Contents

MAJOR FACILITIES

The department is equipped with cutting-edge facilities to support advanced teaching, research, and innovation. Key resources include CNC machining centers, industrial-grade 3D printers, and robotics. Specialized laboratories such as the Additive Manufacturing Lab, IoT Lab, Robotics Lab, Mechatronics Lab, and Manufacturing Process Digitization Lab provide students and researchers with hands-on experience using industry-standard tools and technologies. High-end simulation software for CAD/CAM/CAE and PLC/SCADA systems further enhances practical learning. These facilities are integrated within several Centers of Excellence that foster interdisciplinary collaboration and innovation in Smart Manufacturing, Product Design & Validation, and Industrial Automation.

- ## CNC Laboratory

  The CNC Lab is equipped with advanced machining systems, including the EMCO 250 CNC Lathe and EMCO 250 CNC Milling machine for precision manufacturing. The lab features offline control pads for tool path simulation and is supported by Master CAM software for CAD/CAM integration. CNC tooling and accessories are also available, enabling hands-on training in modern manufacturing processes and industrial automation.

Major Equipment and Software

- CNC Lathe EMCO 250 Turn
- CNC Milling EMCO 250 Mill
- Offline Control Pads for Tool path simulation
- Master CAM Software
- CNC Toolingrt

Fig.1 CNC Lathe

Fig.2 CNC Mill

- **Computer-Aided Process Planning Lab**

This lab supports digital manufacturing and process optimization using advanced software tools like Tecnomatix and DELMIA. These platforms enable virtual process planning, factory simulation, robotics path planning, and ergonomic analysis. The facility is designed to train students and researchers in modern industrial practices aligned with Industry 4.0 and smart manufacturing systems.

Major Equipment and Software

- Tecnomatix Software
- Delmia Software

Fig.3. Computer-Aided Process Planning Lab

- **Computer-Aided Design and Simulation Lab**

This lab is equipped with industry-standard software tools such as Hyper Works, CATIA, NX-Unigraphics, AutoCAD, and Pro-E, enabling advanced design and simulation tasks. It houses 36 high-end computer systems to support modeling, analysis, and virtual prototyping. The facility provides a comprehensive environment for students and researchers to work on complex engineering design, finite element analysis (FEA), and product development projects.

Major Equipment and Software

- Hyperworks Software
- Catia Software
- NX-Unigraphics Software
- AutoCAD Software
- Pro-E Software
- 36 High end Computer Systems

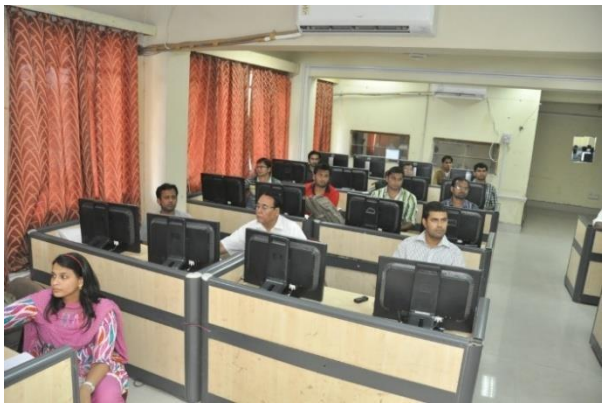



Fig.4. Computer Design and Simulation Lab

- **Workshop (Work Center)**

The workshop is equipped with a comprehensive range of conventional and modern machining and fabrication equipment. Facilities include milling machines, surface grinders, lathes, shapers, welding transformers (both single and three-phase), woodworking tools, hydraulic hacksaws, and pipe-bending machines. This setup provides hands-on training in machining, fitting, welding, and fabrication processes, essential for foundational and advanced mechanical engineering skills.

Major Equipment and Software

- Surface Grinder Machine
- Milling Machine
- Center Lathe
- Shaper Machine
- Circle Cutting Machine
- 3 Phase Welding Transformer
- 1 Phase Welding Transformer
- Wood Working Lathe
- Universal Wood Working Machine
- Circular Saw
- Hydraulic Hacksaw Machine
- Pipe Bending Machine
- Various Hand tools

Fig.5 Mechanical Workshop

Fig.6 Mechanical Workshop

- ## Additive Manufacturing Lab

This lab enables rapid prototyping and small-batch production using advanced 3D printing technologies. Equipped with 3D printers and scanners, it supports the entire workflow from design to post-processing. Key applications include reverse engineering, product validation, virtual displays, and healthcare modeling. The facility promotes innovation through rapid prototyping, cost-effective manufacturing, lightweight part production, and minimized material waste, empowering students and researchers with hands-on experience in next-generation manufacturing.

Major Equipment and Software

- High end CAD workstations Standalone,
- Ultra-fast and Industrial 3D Printer Curing Unit
- 3D Scanner
- AM Software

Fig. 3D scanner

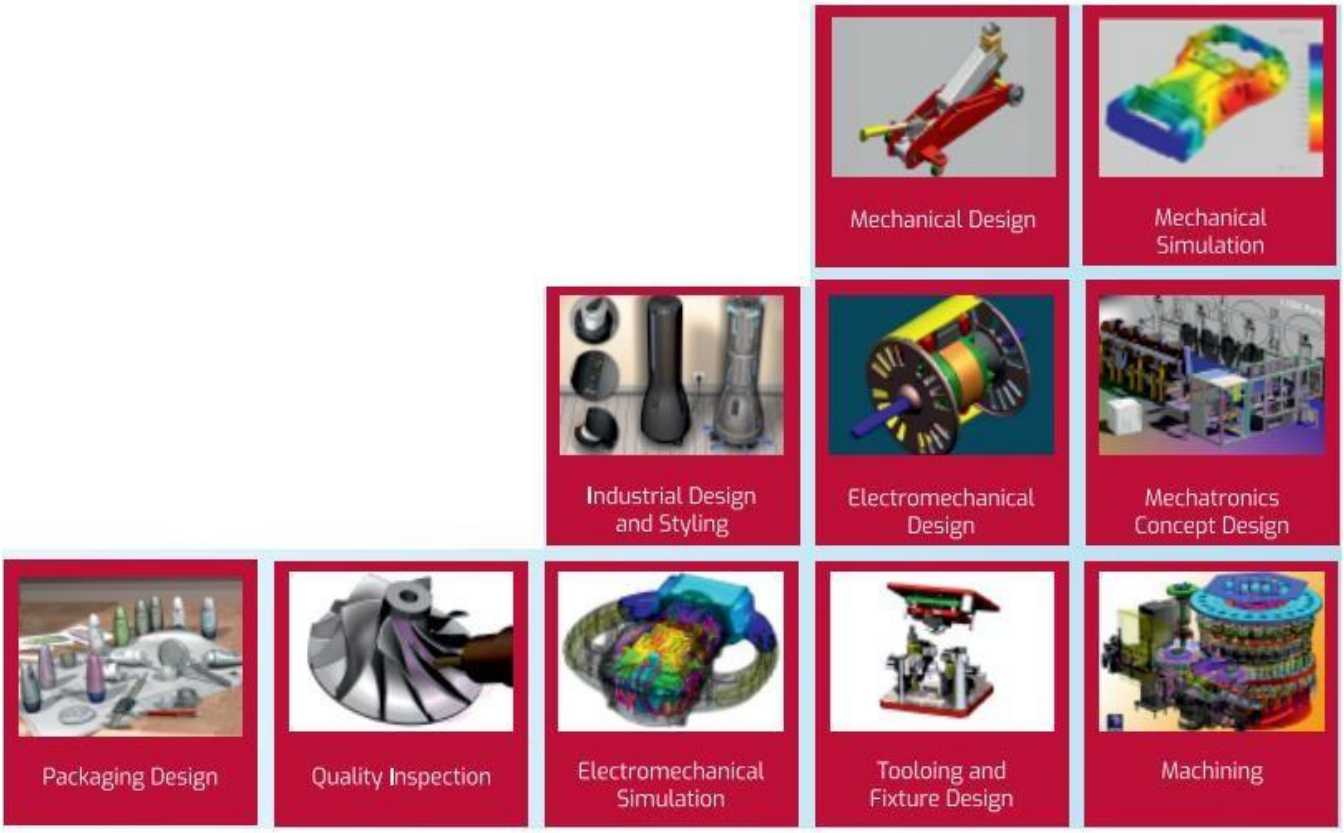
Fig. SLA 3D printer

- **Product Design & Validation Lab**

Siemens NX software is a flexible and powerful integrated solution to deliver quality products at faster pace with greater efficiency. It offers the next generation of design solution enabling us to relalize the value of the digital twin. Design and Validation lab offers customized consulting and market specific solutions aiming to develop highly skilled work force ready for placement in the field of product design and development.

Major Equipment and Software

- High end CAD work stations
- NX Academic Core+CAD
- NX Academic CAE+CAM
- NX Sheet Metal
- NX Wire Harness & Routing
- NX Mechatronics Concept Designer
- Teamcenter
- Femap with NX Nastran
- Syncrofit for NX
- Fibersim for NX
- Solid Edge University Edition



▪ Simulation, Optimization, and Test Lab

Electromechanical System analysis is an integral part of Computer Aided Engineering, being extensively used in the analysis and design of complex life systems ranging from simple linear static problem to highly complex non-linear transient dynamic problems. This lab provides a multi-physics simulation platform having result-oriented features for achieving desired accuracy specifications and reducing the need for physical prototypes in the design process.

Major Equipment and Software

- Software High end CAD work stations
- Simcenter 3D, STAR-CCM,Simcenter Amesim ,
- NX Nastran, HEEDS & TestLab

Hardware

- Simcenter SCADAS XS
- Simcenter SCADAS
- PCB 356A02 Triaxial, accelerometer
- PCB 378B02 1/2" free-field prepol microphone
- TMS ICP LaserTach Kit
- TMS Miniature shaker kit
- PCB 208C02 Multi-purpose, ICP® force sensor

▪ CNC Controller Lab

CNC machines and CNC Controllers play key role in the manufacturing industries to deliver quality products and parts in compliance with the customer demand and industry standards. SINUMERIK CNC Controllers offer a suitable automation solution for all machine designs - for job shop, contract manufacturing and large series production. Practical exposure on the industrial CNC Machines and CNC Controller Design of machining and programming strategies to produce quality products. Formulate standard CNC programming cycles and optimization, and Integration of CAM technology

Major Equipment and Software

- 808D Turning Kit
- 808D Milling Kit
- 840DSL Kit
- Sinutrain

▪ Industrial Automation Lab

Industrial controllers have become the integral part of digital manufacturing, automated & interconnected production and providing flexibility to achieve complete factory automation. This lab offers hands-on training on SIMATIC S7 technology/ products and developing industry ready professionals/ solution providers.

Major Equipment and Software

- S7 1200 PLC with HMI
- S7 1500 PLC with HMI
- PLC Software -TIA Portal
- SCADA Software -TIA Portal
- WinCC

- **Mechatronics Lab**

  Mechatronics is the fundamental building block for pioneering initiatives in multiple engineering disciplines, which are major enablers of Industry 4.0. This lab provides a platform to foster knowledge and working experience of synergistic integration of diverse engineering disciplines amongst the individuals so as to equip them with industry ready skills.

Major Equipment and Software

Advanced mechatronics modular stations specially compiled with Siemens kit :

- Distribution Station
- Testing Station
- Processing Station
- Buffering Station
- Sorting Station

- **Robotics Lab**

  The industrial robot and emerging Robots - the key player in Industry 4.0 are fast creating a niche for their integration in all verticals of industry and human life. The aim is to prepare skilled manpower ready for placement in the manufacturing and automation industry with enhanced employability.

Major Equipment and Software

- High end computer systems
- ABB Collaborative Robot
- ABB CMT Welding Cell
- Robot Software

- **Manufacturing Process Digitization Lab**

  This lab will help to digitalize manufacturing and the process of transforming innovative ideas and raw materials into real products. Through the software available in this lab synchronization between product engineering, manufacturing engineering, production, and service operations can be achieved to maximize production efficiency

Major Equipment and Software

- High end work stations
- NX CAE+CAM
- NX Additive Manufacturing
- Tecnomatix Manufacturing
- Syncrofit for NX
- Geolous
- Opcenter APS