Research Areas

Structural engineering, Geotechnical engineering, and Environmental engineering are the main research areas of the Department of Civil and Environmental Engineering at KAIST.

❒ Structural Engineering

Structural engineering combines art and science to design and build modern infrastructures that safely resist natural and man-made forces. Buildings, bridges, stadiums, offshore structures and other civil facilities define the traditional core of structural engineering. At the periphery of the field, structural engineering shares common interests with mechanical, aerospace, and naval engineering for the design of large, complex systems such as power plants, pipelines, aerospace vehicles, ships, and submarines. We have even laboratories devoted to various research activities including dynamics analysis, quantitative analysis of stresses in concrete, seismic analysis and vibration control of large structures such as bridges, buildings and nuclear power plants, and to studies on safety and reliability, structural health monitoring, and designing an effective structure system through the investigation of the nonlinear behavior of structures.

❒ Geotechnical Engineering

Geotechnical engineering, as the name implies concerns the application of civil engineering technology to aspects of the earth. Geotechnical engineering is fundamental for construction of all type of civil structures such as large underground space and tunnel, subway and highway, railroad, port and airport structures, etc. Since geotechnical materials are ambiguous, which are not easy to determine their engineering properties, the successful geotechnical engineer must develop a 'feel' for soil and rock behavior before designing a safe and economic geotechnical structures. Three of our laboratories perform research on the analysis, design, construction, and maintenance of earth structures related to soft clay and unsaturated granite soil. Our researchers are also involved in geotechnical earthquake engineering, site investigation, non-destructive testing using elastic wave propagation characteristics, and development of geophysical characterization techniques applicable to rocks in an effort to understand the shear behavior of jointed rocks for use in large underground spaces.

❒ Environmental Engineering

Environmental engineers find solutions for environmental problems. Environmental engineering provides safe drinking water, treats and properly disposes of wastes, maintains air quality, controls water pollution, and remediates sites contaminated by spills or improper disposal of hazardous substances. Environmental engineering is multidisciplinary by nature. It involves traditional engineering components such as mathematics, physics, chemistry, and engineering design. Environmental engineering education and practice also require knowledge of a range of other disciplines such as biology, microbiology, ecology, public health, geology, meteorology, economics, political science, and computer science. Three of our laboratories are actively pursuing fundamental and practical research on various approaches to treating water, wastewater, and solid waste, and on managing environmental resources.