

※The figure of Reference 2 has been updated. (September 1, 2025)

Graduate School of Engineering, The University of Tokyo
DENSO CORPORATION

The University of Tokyo and DENSO Jointly Establish a Social Cooperation Program: “Building Sustainable Production System Infrastructure with Advanced AI Technology”

Graduate School of Engineering at the University of Tokyo (Dean: Yasuhiro Kato, hereinafter “the University of Tokyo”) and DENSO CORPORATION (Headquarters: Kariya, Aichi Prefecture; President & CEO: Shinnosuke Hayashi, hereinafter “DENSO”) have jointly established a Social Cooperation Program^{*1}, “Building Sustainable Production System Infrastructure with Advanced AI Technology” as of Tuesday, April 1, 2025.

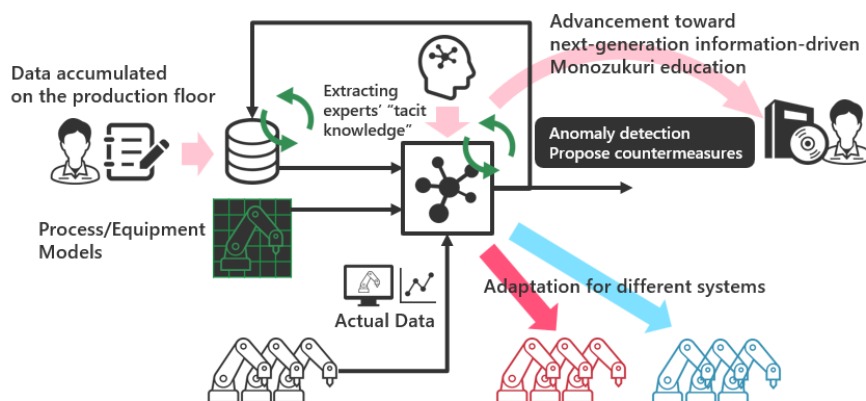
This course aims to further enhance Japan’s strength in lean manufacturing technology^{*2}—a hallmark of its manufacturing industry—by leveraging digitalization and AI technologies, thereby constructing a new operational platform for next-generation production systems. The initiative will focus on systematizing the expertise traditionally handed down by skilled professionals on the production floor and promoting the sustainable evolution of production systems. In addition, by organizing and applying the information collected, the course will contribute to developing human resources for the future of manufacturing by integrating these insights into next-generation manufacturing education.

*1 Social Cooperation Program:

In the context of Japanese universities, this refers to a specialized course or research program established within a faculty or graduate school, funded and co-developed in partnership with external organizations such as private companies (excluding national research and development agencies). The aim is to jointly address common public-interest issues through collaborative research and education.

*2 Lean Manufacturing technology:

A production management and on-site operations methodology that achieves highly efficient manufacturing by thoroughly eliminating waste. Lean manufacturing is widely recognized for optimizing processes and maximizing productivity and is a distinctive strength of Japanese manufacturing industries.



Conceptual Diagram of Sustainable Production System

■Background

While Japanese manufacturing is distinguished by its strength in lean manufacturing technologies, the industry is currently facing serious challenges such as a declining labor force and difficulties in passing down specialized skills and expertise. To overcome these issues and achieve sustainable growth, it is imperative to accelerate digitalization on the factory floor and leverage AI technologies.

Although enormous amounts of data are accumulated daily at production sites, the reality is that this data is not being fully utilized. Furthermore, the expert skills and judgment possessed by experienced workers—often referred to as “tacit knowledge”—are inherently difficult to formalize and transfer, making knowledge succession a significant challenge. In order to dramatically enhance productivity and build resilient production systems capable of adapting to change, it is essential to integrate extensive data with expert knowledge through AI technologies, thereby creating new value for the manufacturing sector.

■Overview

Program Name: “Building Sustainable Production System Infrastructure with Advanced AI Technology”

Duration: April 1, 2025, to March 31, 2029

Affiliated Department: Graduate School of Engineering, The University of Tokyo

Collaborating Company: DENSO CORPORATION

Responsible faculty member:

Jun Ota (Professor, Research into Artifacts, Center for Engineering (RACE), School of Engineering, The University of Tokyo)

Yasushi Umeda (Professor, Department of Precision Engineering, School of Engineering, The University of Tokyo)

Tatsunori Hara (Associate Professor, Research into Artifacts, Center for Engineering (RACE), School of Engineering, The University of Tokyo)

Kohei Kaminishi (Project Lecturer, Research into Artifacts, Center for Engineering (RACE), School of Engineering, The University of Tokyo)

dedicated website: <https://denso.fa.race.t.u-tokyo.ac.jp/>

■Specific Research Content

Systematization of Knowledge on Data Analysis Processes and Logic for Production System Operations

We will systematize the processes and logic for analyzing operational data obtained from manufacturing sites and translating these insights into improvements, establishing them as reusable knowledge.

Extraction of Information from Operational Data and Process/Equipment Models; Analysis and Inference of Causes of Abnormality and Countermeasures

We will combine detailed operational data such as sensor data and images with models of production processes and equipment and use AI to extract useful information. Based on this, we are

developing technology to automatically analyze and infer the causes of production abnormalities and countermeasures.

Model and Knowledge Management for the Sustainable Development of Production System

Operation Platforms

We will establish effective model management and knowledge management methods to keep the developed knowledge models and accumulated knowledge up to date, enabling the production system to continuously evolve and develop.

Systematization of Research Outcomes and Application to Next-Generation Monozukuri Education

We will organize and systematize the research outcomes obtained through this course and apply them to the development of educational programs designed to cultivate talent for the future of Monozukuri, where AI and data utilization are essential.

We aim to establish methods that contribute to the construction of a sustainable next-generation production system operation platform by combining the University of Tokyo's cutting-edge AI research capabilities with Denso's manufacturing knowledge and technologies cultivated over many years.

Reference 1: To commemorate the launch of this joint lecture series, we will hold a public kickoff symposium to introduce its activities to a wide audience. Through presentations on research topics by lecture series members and panel discussions by speakers, we will examine the future of next-generation production systems.

Symposium Overview

Date: Tuesday, October 21, 2025, 2:00 PM – 5:30 PM (Optional Tour: 1:00 PM – 1:50 PM)

Venue: Room 51, 1st Floor, Building 5, Faculty of Engineering, Hongo Campus, The University of Tokyo, and online (via Zoom)

Participation fee: Free

For details such as how to apply, please refer to the website of the Research into Artifacts, Center for Engineering (RACE), The University of Tokyo. (<https://race.t.u-tokyo.ac.jp/>)

Reference 2: To foster a sense of unity between the University of Tokyo and DENSO, and to encourage deeper empathy with DENSO's philosophy, the dedicated classroom in Building 5 of the Faculty of Engineering at the University of Tokyo used for this course will be decorated with DENSO's corporate colors and logo from September 2025 until March 2029, when the course concludes.



【Contact information】

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DENSO CORPORATION, Public Relations and External Affairs Division