

Dept. of Mechanical Engineering	Web Site : http://me.kaist.ac.kr/kr/
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Introduction

Achieving the Dreams of Human-centric Society of the 21st Century

The Mechanical Engineering Department at KAIST has fostered about 5,700 talented graduates since its establishment in 1971, and the graduates of our department have taken central roles in domestic and international companies, research institutions, universities, as well as government agencies. Our department pursues world-class excellence in both education and research, and expands our pioneering professional reputation on the merits of their contributions in fundamental and creative research and of their services in high-growth industries. We recognize the importance of our commitment and service to develop the tools and methodologies to realize our imagination in a 21st Century Human-centric Society. We strive to provide engineering solutions to key issues facing our society and to foster elite leaders of the future in mechanical engineering who will uphold the prestige of our profession with a genuine responsibility for mankind. The ultimate dream of all members in our department is for the happiness and well-being of human society for generations to come.

Fostering Responsible Mechanical Engineering Leaders Who Will Reform the Future

As the core foundation of all engineering, Mechanical Engineering spans over diverse academic fields and knowledge. In our Mechanical Engineering Department, students gain comprehensive knowledge on the fundamental basics of mechanics and mechanical design methodologies. Having its basis in systems engineering, various disciplines of mechanical engineering can be sub-categorized into thermal engineering, fluid engineering, energy and power engineering, dynamics and control, production and design engineering, solid mechanics and structural mechanics, materials and fracture mechanics, opto-electro mechanics, bio mechanics, and micro and nano-mechanics. Moreover, mechanical engineering has recently been grafted with other neighboring fields such as electrical engineering, chemical engineering, bioengineering, materials engineering, and physics to create new areas for convergence technology, serving the future of high-tech industry as the most comprehensive and vital component. Accordingly, we are putting forth great efforts to nurture students so they will be ready to take leading roles in a wide range of the fields and activities in our society. Our department's priority is to improve and tailor our education system to emphasize and cultivate the fundamentals in mechanical engineering, logical thinking and comprehensive design-capability. Along with the recent expansion in the field of convergence, the education of fundamental courses of traditional mechanics in mechanical engineering, which appears to have been overlooked, will be strengthened to educate students on scholastic abilities that have the basic principles and knowledge upon which they can

build up their research and career. We are developing our curricula in such a way to nurture students with fundamental classical engineering courses that have been modified and improved to meet the needs of the future. Furthermore, we not only offer opportunities for students to participate in diverse caliber-enhancing programs to inspire creative thinking and a challenging spirit, but also work continuously to embed a proper sense of engineering ethics, diverse viewpoints and other fundamental qualities of global leaders.

■ Research of KAIST Mechanical Engineering

1) Design and Manufacturing for Reliability

- Innovative design & manufacturing theory, mechanical analysis methods for mechanical systems with high reliability
 - New designs and technologies for modeling and governing equation
 - Innovation and creation of mechanical systems
 - Innovation of the analysis and design programs and tools Development & application of new materials to mechanical systems
 - Manufacturing system modeling, simulation, and optimization
 - Simulation of tribo-systems
 - Analysis & design under uncertainties

2) Multi and Transcending Scale Engineering

- Extreme-scale mechanical engineering research ranging from nanometer-scale materials design to ocean-scale fluid dynamics
 - Micro/nano-scale and multi-scale physics and simulations
 - Design & fabrication of meta-materials with extreme material properties
 - Development of flexible micro/nano devices and systems
 - Opto-fluid-flexible body interaction and nature-inspired fluid mechanics
 - High-performance lasers and laser-based precision engineering
 - Complex fluid phenomena at the air-ocean-land interfaces

3) Energy: Generation, Efficiency, and Sustainability

- Analysis and design of heat transfer and fluid mechanics encountered in power production and energy conversion systems
 - Design of energy systems ranging from sub-micro to macro scale
 - Engines, fuel cells, turbo systems, cooling of electronic devices
 - Developing a novel energy conversion device
 - Numerical/experimental analyses of heat transfer and fluid mechanics
 - Fundamental research on flow control and heat transfer enhancement
 - Production and application of cryogenics and superconductivity
 - Temperature measurement at micro/nanoscale and flow visualization

4) Biomedical Engineering

- Biomechanics research and its application for disease diagnosis, treatment innovation, medical robots, sports training systems
 - Cellular/tissue/organism level biomechanics and mechanobiology
 - Medical robotics and simulation

- Physical human robot interaction system and bio-mechatronics
- Biomedical photonics imaging system
- VR-based rehabilitation system for optimal rehabilitation
- Wearable sports training system based on sports biomechanics

5) Intelligent Mechatronics and Robotics

- Interdisciplinary research on intelligent machine technology including sensor, actuator, acoustics, vibration, control and robots
 - Design and control of humanoid robot and automatic system platform
 - Intelligence, navigation and control for unmanned vehicle systems
 - Medical robotics and medical simulation
 - Design and fabrication of bio-inspired artificial muscles
 - Vibro-acoustic source identification and design for sound quality
 - Customized active noise control for automobile, MRI, home appliances