

Department of Mechanical Engineering

Introduction

In the Department of Mechanical Engineering, we are conscious of the importance of the role that mechanical engineering must play in areas such as energy and environmental systems, materials, transportation, robotics, manufacturing, information technology, biomechanics, health care, many of which are national priorities.

The Departments of Mechanical Engineering and Production Systems Engineering have been recently merged to better respond to the needs of the society. The integration produced a rich portfolio of research and academic activities in areas ranging from nano-scale processing to health-care robotics to supply chain management. As a result, the new department offers a diverse range of academic programs in 4 basic areas of specialization: Mechanical Systems Design, Materials and Manufacturing, Systems Control and Robotics, and Energy and Environment.

The mission of the Department of Mechanical Engineering in TUT is to prepare students with the knowledge and abilities to improve, evaluate, design and control safe, sustainable, and cost-effective technologies in order to make innovative and useful contributions to humanity. With this in mind, we seek to enhance both research and education and inspire new generations to create breakthrough solutions to serve all people.

Courses

Mechanical Systems Design Course:

This course is composed of Material and Structural Mechanics Laboratory, Machine Dynamics Laboratory, Frontier Forming System Laboratory, MEMS/NEMS Processing Laboratory and OSG Nano Micro Machining Laboratory, and deals with strength of materials, solid mechanics, machine dynamics, machine design, manufacturing processes, biomechanics, etc.

Materials and Manufacturing Course:

This course is composed of Materials Function Control Laboratory, Laboratory for Material Strength & Characterization in 3D/4D, Thin Film Laboratory and Interface and Surface Fabrication Laboratory, and deals with metallic materials, non-metallic materials, evaluation and failure prevention of materials, joining processes, etc.

System Control and Robotics Course:

This course is composed of Robotics and Mechatronics Laboratory, Instrumentation System Laboratory, System and Control Engineering Laboratory and Industrial Systems Engineering Laboratory, and deals with control engineering, measurement and instrumentation engineering, production systems engineering, mechatronics engineering, robotics engineering, etc.

Environment and Energy Course:

This course is composed of Energy Conversion Engineering Laboratory, Thermo-Fluid Engineering Laboratory, Natural Energy Conversion Science Laboratory and Energy Conservation Engineering Laboratory and deals with thermodynamics, fluid mechanics, heat transfer, hydraulic power systems, conversion engineering, etc.

Admission Policy

The aim of the Graduate Program in Mechanical Engineering is to nurture students with skills enabling them to become world-class engineers to meet the challenges of an increasingly complex and globalized society. The program emphasizes mastering novel methods and technologies for the promotion and development of a sustainable environment on a global scale. Our Program is suitable for students wishing to:

- Develop skills required for planning and leading independent research based on an in-depth understanding of the fundamental principles of mechanical engineering.
- Develop skills based on studies outside of the classroom and thereby contribute to society by devising solutions to demanding technical and social problems.
- Develop skills to communicate complex and intricate concepts to both technical and non-technical audiences.

Mechanical Systems Design Course

Position	Name	Field	Research Interests
Professor	Dr. Eng. Tadaharu Adachi (Mr) adachi@me.tut.ac.jp	Mechanics of Materials Structural Mechanics Materials Engineering Impact Engineering	(1) Evaluation of mechanical properties and material design of polymers and polymeric composites (2) Development of mechanical system for absorption of impact energy (3) measurement of mechanical properties and evaluation of micro defects by ultrasonic.
Professor	Dr. Eng. Shozo Kawamura (Mr) kawamura@me.tut.ac.jp	Mechanical Vibrations	(1) Modeling and Analysis of Structures (2) Dynamic Analysis of Human Motion
Professor	Dr. Eng. Takayuki Shibata (Mr) shibata@me.tut.ac.jp	Precision Machining Microfabrication	(1) Micro/Nanomachining (2) MEMS/NEMS(Micro/Nano Electro Mechanical Systems)
Professor	Dr. Eng. Ken-ichiro Mori (Mr) mori@me.tut.ac.jp	Forming Processes	(1) Forming Processes of Lightweight Parts (2) Finite Element Method for Forming Processes
Associate Professor	Dr. Eng. Yoshinori Takeichi (Mr) takeich@me.tut.ac.jp	Tribology	(1) Analysis of Solid Lubrication (2) Surface Analysis for Tribology
Associate Professor	Dr. Eng. Takahiro Kawashima (Mr) kawashima@me.tut.ac.jp	Micromachining Technologies	Development of smart sensors for neural recordings
Associate Professor	Dr. Eng. Yohei Abe (Mr) abe@me.tut.ac.jp	Forming Processes	(1) Forming Processes of Light Weight Parts (2) Plastic Joining Processes

Materials and Manufacturing Course

Position	Name	Field	Research Interests
Professor	Dr. Eng. Masanobu Izaki (Mr) m-izaki@me.tut.ac.jp	Thin Film Science and Technology	(1) Electrochemical Preparation of Smart Oxide Films (2) Electrochemical Construction of High Performance Solar Cells
Professor	Ph. D. Minoru Umemoto (Mr) umemoto@me.tut.ac.jp	Physical Metallurgy	(1) Microstructure and Properties Control of Metallic Materials (2) Formation and Characterization of Functional Materials
Professor	Dr. Eng. Masahiro Fukumoto (Mr) fukumoto@me.tut.ac.jp	Joining Process	(1) Noble Coating Process by Means of Particle Deposition (2) Friction Stir Aided Innovative Welding Process between Dissimilar Materials
Associate Professor	Dr. Eng. Yoshikazu Todaka (Mr) todaka@me.tut.ac.jp	Physical Metallurgy	(1) Structure and Properties Control of Metallic Materials (2) Formation and Characterization of Functional Materials
Associate Professor	Dr. Eng. Toshiaki Yasui (Mr) yasui@tut.jp	Surface Modification Joining Process	(1) Surface Modification by Plasma and Ion Process (2) Welding between Dissimilar Materials by Friction Stirring
Associate Professor	Dr. Eng. Seiji Yokoyama (Mr) yokoyama@me.tut.ac.jp	Physical Chemistry of Metals	(1) Recycle of Waste Materials (2) Properties of Metallic Materials
Associate Professor	Dr. Eng. Masakazu Kobayashi (Mr) m-kobayashi@me.tut.ac.jp	Analysis and evaluation of material microstructure	Characterization of microstructure in materials by high-resolution X-ray CT

System Control and Robotics Course

Position	Name	Field	Research Interests
Professor	Dr. Eng. Yoshiaki Shimizu (Mr) shimizu@me.tut.ac.jp	Process Systems Engineering	(1) Multi-Objective Decision Making in Manufacturing Systems (2) Environmentally Conscious Planning/Design
Professor	Dr. Eng. Zhong Zhang (Mr) zhang@me.tut.ac.jp	Instrumentation Systems Engineering	(1) Signal, Image Processing Using Wavelet Transform (2) Intelligent System Using Neural Network
Professor	Dr. Eng. Kazuhiko Terashima (Mr) terasima@me.tut.ac.jp	Automatic Control And Robotics	(1) Design and Control of Multivariable Systems (2) Human Friendly Robot
Professor	Dr. Eng. Shinichi Suzuki (Mr) shinichi@me.tut.ac.jp	High-Speed Mechanics/Optical Measurement	(1) Prediction of Crack Path in Dynamic Fracture Phenomena (2) Generation of Laser Induced Under Water Shock Wave
Associate Professor	Dr. Eng. Naoki Uchiyama (Mr) uchiyama@me.tut.ac.jp	Control Engineering	(1) Control of Mechanical Systems (2) Robotics/Mechatronics
Associate Professor	Dr. Eng. Tetsuo Miyake (Mr) miyake@ime.tut.ac.jp	Image Processing	(1) Eye-gaze Human Interface (2) Image Based Measurement and Recognition
Associate Professor	Dr. Eng. Takanori Miyoshi (Mr) miyoshi@tut.jp	Automatic Control	(1) Human-Machine Cooperation with Power Assist System (2) Feedforward Control without Residual Vibration
Associate Professor	Ph. D. Rafael Batres (Mr) rbp@tut.ac.jp	Process Systems Engineering	(1) Model Reuse and Exchange, Process Safety (2) Synthesis of Biomass Processes

Environment and Energy Course

Position	Name	Field	Research Interests
Professor	Dr. Eng. Akiyoshi Iida (Mr) iida@me.tut.ac.jp	Fluid Dynamics Aeroacoustics	(1) Control of Turbulent Flow (2) Study of Aeroacoustics and Development of Low Noise High-Speed Vehicles
Professor	Dr. Eng. Kenzo Kitamura (Mr) kitamura@me.tut.ac.jp	Heat Transfer	(1) Convective Heat Transfer (2) Augmentation and Control of Convective Heat Transfer
Professor	Dr. Eng. Susumu Noda (Mr) noda@me.tut.ac.jp	Combustion Engineering	(1) Modeling of Turbulent Diffusion Combustion (2) Development of Low NOx Combustion System
Professor	Dr. Eng. Masafumi Nakagawa (Mr) nakagawa@me.tut.ac.jp	Multi-Phase Flow	(1) Dynamics of High-Speed Two Phase Flow (2) Research and Development for Geothermal and Refrigeration Cycle
Professor	Dr. Eng. Hideki Yanada (Mr) yanada@me.tut.ac.jp	Fluid Engineering	(1) Electrostatic Liquid Filtration and Electrohydrodynamic Flow (2) Control of Fluid Power Systems
Associate Professor	Dr. Eng. Takashi Suzuki (Mr) takashi@me.tut.ac.jp	Thermal Engineering	(1) Gas-liquid Two-Phase Flow (2) Improvement of Liquid Atomization
Associate Professor	Dr. Eng. Nobumasa Sekishita (Mr) sekishita@me.tut.ac.jp	Fluid Dynamics	(1) Wind Tunnel Experiment of Turbulent Shear Flow (2) Development of Flow Measurements and Analysis

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