

Industrial & Systems Engineering Dept.

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■ Outline

The discipline of industrial & systems engineering (ISysE) concerns modeling, analysis, design, and control of large scale complex systems. These systems utilize relevant inputs and resources such as materials, equipment, people, information, and money to create values for our society. Industrial & systems engineering draws upon specialized knowledge and skills in mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design to specify, predict, and evaluate the performance of a target system under study. Industrial and systems engineering has greatly contributed to the advancement of modern industrialization, and continues to do so leading the era of the 4th Industrial Revolution. In the latter part of the 20th century, information technology was added as the most important tool for industrial engineering, resulting in computer-integrated manufacturing and e-Business. Furthermore, application areas have significantly increased, and ISysE disciplines now encompass service sectors such as the healthcare and financial industries. As our society is now facing a rapid change due to the 4th Industrial Revolution which is characterized by a fusion of AI and cyber-physical systems (CPS), the role of industrial engineers is becoming more critical than ever.

■ Scholarship and Research Activities

KAIST ISysE's major themes of research include scientific decision-making and system analysis and synthesis, covering following 4 major fields:

- Operations Management: Solve high-impact industrial problems by expanding knowledge boundary in operations management
- Operations Research: Generate breakthroughs in mathematical methodologies for optimization, statistics, and stochastic modeling
- System Analytics: Develop enabling system technologies that combine machine learning, data science, and big data analytics
- System Synthesis: Create innovative products, services, and systems for better human life

Traditionally, ISysE has focused largely on manufacturing technology innovation. Recently, the research focus is shifting toward the service and value innovation domains such as healthcare systems, financial systems, and energy systems. KAIST

ISysE strives to play a pioneering role in creating innovations for the manufacturing and service domains by leveraging big data analysis and artificial intelligence, thereby responding to the change of industrial and societal landscape caused by the 4th Industrial Revolution. KAIST ISysE established a research center on Industrial Intelligence and Big Data to facilitate education/research and nurture industrial relationship. In 2017, the center offered a series of lectures on the fundamentals on AI to KAIST students and introduced the KAIST AI Academy Program with LG CNS.