

# Objectives and Learning Outcomes

## 1 Objectives

The major aims to cultivate students with comprehensive development in morality, intelligence, physical health, aesthetics, and labor skills, aligning with national strategic and regional economic needs. Graduates are expected to be well-versed in professional theories and proficient in practical engineering skills. They are prepared for roles in investigation, design, construction, management, consultation, and operational maintenance across various domains such as Architectural Engineering, Road and Bridge Engineering, and Geotechnical and Urban Underground Engineering. The program seeks to produce application-oriented senior professionals capable of tackling complex civil engineering challenges.

Within 5 years after graduation, graduates shall achieve the following objectives:

- ◆ Objective 1: Possess the ability to integrate engineering mathematics with multidisciplinary approaches to solve complex civil engineering problems, competent in investigation, design, construction, management, consultation, and operational maintenance.
- ◆ Objective 2: Exhibit a high sense of social responsibility and professional ethics, able to evaluate and integrate social, legal, economic and environmental considerations into engineering practices.
- ◆ Objective 3: Maintain a healthy body and mind, exhibit strong humanistic qualities, and demonstrate team spirit, as well as effective communication and presentation skills.
- ◆ Objective 4: Have the capability to coordinate, make decisions, and implement engineering projects, applying engineering management principles and economic decision-making methods in a multidisciplinary context.
- ◆ Objective 5: Proactively adapt to modernization and societal needs, demonstrating capabilities in self-directed and lifelong learning, with a strong grasp of sustainable development concepts and a global perspective.

## 2 Learning Outcomes or Graduation Requirements

- R1. Engineering knowledge: Be able to use mathematics, natural sciences, basic and professional engineering knowledge to solve complex civil engineering problems.
- R2. Problem analysis: Be able to apply fundamental principles of mathematics, natural sciences, and engineering sciences to identify, articulate and analyze complex civil engineering problems, achieving effective conclusions through literature research.

- R3. Design/develop solutions: Be able to design solutions for complex civil engineering problems, create components (nodes), structures, systems, or technical schemes tailored to specific needs, incorporating innovation and considering social, health, safety, legal, cultural and environmental factors.
- R4. Research: Be able to conduct research on complex civil engineering problems using scientific principles and methods, including experiment design, data collection, processing, analysis, and interpretation; synthesize information to derive practical and effective conclusions for application in engineering practice.
- R5. Use of modern tools: Be able to develop, select, and utilize appropriate technologies, resources, and modern engineering and IT tools for analyzing, designing, calculating, simulating and predicting complex civil engineering issues, while understanding their limitations.
- R6. Engineering and society: Be able to evaluate the impact of engineering practices, including geological investigation, design, construction, management, consultation, and operational maintenance, on society, health, safety, law, and culture, based on civil engineering background knowledge and technical standards, and understand their associated responsibilities.
- R7. Environment and sustainable development: Be able to understand and evaluate the environmental and societal impacts of engineering practices in the context of sustainability.
- R8. Professional codes: Be able to possess literacy in humanistic and social sciences, a strong sense of social responsibility, and can abide by civil engineering ethics and professional standards, serving society and fulfilling their duties.
- R9. Individuals and teams: Be able to take on roles as individuals, team members, and leaders within multidisciplinary teams when addressing complex civil engineering challenges.
- R10. Communication: Be able to effectively communicate with industry peers and the public on complex civil engineering issues, including writing reports and designing documentation, presenting speeches, and clearly expressing or responding to instructions. Possess a global perspective and be able to communicate effectively across cultural boundaries.
- R11. Project management: Be able to understand and apply principles of engineering management and economic decision-making within multidisciplinary settings.
- R12. Lifelong learning: Be able to possess a strong commitment to independent and lifelong learning, with the ability to continuously learn and adapt to advancements in professional and technical disciplines, as well as societal

changes.