

Talent training objectives and learning outcomes of Civil Engineering major in the school of architectural and engineering, Kunming University

1 Training Objectives

Civil engineering major of Kunming University is based on the needs of regional economic and social development, and facing the main battlefield of new urbanization and rural revitalization, this program trains versatile applied talents who adapt to the strategic needs of national infrastructure development. Graduates will systematically master the professional knowledge of civil engineering, possess solid engineering practice abilities, and be competent in design, construction, management, and research related to building engineering, roads, and bridges. They will also possess lifelong learning abilities, innovation awareness, organizational management capabilities, and international perspectives. Five years after graduation, students of this program are expected to achieve the following talent training objectives:

Training Objectives	Objective Connotation
Objective 1	<i>Possess good ideological and moral cultivation and scientific and cultural literacy; able to abide by engineering ethics, professional ethics, and behavioral norms in engineering practice, and assume and fulfill social responsibilities.</i>
Objective 2	<i>Competent in technical, management, and research work in engineering design, construction, and operation in civil engineering and related fields; able to solve complex engineering problems in building engineering, road and bridge engineering, and possess the basic knowledge and basic qualities of registered engineers.</i>
Objective 3	<i>Possess good teamwork awareness, communication skills, written expression skills, and a certain international perspective; able to play a backbone role in a team.</i>
Objective 4	<i>Possess lifelong learning ability and a spirit of hard work; able to continuously improve professional and comprehensive qualities to adapt to the business requirements of the civil engineering industry, and possess engineering innovation awareness and competitive ability.</i>

2 learning Outcomes

The learning outcomes of this major is reflected by the graduation requirements. The graduation requirements of this major are as follows:

Graduation Requirements	Sub-indicators
1. Engineering Knowledge: Ability to apply mathematics, natural sciences, engineering fundamentals, and professional knowledge to solve complex engineering problems in building engineering, roads and bridges, etc.	1.1 Possess and apply mathematical knowledge required for engineering work. 1.2 Possess and apply natural science knowledge required to solve engineering problems. 1.3 Ability to use engineering fundamentals to provide support for solving complex engineering problems. 1.4 Ability to use civil engineering professional knowledge to solve complex engineering problems in building, road, and bridge engineering.
2. Problem Analysis: Capability to identify, express, and solve complex engineering problems in civil engineering using basic principles of mathematics, natural sciences, and engineering sciences to obtain effective conclusions.	2.1 Ability to identify and express civil engineering technical problems using basic theories of mathematics, chemistry, physics, and surveying. 2.2 Ability to identify and express complex civil engineering problems using basic concepts and theories of engineering sciences. 2.3 Ability to analyze complex civil engineering problems through literature research, and use mathematics, natural sciences, and engineering sciences for reasoning and verification to obtain effective conclusions.
3. Design/Develop Solutions: Ability to propose engineering design and construction solutions for complex civil engineering problems, design structural systems and construction methods meeting specific needs, reflecting innovation awareness and considering social, economic, legal, normative, and	3.1 Master basic methods of civil engineering design and construction; able to obtain effective information, analyze, and propose systematic solutions for complex problems. 3.2 Ability to determine design schemes and construction management models

environmental factors.	for specific needs; use drawings and calculation books to express design outcomes; demonstrate design rationality and innovation. 3.3 Ability to comprehensively consider social, economic, legal, normative, and environmental safety factors in the design process.
4. Research: Ability to conduct research on complex civil engineering problems based on scientific principles and methods, propose reasonable research plans, analyze and interpret data, and derive valid conclusions through information synthesis.	4.1 Master basic scientific research methods and basic experimental skills, and perform reasonable data analysis and processing. 4.2 Design scientific experimental plans using reasonable principles and skills based on professional knowledge; analyze data and interpret results. 4.3 Understand key scientific issues; explain experimental phenomena and derive effective conclusions based on civil engineering principles.
5. Use of Modern Tools: Ability to develop, select, and use appropriate technologies, resources, modern engineering tools, and IT tools for complex engineering problems, including prediction and simulation, understanding their limitations.	5.1 Ability to select and use appropriate technologies, resources, modern tools, IT, and professional software for complex problems. 5.2 Ability to use modern tools to analyze, calculate, and design; simulate and predict technical indicators affecting performance, understanding model limitations.
6. Engineering and Society: Capability to conduct reasonable analysis based on engineering background knowledge, evaluate the impact of professional practices and complex problem solutions on society, health, safety, law, and culture, understanding assumed responsibilities.	6.1 Understand technical standards, codes, intellectual property rights, industrial policies, and laws/regulations related to civil engineering. 6.2 Possess professional capability to analyze and evaluate the impact of project implementation on society, health, safety, law, and culture,

	understanding civil engineers' responsibilities.
7. Environment and Sustainable Development: Ability to understand and evaluate the impact of engineering practices addressing complex civil engineering problems on society, environment, economy, and sustainable development.	7.1 Recognize and understand the impact of civil engineering project implementation on the environment and social sustainable development. 7.2 Ability to analyze and evaluate the impact of engineering practices on the natural environment and sustainable development.
8. Professional Norms: Love the motherland, possess physical and mental health, humanities and social science literacy, and social responsibility; understand and abide by engineering ethics and norms, demonstrating responsibility, hard work, contributing to the country, and serving society.	8.1 Possess a scientific worldview, outlook on life, and values; possess good ideological and moral qualities. 8.2 Possess good physical and mental health, humanities and social science literacy, and a sound personality. 8.3 Understand engineers' social responsibilities; abide by professional ethics and norms, and fulfill responsibilities in practice.
9. Individual and Team: Possess a good team spirit; ability to take on roles as individuals, team members, and leaders in multidisciplinary teams when addressing complex civil engineering problems.	9.1 Accurately grasp one's role in a multidisciplinary team, fulfill duties, and proactively cooperate with other members. 9.2 Ability to organize and coordinate team members and coordinate relationships with personnel from other disciplines to jointly solve problems.
10. Communication: Ability to effectively communicate and exchange views with industry peers and the public on complex problems, including writing reports, making presentations, and possessing an international perspective for cross-cultural communication.	10.1 Ability to effectively communicate with peers and the public, including writing project reports and design documents clearly. 10.2 Possess good civil engineering professional foreign language skills, understand international status, and communicate effectively cross-culturally.

11. Project Management: Understand engineering project management principles and basic economic decision-making methods, applying them to multidisciplinary civil engineering practices.	11.1 Understand the importance of project management; apply economic analysis and decision-making methods to practice. 11.2 Ability to carry out preliminary engineering design using engineering knowledge from multidisciplinary perspectives (engineering, management, economics).
12. Lifelong Learning: Possess self-directed and lifelong learning awareness, with the ability to continuously learn and adapt to the development of the civil engineering industry and society.	12.1 Recognize the necessity of continuous self-learning and lifelong learning awareness. 12.2 Achieve certain results through self-learning; possess the ability to adapt to industry and social development.