Civil Engineering Program Objective Matrix

Training Objective	Expected Learning Outcomes of the Curriculum (Knowledge/Skills/Abilities)	Course Modules/Courses
1. Master foundational knowledge in mathematics, natural sciences, and information technology to establish a solid foundation for subsequent coursework and apply this knowledge to solve engineering problems.	**Knowledge**: Master the fundamentals of mathematics, natural sciences, information technology, and computer basics. **Skills**: Be able to apply mathematical and natural science language to formally present complex civil engineering problems. **Abilities**: Be able to observe, analyze, and solve technical problems using mathematical and informational viewpoints and methods of thinking. Based on the characteristics of mathematics and information technology, conduct continuous analysis, synthesis, computation, judgment, and reasoning on engineering phenomena, possessing the fundamental abilities to solve engineering problems.	**Mathematics and Physics:** Advanced Mathematics A (1) Advanced Mathematics A (2) Linear Algebra A Probability and Mathematical Statistics A University Physics (1) University Physics (2) General Chemistry A Mathematical Modeling **Information Technology:** Computer Fundamentals for College Students Computer Languages
2. Master the fundamental knowledge of civil engineering, apply the learned	**Knowledge**: Master fundamental engineering knowledge such as engineering mechanics, engineering materials, as well as specialized knowledge in steel structures	**Engineering Fundamentals:** Descriptive Geometry Civil Engineering Drawing (including CAD) Theoretical Mechanics

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knowledge to identify and analyze complex civil engineering problems, and lay a solid foundation for further solving complex civil engineering problems.	and concrete structures. **Skills**: Apply basic principles of engineering science to identify complex civil engineering problems, analyze these problems, and determine the key aspects for solving the issues. **Abilities**: Use engineering principles to analyze the influencing factors in the problem-solving process from multiple angles, effectively express the analysis process and conclusions, and use them to guide the formulation of solutions.	Mechanics of Materials Structural Mechanics (1) Structural Mechanics (2) Soil Mechanics Fluid Mechanics Civil Engineering Materials Engineering Surveying B Engineering Geology Electrical and Electronics Practical Training A Metalworking Practical Training A Engineering Geology Orientation Internship Surveying Internship Mechanics of Materials Experiment Building Materials Experiment Soil Mechanics Experiment **Professional Foundation Courses:** Foundation Engineering Principles of Concrete Structure Design Engineering Economics and Construction Regulations Introduction to Civil Engineering Basic Principles of Steel Structures Introduction to Seismic Engineering Orientation Internship

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<tr><th>Training Objective</th><th>Expected Learning Outcomes of the Curriculum (Knowledge/Skills/Abilities)</th><th colspan="3">Course Modules/Courses</th></tr>
<tr><td rowspan="3">3. Master professional knowledge in civil engineering, enabling the investigation, design, and analysis of complex engineering problems in related fields, and the development of solutions to meet the specific needs of complex civil engineering issues.</td><td rowspan="3">Knowledge: Master specialized knowledge related to building, road and bridge, and rail engineering design, construction, management, and other aspects in civil engineering.
Skills: Able to complete the design of structures and components (nodes) that meet specific civil engineering needs, and able to develop construction plans for specific complex engineering problems.
Familiar with modern tools related to civil engineering, understanding their limitations, and possessing the ability to select and use appropriate tools.
Abilities: In design and construction planning, able to fully consider constraints such as social, health, safety, legal, cultural, and environmental factors.
Able to use modern tools to model and calculate complex civil engineering problems, and analyze the validity and limitations of the results.
Master the operation of basic software required for the development of</td><td colspan="3">Professional Application Courses:
Engineering Project Management
Construction Principles and Methods
Engineering Structure Load and Reliability Theory</td></tr>
<tr><td>Road and Bridge</td><td>Construction Engineering</td><td>Urban Rail Transit</td></tr>
<tr><td>Bridge and Culvert Hydrology
Road Survey and Design
Subgrade and Pavement Engineering
Bridge Engineering (1)
Bridge Engineering (2)
Road and Bridge Engineering Construction Technology
Road and Bridge Engineering Budgeting
Traffic Engineering</td><td>High-rise Building Structures
Building Architecture
Steel Structure Design
Masonry Structures
Concrete Structure Design
Prefabricated Buildings
Building Engineering Budgeting
Building Engineering Construction</td><td>Urban Rail Transit Network Planning and Route Design
Track Engineering
Tunnel and Underground Engineering
Railway Bridges
Urban Rail Transit Stations
Railway Subgrades
Urban Rail Transit</td></tr>
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	informatization in the construction industry, and possess the ability to build and apply information models.			Engineering Budgeting Road and Railway Engineering Construction Technology
		Professional Practice Courses: Civil Engineering Structural Testing Technology Concrete Structure Design Principles Course Design Foundation Engineering Course Design Budgeting Course Design Construction Organization Design		
		Road and Bridge	Construction Engineering	Urban Rail Transit
		Road Survey and Design Course Design Subgrade and Pavement Engineering Course Design Retaining Wall Course Design Bridge Engineering Course Design	Building Architecture Course Design Ribbed Beam Floor Course Design (including Masonry) Single-story Industrial Plant Course Design Steel Structure Course Design	Urban Rail Transit Route Course Design Track Engineering Course Design Railway Bridge Course Design Tunnel and

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				Underground Engineering Course Design
4. Possess awareness of autonomous learning and lifelong learning, with the ability to track the development trends in the related fields of the major and complete further self-development.	**Knowledge**: Master methods for tracking and learning the latest developments and knowledge in the forefront and emerging fields of civil engineering. **Skills**: Recognize the importance of lifelong learning, actively track developments in the major and related fields, and possess the ability for self-directed learning. **Abilities**: Apply acquired professional knowledge widely, combining it with cutting-edge developments. Possess the ability to adapt to new developments in the civil engineering industry.	**Professional Development Courses:** Fundamentals of Innovation and Entrepreneurship Literature Search and Research Methods Basics of BIM New Technologies in Civil Engineering Civil Engineering Structural Testing Technology **Integrated Application Courses:** Production Internship Graduation Internship Comprehensive Graduation Training		

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5. Master cross-cultural and international cooperation and communication skills to adapt to social development and globalization.	**Knowledge**: Master one foreign language. **Skills**: Read professional literature in English and perform mutual translation between Chinese and English. **Abilities**: Have a basic understanding of the international status of civil engineering disciplines and related industries, and possess initial communication and exchange abilities in a cross-cultural context.	**Foreign Language Courses:** College English (1) College English (2) College English Extension Courses (1) College English Extension Courses (2) College English Practice (1) College English Practice (2) Professional English
6. Understand the current social model and social norms in China, demonstrate good social behavior, teamwork spirit, and humanistic care awareness. Develop comprehensively in moral, intellectual, physical, and psychological aspects.	**Knowledge**: Master knowledge of modern Chinese history, basic principles of Marxism, military theory, etc., and engage in patriotism education, physical education, and military training. **Skills**: Understand social phenomena, stay informed about and adapt to social development, possess communication and collaboration abilities, demonstrate strong teamwork spirit, and promote physical and mental well-being and self-improvement. **Abilities**: Possess sound character and good psychological qualities. Understand	**Humanities and Social Sciences Courses:** Ethics and the Rule of Law Outline of Modern Chinese History Basic Principles of Marxism Introduction to Thought and Theoretical System of Socialism with Chinese Characteristics Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era Labor and Education Situation and Policy College Student Mental Health Education Career Development and Employment Guidance for College Students (1) Career Development and Employment Guidance for College Students (2)

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	China's national conditions, have humanistic and social science literacy, and social responsibility, enabling adherence to professional ethics and conduct in engineering practices, shouldering responsibilities, contributing to the nation, and serving society.	Military Theory for College Students University Physical Education and Health (1) University Physical Education and Health (2) University Physical Education and Health (3) University Physical Education and Health (4) Introduction to Life Sciences Introduction to Environmental Science Orientation Education and Military Training Social Practice and Volunteer Service