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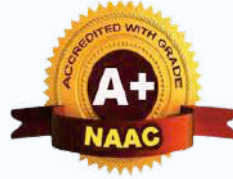
www.tgpcet.com

TULSIRAMJI GAIKWAD-PATIL

College of Engineering & Technology

Approved by AICTE, New Delhi and Govt. of Maharashtra | Affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

— AN AUTONOMOUS INSTITUTE —



GAIKWAD-PATIL
GROUP OF INSTITUTIONS

YOUR DREAM IS OUR MISSION



Our Inspiration

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Late Shri. Tulsiramji Gaikwad-Patil
(1st April 1915 - 18th July 1986)
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The Gaikwad-Patil Group derives its inspiration from Late Shri. Tulsiramji Gaikwad-Patil, the grandfather of the Chairman of the Group, Dr. Mohan Gaikwad-Patil. A man far ahead of his times, Shri. Tulsiramji Gaikwad-Patil was primarily an agriculturist, but also a true connoisseur with many varied interests. One of his passions was education. This visionary bucked the trend of sending sons into agriculture and ensured excellent education for his children and grandchildren. It was his foresight that took the family from being rural landlords to urban, uber-class professionals and entrepreneurs. In essence, the Gaikwad-Patil Group stands on the strong foundation of Shri Tulsiramji Gaikwad-Patil's foresight, vision, and commitment to education as a catalyst for progress.



About Institute

Gaikwad-Patil Group of Institutions (GPGI) provides quality education across various sectors such as Engineering & Technology, Science, Management, Architecture, and Health Sciences, with a strong focus on academic excellence, innovation, and holistic development.

Tulsiramji Gaikwad-Patil College of Engineering and Technology (TGPCET) was established in the year 2007 by Vidarbha Bahu-Uddeshiya Shikshan Sanstha (VBSS), a registered educational society. TGPCET is a self-financed private engineering institution, affiliated to Rashtrasant Tukadoji Maharaj Nagpur University (RTMNU), Nagpur, and MSBTE, Mumbai, and approved by AICTE, New Delhi and DTE, Maharashtra State.

The institute has been conferred Autonomous Status by the University Grants Commission (UGC) with effect from the academic session 2021–22. TGPCET is NAAC accredited with A+ Grade (3.32 CGPA) by NAAC, Bengaluru. The institute is also accredited by the National Board of Accreditation (NBA) for its Mechanical Engineering, Electrical Engineering, Civil Engineering, and Electronics & Communication Engineering programmes. Additionally, the Diploma programmes in Mechanical Engineering, Computer Science and Engineering, and Electrical Engineering are also NBA accredited.

TGPCET offers a diverse range of academic programs, including 12 Undergraduate programmes, comprising 10 Engineering (B.Tech.) programmes, along with BBA and BCA. The institute also offers 10 Postgraduate programmes, including 8 M.Tech. programmes in specialized engineering domains such as Computer Science and Engineering, Integrated Power System, Structural Engineering, Electronics & Communication Engineering, Artificial Intelligence & Machine Learning, Mechanical Engineering Design, Aeronautical Engineering, and Electric Vehicle Technology, along with MBA and MCA to meet evolving industry demands.

Furthermore, TGPCET houses 02 Research Centres offering Ph.D. programmes in Civil Engineering and Computer Science & Engineering, fostering advanced research and innovation. The institute also provides 6 Diploma programmes in Engineering, including Mechanical Engineering, Civil Engineering, Computer Science and Engineering, Electrical Engineering, Information Technology, and Electronics & Communication Engineering.

With a strong academic foundation, industry-oriented curriculum, and commitment to excellence, TGPCET continues to stand as a premier autonomous institution in Central India, nurturing technically competent and socially responsible professionals.

Vision Mission



VISION

To emerge as Learning Center of Excellence in the National Ethos in domains of Science, Technology and Management.



MISSION

[M1] To strive for rearing standard and stature of the students by practicing high standards of professional ethics, transparency and accountability.

[M2] To provide facilities and services to meet the challenges of Industry and Society.

[M3] To facilitate socially responsive research, innovation and entrepreneurship.

[M4] To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices.

Our Management



Dr. Mohan Gaikwad
Chairman, Gaikwad-Patil Group

“Education empowers individuals to envision the future and equips them to create it through knowledge, innovation, and responsible action.”

Dr. Mohan Gaikwad-Patil, with more than 35 years of experience in the education system to his credit, established the Gaikwad-Patil Group of Institutions in Nagpur to cater to the quality education needs of the youth in Vidarbha. His early experience teaching in an engineering college made him acutely aware of the dissonance between engineering education in the country and the requirements of the industry. He therefore began with the dream of starting an engineering college that equips students with knowledge, skills, and attitudes relevant to the industry. That dream has manifested today in the form of an educational group well known in the region for its constant striving to impart quality and industry-relevant education to the students by teaching courses like B.Tech, M.Tech, Architecture, Polytechnic, MBA, MCA, Pharmacy, BAMS, Physiotherapy and Nursing. Hardly in his early forties, Dr. Mohan Gaikwad-Patil is the young and dynamic face of the group. His contagious enthusiasm and unflagging drive are truly inspiring.



Mr. Akash Gaikwad-Patil
Vice Chairman, GPG

“Education is not preparation for life, education is life itself.”

In a world brimming with challenges, the need for brilliant engineers who can think critically, solve problems creatively, and adapt to a rapidly evolving technological landscape has never been greater. At TGPCET, we are committed to providing an education that goes beyond textbooks. Our curriculum is meticulously crafted to equip students with the technical expertise, soft skills, and design thinking abilities necessary to thrive in the ever-changing engineering landscape. We believe in nurturing well-rounded individuals with a strong foundation in ethics, social responsibility, and a passion for making a positive impact on the world. Our state-of-the-art facilities, coupled with a dedicated and experienced faculty, provide a stimulating learning environment that ignites curiosity and encourages exploration. We don't just produce engineers; we empower future leaders, innovators, and entrepreneurs who will shape the world of tomorrow. We are confident that our graduates will be at the forefront of technological advancements, tackling global challenges, and building a future brimming with possibilities.

Our Management



Dr. Anjali Patil-Gaikwad
President, GPGI

“Shaping Minds, Building Futures: Welcome to the Engineering Innovation Hub”

“Welcome to TGPCET, a premier institution dedicated to nurturing exceptional engineers who can shape the world of tomorrow. Here, we believe in cultivating a stimulating learning environment that fosters creativity, critical thinking, and a passion for innovation. Our vision is to provide a holistic learning experience that equips you with the technical expertise, leadership skills, and innovative thinking needed to thrive in a dynamic industry. With a rich legacy of academic excellence, we offer a diverse range of engineering and management programs designed to equip you with the knowledge, skills, and experiences needed to thrive in the ever-evolving engineering landscape. Our dedicated faculty, state-of-the-art facilities, and strong industry partnerships ensure you receive a well-rounded education that prepares you for success in your chosen field. We invite you to join our vibrant community and embark on a journey of excellence.”

AICTE
IDEALab

Academic Innovation Board



Dr. P. L. Naktode
Chief Mentor,
IDEA Lab, TGPCET

“Innovate, Design, Create — Transforming Ideas into Impact.”

It gives me great pride to introduce the AICTE IDEA (Innovation, Design and Entrepreneurship) Lab at Tulsiramji Gaikwad-Patil College of Engineering and Technology. The IDEA Lab provides a vibrant platform for students to explore creativity, apply design thinking, and develop innovative solutions through hands-on and interdisciplinary learning.

This initiative reflects our commitment to nurturing skilled, innovative, and entrepreneurial engineers who can contribute meaningfully to society and nation-building. I encourage students to actively utilize the IDEA Lab facilities, think creatively, collaborate effectively, and transform their ideas into impactful innovations. Best wishes for a future driven by innovation and excellence.



Dr. Sandeep Gaikwad
Faculty Coordinator
IDEA Lab, TGPCET

“Creating Innovators for a Brighter Tomorrow — Where Ideas Turn into Impact.”

The true essence of education lies in using knowledge for the benefit of society and contributing to nation-building through innovation and responsible engineering. It is our proud privilege to provide students with the AICTE IDEA (Innovation, Design and Entrepreneurship) Lab as a platform to explore creativity, develop practical skills, and transform ideas into meaningful solutions.

With a clear vision to nurture technologically competent and socially responsible engineers, we are committed to providing a hands-on, industry-oriented, and innovation-rich learning environment. The IDEA Lab is designed to strengthen problem-solving abilities, design thinking, and entrepreneurial mindset among students through modern tools, interdisciplinary collaboration, and project-based learning.

Let this IDEA Lab be a stepping stone toward innovation, leadership, and national development.

Best wishes for a future driven by creativity, commitment, and excellence.

Academic Innovation Board

“Shaping the Future through Engineering Innovation.”



Dr. Pragati Patil
Faculty Co-Coordinator
IDEA Lab, TGPCET

At TGPCET, we believe that innovation is the cornerstone of progress and the driving force of sustainable development. The AICTE IDEA (Innovation, Design and Entrepreneurship) Lab stands as a forward-looking initiative aimed at shaping thinkers, creators, and leaders who can address tomorrow's challenges with confidence and competence.

The IDEA Lab is envisioned as a catalyst for transformational learning—where curiosity meets technology, ideas evolve into solutions, and students gain the freedom to experiment, design, and innovate beyond conventional boundaries. Through hands-on engagement, interdisciplinary collaboration, and industry-oriented mentorship, the lab empowers learners to move from imagination to implementation.

I urge our students to embrace this platform with ambition and responsibility, to question boldly, innovate ethically, and contribute solutions that serve society and industry alike. Let the IDEA Lab be the foundation upon which future innovators and entrepreneurs of TGPCET build their legacy.

Best wishes for a future shaped by vision, innovation, and excellence.

It gives me great pleasure to share this message for the AICTE IDEA (Innovation, Design and Entrepreneurship) Lab at TGPCET, which strongly supports our commitment to quality education and outcome-based learning.



Prof. Ritesh Banpurkar
Faculty Co-Coordinator
IDEA Lab, TGPCET

The IDEA Lab enhances experiential learning, promotes innovation, and strengthens industry-relevant skills through hands-on activities, interdisciplinary projects, and prototype development. It plays a vital role in achieving program outcomes and continuous academic improvement.

I encourage students and faculty to actively engage with the IDEA Lab to foster creativity, research, and entrepreneurial thinking, contributing to academic excellence and societal development.

Best wishes for the continued success of the AICTE IDEA Lab at TGPCET.

IdeaLab Tech Guru's



Mr. Chetan Jambhulkar
IoT and PCB Design Cell



Mr. Suraj Mahajan
IoT and PCB Design Cell



Mr. Sandeep Thakre
IoT and PCB Design Cell



Ms. Kalyani Sawarkar
IoT and PCB Design Cell



Dr. Neerajkumar Wayzode
3D Printing Cell



Mr. Ravindra Shende
Machining & Fabrication
Cell



Mr. Shrikant Kathwate
Machining & Fabrication
Cell



Dr. Vinay Kumar
Machining & Fabrication
Cell



Mr. Balakrishna Das
Software Cell



Mr. Alex Pradip Dhoke
Software Cell



Mr. Bramhadeo Wadibhasme
Software Cell

IdeaLab

Student Ambassadors



Abhishek Gajbhiye



Anshul Wandhare



Aryan Shembekar



Asif Bacchu



Akansha Tembhare



Anshika Borkar



Bhavesh Khapekar



Suyog Kapse



Dardshan Tripadwar



Ashmil Shettewar



Dyananda Yelne



Jijau Ravate



Krishna Khandare



Krushna Kayande



Madan Raut



Madhura Nikhare

IdeaLab

Student Ambassadors



Mohit Patil



Prathmesh Takalkar



Riya Gedam



Rohit Barbate



Shivam Dhulase



Shivam Kushwaha



Shlok Bahe



Sumit Raut



Tina Ajmire



Umang Patil



Pranjal Bodele



Rutikesh Aldar





बौधायन IoT-PCB Design & Fabrication



The IoT, PCB Design & Fabrication Laboratory under the AICTE IDEA (Innovation, Design and Entrepreneurship) initiative at TGPCET is a modern, hands-on innovation facility that enables students to design, build, test, and validate complete electronic and IoT-based systems. The lab supports learning through practical experimentation, product development, and interdisciplinary innovation.

This facility bridges the gap between theoretical concepts and real-world engineering applications by providing access to industry-relevant tools, embedded platforms, and electronic fabrication resources within the campus.

OBJECTIVES

- To develop practical electronics and embedded system skills
- To promote design thinking and product development
- To enable in-house PCB design and fabrication
- To support innovation, research, and startup initiatives
- To encourage interdisciplinary project-based learning

KEY FACILITIES

PCB Design & Fabrication

- PCB Milling Machine for rapid prototyping
- Copper Clad Boards (Single & Double Side)
- Precision PCB Drill Bits
- Reflow Oven for SMD assembly
- Soldering & Rework Stations



बौधायन IoT-PCB Design & Fabrication

KEY FACILITIES

Testing & Measurement

- Digital Microscope (up to 1600X)
- Bench Top Multimeter
- LCR Meter
- Regulated DC Power Supplies
- Non-Contact Voltage Testers

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- Digital Microscope (up to 1600X)
- Bench Top Multimeter
- LCR Meter
- Regulated DC Power Supplies
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Embedded & IoT Platforms

- Arduino UNO, Nano, Mega
- Raspberry Pi 4
- ESP8266 NodeMCU and ESP32
- BeagleBone Black and Blue

STUDENT ACTIVITIES

- IoT system development and automation projects
- Smart agriculture, smart home, healthcare prototypes
- Custom PCB design and fabrication
- Hackathons, workshops, and innovation challenges
- Final-year projects and research support

LEARNING OUTCOMES

Students will be able to

- Design and implement embedded and IoT systems
- Fabricate and test printed circuit boards (PCBs)
- Integrate sensors, controllers, and communication modules
- Develop problem-oriented innovative solutions
- Work in multidisciplinary teams using modern tools



कणाद 3D Printing & Rapid Prototyping



The 3D Printing & Rapid Prototyping Lab enables students to convert digital designs into physical models quickly and accurately. This facility supports the complete product development cycle from concept design to functional prototype, encouraging experimentation and design validation.

OBJECTIVES

- To promote design thinking and rapid product development
- To enable fast prototyping and iterative design
- To support innovation, startups, and research projects

FACILITIES & CAPABILITIES

- High-precision 3D printers for plastic prototyping
- CAD-to-print workflow support
- Prototype validation and testing
- Integration with PCB and machining labs for complete product development

STUDENT ACTIVITIES

- Product design and casing development
- Engineering model fabrication
- Architecture and design prototypes
- Medical and assistive device models
- Startup product validation

LEARNING OUTCOMES

Students will be able to

- 3D modelling and design optimization
- Rapid manufacturing techniques
- Prototype testing and redesign
- Innovation-driven product development



चाणक्य Robotics & Automation



The Robotics & Automation Lab provides a platform for students to design, program, and test robotic systems and automated solutions. The lab promotes interdisciplinary learning by integrating mechanical systems, electronics, control systems, and programming.

OBJECTIVES

- To develop skills in robotics, automation, and intelligent systems
- To promote industry-relevant automation technologies
- To encourage innovation in smart machines and control systems

FACILITIES & CAPABILITIES

- Robotic kits and programmable controllers
- Sensors, actuators, and motor control systems
- Microcontroller and embedded platforms
- Vision, line-following, pick-and-place, and autonomous robot setups

STUDENT ACTIVITIES

- Industrial automation simulations
- Mobile robots and autonomous systems
- Smart manufacturing concepts
- Assistive and service robotics
- Competition and hackathon projects

LEARNING OUTCOMES

Students learn to

- Design and assemble robotic mechanisms
- Program controllers and integrate sensors
- Implement automation logic and control strategies
- Develop real-world robotic applications



नागार्जुन Machining & Fabrication



The **Machining & Fabrication Laboratory** under the AICTE IDEA (Innovation, Design and Entrepreneurship) initiative at TGPCET is a modern prototyping and manufacturing facility designed to support product development, mechanical fabrication, and multidisciplinary innovation. The lab enables students to convert design concepts into physical prototypes using advanced machining, cutting, and welding technologies. This laboratory plays a crucial role in promoting hands-on engineering, rapid prototyping, and industry-relevant manufacturing skills, strengthening the innovation ecosystem on campus.

OBJECTIVES

- To provide practical exposure to manufacturing and fabrication processes
- To support rapid prototyping and product realization
- To enhance skills in CNC machining, cutting, and welding
- To promote design-to-development learning
- To support innovation, startups, and research projects

MAJOR FACILITIES

CNC Router Machine

- Working Area: 1300 × 2500 × 250 mm
- Resolution & Repeatability: ± 0.03 mm
- Spindle Speed: Up to 24,000 RPM
- Structure: Rack & Pinion, Ball Screw Linear Rails, Steel Frame
- Applications: Rapid prototyping, product design, signage, aerospace & mechanical components, research projects

CNC Router Machine

- Working Area: 1300 × 2500 × 250 mm
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- Structure: Rack & Pinion, Ball Screw Linear Rails, Steel Frame
- Applications: Rapid prototyping, product design, signage, aerospace & mechanical components, research projects



नागार्जुन Machining & Fabrication

MAJOR FACILITIES

Lathe Machine

- Bed Length: 1370 mm, Swing over Saddle: 190 mm
- Spindle Speed Range: 40–950 RPM, V-Belt Drive
- Applications: Shafts, bolts, bushes, repair and maintenance, machine components

Laser Cutting & Engraving Machine

- Working Area: 600 × 900 mm, Laser Power: 100 W CO₂
- Cutting Speed: Up to 30,000 mm/min, Engraving up to 64,000 mm/min
- File Support: PLT, CDR, AI, DWG, DXF, BMP, JPEG
- Applications: Signage, electronics, automotive parts, branding, décor, textiles, wood, and leather

Welding Machine

- Capacity: Up to 250 Amps, Voltage: 220–440 V
- Cooling: Oil / Air Cooled
- Applications: Structural frames, chassis fabrication, machinery repair, agricultural equipment

Table Saw Machine

- Table Size: 430 × 640 mm, Blade Speed: 4500 RPM
- Cutting Capacity: 85 mm (90°), 60 mm (45°)
- Applications: Wood cutting, panel sizing, grooves, slots, angled cuts, furniture components

STUDENT ACTIVITIES

- Mechanical prototype development
- Product casing and structural fabrication
- Interdisciplinary innovation projects
- Startup prototype support
- Hackathons and design competitions
- Final-year and research projects

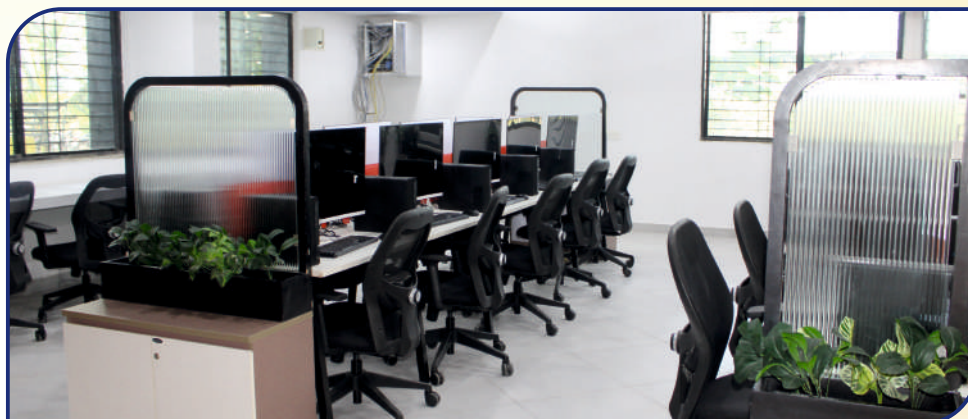
LEARNING OUTCOMES

Students will be able to

- Operate CNC, laser cutting, and conventional machines
- Fabricate components from design drawings
- Apply safety standards and manufacturing practices
- Develop complete product prototypes
- Work collaboratively in multidisciplinary teams



पाणिनी Software Cell



The **Software Laboratory** under the AICTE IDEA (Innovation, Design and Entrepreneurship) initiative at TGPCET is a comprehensive digital innovation facility that supports design, simulation, development, automation, and artificial intelligence applications. The lab enables students to develop complete digital solutions that complement hardware prototypes and support multidisciplinary innovation. This lab is built entirely on open-source, AICTE-approved software platforms, ensuring accessibility, flexibility, and industry relevance.

OBJECTIVES

- To develop skills in software development, simulation, and analysis
- To support AI, machine learning, and data processing applications
- To enable PCB design, CNC programming, and manufacturing integration
- To promote collaborative and project-based learning
- To support research, innovation, and startup development

SOFTWARE DOMAINS & TOOLS

Management & Teaching Tools

- Git, GitHub/GitLab – Version control and collaboration
- MkDocs – Project documentation
- Moodle (LMS) – Course and training management
- Docker – Containerization of applications
- VirtualBox – Virtual machines and OS simulation
- JupyterHub – Multi-user coding environment

Mechanical Design & Simulation

- FreeCAD, LibreCAD – Parametric modeling and drafting
- OpenSees, CalculiX – Structural and stress analysis
- OpenFOAM – Fluid flow simulation
- Gmsh – Mesh generation
- Blender – Visualization and 3D modeling
- QGIS – Mapping and civil applications



SOFTWARE DOMAINS & TOOLS

PCB Design, CNC & Laser Processing

- KiCad, gEDA – PCB schematic and layout design
- Ngspice – Circuit simulation
- Gerbv, FreeRouting, KiCost – Gerber viewing, routing & BOM
- Inkscape, Boxes.py – Design for laser cutting
- LaserGRBL, K40 Whisperer, LightBurn (OSS) – Laser control
- LinuxCNC, Universal G-Code Sender, CAMotics, PyCAM, bCNC – CNC control and simulation

AI & Machine Learning Applications

- OpenCV, scikit-image – Image processing
- TensorFlow, PyTorch – Neural networks and deep learning
- NumPy, Matplotlib – Data analysis and visualization
- Labellmg, Jupyter Notebook – Dataset creation and coding
- DeepSpeech, Kaldi, ESPnet, Vosk, Festival, Librosa, NLTK – Speech and language processing

STUDENT ACTIVITIES

- Software development for IoT and robotics systems
- AI-based image and speech recognition projects
- Simulation of mechanical and civil structures
- CNC and laser machine programming
- Hackathons, coding challenges, and startup development

LEARNING OUTCOMES

Students will be able to

- Develop and deploy software-driven engineering solutions
 - Apply AI/ML techniques to real-world problems
 - Integrate software with hardware prototypes
 - Perform simulation, design validation, and optimization
- Work collaboratively using modern development tools



कपिल Conference Room



The **Conference Hall of the AICTE IDEA Lab at TGPCET** serves as a dedicated space for knowledge sharing, innovation discussions, training programs, and collaborative interactions among students, faculty, industry experts, and entrepreneurs. It plays a vital role in connecting ideation with execution by providing a professional environment for learning, mentoring, and strategic planning.

OBJECTIVES

- To provide a platform for expert lectures and technical workshops
- To facilitate project reviews, brainstorming, and design discussions
- To support industry–academia interactions and startup mentoring
- To encourage interdisciplinary collaboration and innovation culture

FACILITIES

- Multimedia presentation system
- Audio-visual teaching aids
- Seating arrangement suitable for training programs and meetings
- Flexible layout for seminars, panel discussions, and group activities

STUDENT ACTIVITIES

- Innovation awareness programs and design thinking workshops
- Startup guidance and mentoring sessions
- Student project presentations and reviews
- Hackathon briefings and ideation meets

LEARNING OUTCOMES

- Enhances students' communication and presentation skills
- Develops professional interaction and public speaking abilities
- Provides exposure to real-world innovation practices
- Familiarizes students with entrepreneurial and startup ecosystems



सुब्रह्मण्यन चंद्रशेखर Ideation Studio



The Ideation Studio Room of the AICTE IDEA Lab at TGPCET is a creative and collaborative space specially designed to promote design thinking, brainstorming, and early-stage innovation development. This studio provides an open and flexible environment where students can freely exchange ideas, explore possibilities, and conceptualize solutions to real-world problems. The Ideation Studio serves as the starting point of the innovation journey, where ideas are nurtured before moving to design, prototyping, and product development stages.

OBJECTIVES

- To encourage creative thinking and problem discovery
- To facilitate brainstorming and collaborative ideation
- To support design thinking and user-centric innovation
- To promote interdisciplinary interaction and teamwork

FACILITIES

- Flexible seating and group discussion zones
- Whiteboards and writable surfaces for idea mapping
- Presentation boards for concept pitching
- Internet-enabled collaborative workspace

STUDENT ACTIVITIES

- Design thinking workshops
- Brainstorming and ideation camps
- Problem identification and solution mapping sessions
- Startup idea discussions and pitch preparation

LEARNING OUTCOMES

- Enhances critical thinking and problem-solving abilities
- Encourages creative and innovative thinking
- Improves effective communication and idea articulation
- Promotes productive teamwork and collaboration

LASER CUTTER & ENGRAVING MACHINE

SIL 3 x 2



PARAMETER DETAILS

Working Area	600 mm × 900 mm
Laser Type	CO ₂ DC Glass Laser Tube
Laser Power	100 W
Repeat Positioning Accuracy	0.1 mm (Max)
Cutting Speed	0 – 30,000 mm/min
Engraving Speed	0 – 64,000 mm/min
Graphic File Support	PLT, CDR, AI, DWG, DXF, BMP, JPEG

WELDING MACHINE

EVEREST



PARAMETER DETAILS

Max Welding AMPS	250 AMPS
PRAM Volts	220 V - 440 V
Cycles	50%
Cooling	Oil Cooled / Air Cooled

CNC ROUTER MACHINE

SIL 1325



PARAMETER DETAILS

X, Y, Z Working Area	1300 mm × 2500 mm × 250 mm
Resolution	± 0.03 mm
Repeatability	± 0.03 mm
Maximum RPM	0-24000 RPM
Maximum Working Speed	0-18000 RPM
X,Y,Z Structure	Rack Pinion, Ball Screw linear Rails
Structure	Welding Steel Structure

LATHE MACHINE

DILIP 2



PARAMETER DETAILS

Length of Bed	1370 mm
Width of Bed	225 mm
Height of Centre	165 mm
Swing over saddle	190 mm
Range of spindle speed	40 to 950 RPM
Spindle Drive	V – Belt
Sleeve Diameter	38 mm

WELDING MACHINE

EVEREST



PARAMETER DETAILS

Max Welding AMPS	250 AMPS
PRAM Volts	220 V - 440 V
Cycles	50%
Cooling	Oil Cooled / Air Cooled

TABLE SAW MACHINE

INGCO TS150078

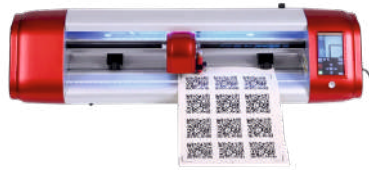


PARAMETER DETAILS

Main Table size	430 mm x 640 mm
Maximum Cutting Capacity	85 mm (90°) x 60 mm (45°)
Input Power	1500 W
No Load Speed	4500 RPM
Voltage	220 V - 240 V
Blade tilting range	0° - 45°

VINYL CUTTING PLOTTER

SKYCUT C24



PARAMETER DETAILS

Max Media Width	720 mm
Max Cutting Width	610 mm
Max Contour Cutting Width	570 mm
Motor Type	Stepper
Max Cutting Force	800 g
Max Moving Speed	700 mm/s
Max Cutting Speed	600 mm/s
Cutting Precision	± 0.01 mm
Repeat Precision	± 0.01 mm
Display	Large Touch Screen
Auto Contour Cut	Camera-based
Connectivity	USB Flash / USB Cable / Wi-Fi (Optional)
Power	< 100 W
Working Environment	+5 °C to +35 °C
CorelDRAW Compatible	Yes

DUAL-NOZZLE FDM 3D PRINTER

BAMBU LAB H2D



SPECIFICATIONS

Parameter	Details
Build Volume (Single Nozzle)	325 × 320 × 325 mm³
Build Volume (Dual Nozzle)	300 × 320 × 325 mm³
Printing Technology	FDM, Dual Nozzle System
Max Print Speed	1000 mm/s
Max Acceleration	20,000 mm/s²
Max Hotend Temperature	350 °C (All-Metal)
Max Heated Bed Temperature	120 °C
Active Chamber Heating	Up to 65 °C
Extruder Gear	Hardened Steel
Nozzle	Hardened Steel
Filament Diameter	1.75 mm
Supported Nozzle Diameters	0.2, 0.4, 0.6, 0.8 mm
Screen	5-inch, 720 × 1280 Touchscreen
Connectivity	Wi-Fi, Bambu-Bus, Micro-SD, LAN
Air Purification	G3 Pre-filter, HEPA H12, Activated Carbon
Motion Accuracy	5 μm Resolution Optical Motion Calibration

CREALITY CR-SCAN OTTER 3D SCANNER



SPECIFICATIONS

Parameter	Details
Scanning Accuracy	Up to 0.02 mm
Scanning Technology	Infrared Structured Light
Vision System	Four-lens Stereo Vision
Color Scanning	24-bit Full-Color
Scanning Speed	Up to 20 fps
Object Size Range	Small to large objects (approx. 10 mm to 2000 mm)
Anti-shake Technology	Yes
Data Interface	USB (wired)
Supported Output Formats	STL, OBJ, PLY
Software	Creality Scan
Operating System	Windows / macOS
Power Supply	5 V $\Rightarrow$ 3 A
Operating Temperature	-10 °C to 40 °C

RESIN 3D PRINTER PHROZEN SONIC MINI 4K



SPECIFICATIONS

PARAMETER	DETAILS
Printing Technology	Resin 3D Printer – LCD Type
Light Source	405 nm ParaLED Matrix 2.0
Masking LCD Resolution	3840 × 2160 (4K)
LCD Size	6.1" Monochrome
XY Resolution	35 μ m
Layer Thickness	0.01–0.30 mm
Maximum Printing Speed	~80 mm/hour
Build Volume (Print Area)	~134 × 75 × 130 mm (5.2 × 2.9 × 5.1 in)
Connectivity	USB
Software	ChiTuBox (supported)
Power Requirement	AC100–240 V ~ 50/60 Hz
Printer Dimensions	~250 × 250 × 330 mm
Printer Weight	~5 kg

MTAB ARISTO ROBOT

6-AXIS INDUSTRIAL EDUCATIONAL ROBOT



SPECIFICATIONS

Parameter	Details
Number of Axes / Height	6 / 522 mm
Joint Actuators	Servo Motor (With Encoders)
Transmission	Belt drives, Ball Screws, Elbow & Gear drive
Joints	Ball Bearings
Gripper	Angular Jaws Type (Detachable)
Gripper Actuator	Pneumatic
Pay Load (Including Gripper)	3 kg
Repeatability	± 0.3 mm

CNC MILLING MACHINE

MTAB - FLEX MILL



SPECIFICATIONS

Parameter	Details
X-Axis Travel (Longitudinal)	250 mm
Y-Axis Travel (Cross)	150 mm
Z-Axis Travel (Vertical)	220 mm
Table Size (Clamping Surface)	480 × 180 mm
T-Slots	3 × 10 mm
Max Load on Table	50 kg
Positional Accuracy	0.010 mm
Repeatability	± 0.005 mm
Rapid Feed (X / Y / Z)	5 m/min
Spindle Speed	3000 rpm

INGCO BMS14007

MTAB - FLEX MILL



SPECIFICATIONS

Parameter	Details
Voltage	220-240V ~ 50/60Hz
Input Power	1400 W
No-load Speed	5000 rpm
Blade Size	210 mm (8-1/4") × 25.4 mm
Base Material	Aluminium
Mitre Table Angles	0° to 45° left and right
Bevel Cuts	0° to 45° to the left
Cutting Capacity (0°/0°)	55 × 120 mm
Cutting Capacity (45°/0°)	55 × 83 mm
Cutting Capacity (0°/45°)	30 × 120 mm
Cutting Capacity (45°/45°)	30 × 83 mm

CNC TURNING MACHINE

MTAB - FLEX TURN



SPECIFICATIONS

Parameter	Details
Chuck Size	100 mm
Max. Turning Diameter	80 mm
Max. Turning Length	190 mm
Swing over Cross Slide	80 mm
Swing over Way Cover	244 mm
Max. Spindle Speed	6000 rpm
Number of Turret Stations	8
X-Axis Travel	190 mm (Diameter)
Z-Axis Travel	210 mm
Rapid Traverse (X / Z)	5 m/min
Feed Rate	2 m/min
Max. Speed	4000 rpm

VOLTZ VZ-DS-500

BELT & DISC GRINDER / SANDER



SPECIFICATIONS

Parameter	Details
Model	VZ-DS-500
Type	Electric Belt & Disc Grinder / Sander
Motor Power	500 W
Speed	2980 RPM
Belt / Disc Size	6 inch
Power Source	Corded Electric
Mounting Type	Bench-top

INGCO SS852

SCROLL SAW (85W)



SPECIFICATIONS

Parameter	Details
Voltage	220-240 V ~ 50 Hz
Input Power	85 W
No-load Speed	0-1450 rpm
Max Cutting Depth	50 mm
Max Cutting Width	410 mm (16")
Table Size	375 x 250 mm
Table Tilting Range	0-45° (Left)
Blade Size	133 mm

SOFTWARE LIST FOR 3D PRINTING LABORATORY

SPECIFICATIONS

SOFTWARE	PURPOSE AND USAGE
Ultimaker Cura	Convert models to G-code
PrusaSlicer	Professional slicing
MeshLab	Fix STL files
Blender	Modify 3D models
OctoPrint	Web-based printer control
Netfabb Basic (old OSS)	Repair models
OpenSCAD	Code-based modeling

SOFTWARE LIST FOR IoT LABORATORY

SPECIFICATIONS

SOFTWARE	PURPOSE AND USAGE
Arduino IDE	Code upload & testing
Thonny	Beginner-friendly Python IDE
PlatformIO	Advanced embedded development
Raspberry Pi OS	Linux OS for Pi
Mosquitto	IoT communication
Node-RED	Visual IoT programming
ThingsBoard (Community)	IoT visualization
Home Assistant	Automation platform
MQTT Explorer	Debug MQTT messages
Wokwi (Offline support tools)	Arduino simulation support

SOFTWARE LIST FOR LABORATORY MANAGEMENT AND TEACHING TOOLS

SPECIFICATIONS

SOFTWARE	PURPOSE AND USAGE
Version Control	Git + GitHub/GitLab CE
Documentation	MkDocs
LMS	Moodle
Containerization	Docker
Virtualization	VirtualBox
Collaboration	JupyterHub

SOFTWARE LIST FOR MECHANICAL DESIGN

SPECIFICATIONS

SOFTWARE	PURPOSE AND USAGE
FreeCAD	Parametric modelling for mechanical parts
OpenSees	Structural simulation
CalculiX	Stress, strain, thermal analysis
OpenFOAM	Fluid flow simulation
LibreCAD	Technical drawings
QGIS	Civil surveying, mapping
Blender (Open Source)	Visualization & modelling
Gmsh	Mesh generation for simulations

SOFTWARE LIST FOR PCB DESIGN LABORATORY

SPECIFICATIONS	
SOFTWARE	PURPOSE AND USAGE
KiCad	Industry-standard open PCB design
Ngspice	Circuit simulation
Gerbv	Gerber file viewer
FreeRouting	Automatic PCB routing
gEDA	Schematic capture
KiCost	Automatic BOM generation

SOFTWARE LIST FOR LASER CUTTING MACHINE & CNC LABORATORY

SPECIFICATIONS	
SOFTWARE	PURPOSE AND USAGE
Inkscape	Vector Design - Create cutting designs
LaserGRBL	Laser Control - Send jobs to laser engravers
K40 Whisperer	CAM Software - Control K40 lasers
Boxes.py	Layout - Parametric box generator
LightBurn (Alt OSS tools)	CNC Integration
LinuxCNC	CNC Control - Machine controller
FreeCAD Path Workbench	CAM Software - Toolpath generation
Universal Gcode Sender	G-Code Sender - Control CNC machine
CAMotics	Simulation - Toolpath simulation
PyCAM	2D CAM - CNC milling toolpaths
bCNC	Engraving - CNC control and probing

SOFTWARE LIST FOR AI-ML LAB (SPEECH RECOGNITION & IMAGE PROCESSING)

SPECIFICATIONS	
SOFTWARE	PURPOSE AND USAGE
OpenCV	Image processing
TensorFlow	Neural networks
PyTorch	Research framework
NumPy	Matrix operations
Matplotlib	Plotting
scikit-image	Image algorithms
LabelImg	Dataset labeling
Jupyter Notebook	Interactive coding
Mozilla DeepSpeech	Speech-to-text
Kaldi	Research speech recognition
NLTK	Text processing
Librosa	Feature extraction
ESPnet	Speech models
Vosk	Lightweight speech recognition
Festival	Text-to-speech



Program Outcomes

Program Outcomes — AICTE IDEA Lab, TGPCET

Participation in the AICTE IDEA (Innovation, Design and Entrepreneurship) Lab equips students with the ability to apply core engineering principles, scientific knowledge, and computational skills to identify, analyze, and solve complex real-world problems through innovative and practical solutions. Students develop competence in designing systems and components, creating digital models, fabricating prototypes, and integrating hardware and software using modern engineering tools such as CAD/CAM software, simulation platforms, embedded systems, automation technologies, and digital manufacturing equipment.

The program strengthens experimental skills by encouraging testing, validation, performance analysis, and iterative improvement of designs based on data-driven decisions. Learners also gain awareness of professional ethics, safety standards, sustainability, and societal impact while developing solutions that are environmentally responsible and socially relevant. Through collaborative projects, hackathons, workshops, and startup-oriented activities, students enhance teamwork, leadership, communication, documentation, and project management capabilities, preparing them for multidisciplinary and industry-oriented environments.

The IDEA Lab further nurtures entrepreneurial thinking by exposing students to product development cycles, intellectual property concepts, and innovation ecosystems, thereby motivating them to become job creators and technology leaders. Overall, the program fosters self-directed learning, adaptability to emerging technologies, and continuous professional development, ensuring that graduates are future-ready, innovative, and globally competent engineers.



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