliab Enterprise

About :

The Piezo-based Dynamometer represents a breakthrough in force measurement technology, utilizing piezoelectric sensors to convert mechanical stress into electrical signals with remarkable accuracy and sensitivity. The MLB-PML- PZ500 is ideal for various applications from biomedical research to industrial quality control.

Salient Features:

- Capacity: 5 kN, Radial and Thrust measuring range: 0 ± 5000 N.
- Sensitivity: 0.1 N, Accuracy: ± 0.5%, Traceable to National Physical Laboratory.
- MT & Milling tool software for digital and graphical display of forces, data recording, printing, and transfer to MS Excel.

Applications:

- Precise force measurement capabilities driving advancements across various fields.

Measure with Unparalleled Accuracy with Piezo-based Dynamometer. Precision Force Measurement for Advanced Research.

X-Ray Diffractometer (XRD)

Model Name : D6 PHASER

Company Name : Bruker India Scientific Pvt. Ltd.

About :

The D6 PHASER X-ray diffractometer is an adaptable instrument designed for analyzing powders, thin films, epitaxial layers, ceramics, and other materials through X-ray diffraction. This technique involves directing main X-rays at the sample substance, where its wave nature causes diffraction at specific angles, providing information on the crystal structure.

Salient Features:

- XRD measurement with a 1.2KW X-ray tube source.
- Accurate XRD pattern measurement with ±0.01° precision.
- Various specimen holders for user-defined applications in pharmaceuticals, materials science, life science, and engineering.
- Vacuum chuck for tiny thin film samples and wafer testing.

X-Ray Reflectometry (XRR):

- Measures the thickness, density, and roughness of thin films.
- Provides high-resolution data for thin film analysis.

Applications:

- Material research, pharmaceuticals, energy sector, semiconductor industries, and crystallographic research.

Unlock the Secrets of Crystalline Structures with D6 PHASER. Precision Analysis for Advanced Material Research.

Get In Touch

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