



University : National Chin-Yi University of Technology
Country : Taiwan
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[SDGs 17] Partnership for the Goals 全球夥伴

[17.3.9] Please indicate if your university publishes progress against SDG9?

NCUT is committed to advancing sustainable industrialization, innovation, and resilient infrastructure, aligning with UN Sustainable Development Goal 9 (SDG 9). Through research, industry-academia cooperation, and talent development, NCUT enhances manufacturing efficiency, fosters innovation, and drives local and global industry transformation.

1. Research and Development Centers

(A) Precision Machinery Research Development Center (TAF)

- **Testing Laboratory:** Provides testing and consultation services, creating revenue surplus and enhancing the university's visibility. Subject to annual supervision and evaluation by the Taiwan Accreditation Foundation (TAF).
- **Calibration Laboratory:** Accredited for three calibration techniques, with plans for continuous expansion. Supports local enterprises by offering precision measurement services.
- **Partnerships:** Collaborated with Palmary Machinery, Chin Hung Machinery, Focus Seiki, TECO Electric and Machinery, Gentiger Machinery, among others (2022–2024).

(B) Product Proofing Center

- Established to meet the industry's demand for pre-mass-production prototyping, ensuring product feasibility and quality.
- Provides testing, functional refinement, and cost-reduction strategies for SMEs.

(C) Industrial Control Cybersecurity Center

- Offers cybersecurity management, health checks, penetration testing, blockchain, cloud security, and intrusion detection services.
- Achievements:
 - Secured two MOE cybersecurity faculty positions (2022).
 - Assisted NCUT professors in winning national ITSA-Class B projects (2023).
 - Joined National Sun Yat-sen University and National Chung Hsing University in advanced cybersecurity R&D projects (2024).
 - Supported enterprises such as Beatitudes Elderly Service Co. and Veracity Digital Research Ltd. in developing cybersecurity training and service platforms.



(D) AI Talent Development and Research Center

- Focused on AI education, Industry 4.0, and applied innovation.
- Received 120 sets of Si-eye AI software from 3DFamily Technology Co.
- Established AI classrooms in the Machine Tool College Building for local AI talent cultivation.

2. Industrial Production Line Base

(A) Integrated Plant and Machine Tool Talent Development Center

- Installed four CNC milling machines, a five-axis cradle machining system, and small CNC milling machines for teaching and R&D.
- Focus on intelligent CNC machining systems and cutting monitoring technology.

(B) Mechanical and Electrical Test Platform

- Provides function testing and adjustment of modular products (rotary tables, principal axes, tool holders).
- Enhances student training in mechanical-electrical integration.

(C) Assembly Platform for Key Modules

- Trains students in assembly of precision modular components such as rotary tables, roller camshafts, DD motors, and optical encoders.

(D) Six-Axis Articulated Robot Arm and Visual Positioning System

- Supports human-machine collaboration training.
- Integrated into intelligent manufacturing production lines to improve efficiency and flexibility in automated processes.

3. Innovation and Entrepreneurship

Intelligent Taichung Maker Base (MOE Designated)

- Central Taiwan's only MOE-recognized innovation base.
- Supports cross-school entrepreneurial teams with interdisciplinary collaboration workshops and reward mechanisms.
- Builds an innovation campus cultivating entrepreneurial talent.

4. Industry-University Alliances

Hard-to-Cut Material Machining Technology Alliance

- Provides services in ultrasonic-assisted machining, CNC grinding, polishing, and accuracy testing.
- Activities include:



- Exchange visits, seminars, consulting services.
- Talent development programs, internships, scholarships.
- Technical services, patent support, and joint R&D projects.

5. Development of Smart Technology

(A) AI Family Co-Learning Camp

- Jointly organized with Taichung City Family Education Center.
- Engaged parents and children in VR, AI learning principles, AI programming, and applied creativity.

(B) AI Creation Award Achievements

- **2024 National AI Creation Awards:**
 - **1st Place:** Department of Intelligent Automation Engineering — “A Thousand Tons of Forging Shakes the World, Ant Colony Intelligence Leads the Way.”
 - **3rd Place:** Department of Mechanical Engineering — EMQL System Development.
- Forging spray optimization technology successfully applied in industrial production of 100,000 parts, reducing costs and boosting efficiency.

(C) Intelligent Living Technology Conference (ILT 2024)

- NCUT has hosted the Intelligent Living Technology Conference since 2006.
- Focus: smart home environments, safety monitoring, renewable energy, and e-services.
- Serves as a collaborative platform for universities and industries in sustainable living technologies.

6. SDG 9 Mapping to UN Targets and Indicators

SDG 9 Target	Indicator	NCUT Achievements
9.2 Promote sustainable industrialization	9.2.1 MVA	Industry-academia projects, CNC line development, SME collaboration
9.4 Upgrade infrastructure	9.4.1 CO ₂ per value added	Precision Machinery R&D, Hard-to-Cut Alliance reducing energy use
9.5 Enhance R&D and innovation	9.5.1 R&D personnel	AI Talent Center, Cybersecurity Center, national projects
	9.5.2 R&D expenditure	ILT 2024, government-funded projects

9.b Support domestic tech & SMEs	9.b.1 SMEs with support	Product Proofing Center, Maker Base for innovation
9.c Expand ICT and innovation	9.c.1 ICT access	Cybersecurity services, AI Family Co-Learning Camp

NCUT actively advances SDG 9 by integrating smart manufacturing, AI, cybersecurity, prototyping services, and innovation ecosystems. Through industry collaboration, talent cultivation, and sustainable technology development, NCUT strengthens industrial resilience, drives innovation, and fosters inclusive growth in line with national and global sustainable development goals.

(B) Machine Tool Industry Cooperation Base Cooperates with 500 Enterprises

Teachers specializing in relevant fields are collaborating with the project manager of the Office of Industry-Academia Collaboration to form an industry consulting service team. The president of NCUT aims to lead the team to visit individual enterprises and conduct joint studies through cooperation, overcoming technological bottlenecks, and strengthening industry-university cooperation to improve teachers' knowledge of enterprise services and technological advancements, implement vocational education policies in industry-university cooperation, and promote spaces for industry-university cooperation manufacturers to establish themselves and create more collaboration opportunities.

Meanwhile, we must assist with industry transformation, introduce the abundant R&D energy of academic circles to SMEs to discover opportunities for corporate operations and R&D upgrades, and help enterprises obtain subsidies from relevant ministries and government commissions.



▲ Industry Cooperation Base

"Industry Cooperation with 500 Enterprises"

We collaborate in research on core technology by striving for government plan projects and inviting enterprises to become partners.

The manager of the Office of Industry-Academia Collaboration of NCUT coordinates teachers to cooperate with enterprises and lead students to engage in industry learning to increase their practical experience, develop advanced elites for the industry, and assist enterprises in enhancing competitiveness and transformation, reinforcing industry-university cooperation.

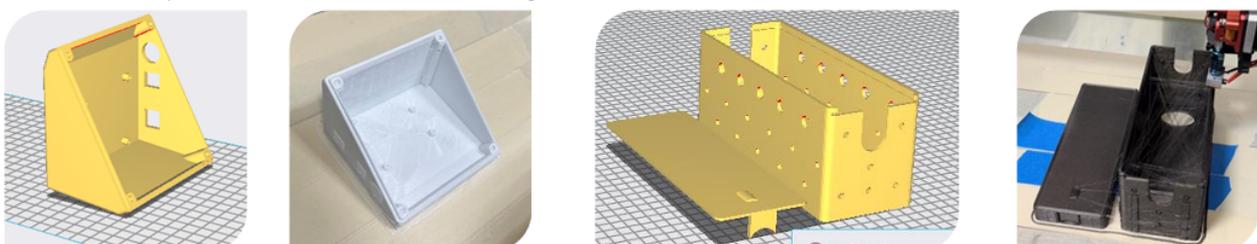
We are hiring more technology-oriented teachers and research fellows, recruiting doctoral students and excellent foreign masters and doctoral degree holders to assist teachers with establishing R&D teams, actively improving innovative technology R&D and core technology in the industry.



▲ Industrial Cooperation

(D) Product Proofing Center

In response to the current industry trend toward product diversification and the significant demand for market development, companies must conduct product proofing before mass production to ensure product integrity and feasibility. Proofings are then refined in terms of functionality and appearance, addressing any defects, reducing production costs, and improving product quality. To meet these proofing needs of the industry, NCUT has established a Product Proofing Center.



▲ Proofing Product "DOWN"

▲ Proofing Product "Shiny Turing"

(F) AI Talent Development and Research Center

Over the past decade, advancements in AI have not only provided better decision-making but have also strengthened organizational capabilities and increased efficiency. AI has become a key focus for student training to meet market demands. In response to the government's promotion of Industry 4.0 policies and the application of artificial intelligence, NCUT aims to train national business elites, as well as teachers and students from various schools. NCUT received a donation of 120 sets of Si-eye AI tool software from 3DFamily Technology Co., Ltd., and is using two specialized computer classrooms in the Machine Tool College Building as the base for developing local AI talent.



▲ Press Conference for the Donation Si-eye AI Tool Software by 3DFamily Technology Co., Ltd.

April 8, 2022: 3DFamily Technology Co., Ltd. donated 120 sets of Si-eye AI tool software to our university, and specialized computer classrooms in the Machine Tool College Building were used as the base for developing local AI talent.



▲ EYE Deep Learning Image Detection Software Training

August 25, 2022: In line with the government's Industry 4.0 policy, related software training activities were launched to promote AI applications and train national business elites, teachers, and students from various schools.



▲ AI Family Co-Learning Camp

February 1-2, 2024: In collaboration with the Taichung City Family Education Center, NCUT launched a two-day AI Family Co-Learning Camp during the winter vacation, where parents and children experienced the wonders of AI.



▲ Tien Kang AI Lecture

June 16, 2024: Tien Kang Co., Ltd. invited Professor Chang Chun-Lung, Department of Artificial Intelligence and Computer Engineering, to give a lecture on AI Development Trends and Applications. He discussed how AI technology is developing at an astonishing pace and is gradually being integrated into all aspects of life.

B. Industrial Production Line Base

(A) Integrated Plant and Machine Tool Talent Development Center of the Department of Mechanical Engineering

Four new three-axis CNC milling machines have been set up in the integrated plant. Cradle-type five-axis machining equipment and a general small CNC milling machine with domestic and foreign controllers have been installed in the Machine Tool Talent Development Center. In addition to general teaching, these machines are particularly suitable for the technical development of computer networking intelligent manufacturing systems and the technological R&D of CNC intelligent cutting machining monitoring technology through industry collaboration.



▲ CNC Vertical Grinding Machine



▲ Five-Axis Milling Machine



▲ Vertical Machining Center

(B) Mechanical and Electrical Test Platform for Key Modules

This includes modular products (e.g., rotary tables, principal axis, and driven tool holders) and the mechanical and electrical control system to conduct function tests and precision adjustments, etc. so students can engage in practical training on the mechanical and electrical integration of modular products.



▲ Key Module Electromechanical Testing Field



▲ Key Module Electromechanical Testing Teaching



▲ Key Module Electromechanical Testing Platform

(C) Assembly Platform for Key Modules

This consists of a rotary table, high-speed built-in principal axis or swing head, and contains a variety of different components (DD motors, roller camshafts, rotary tables, cross roller bearings, optical encoders, brake discs, etc.) as well as assembly and precision measuring tools to provide technically excellent students with practical training on the assembly of modular products.



▲ Key Module Assembly Platform



▲ Key Module Assembly Teaching Courses



▲ Key Module Assembly Field

(D) Six-Axis Articulated Robot Arm and Visual Positioning System

This equipment is used in the Mechanical Arm Human-Machine Collaborative Practical Operation Module of the technical course. The intelligent manufacturing mechanical arm human-machine collaborative technology training platform is utilized on the parts production line. The mechanical arm and automatic peripheral hardware are integrated to automate the process of man-machine collaboration, improve manufacturing efficiency, and enhance the quantity of diversified flexible processes.



▲ Coordinate Measuring Machine



▲ CNC Imaging Device



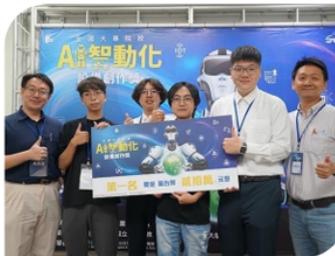
▲ Laser Interferometer

(B) AI Creation Award

NCUT achieved excellent results in the 13th 2024 National University/College AI Creation Awards. The Department of Intelligent Automation Engineering team won first place with their project "A Thousand Tons of Forging Shakes the World, Ant Colony Intelligence Leads the Way." The Department of Mechanical Engineering team earned third place with their "Electrostatic Minimum Quantity Lubrication (EMQL) System Development and Application" project, showcasing their potential in the field of smart manufacturing.

The "A Thousand Tons of Forging Shakes the World, Ant Colony Intelligence Leads the Way" project of the Department of Intelligent Automation Engineering team optimizes forging spray paths using AI algorithms and combines human-machine collaboration to enhance spray efficiency. The system is highly flexible, and compatible with various brands of robotic arms and machines, meeting the needs of small-batch customized production. As per data from a major forging manufacturer, this system has been successfully applied to the production of 100,000 forged pieces, significantly reducing changeover time and greatly improving product quality and productivity.

Students have transformed theoretical knowledge from the classroom into practical solutions, demonstrating their potential in the field of smart manufacturing, and highlighting the importance of industry-university collaboration in driving industrial upgrades. The team's project has been successfully validated in a forging plant, proving the high practicality of their technology. Moving forward, the team will continue to refine its technology and work closely with the industry to promote the development of smart manufacturing.



▲ The Department of Intelligent Automation Engineering Team Won First Place with their Project "A Thousand Tons of Forging Shakes the World, Ant Colony Intelligence Leads the Way"



▲ 2023 Advanced Materials Manufacturing Technology Forum



▲ 2024 Technology Forum



▲ Alliance Visiting Plants for Technical Guidance and Exchange



▲ Alliance Leading Student Teams on Company Visits



▲ Companies Visiting Alliance Laboratories for Technical Exchange



▲ Companies Coming to NCUT for Consultation and Discussion