Hunan City University

ASIIN Accreditation Self-Assessment Report

Civil Engineering and Water Supply and Drainage Science and Engineering

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1. Overview of the Major

Table 1-1 Overview of the Civil Engineering

Major (Chinese)	土木工程
Major (English)	Civil Engineering
Degree	Bachelor's
Program Duration	Four years
ECTS Credits	232
Study Mode	Full-time
Website	https://www.hncu.edu.cn/
First Enrollment Date for the Major	September 1, 2002
Semester Start Date	Fall Admission
Planned Enrollment Number	280
Tuition Fee	5,900 RMB/year
College	College of Civil Engineering
College Website	https://tmgc.hncu.edu.cn/
Major Leader	Professor Cao Guohui
Phone	13707379000
E-Mail	cgfcivil@163.com

Table 1-2 Overview of the Water Supply and Drainage Science and Engineering

Major (Chinese)	给排水科学与工程
Major (English)	Water Supply and Drainage Science and Engineering
Degree	Bachelor's
Program Duration	Four years
ECTS Credits	230
Study Mode	Full-time
Website	https://www.hncu.edu.cn/
First Enrollment Date for the Major	September 1, 2003
Semester Start Date	Fall Admission
Planned Enrollment Number	Max. 150 students
Tuition Fee	5,900 RMB/year
College	College of Municipal and Geomatics Engineering
College Website	https://szch.hncu.edu.cn/index.htm
Major Leader	Professor Chi Nianping
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2. Training Program Content and Implementation

The Civil Engineering major at Hunan City University (HNCU) originated from the Industrial and Civil Engineering major of the former Hunan City Construction College (formerly a university directly under the Hunan Provincial Construction Committee, Enrollment in 1984). The Civil Engineering major began undergraduate admissions in 2002 and was approved as a first-class undergraduate program construction point in Hunan Province in 2019, and as a national first-class undergraduate program construction point in 2020. The Water Supply and Drainage Science and Engineering major was established in 1984, the major began enrolling undergraduate students in 2003, was recognized as a Hunan Province Distinguished Major for Ordinary Colleges in 2009, and was approved as a first-class undergraduate program construction point in Hunan Province in 2019. Above majors closely aligns with China's rapidly developing civil engineering industry. The educational approach combines theory with practice, training high-quality professionals who possess a broad foundational knowledge, strong professional expertise, and the ability to apply their knowledge and skills to solve basic engineering problems. These graduates are "engineering-oriented, application-focused, and internationally-minded" talents. Graduates demonstrate strong comprehensive innovation awareness, independent working ability, and teamwork spirit in the field of engineering science and technology. They also exhibit a high cultural level, good professional ethics, a strong sense of social responsibility, an international perspective, and excellent social competitiveness and creativity. They are equipped to meet the demands of civil engineering-related industries and sectors, fulfilling the requirements for internationally recognized engineering qualifications and professional engineer credentials.

2.1 Training Objectives

2.1.1 Civil Engineering

Civil Engineering major is based on the regional economic and social development needs, aiming at the construction of new-type urbanization and rural revitalization. It trains professionals who meet the national infrastructure development needs, with solid engineering practice skills, autonomous learning ability, cooperative communication skills, and innovation capabilities. These professionals are prepared to work in construction, management, and design roles in areas such as road and bridge

engineering, building engineering, and urban rail transit engineering, possessing strong professional ethics and social responsibility.

The knowledge, skills, and abilities of the program's graduates are designed to achieve the following objectives:

Training Objective 1: Master basic knowledge in mathematics, natural sciences, and information technology to lay a solid foundation for subsequent coursework, applying the learned knowledge to solve engineering problems.

Training Objective 2: Master fundamental knowledge in civil engineering and use this knowledge to identify and analyze complex engineering problems, building a solid foundation for further solving complex civil engineering issues.

Training Objective 3: Master professional knowledge in civil engineering, capable of investigating, designing, and analyzing complex engineering problems in related fields, and proposing solutions that meet the specific needs of complex civil engineering challenges.

Training Objective 4: Master cutting-edge knowledge and skills in civil engineering, able to track the development trends in the field and pursue further self-development.

Training Objective 5: Master cross-cultural and international cooperation and communication skills that are adaptable to social development and globalization.

Training Objective 6: Understand China's current social model and norms, demonstrating good social behavior, teamwork spirit, and humanistic care. Develop comprehensively in moral, intellectual, physical, and psychological aspects.

The training objectives of the Civil Engineering major can be viewed on **Appendix A -1** or the English homepage of the College of Civil Engineering (https://tmgc.hncu.edu.cn/ASIINrz/Civil_Engineering/pymb_Objectives.htm).

2.1.2 Water Supply and Drainage Science and Engineering

Water Supply and Drainage Science and Engineering major aims to cultivate talents who can adapt to China's new urbanization and rural revitalization strategies, meet the developmental needs of regional economies and societies, and achieve holistic development in moral, intellectual, physical, aesthetic, and labor education. Students will master the foundational theories, engineering skills, and management methods necessary for the benign social cycling of urban water systems. They will have the capacity for teamwork, innovation, and self-directed learning, embody the core values of socialism, possess a sense of social responsibility and a sustainable development mindset, and have cultural literacy, professional ethics, and an entrepreneurial spirit. Graduates will be able to engage in design, construction, operation, management, and preliminary

R&D in fields such as water quality assurance, sewage treatment and resource recovery, comprehensive water environment management, building water supply and drainage, smart water services, and engineering management, serving as high-quality, application-oriented engineering technical talents in water supply and drainage science and engineering and related industries.

Upon graduation, students in this major are expected to achieve the following objectives:

Training Objective 1: Understand China's current social patterns and norms, possessing good social behavior, team spirit, and awareness of humanistic care. To develop comprehensively in moral, intellectual, physical, and psychological aspects.

Training Objective 2: Master foundational knowledge in mathematics and natural sciences to establish a solid foundation for subsequent course studies and apply this knowledge to solve engineering problems.

Training Objective 3: Master the foundational knowledge of Water Supply and Drainage Science and Engineering, apply this knowledge to identify and analyze complex engineering problems within the field, and lay a solid foundation for further resolving complex engineering issues in Water Supply and Drainage Science and Engineering.

Training Objective 4: Master a broad range of foundational engineering and professional knowledge to lay the groundwork for future specialized course studies.

Training Objective 5: Master professional knowledge in Water Supply and Drainage Science and Engineering, capable of investigating, designing, and analyzing complex engineering issues in related fields, and proposing solutions that meet the specific needs of complex water supply and drainage engineering problems.

Training Objective 6: Possesses awareness of self-directed and lifelong learning, and the ability to continuously learn and adapt to personal development needs.

The professional training objectives can be found in the Professional Training Plan **Appendix A-2** or viewed on the homepage of the School of Municipal and Geomatics Engineering:
(https://szch.hncu.edu.cn/ASIINrz/Water_Supply_and_Drainage_Science_and_Engineering/pymb_Objectives.htm)

2.2 Learning Outcomes of the Program

2.2.1 Course Learning Outcomes (Knowledge, Skills, and Abilities)

(1) Basic Scientific Literacy and Engineering Abilities

- Ability to understand and apply mathematics and natural sciences to solve practical engineering problems;
- Ability to understand and participate in general industry processes, meeting potential job and technical requirements;
- Ability to track the development trends of modern science and technology and their application prospects.

(2) Civil Engineering Professional Knowledge and Abilities

- Ability to acquire and apply civil engineering professional knowledge;
- Possession of strong professional practice skills and vocational abilities;
- Ability for further study, advanced degree pursuit, and research.

(3) International Communication Ability

- Possession of sufficient English language knowledge to communicate with international peers;
- Ability to work and collaborate in foreign countries or multinational companies; supported by a solid foreign language and cross-cultural background.

(4) Computer and Information Application Ability

- Ability to use computer software and networks;
- Familiarity with common methods of literature, information, and data retrieval, with the ability to acquire and utilize information (including literature);
- Ability to integrate professional knowledge with computers, such as computer-aided design and simulation.

(5) Engineering and Professional Practice Ability

- Ability to design solutions to complex engineering problems in the field of civil engineering;
- Ability to design buildings, bridges, and rail systems that meet specific needs, incorporating innovation in the design process and considering social, health, safety, legal, cultural, and environmental factors;
- Ability to design, construct, and operate building, road, bridge, and rail engineering systems according to regulations, as well as to analyze and evaluate practical engineering problems and provide valuable solutions.

(6) Teamwork and Management Ability

- Good mental health and personal integrity;
- Strong legal awareness and social responsibility;
- Teamwork spirit and some management abilities;
- Ability to thrive in competitive environments and challenging work conditions.

2.2.2 Evaluation and Requirements of Civil Engineering

(1) Professional Assessment

Hunan City University successfully completed the Ministry of Education's undergraduate teaching evaluation and educational assessment in 2018 and 2024 with high quality. Civil Engineering is one of the most distinctive undergraduate programs at Hunan City University. Based on the OBE (Outcome-Based Education) engineering education concept, the talent cultivation plan was comprehensively revised in 2019, and the application for engineering education accreditation from the Ministry of Education was initiated.

(2) Employment Market Demand

Graduates of this program are widely accepted in the employment market. They possess strong practical abilities, solid foundational professional knowledge, adaptability, innovation awareness, and high comprehensive skills.

The Civil Engineering major is offered in three sub-disciplines, with a broad employment scope. The "Building Engineering" direction emphasizes cultivating skills in research, design, construction, operation, and management in the building sector. The employment market mainly includes areas such as real estate development, construction, and architectural design. The "Road and Bridge Engineering" direction focuses on cultivating skills in research, design, construction, operation, and management in the road and bridge fields. The employment market primarily includes road and bridge design, construction, installation, or operation management sectors. The "Urban Rail Transit Engineering" direction focuses on developing abilities in the design, construction, installation, and operation of urban subways, light rail, and conventional rail systems. Employment is primarily directed toward design, construction, and operation of transportation infrastructure like subways, high-speed rail, and light rail.

In the past three years, the employment rate of graduates from this program (including those continuing studies domestically and internationally) has been over 90%.

(3) Graduate Survey

The results from the survey of program graduates indicate that the curriculum is well-structured, closely aligned with the demands of the employment market, and that graduates adapt well after completing their studies, with academic performance fully meeting the expected goals.

2.2.3 Evaluation and Requirements of Water Supply and Drainage Science and Engineering

(1) Professional Evaluation

The Water Supply and Drainage Science and Engineering major is one of the undergraduate programs at Hunan City University. The program has passed the People's Republic of China Ministry of Housing and Urban-Rural Development's annual evaluation for higher education majors in Water Supply and Drainage Science and Engineering in 2021 and successfully underwent re-evaluation in 2024.

(2) Labor Market Demand

In the employment market for Water Supply and Drainage Science and Engineering, with the acceleration of global urbanization and the growing awareness of water resource management and environmental protection, the field has shown a steady growth trend. Graduates of this major are highly adaptable in the job market, with professional skills encompassing the planning, design, construction, and management of urban water supply systems, as well as the construction and maintenance of drainage systems, including critical areas such as wastewater treatment and stormwater discharge.

Especially given the current context of increasingly scarce water resources, there is an urgent demand for the intelligent and efficient development of water supply and drainage systems, which provides abundant employment opportunities for graduates. They are able to play key roles not only in government agencies, environmental departments, and design institutes within the public sector but also find opportunities to showcase their talents in the private sector, including in construction projects, municipal engineering, and industrial enterprises.

According to student surveys conducted over the past few years on graduates of this major, the primary industries of employment are concentrated in construction (49.38%), water conservancy, environmental, and public facility management (27.16%), and electricity, heat, gas, and water production and supply (6.17%), totaling 82.71%. Graduates are mainly employed in planning, design, construction, and management units, with 39.51% engaged in design, 35.80% in construction, 14.81% in management, and 9.88% in other areas. Graduates working in fields directly or somewhat related to their major comprise 74.05%, while those working in generally related fields comprise 16.03%, totaling 90.08%. This indicates that our university’s program and training requirements align well with job market demands, and the employment fields of graduates are consistent with the training objectives.

(3) Graduate Self-Evaluation

According to the survey results from recent graduates, the majority believe that our training program meets the school's goals for applied talent development, aligns with current industry needs, and fulfills professional assessment and accreditation standards.

According to the survey results of the employment situation of graduates in the past five years, the achievement rate of the six ability objectives is above 98%. According to the questionnaire survey results on the salary of graduates in recent years, those with a monthly salary of over 8,000 yuan account for 43.94%, those with a monthly salary of 5,000 - 8,000 yuan account for 39.39%, and the rest account for 16.67%. This indicates that the salary level of graduates of this major is relatively high and has certain development prospects. Details of the graduate questionnaire analysis can be found in **Appendix A-3**.

2.3 Learning Outcomes of Each Course Module

2.3.1 Curriculum Plan Modules of Civil Engineering

According to the course arrangement, the entire curriculum system is divided into 10 ability areas: Mathematics and Physics; Information Technology; Engineering Fundamentals; Professional Foundations; Professional Application; Professional Practice; Professional Development; Integrated Application; Foreign Language; Humanities and Social Sciences.

(1) Mathematics and Physics courses equip students with basic knowledge in mathematics, physics, and other natural sciences, deepening their understanding of natural sciences and improving their scientific literacy to solve practical problems in science and technology applications, thus laying a solid foundation for further professional study.

(2) Information Technology courses enable students to master the fundamentals of computer science and information technology, applying computer and information technology tools to effectively solve practical problems in the field of science and technology, providing a solid foundation for future research.

(3) Engineering Fundamentals courses allow students to master basic knowledge in areas such as engineering mechanics, engineering materials, measurement, and engineering drawing, laying a solid foundation for learning engineering application courses.

(4) Professional Foundation courses enable students to master fundamental knowledge related to civil engineering, including principles of concrete structures, principles of steel structures, engineering project management, and civil engineering construction, laying the foundation for subsequent theoretical and practical courses in civil engineering.

(5) Professional application courses enable students to master specialized knowledge and skills related to civil engineering, particularly in the areas of building engineering, road and bridge engineering, and urban rail transit engineering, thereby enabling them to analyze and solve complex engineering problems in the civil engineering field.

(6) Professional practice courses include engineering fundamentals course design, comprehensive professional experiments, comprehensive professional course design, innovation and entrepreneurship project training, and internships. These courses primarily cultivate students' professional experimental skills, engineering application concepts, and innovative practice skills. The goal is to allow students to understand the entire process of design, construction, management, and maintenance of structures such as bridges, buildings, and rail systems in practical civil engineering, further validating and consolidating theoretical knowledge, and deepening the understanding of applied knowledge. During the practice process, emphasis is placed on cultivating students' ability to comprehensively apply professional knowledge to analyze and solve real-world complex engineering problems.

(7) Professional development courses enable students to master cutting-edge knowledge and skills in the field of civil engineering, tracking the development trends in related areas such as green building and intelligent construction. Through these courses, students complete further self-development.

(8) Integrated application courses include production internships, graduation internships, and graduation design projects. The aim is to allow students to combine knowledge, skills, and abilities to execute and complete tasks, propose solutions, and solve practical problems. Each student is required to independently complete tasks under the guidance of a mentor and successfully defend their work.

(9) Foreign language courses aim to cultivate students' mastery of a foreign language, enabling them to read professional literature and communicate in a foreign language, as well as develop the ability for cross-cultural and international cooperation and communication.

(10) Humanities and social science general education courses aim to develop students' cultural literacy, social skills, and teamwork spirit. They enable students to grasp the basics of humanities and social sciences, possess good humanistic qualities, and assume professional, social, and environmental responsibilities. Students are trained and exercised through various practical and team activities, enabling them to communicate effectively, adapt to different environments, and integrate into society.

2.3.2 Curriculum Plan Modules of Water Supply and Drainage Science and Engineering

According to the course setup, the entire curriculum system is divided into six categories: Humanities and Social Sciences, Mathematics and Natural Sciences, Basic Professional Studies, Basic Engineering, Core Professional Studies, and Engineering Practice.

(1) Courses in Humanities and Social Sciences are dedicated to cultivating students' profound cultural depth, broad social awareness, and strong sense of responsibility. Through their studies, students will grasp the fundamental knowledge of humanities and social sciences, develop a deep understanding of professional, social, and environmental responsibilities, and be able to communicate and collaborate effectively in a multicultural environment, demonstrating good teamwork and social adaptability.

(2) Courses in Mathematics and Natural Sciences aim to enable students to master the basic principles and methods of mathematics, physics, and other natural sciences, deepening their understanding of the laws of nature. Through these courses, students will enhance their scientific literacy and develop the ability to solve scientific and technical problems in the field of water supply and drainage science and engineering, laying a solid theoretical foundation for subsequent professional studies.

(3) Basic Professional Courses provide students with a foundational knowledge framework in the field of Water Supply and Drainage Science and Engineering, covering core areas such as hydrology, water chemistry analysis, water treatment biology, and hydraulics. Through these courses, students will master the necessary professional terminology, basic principles, and calculation methods, setting a solid foundation for further in-depth study of core professional courses and engaging in engineering practice.

(4) Basic Engineering Courses focus on teaching fundamental engineering knowledge such as engineering mechanics, electrical engineering, engineering Geomatics, and engineering drawing. Through these courses, students will acquire the basic methods and skills to solve practical engineering problems, providing the necessary engineering literacy and technical support for participating in the design, construction, operation, and management of water supply and drainage systems.

(5) Core Professional Courses aim to deepen students' understanding of professional knowledge in the field of Water Supply and Drainage Science and Engineering and develop their ability to solve real, complex engineering problems. Through learning, students will grasp the professional knowledge and skills necessary for the design, construction, operation, and maintenance of water supply and drainage systems, laying a solid foundation to become highly skilled water supply and drainage engineers.

(6) Engineering Practice Courses emphasize the integration of theory and practice, aimed at developing students' professional experimental skills, engineering application concepts, and innovative practice capabilities. Students will participate in actual water supply and drainage engineering projects, understanding the entire process of system design, construction, management, and maintenance, thereby verifying and consolidating theoretical knowledge and deepening their understanding of applied knowledge. Additionally, these courses focus on cultivating students' abilities to comprehensively apply professional knowledge to analyze and solve real, complex engineering problems, laying a solid foundation for their future careers.

2.3.3 Objective Matrix

Table 2-1 Civil Engineering major 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

<table>
<tr>
<td>2. Master the fundamental knowledge of civil engineering, apply the learned knowledge to identify and analyze complex civil engineering problems, and lay a solid foundation for further solving complex civil engineering problems.</td>
<td>Knowledge: Master fundamental engineering knowledge such as engineering mechanics, engineering materials, as well as specialized knowledge in steel structures 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.</td>
<td>Engineering Fundamentals:
Descriptive Geometry
Civil Engineering Drawing (including CAD)
Theoretical Mechanics
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</td>
</tr>
<tr>
<td rowspan="2">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</td>
<td rowspan="2">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.</td>
<td>Professional Application Courses:
Engineering Project Management
Construction Principles and Methods
Engineering Structure Load and Reliability Theory</td>
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<td>Road and Bridge</td>
<td>Construction Engineering</td>
<td>Urban Rail Transit</td>
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complex civil engineering issues.	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 informatization in the construction industry, and possess the ability to build and apply information models.	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	High-rise Building Structures Building Architecture Steel Structure Design Masonry Structures Concrete Structure Design Prefabricated Buildings Building Engineering Budgeting Building Engineering Construction	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 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 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		

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 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.	**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) 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

Table 2-2 Water Supply and Drainage Science and Engineering major Objective Matrix

Training Objectives	Anticipated Learning Outcomes of the Entire Course	Corresponding Courses
1. Understand China's current social patterns and norms, possessing good social behavior, team spirit, and awareness of humanistic care. To develop comprehensively in moral, intellectual, physical, and psychological aspects.	**Knowledge:** Master knowledge of modern Chinese history, basic principles of Marxism, military theory, implement patriotic education, physical education, and military training, and master a foreign language. **Skills:** Understand social phenomena, pay attention to and adapt to social development, possess the ability to communicate and collaborate with others, have a good team spirit, and promote personal physical and mental health and self-improvement. **Abilities:** Possess a well-rounded personality and good psychological quality. Understand China's national conditions, have literacy in humanities and social sciences, and a sense of social responsibility, able to understand and abide by professional ethics and behavioral norms in engineering practice, take responsibility, contribute to the nation, serve the society, and possess a certain international perspective.	Courses include Ideological, Moral and Legal Studies, Outline of Modern and Contemporary Chinese History, Basic Principles of Marxism, Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics, An Introduction to Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, Current Affairs and Policies, College English (1), College English (2), Extended College English Series (1), Extended College English Series (2), Practical Writing, College Student Psychological Health Education, College Student Career Development and Employment Guidance (1), College Student Career Development and Employment Guidance (2), Basics of Innovation and Entrepreneurship, College Military Theory, College Sports and Health (1), College Sports and Health (2), College Sports and Health (3), College Sports and Health (4), Arts and Physical Education, Humanities and Social Sciences, Innovation and Entrepreneurship, Freshman Orientation and Military Training, Public Welfare Labor, Social Practice and Volunteer Services.
2. Master foundational knowledge in mathematics and natural sciences to establish a solid foundation for subsequent course studies and apply this knowledge to solve engineering problems.	**Knowledge:** Master foundational knowledge in mathematics and natural sciences. **Skills:** Utilize knowledge of mathematics and natural sciences to understand and accurately articulate real engineering problems, and develop basic models to solve various practical issues in technology and engineering applications. **Ability:** Capable of observing, analyzing, and solving technical problems using the perspectives and thinking	Courses include Advanced Mathematics A (1), Advanced Mathematics A (2), Linear Algebra, Probability and Mathematical Statistics, College Physics A (1), College Physics A (2), College Physics Laboratory, General Chemistry, Organic Chemistry, Physical Chemistry.

	methods of mathematics and natural sciences. Continuously analyze, synthesize, calculate, judge, and reason about engineering phenomena based on the characteristics of mathematics and natural sciences to solve engineering problems.	
3. Master the foundational knowledge of Water Supply and Drainage Science and Engineering, apply this knowledge to identify and analyze complex engineering problems within the field, and lay a solid foundation for further resolving complex engineering issues in Water Supply and Drainage Science and Engineering.	**Knowledge:** Master foundational engineering knowledge such as AutoCAD basics and computer applications in water supply and drainage engineering, as well as fundamental expertise in hydraulics and water chemistry analysis. **Skills:** Able to apply basic engineering science principles to identify complex engineering problems in water supply and drainage science and engineering, and capable of analyzing these problems to determine the critical elements needed for resolution. **Ability:** Capable of using engineering principles to analyze the factors affecting the problem-solving process from multiple angles, effectively express the analysis process and conclusions, and use these to guide the development of solutions.	Courses include Introduction to Water Supply and Drainage Science and Engineering, Hydraulics, Water Chemistry Analysis, Hydrology and Hydrogeology, Water Treatment Biology, Basics of AutoCAD, Computer Applications in Water Supply and Drainage Engineering (including BIM Technology), and Professional English.
4. Master a broad range of foundational engineering and professional knowledge to lay the groundwork for future specialized course studies.	**Knowledge:** Master foundational knowledge in information technology, computer science, and related engineering basics such as engineering drawing and engineering mechanics. **Skills:** Capable of applying knowledge in mechanics and engineering to engineering planning, design, construction, and operational management. Master the use of modern engineering tools, information technology tools, engineering techniques, and resources, and able to reasonably select modern tools for complex engineering problems; understand the basic methods for developing engineering techniques and modern engineering tools. **Ability:** Consider the impacts of social, health, safety, legal,	Courses include Basic Computer Science for College Students, Computer Programming (C Language), Engineering Drawing, Electrical Engineering, Engineering Mechanics, Civil Engineering Fundamentals, Water Engineering Economics and Budgeting, Engineering Geomatics, and Engineering Project Management.

	cultural, and environmental factors on solutions, and possess a certain level of innovative thinking.	
5. Master professional knowledge in Water Supply and Drainage Science and Engineering, capable of investigating, designing, and analyzing complex engineering issues in related fields, and proposing solutions that meet the specific needs of complex water supply and drainage engineering problems.	**Knowledge:** Master the professional knowledge involved in the design, construction, and management of water supply, drainage, and building water supply and drainage engineering. **Skills:** Capable of designing units (components) or process flows that meet specific needs of water supply and drainage science and engineering, and can develop construction plans for specific complex engineering problems. Familiar with modern tools related to water supply and drainage science and engineering, understands their limitations, and has the ability to discern and select appropriate tools. **Ability:** In the design and construction planning process, able to fully consider constraining factors such as society, health, safety, law, culture, and the environment. Able to use modern tools to model and compute complex engineering problems in water supply and drainage science and engineering, and can analyze the effectiveness and limitations of the results.	Courses include Pumps and Pumping Stations, Water Quality Engineering Experiments, Water Resources Utilization and Protection, Water Supply and Drainage Network Systems (1), Water Supply and Drainage Network Systems (2), Building Water Supply and Drainage Engineering, Water Quality Engineering (1), Water Quality Engineering (2), Water Engineering Construction, Water Process Equipment Basics, Water Supply and Drainage Engineering Instrumentation and Control, Interpretation and Application of Water Supply and Drainage Design Standards, Water Engineering Operation and Intelligent Management.
6. Possesses awareness of self-directed and lifelong learning, and the ability to continuously learn and adapt to personal development needs.	**Knowledge:** Master methods for tracking and learning about the latest developments and knowledge in the frontiers and new areas of water supply and drainage science and engineering. **Skills:** Recognize the importance of lifelong learning, able to proactively follow developments in the profession and related fields, possessing the ability to learn independently. **Ability:** Capable of broadly applying acquired professional knowledge, combined with cutting-edge advancements. Equipped with the ability to adapt to new developments in the water supply and drainage science and engineering	Courses include Electrical and Electronic Engineering Practical Training A, Geomatics Internship, Familiarization Internship, Pump and Pump Station Course Design, Building Water Supply and Drainage Course Design, Water Supply Network Course Design, Drainage Network Course Design, Water Treatment Course Design (including practical training at a water treatment plant), Wastewater Treatment Course Design (including practical training at a wastewater treatment plant), Water Engineering Economics and Preliminary Budget Course Design, Production Internship, Metalworking Internship, Graduation Internship,

	industry.	Comprehensive Graduation Training, Graduation Education.

2.4 Employment Prospects and Practical Relevance

2.4.1 Employment Market Prospects and Positioning of Civil Engineering

Civil Engineering Major was approved as a first-class undergraduate program construction point in Hunan Province in 2019 and as a national first-class undergraduate program construction point in 2020. To meet the demand for applied engineering talent cultivation in China and to reflect the goals of modern engineering application-focused universities, this program adheres to a model of cooperation between industry, academia, and research, with an industry demand-oriented approach. It emphasizes the coordinated development of knowledge, abilities, and quality, while enhancing the cultivation of innovation awareness and capabilities. The program emphasizes the intersection and integration of disciplines such as computer technology, engineering physics, and mechanical engineering. It constructs a teaching model that combines theoretical teaching, practical teaching, and quality education, with a professional curriculum system that has distinct characteristics, including "broad scope, solid foundation, strong practice, and innovation-driven." The program strengthens comprehensive practical skills training, forming a multi-level, open, industry-academia integrated talent development system, thereby achieving the goals of professional talent cultivation.

The Civil Engineering major is offered in three sub-disciplines, with a broad employment scope. The "Road and Bridge Engineering" direction focuses on cultivating skills in research, design, construction, operation, and management in the road and bridge fields. The employment market primarily includes road and bridge design, construction, installation, or operation management sectors. The "Building Engineering" direction emphasizes cultivating skills in research, design, construction, operation, and management in the building sector. The employment market mainly includes areas such as real estate development, construction, and architectural design. The "Urban Rail Transit Engineering" direction focuses on developing abilities in the design, construction, installation, and operation of urban subways, light rail, and conventional rail systems. Employment is primarily directed toward design, construction, and operation of transportation infrastructure like subways, high-speed rail, and light rail.

In the past three years, graduates have mainly worked in departments related to civil engineering, such as design, construction, installation, testing, technical consulting, and technical services. Employment destinations include design companies, construction

and installation engineering companies, technical consulting agencies, new energy technology companies, and others. The employment rate for civil engineering graduates remains high, and the employment situation for the past three years is shown in Table 2-3. A graduate tracking system has been established for comprehensive analysis of graduate outcomes. The analysis results show that graduates are spread across the country and have high confidence and recognition in the industries they are involved in. Employers have given positive evaluations of the graduates' training quality. Over the past three years, more than 1,000 graduates have been provided to relevant fields. The majority of graduates have become technical backbones and management personnel in these companies. For the questionnaire survey on graduates and employers for the employment quality report is shown in **Appendix A-4**.

Table 2-3 Employment Situation of Civil Engineering in the Last Three Years (Unit: %)

Graduation Year	2022	2023	2024
Number of people	366	380	307
Employment rate (%)	97.82	99.47	91.80

Employers include China State Construction Railway Investment Engineering Group Co., Ltd, CSCEC 4 Civil Engineering Co., Ltd, China State Construction Railway Investment Engineering Group Co., Ltd, The Civil Engineering Group Corporation of China Construction Second Engineering Bureau Ltd., China State Construction Engineering Corporation, China Railway Group Limited, China Railway No.5 Engineering Group Co., Ltd., CCCC Fourth Highway Engineering Co., Ltd, China National Nuclear Corporation, Broad Homes, The 23rd Metallurgical Construction Group Co., Ltd. of Minmetals, and over 100 large enterprises including Hunan Construction Engineering Group, Sinohydro Engineering Bureau 8, Hunan Road and Bridge Company, among others.

2.4.2 Employment Market Prospects and Positioning of Water Supply and Drainage Science and Engineering

The Water Supply and Drainage Science and Engineering program is positioned to cultivate applied talents with solid foundations, emphasis on application, distinctive qualities, and high calibers, who are equipped with robust practical abilities and an entrepreneurial spirit. This positioning aligns with the needs of regional economic and social development, new urbanization, rural revitalization, and intelligent manufacturing battlegrounds. The 2021 edition of the program's training objectives aligns with China's

new urbanization construction and rural revitalization strategy, matching the needs of regional economic and social development. The program aims to master basic theoretical knowledge of urban water systems' benign social recycling processes, engineering skills, and management methods. It also focuses on developing capabilities in teamwork, innovation, and self-learning, practicing socialist core values, possessing a sense of social responsibility and sustainable development, cultural literacy, professional ethics, and entrepreneurial awareness. Graduates are prepared to engage in design, construction, operation, management, and initial R&D in fields like water quality assurance, wastewater treatment and resource recovery, comprehensive water environment management, building water supply and drainage, intelligent water affairs, and engineering management, serving as high-quality, application-oriented engineering technical talents in water supply and drainage science and engineering and related industries. This specific implementation reflects the school's talent cultivation positioning of nurturing talents with solid foundations, emphasis on application, distinctiveness, high quality, and strong practical and entrepreneurial capacities.

To meet the needs of national strategy, social development, and technological innovation, this program continuously expands its professional scope and deepens its content. The research areas have evolved from traditional water purification and distribution to encompass water quality safety and resource recovery, comprehensive water environment management, and intelligent water services. The service domain has shifted from urban infrastructure construction to promoting the benign social circulation of water. The training objectives focus on the national "dual carbon" development strategy and adapt to the needs of "intelligent water services" and "black and odorous water body management" in socio-economic development. This is specifically reflected in areas such as water quality assurance, wastewater treatment and resource recovery, comprehensive water environment management, building water supply and drainage, and intelligent water affairs and engineering management. The program commits to serving the construction and development of the Dongting Lake Ecological Economic Zone and the Chang-Zhu-Tan Pilot Area for a Resource-Saving and Environmentally Friendly Society, providing talent and technical support for industry development.

In the past three years, employment outcomes for this program have been positive, with specific annual employment rates detailed in Table 2-2. The program has conducted follow-up surveys on the employment status of graduates and employer satisfaction. From the perspective of graduate employment, most are working in fields related to their major. Employers generally affirm the political and ideological quality and dedication of graduates from this program, acknowledging that they possess solid foundational and

professional knowledge, strong practical skills, a hardworking attitude, and good organizational, writing, and self-learning abilities. Overall, employers are quite satisfied with the quality of graduates from the Water Supply and Drainage Science and Engineering program. However, some employers believe that the graduates' practical and innovative abilities could be further enhanced. Detailed tracking survey analysis reports can be found in **Appendix A-5**.

Over the past three years, the employment rate for graduates from this program can be seen in Table 2-4, with detailed employment information available in **Appendix A-6 ~A -8**. Graduate employment is primarily distributed among state-owned enterprises, private companies, other enterprises and institutions related to this field, as well as those pursuing further studies. This distribution aligns with the training objectives of the program. The employment intentions of the students are clear, with over 85% of employed graduates working in positions related to their field of study, indicating that the graduates meet the societal and industry demands for water supply and drainage professionals, and generally match the program's training goals. Unemployed graduates are mainly those who chose to prepare for postgraduate studies, missing employment opportunities, and some have opted to forgo employment to focus entirely on preparing for their next entrance exams. Additionally, some students have high employment expectations, plan to take civil service exams, or are waiting for opportunities in other industries. Thus, the reasons for unemployment among graduates may involve factors such as personal career planning, market demand fluctuations, salary expectations, working conditions, and policy orientations. The distribution of employers of graduates from recent years is detailed in **Appendix** A-6~A-8.

Table 2-4 Employment Status of Water Supply and Drainage Science and Engineering over the Past 3 Years

Graduation Year	2022	2023	2024
Number of people	88	75	88
Employment rate (%)	94.3	96	98.9

2.4.3 Practical Abilities

(1) Laboratory

Laboratory skills are developed based on the National Experimental Teaching Demonstration Center and the Engineering Training Center. Laboratory projects are divided into basic subject experiments, in-class professional experiments, and innovative

open experiments. Among these, basic subject experiments and in-class professional experiments are conducted at the National Experimental Teaching Demonstration Center for Civil Engineering, while innovative open experiments are conducted at the Engineering Training Center. Currently, there are 6 in-class laboratory courses, including 5 professional laboratory courses and 1 basic subject laboratory course, with a total of 40 experimental projects. The experimental courses of Water Supply and Drainage Science and Engineering are divided into water analytical chemistry experiment, water treatment biology experiment, hydraulics experiment, water quality engineering experiment, pump and pumping station experiment, and building water supply and drainage engineering experiment. A total of 34 experimental projects have been opened. Strengthening students' understanding of theoretical courses through experimental courses, and cultivates students' innovation ability, data analytics ability and practical ability.

(2) Internships and Practical Training

Internships and practical training of Civil Engineering include orientation internships, engineering geology internships, surveying internships, construction internships, graduation internships, electrical and electronic training, and metalworking training. Internships and practical training of Water Supply and Drainage Science and Engineering include cognition internship, electrical and electronics training A, surveying internship, metalworking internship, production internship, and graduation internship. Electrical and electronic practical training and metalworking practical training are completed under the guidance of teachers from the School of Innovation and Entrepreneurship. Cognition practice, engineering geology practice and surveying practice are guided by on-campus instructors and completed in Hunan Province, and the on-campus instructors give corresponding evaluations. The construction practice and graduation practice are completed under the guidance of on-campus instructors and business mentors across the country, and the relevant evaluations of the practice process are given by the internship business units and off-campus instructors. The internship syllabus and related requirements can be found in **Appendix A-9-1 and A-9-2**.

(3) Course Design and Graduation Design

Course design of Civil Engineering includes Concrete Structure Design Principles, Foundation Engineering, Budgeting Course Design, Construction Organization Course Design, Building Architecture Course Design, Ribbed Beam Floor Course Design (including Masonry), Single-story Industrial Plant Course Design, Steel Structure Course Design, Road Survey Design, Subgrade and Pavement Engineering Course Design, Retaining Wall Course Design, Bridge Engineering Course Design, Urban Rail

Transit Route Course Design, Track Engineering Course Design, Railway Bridge Course Design, Tunnel and Underground Engineering Course Design. The course design syllabus and related requirements can be found in **Appendix A-10**.

The graduation design of the Civil Engineering major stems from real engineering needs and is selected from faculty research projects or engineering application projects at practical bases. The purpose is to assess students' ability to apply the knowledge they have learned comprehensively. The entire process emphasizes design and integrated ability training, focusing on cultivating students' engineering awareness, independent problem-solving skills, and teamwork spirit, particularly their innovation awareness and abilities. New ideas, improvements, and discoveries are encouraged. In addition, external mentors with engineering and practical backgrounds are invited to participate in guidance, implementing the "dual mentorship system" of university and industry for undergraduate graduation project supervision. The entire graduation project process includes multiple stages such as topic selection, mid-term review, defense qualification check, guidance and grading by professors, defense, selection of top defenses, and the university’s outstanding graduation design display. This process aims to strictly control the content and quality of the bachelor’s degree graduation project, ensuring the quality of the final project. The graduation project outline and related requirements can be found in **Appendix A-11**.

Course design of Water Supply and Drainage Science and Engineering includes Pump and Pump Station Design, Building Water Supply and Drainage Design, Water Supply Network Design, Drainage Network Design, Wastewater Treatment Design (including practical training at wastewater treatment plants), Water Treatment Design (including practical training at water treatment plants), and Water Engineering Economics and Preliminary Budget Design. The course design content is closely integrated with the core knowledge of Water Supply and Drainage Science and Engineering application, aiming to exercise students' design ability and practical operation ability.

For graduation design, the design content for the Water Supply Engineering and Drainage Engineering directions includes both network and water plant components, while the Building Water Supply and Drainage Engineering design content includes building water supply, building drainage, and building fire protection, among others. The required outcomes for these three directions are: design calculation manuals (including engineering estimates) and design drawings. There is strict management of graduation project documentation, with tasks assignments and initial reports being reviewed first to identify and correct any issues in a timely manner; graduation project

materials are reviewed before the defense, and only those meeting the requirements are allowed to proceed to defense; after the defense, materials are systematically organized based on the defense outcomes, and once meeting the standards, are archived by the college's academic affairs office. The related graduation project requirements can be found in **Appendix A-12 and A-13**.

(4) Innovation and Entrepreneurship Practice

Students actively participate in innovation and entrepreneurship activities, with a 100% participation rate in undergraduate innovation and entrepreneurship projects. The Civil Engineering major, leveraging the National Experimental Teaching Demonstration Center for Civil Engineering, actively builds communication platforms for undergraduate students and professional faculty. Through student innovation studios, the Civil Engineering College's structural design studio, and the Civil Engineering College's Technology Association, the program promotes various student innovation, entrepreneurship, and academic competition projects, leading to a series of high-level outcomes. The list of student innovation and entrepreneurship projects can be found in **Appendix A-14**In recent years, students have participated in academic competitions and won multiple national and provincial-level awards. The award details of Civil Engineering can be found in **Appendix A-15.** The award details of Water Supply Engineering and Drainage Engineering can be found in **Appendix A-16**.

2.5 Admission Requirements

2.5.1 Admission Criteria

According to the *Education Law of the People's Republic of China*, the *Higher Education Law of the People's Republic of China*, and other relevant laws and regulations from the Ministry of Education, all individuals entering Hunan City University for undergraduate study and pursuing a bachelor's degree must hold a high school diploma or an equivalent qualification and must participate in the National College Entrance Examination (Gaokao). Those who meet the following conditions are eligible to apply: 1) Comply with the Constitution and laws of the People's Republic of China; 2) Have graduated from high school or possess an equivalent qualification; 3) Be in good physical health.

2.5.2 Admission Process

University admissions in China are determined by each province and municipality based on the number of applicants and exam scores. Admissions are divided into the first, second, and third batches, with candidates ranked by scores from highest to lowest. Admission to the Civil Engineering major at Hunan City University is in the first batch,

with Language and Literature, Mathematics, Foreign Language, Physics, and Chemistry as mandatory subjects for the Gaokao.

During the admission phase, the admissions department at Hunan City University evaluates candidates comprehensively based on predetermined admission plans, primarily considering exam scores for selection. A typical admission process includes: file submission, file review, pre-admission, admission checks, and issuance of admission letters.

Upon entering Hunan City University, new students are required to provide their admission letter and identification documents, then follow the instructions in the registration notice to register at the appropriate department. A typical enrollment process includes: confirming registration, paying tuition, registering for academic status, and collecting study materials and supplies.

2.5.3 Admission Transparency

The admission and enrollment process for freshmen at Hunan City University strictly follows the relevant procedural documents and is highly transparent. According to the *Education Law of the People's Republic of China*, the admission process for regular higher education institutions in China follows a "school responsibility, admission office supervision" system. Here, the "admission office" refers to the provincial-level admission office rather than HNCU's own admission office. This means that for candidates who meet the requirements of political and moral assessment, comply with laws and regulations, pass the physical examination, achieve the required score on the national entrance examination, and meet HNCU's file transfer criteria, whether they are admitted and the program to which they are admitted is determined by HNCU itself.

HNCU has issued and implemented documents such as the *2024 Hunan City University Undergraduate Admissions Regulations* (see **Appendix A-17**), *Hunan City University Online Admission Site Management Regulations* (see **Appendix A-18**), and *Guidelines for Physical Examination in University Admissions* (see **Appendix A-19**), to standardize the admission process and improve publicity channels.

The university is responsible for providing explanations to unadmitted candidates and handling other unresolved issues. The provincial-level admission offices organize and implement the submission of qualified candidates' electronic files to the universities and supervise the universities’ compliance with national admission policies, adjustments to admission plans, and enforcement of those plans, correcting any violations of national admission policies and regulations.

2.6 Training Plan

The training plan is the basic basis for organizing various teaching activities and is a foundational document for HNCU's management, monitoring, and evaluation of teaching quality. To verify the quality of the training plan, standardize HNCU's training plan development process, ensure the achievement of talent cultivation goals, and better optimize and improve the plan, HNCU has formulated the *Implementation method of rationality evaluation of talent training program in Hunan City University* (see **Appendix A-20**), which specify the development and revision of the training plan. The training plan for this program is jointly drafted by the college, department, and industry and enterprise experts, reviewed by the college's teaching advisory committee, and submitted for approval by the university (The list of teaching steering committees of the School of Civil Engineering is provided in **Appendix A-21**, The list of teaching steering committees of the School of Municipal and Surveying and Mapping Engineering is provided in **Appendix A-22**).

3. Degree Courses: Structure, Methods, and Implementation

3.1 Structure and Modules of Civil Engineering

3.1.1 Structure of Civil Engineering

The undergraduate training plan for this program is a four-year system. Overall, the course system is divided into ten ability domains, with the learning content in each domain being interconnected in chronological order. Regarding credit and the distribution of hours across the various ability domains, language courses and general foundational courses are scheduled in the first to fourth semesters, including English, ideological and political education, physical education, etc., to familiarize students with relevant English, humanities, and law, thereby improving their cross-cultural communication skills and humanistic literacy.

Mathematics, physics, and information technology courses are scheduled in the first to fourth semesters, allowing students to become familiar with basic knowledge and skills, providing a foundation for studying subsequent professional courses. For example, advanced mathematics is scheduled in the 1st-2nd semesters, linear algebra and probability theory and mathematical statistics are scheduled in the 3rd-4th semesters; university physics is scheduled in the 2nd-3rd semesters; information technology courses are scheduled in the 1st-3rd semesters, to ensure that students can master the knowledge and skills of computer science and information technology.

Engineering fundamentals courses are scheduled in the 1st-5th semesters, including courses related to engineering knowledge and skills, such as descriptive geometry, civil engineering drawing (including CAD), theoretical mechanics, mechanics of materials, structural mechanics, civil engineering materials, etc., laying the foundation for subsequent engineering applications and professional courses.

Engineering application courses are scheduled in the 5th-7th semesters, including the specialized courses of this program. These courses are crucial in the entire curriculum system, as they deepen and expand the professional knowledge and application in the field of civil engineering.

Professional practice and integrated application courses are primarily scheduled in the 4th-8th semesters. Most of the topics in the integrated application courses come from real engineering projects of enterprises. Professional practice and integrated application courses help students accumulate a substantial amount of practical engineering experience, enhancing their employment competitiveness. According to the course arrangement, students will ultimately earn 232 credits after completing the 8-semester program.

3.1.2 Modules of Civil Engineering

According to the training objectives, all courses cover ten ability areas, with expected learning outcomes and corresponding courses as follows:

Mathematics and Physics Courses

Expected learning outcomes: Master basic knowledge and principles of mathematics, physics, and other natural sciences, deepen the understanding of natural sciences, and improve scientific literacy in problem-solving, laying the foundation for subsequent engineering fundamentals courses.

Basic requirements: Able to apply the learned basic theories of natural sciences to analyze scientific problems in engineering practice.

Corresponding courses: Advanced Mathematics, Linear Algebra A, Probability Theory and Mathematical Statistics A, University Physics, General Chemistry A, Mathematical Modeling.

Information Technology Courses

Expected learning outcomes: Master basic knowledge of information technology and computer science, and be able to apply computer and information technology tools to effectively solve practical problems in the field of science and technology, laying the foundation for future learning.

Basic requirements: Able to use computer and information technology methods to solve practical problems in scientific and technological fields related to the learned major.

Corresponding courses: Computer Fundamentals for College Students, Computer Languages.

Engineering Fundamentals Courses

Expected learning outcomes: Master a broad range of engineering fundamental knowledge, laying a solid foundation for subsequent engineering application courses.

Basic requirements: Master engineering mechanics, engineering materials, and other professional fundamental knowledge; be able to apply basic principles of engineering science to identify complex engineering problems in civil engineering, analyze these problems, and determine the key aspects for solving them; be able to use engineering principles to analyze factors influencing the problem-solving process from multiple perspectives, effectively express the analysis process and conclusions, and use them to guide the formulation of solutions.

Corresponding courses: Descriptive Geometry, Civil Engineering Drawing (including CAD), Theoretical Mechanics, Mechanics of Materials, Structural Mechanics, Soil Mechanics, Fluid Mechanics, Civil Engineering Materials, Engineering Surveying B, Engineering Geology, Electrical and Electronic Training A, Metalworking Training A, Engineering Geology Orientation Internship, Surveying Internship.

Professional Foundation Courses

Expected learning outcomes: Master professional knowledge and skills in civil engineering and related fields, enabling the analysis and solution of complex engineering problems.

Basic requirements: Master engineering fundamentals such as foundation engineering, principles of concrete structure design, and basic principles of steel structures; be able to apply basic engineering science principles to identify complex civil engineering problems, analyze these problems, and determine the key aspects for problem-solving; be capable of using engineering principles to analyze factors influencing the problem-solving process through various approaches, and effectively communicate the analysis process and conclusions to guide the formulation of solutions.

Corresponding 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.

Professional Application Courses

Expected learning outcomes: Master professional knowledge in civil engineering, including areas such as building, road and bridge, and rail engineering design, construction, and management.

Basic requirements: Able to complete the design of structures and components (nodes) that meet specific civil engineering needs, and 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. 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 informatization in the construction industry, and possess the ability to build and apply information models.

Corresponding courses:

Engineering Project Management, Construction Principles and Methods, Engineering Structure Load and Reliability Theory.

Road and Bridge Direction: 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.

Building Engineering Direction: High-rise Building Structures, Building Architecture, Steel Structure Design, Masonry Structures, Concrete Structure Design, Prefabricated Buildings, Building Engineering Budgeting, Building Engineering Construction.

Urban Rail Transit Direction: Urban Rail Transit Network Planning and Route Design, Track Engineering, Tunnel and Underground Engineering, Railway Bridges, Urban Rail Transit Stations, Railway Subgrades, Urban Rail Engineering Budgeting, Road and Railway Engineering Construction Technology.

Professional Practice Courses

Expected learning outcomes: Master professional knowledge in civil engineering, including areas such as building, road and bridge, and rail engineering design, construction, management, and experimentation.

Basic requirements: Able to complete the design of structures and components (nodes) that meet specific civil engineering needs, and 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. 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 informatization in the construction industry, and possess the ability to build and apply information models. The goal of laboratory courses is to cultivate students' hands-on practical ability, problem analysis and solving skills, and a scientifically rigorous experimental attitude, while also fostering teamwork skills.

Corresponding courses:

Road and Bridge Direction: Road Survey and Design Course Design, Subgrade and Pavement Engineering Course Design, Retaining Wall Course Design, Bridge Engineering Course Design, Mechanics of Materials Experiment, Building Materials Experiment, Soil Mechanics Experiment, and Civil Engineering Structural Testing Technology.

Building Engineering Direction: Architectural Design Course, Ribbed Beam Floor Course Design (including Masonry), Single-story Industrial Plant Course Design, Steel Structure Course Design, Mechanics of Materials Experiment, Building Materials Experiment, Soil Mechanics Experiment, and Civil Engineering Structural Testing Techniques.

Urban Rail Transit Direction: Urban Rail Transit Line Course Design, Track Engineering Course Design, Railway Bridge Course Design, Tunnel and Underground Engineering Course Design, Mechanics of Materials Experiment, Building Materials Experiment, Soil Mechanics Experiment, and Civil Engineering Structural Testing Techniques.

Professional Development Courses

Expected Learning Outcomes: Master the methods for tracking and learning the dynamic developments and knowledge in the forefront and emerging fields of civil engineering.

Basic Requirements: Recognize the importance of lifelong learning, actively track developments in the major and related fields, and possess the ability for self-directed learning. Be able to apply the acquired professional knowledge widely, combining it with cutting-edge developments. Possess the ability to adapt to new developments in the civil engineering industry.

Corresponding Courses: Fundamentals of Innovation and Entrepreneurship, Literature Search and Research Methods, Basics of BIM, New Technologies in Civil Engineering, Civil Engineering Structural Testing Technologies.

Integrated Application Courses

Expected Learning Outcomes: Master the methods for tracking and learning the dynamic developments and knowledge in the forefront and emerging fields of civil engineering.

Basic Requirements: Recognize the importance of lifelong learning, actively track developments in the major and related fields, and possess the ability for self-directed learning. Be able to apply the acquired professional knowledge widely, combining it with cutting-edge developments. Possess the ability to adapt to new developments in the civil engineering industry.

Corresponding Courses: Production Internship, Graduation Internship, Comprehensive Graduation Training.

Foreign Language Courses

Expected Learning Outcomes: Possess cross-cultural communication skills necessary for international cooperation, better adapting to social development and globalization.

Basic Requirements: Be able to read professional literature in English and perform mutual translation between Chinese and English. 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.

Corresponding 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.

Humanities and Social Sciences Courses

Expected Learning Outcomes: Master knowledge of Modern Chinese History, Basic Principles of Marxism, Military Theory, etc., and engage in patriotism education, physical education, and military training.

Basic Requirements: Understand social phenomena, stay informed about and adapt to social development, possess communication and collaboration abilities, demonstrate good teamwork spirit, and promote physical and mental well-being and self-improvement. Have sound character and good psychological qualities. Understand 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.

Corresponding 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, Situation and Policy, College

Student Mental Health Education, Career Development and Employment Guidance for College Students, Military Theory for College Students, University Physical Education and Health, Introduction to Life Sciences, Introduction to Environmental Science, Orientation Education and Military Training, Social Practice and Volunteer Service.

3.2 Structure and Modules of Water Supply and Drainage Science and Engineering

3.2.1 Structure of Water Supply and Drainage Science and Engineering

The current curriculum for this major implements the 2021 training plan, with talent training programs from 2019 and 2021 versions used over the past three years. Taking the course system from the 2021 training plan as an example, the curriculum has been meticulously designed to meet the proportional requirements of general standards. All detailed requirements of the additional professional standards, such as course setup, practical components, and graduation projects, are incorporated into the course system. During the design process of the course system, input from industry and business experts was invited to ensure the effective achievement of graduation requirements.

The undergraduate training program for this major is structured as a four-year course, divided into five parts: General Education, Discipline Foundations, Professional Core, Autonomous Development, and Concentrated Practice. The curriculum system is further subdivided into six modules: Mathematics and Natural Science courses, General Education courses in Humanities and Social Sciences, Basic Engineering courses, Fundamental Professional courses, Specialized courses, and Engineering Practice and Graduation Projects (Thesis).

In terms of credit distribution and instructional hours across various competency areas, General Education courses in Humanities and Social Sciences are scheduled from the 1st to the 6th semester. These include Ideological, Moral and Legal Studies, Outline of Modern and Contemporary Chinese History, Basic Principles of Marxism, Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics, An Introduction to Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, Current Affairs and Policies, College English, Extended College English Series, Practical Writing, College Student Psychological Health Education, College Student Career Development and Employment Guidance, Basics of Innovation and Entrepreneurship, College Military Theory, College Sports and Health, Arts and Physical Education, Humanities and Social Sciences, Innovation and Entrepreneurship, Orientation and Military Education, Public Welfare Labor, and Social Practice and

Volunteer Services, all aimed at enhancing students' cross-cultural communication skills and cultural literacy.

Mathematics and Natural Science courses are scheduled during the 1st to 4th semesters, including Advanced Mathematics, Linear Algebra, Probability Theory and Mathematical Statistics, College Physics, General Chemistry, Organic Chemistry, Analytical Chemistry, and Physical Chemistry along with their laboratory experiments, laying the foundation for subsequent specialized courses. Basic Engineering courses are arranged from the 1st to 6th semesters, providing students with fundamental engineering literacy. Fundamental Professional courses are mainly scheduled between the 3rd and 5th semesters, serving as a bridge between basic and specialized courses. Core Professional courses are scheduled from the 4th to 7th semesters, which are crucial within the entire curriculum system to deepen and expand students' expertise and application skills in the field of water supply and drainage engineering. Concentrated Practical courses are arranged from the 3rd to 8th semesters, allowing students to promptly apply theoretical knowledge to the practical aspects of water supply and drainage, helping them accumulate a wealth of practical engineering experience and enhancing their employability. The comprehensive graduation training in the Concentrated Practical courses is scheduled for the 8th semester, with most topics derived from faculty-involved enterprise cooperative design projects. According to the curriculum, students will ultimately earn 230 ECTS credits after eight semesters of study.

Taking the 2021 training plan as an example, a complete course list for this major can be found in **Appendix A-1.**

3.2.2 Modules of Water Supply and Drainage Science and Engineering

According to the course arrangement, the entire curriculum system is divided into six modules: Humanities and Social Sciences General Education; Mathematics and Natural Science; Fundamental Professional; Basic Engineering; Specialized; and Engineering Practice.

Humanities and Social Sciences General Education Courses

Expected Learning Outcomes: Equip students with professional norms, practice socialist core values, possess literacy in humanities and social sciences, and a sense of social responsibility. They are expected to conscientiously observe these norms in water engineering practice, understanding engineers' responsibilities toward public safety, health, welfare, and environmental protection. Students should adhere to professional ethics and engineering ethical standards, and willingly fulfill their responsibilities. They should be able to take on individual, team member, and leadership roles in multidisciplinary teams, displaying strong collaboration skills and some organizational

abilities. Additionally, students should master a foreign language, understand international trends and research advancements in urban and rural water engineering, respect the impact of different cultural backgrounds on engineering practice, and effectively communicate and interact across cultural backgrounds.

Basic Requirements: As team members, enhance physical fitness to maintain physical and mental health, fostering self-actualization and team spirit. Engage in various social practices to understand relevant knowledge in humanities and social sciences, adapt to social development, and assume social responsibilities.

Courses included: Ideological & Moral Cultivation and Legal Basis, Outline of Modern and Contemporary Chinese History, Basic Principles of Marxism, Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics, An Introduction to Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, College Military Theory and Training, Current Affairs and Policy, College Student Psychological Health Education, College Student Career Development and Employment Guidance (1), Student Career Development and Employment Guidance (2), Basics of Innovation and Entrepreneurship, College English (1), College English (2), Extended College English Series (1), Extended College English Series (2), Practical Writing, Public Welfare Labor, College Sports and Health.

Mathematics and Natural Science Courses

Expected Learning Outcomes: Enable students to master mathematical knowledge related to Water Supply and Drainage Science and Engineering and apply it to understand the fundamental principles of the major; utilize natural science knowledge to describe and explain important phenomena in complex problems within Water Supply and Drainage Science and Engineering.

Basic Requirements: Ability to apply the basic theoretical knowledge of mathematics and natural sciences learned to analyze scientific problems in engineering practice.

Courses Included: (1) Mathematics: Advanced Mathematics A(1), Advanced Mathematics A(2), Linear Algebra, and Probability Theory and Mathematical Statistics; (2) Physics: College Physics A(1), College Physics A(2), and College Physics Laboratory; (3) Chemistry: General Chemistry, Organic Chemistry, and Physical Chemistry.

Fundamental Professional Courses

Expected Learning Outcomes: Enable students to apply knowledge from mechanics, engineering, etc., for engineering planning, design, construction, and operational management; to use an integrated approach with mathematics, natural sciences, engineering, and Water Supply and Drainage Science and Engineering principles and

methods, capable of identifying, judging, analyzing, and articulating complex engineering problems; to use fundamental principles of Water Supply and Drainage Science and employ scientific methods to comprehensively analyze data and reach effective conclusions; to master the use of modern engineering tools, information technology tools, engineering technologies, and resources, and make appropriate choices for modern tools in complex engineering scenarios; to grasp the basic methods of developing engineering technologies and modern engineering tools.

Basic Requirements: Capable of applying fundamental principles of engineering science to identify complex engineering problems in Water Supply and Drainage Science and Engineering, analyze these problems, and determine key solutions.

Courses Included: Introduction to Water Supply and Drainage Science and Engineering, Hydraulics, Water Analytical Chemistry, Hydrology and Hydrogeology, Water Treatment Biology, AutoCAD Fundamentals, Computer Applications in Water Supply and Drainage Engineering (including BIM Technology), Professional English

Basic Engineering Courses

Expected Learning Outcomes: Enable students to utilize fundamental principles of natural sciences and engineering, master methods and skills in basic engineering experimental design, testing, and measurement, design experiments based on engineering problems, choose appropriate research platforms, apply analytical testing and measurement methods correctly, conduct scientific experiments accurately, and properly collect, analyze, and interpret experimental data.

Basic Requirements: Capable of using engineering principles to analyze the factors influencing the problem-solving process through multiple approaches, effectively communicate the analysis process and conclusions, and guide the formulation of solutions.

Courses Included: College Computer Basics, Computer Programming (C Language), Engineering Drawing, Electrical and Electronic Engineering, Engineering Mechanics, Basics of Civil Engineering, Economics and Preliminary Budgeting in Water Engineering, Engineering Geomatics, Engineering Project Management

Core Professional Courses

Expected Learning Outcomes: Enable students to master the analytical and design methods for components or process flows, develop reasonable solutions tailored to the specific needs of Water Supply and Drainage Science and Engineering, and meet the particular requirements of actual engineering projects; consider the impacts of social, health, safety, legal, cultural, and environmental factors on solutions, and possess a certain level of innovative thinking; capable of using technology, engineering, economic,

and management models and methods to develop, select, and use modern tools for simulation, analysis, prediction, and optimization to solve complex engineering problems, and understand their limitations; possess awareness of harmonious development between humans and nature, have knowledge of environmental protection, adhere to the concept of sustainable social development, and be able to understand and evaluate the impact of solving complex engineering problems on the sustainable development of society, the environment, and the economy.

Basic Requirements: Master the professional knowledge and skills of Water Supply and Drainage Science and Engineering and its sub-disciplines, understand the professional knowledge involved in interdisciplinary and new fields, and possess the professional working skills required for the Water Supply and Drainage Science and Engineering industry.

Courses Included: Pumps and Pumping Stations, Water Resources Utilization and Protection, Water Supply and Drainage Network Systems (1), Water Supply and Drainage Network Systems (2), Building Water Supply and Drainage Engineering, Water Quality Engineering (1), Water Quality Engineering (2), Water Engineering Construction, Water Quality Engineering Laboratory, Water Process Equipment Fundamentals, Water Supply and Drainage Engineering Instrumentation and Control, Professional English, Engineering Project Management, Introduction to Water Supply and Drainage Science and Engineering, Interpretation and Application of Water Supply and Drainage Design Standards, Water Engineering Operations and Smart Management.

Engineering Practice Courses

Expected Learning Outcomes: Train students to address complex problems in Water Supply and Drainage Science and Engineering through professional communication and exchanges such as design drawings, design manuscripts, research reports, and presentations; accurately understand the relationship between Water Supply and Drainage Science and Engineering and other disciplines, and respond clearly and accurately to queries from industry peers and the public; understand and master the management principles and economic decision-making methods of water engineering projects, and apply them within a multidisciplinary environment. Possess certain organizational and management skills; have the ability to engage in self-directed and lifelong learning, continuously adapting and learning in line with industry developments and personal growth needs.

Basic Requirements: Capable of using theoretical knowledge and practical skills to solve real-world problems, consolidate fundamental theoretical knowledge, deepen

understanding of the application fields of Water Supply and Drainage Science and Engineering, and enhance innovation capabilities.

Courses Included: Electrical and Electronics Training A, Geomatics Internship, Introductory Internship, Production Internship, Metalworking Internship, Graduation Internship, Course Design for Pumps and Pumping Stations, Course Design for Building Water Supply and Drainage, Water Supply Network Design, Drainage Network Design, Wastewater Treatment Design, Water Treatment Design, Water Engineering Economics and Preliminary Budgeting, and Comprehensive Graduation Training.

Details on the instructional hours and credits for each module's courses can be found in the Undergraduate Talent Training Program for Water Supply and Drainage Science and Engineering (**Appendix A-1**)

3.3 Workload and Credits

At Hunan City University, completing 16 contact hours of theoretical courses is equivalent to one Chinese credit. For practical training courses, completing 32 contact hours of study is equivalent to one Chinese credit. Chinese credits are based only on contact hours, whereas the European Credit Transfer and Accumulation System (ECTS) credits calculate not only contact hours but also self-study hours. From the perspective of ECTS credits, the student workload is the sum of his/her contact hours and self-study hours. Generally speaking, 30 hours (including contact hours and self-study hours) equates to one ECTS credit, but there are differences between the two credit systems in terms of self-study hours. When converting Chinese credits to ECTS credits, an average of 58 ECTS credits or 1740 hours (workload) per academic year for Civil Engineering is required, an average of 57.5 ECTS credits or 1725 hours (workload) per academic year for Water Supply and Drainage Science and Engineering is required

3.3.1 Study Time (Workload) / Contact Hours, Credits, and Self-Study

The course hours and credits for each module of the Civil Engineering major can be found in **Appendix B-1**. The syllabus for each course is provided in **Appendixs B-2 ~ B -11**. For the structural and categorization of workload for different modules, Table 3-1 provides the hourly statistics for the student's four years of study.

Table 3-1 Four-Year Course Hour Statistics of Civil Engineering

Module	Contact Hours	Self-Study Hours	Total Hours	Percentage
Mathematics and Physics	432	348	780	11.21%
Information	80	40	120	1.72%

Technology				
Engineering Fundamentals	640	515	1155	16.59%
Professional Foundation	240	225	465	6.68%
Professional Application	384	336	720	10.35%
Professional Practice	328	302	630	9.05%
Professional Development	144	81	225	3.23%
Integrated Application	590	670	1260	18.1%
Foreign Language	240	180	420	6.04%
Humanities and Social Sciences	718	467	1185	17.03%
Total Hours	3796	3164	6960	

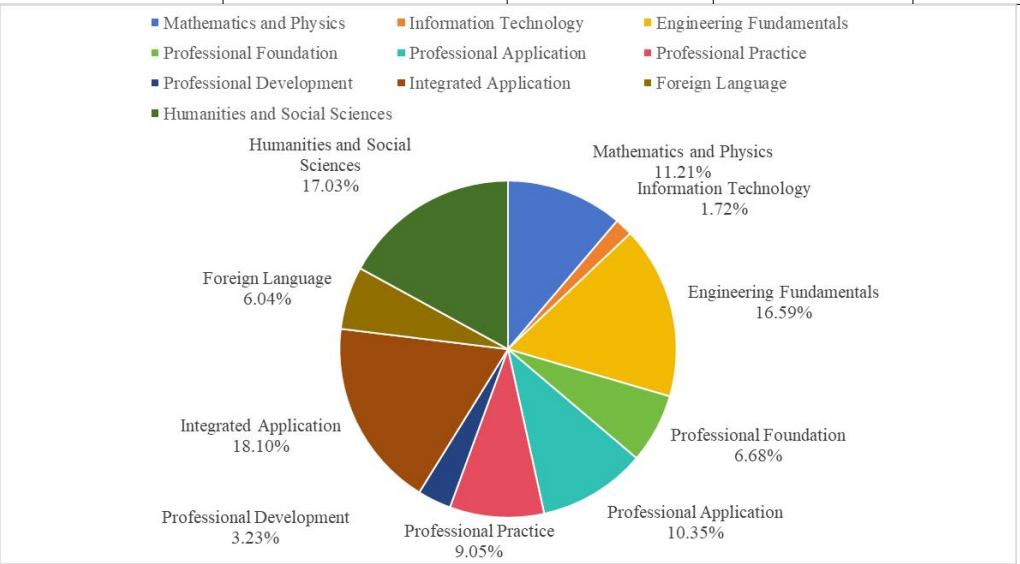

Figure 3.1 Credit Composition of Courses in Different Ability Areas for Civil Engineering

For details on the hours and credits of each course module in Water Supply and Drainage Science and Engineering, see (**Appendix A-2**). Course syllabi can be found in **Appendix B-12**. To illustrate the workload structure and classification of different course modules, Table 3-2 provides a four-year statistical breakdown of student hours.

Table 3-2 Four-Year Course Hour Statistics of Water Supply and Drainage Science and Engineering

Course Module	Contact Hours	Self-study Hours	Total Hours	Percentage
Humanities and Social Sciences	978	717	1695	24.6%
Mathematics and Natural Sciences	424	386	810	11.7%
Professional Foundation	280	215	495	7.1%
Engineering Foundation	288	297	585	8.5%
Professional Core	448	407	855	12.4%
Engineering Practice	1312	1148	2460	35.6%
Total Hours	3730	3170	6900	

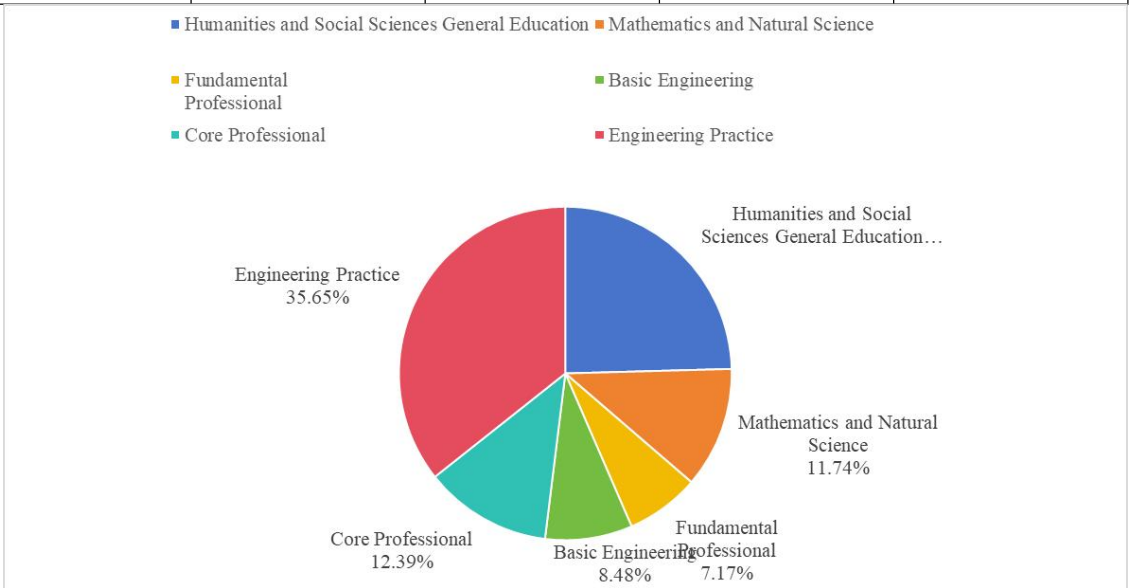

Figure 3.2 Credit Composition of Courses in Different Ability Areas for Water Supply and Drainage Science and Engineering

3.3.2 Credit System

Student learning outcomes are primarily reflected in the form of credits. Each undergraduate must earn the equivalent of 232 ECTS credits in Chinese credits after completing four years of study, meaning an average of 29 ECTS credits per semester. The credit deviation between different semesters should not exceed 3 ECTS credits. The contact hours for each semester are relatively balanced, ensuring that neither the

student's learning effectiveness nor the teacher's teaching quality face structural pressure. Exam results are analyzed by the course instructors, and the student's study time is investigated by tutors and academic advisors to gather the actual learning workload for each semester, ensuring that the actual student workload aligns with the planned workload. Each student of Civil Engineering must complete approximately 870 hours (workload) per semester. 30 hours (workload) is equivalent to 1 ECTS credit. Each student of Water Supply and Drainage Science and Engineering must complete approximately 860 hours (workload) per semester. 30 hours (workload) is equivalent to 1 ECTS credit.

3.4 Teaching Methods

Basic natural science courses and foundational discipline courses are mainly taught in large classes (approximately 80 students), while professional courses are typically taught in smaller classes (around 40 students). Some courses include both theoretical content and in-class experiments, with the in-class experiments usually conducted in batches or groups. Elective courses may be chosen by students based on their personal interests and developmental needs.

In addition to classroom teaching, practice and training are also important components of undergraduate education. The major has more than 20 national and provincial teaching platforms such as the Civil Engineering National Experimental Teaching Demonstration Center and the Civil Engineering Virtual Simulation Experiment Center, which have good practical conditions. At the same time, more than 100 off-campus practice bases have also been established, which can provide students with sufficient internship and training opportunities. At the same time, students can also choose the on-campus research projects of professional teachers to carry out practical learning. The practice base of the School of Municipal and Surveying and Mapping Engineering is mainly in Hunan City University Design and Research Institute Co., Ltd. According to the project characteristics and course requirements, we also cooperate with Yiyang Water Supply Company, Yiyang Tuanzhou Sewage Treatment Plant, Changde Sewage Treatment Plant and other engineering units to provide students with practical opportunities. Students of both majors must participate in professional basic experiments, professional comprehensive experiments, comprehensive curriculum design, innovation and entrepreneurship training, internships, and labor practices.

The teaching methods in this program also widely incorporate online learning models. Most courses have corresponding course websites on the Hunan City University online teaching platform. The established teaching management information platform and open

online course websites provide students with abundant learning resources, stimulating self-directed learning and enhancing their self-study abilities. Practical teaching, such as course design, closely aligns with engineering practice. Engineering fundamentals theory courses introduce engineering practice applications, while professional core theory courses organize teaching around engineering practice projects, training students' engineering thinking, synchronizing course design calculations, optimizing during design weeks, and expressing engineering concepts; the graduation design requires students to conduct topic research based on engineering practice, adhering to the "time, place, and faculty" fixed model to ensure process control and quality of the design results. The design teaching process is depicted in Figure 3.3.

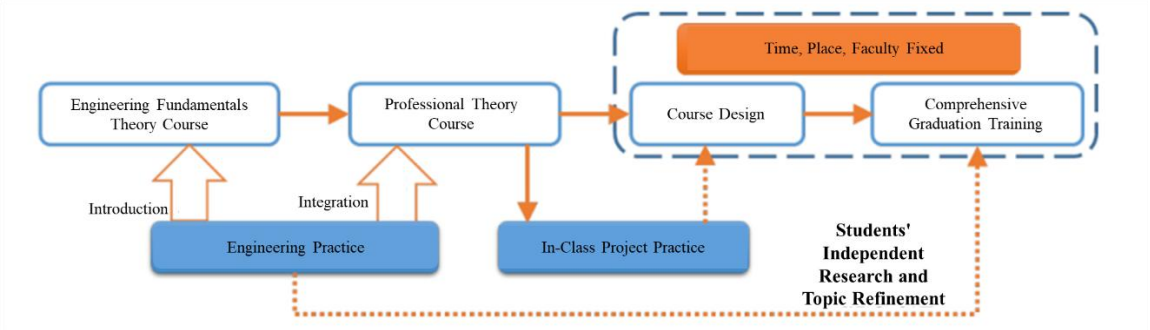

Figure 3.3 Design Teaching Process

3.5 Support and Consultation

(1) Office of Academic Affairs

The daily management and training of undergraduate teaching are primarily handled by the Office of Academic Affairs and the Teaching Quality Management Office. The Office of Academic Affairs is composed of the following departments: Academic Affairs Section, Educational Technology Section, Information Center, Training Section, Practice Section, Admissions Office, and Textbook Section.

External faculty and students must first log in to http://ywpt.hncu.edu.cn:4106/shiro-cas, then click on the school's Teaching Management Information System website: http://58.47.143.9:6038/jwglxt/xtgl/index_initMenu.html?jsdm=&_t=1732871736663#; faculty and staff of Hunan City University can log in to this website with their username and password. Without an account and password for HNCU's faculty or staff, login is not permitted. Once the faculty and staff of the university log in, the interface will appear as shown in Figures 3.4 and 3.5 below.

Figure 3.4 Login Interface of the Teaching Management Information System

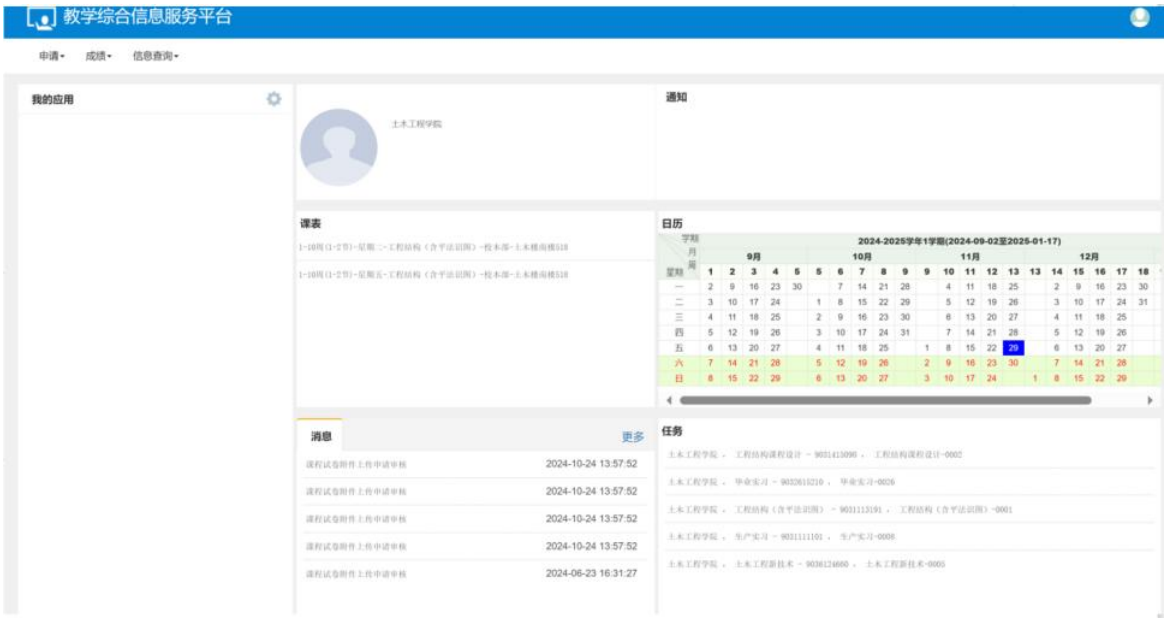

Figure 3.5 Post-Login Interface of the Teaching Management Information System

Each college under HNCU has a dedicated teaching office, responsible for managing the college's teaching affairs under the guidance of the Associate Dean of Teaching.

(2) Student Affairs Department

The Student Affairs Department at Hunan City University is the functional department responsible for student management, education, and services. Its main duties include: implementing ideological and political education, national security education, legal education, school rules and regulations education, health education, psychological education, and moral quality education for students; providing daily guidance and services to students, managing student affairs such as academic style construction, comprehensive quality assessment, evaluations for awards and honors, scholarships and financial aid, student loans, hardship subsidies, and dormitory management; overseeing the work of the Communist Youth League, including education of league members, and

the establishment and management of league organizations; cultivating and assessing student candidates for the Communist Party, and managing the college's branch of the party school; overseeing the selection and review of scholarships and financial aid, and managing the "Green Channel" for new students; conducting investigations and statistics on students' financial difficulties, maintaining files on financially disadvantaged students, and managing a poverty-stricken student database; formulating and enforcing rules and regulations for student education and management; establishing, improving, and maintaining student management records; and handling employment recommendations and management for graduates.

(3) Student Counselor System

Hunan City University has established a comprehensive counselor system covering various aspects such as ideological education, party and league organization building, academic style management, mental health, career planning, and theoretical and practical research. The system is designed to promote the overall development of students. The responsibilities of a counselor specifically include: being responsible for the ideological and theoretical education of students and guiding their values, helping students establish a correct worldview, outlook on life, and values; being responsible for the construction of the Party organization, class, and student groups, which mainly includes the selection, cultivation, and motivation of student leaders, as well as the cultivation and education of students who are active candidates for the Communist Party, and guiding the organization and development of student Party branches and youth league organizations; being responsible for academic atmosphere construction and daily management, including orientation education, graduation education, military training, and helping students develop good study habits and correct study methods, ensuring the orderly progression of students' daily life; being responsible for psychological health education and counseling, conducting preliminary screening and guidance for students' psychological issues, organizing and promoting mental health awareness activities, and cultivating a rational, calm, optimistic, and positive mindset for students; being responsible for career planning and employment guidance, offering scientific career planning and employment guidance services for students. The counselor helps students establish correct views on employment, guiding students to contribute their efforts to grassroots areas, the western regions, and places where the country needs them the most. At the same time, counselors actively provide guidance and support for student innovation and entrepreneurship, inspiring students' innovative spirit and entrepreneurial enthusiasm. Counselors also have responsibilities in theory and practice research, as they are required to study the basic theories of ideological and political education and related

disciplines, participate in academic exchange activities in related fields, and engage in research projects or topics related to ideological and political education both inside and outside the university, continuously improving their professional competence and working abilities. In addition, counselors are responsible for organizing students to participate in social practice, volunteer services, and other activities, fostering students' social responsibility and spirit of dedication, and addressing students' special needs, such as managing students with specific medical conditions, providing personalized services and support.

(4) Academic Advisors

Every undergraduate student has a designated academic advisor who guides them in their academic, professional, and career development. Academic advisors not only impart professional knowledge but also play the role of a guide and partner in the student's growth journey. The primary task of an academic advisor is to help students clarify their academic goals and develop personalized learning plans. By deeply understanding students' foundations, interests, preferences, and career plans, advisors will guide students to arrange their coursework in a reasonable manner, ensuring that students master foundational theories while also exploring the cutting-edge of their major. In terms of professional knowledge and skills development, academic advisors will make full use of laboratory resources to guide students in practical operations and project development. Through participation in research projects, innovative experiments, and academic competitions, students will not only consolidate theoretical knowledge but also develop innovative thinking and teamwork skills in practice. Career planning and employment guidance is another important responsibility of academic advisors. Advisors will combine industry development trends to provide students with employment information and job-seeking skills, helping them establish practical career plans. In addition, academic advisors also pay attention to students' mental health and offer humanistic care. By regularly communicating and interacting, they understand students' academic and personal situations, promptly identify problems, and provide psychological support and assistance.

(5) Corporate Advisors

Hunan City University implements the enterprise mentor system, dedicated to providing students with practical platforms closely connected to industry, to stimulate their innovative thinking and entrepreneurial potential. Enterprise mentors are rigorously selected and certified by Hunan City University. They are mostly experienced management elites or highly skilled engineers from various industries. The principle of mutual selection is implemented between students and enterprise mentors. Students have

the right to independently choose enterprise mentors based on their career plans and research interests. At the same time, enterprise mentors may also select students based on project requirements to ensure efficient and harmonious mentoring relationships. Enterprise mentors provide professional insights and practical strategies throughout, helping students transform theoretical knowledge into practical applications. Additionally, enterprise mentors maintain close communication with academic mentors within the college, jointly building a "dual mentorship" teaching model, optimizing teaching resource allocation, promoting deep integration of industry, academia, and research, and creating a smooth pathway for students from campus to society.

(6) Course Websites

Online teaching has become an indispensable part of teaching activities, greatly enriching teaching methods and improving teaching efficiency. The online course resources for this program are mainly concentrated on HNCU's official online teaching platform (https://hncu.mh.chaoxing.com). This platform integrates various course resources, and students can log in to the platform to access detailed webpages for each course. These webpages are rich in content, covering course introductions, course backgrounds, teaching content, syllabi, exercises, and more, providing comprehensive learning guidance for students. On the platform, students can not only browse various materials closely related to the course, but also engage in real-time online communication with instructors. Students can ask questions at any time and from any place, and instructors can respond promptly. This face-to-face communication method allows students to gain a deeper understanding of course content, while also enabling instructors to more accurately gauge students' learning progress, thereby adjusting teaching strategies and improving teaching quality.

(7) Internal Major Transfer

At Hunan City University, in order to fully embody the student-centered educational philosophy and further stimulate students' learning enthusiasm and initiative, the university promotes students' comprehensive and individualized development. Based on a thorough consideration of HNCU's and college's existing teaching resources and conditions, maximum convenience is provided for students wishing to transfer majors. The Management Measures for the Transfer of Majors by Full-time Regular Undergraduate Students at Hunan City University**.** The major transfer process follows the principles of procedural standards, fairness, and merit-based adjustments, mainly targeting first-year undergraduate students. Students are allowed to transfer majors only once during their time at HNCU. Once the major transfer application is approved by HNCU, it cannot be changed again.

Major transfer is divided into two categories: ordinary cases and special cases.

Students transferring majors must participate in the major transfer examination organized by the Office of Academic Affairs. The specific process is as follows: (1) The student applies by filling out the "Hunan City University Major Transfer Application Form" within 30 days before the end of the first semester of the first year, along with relevant supporting documents and a personal commitment letter; (2) The approval of the dean of the originating college; (3) A comprehensive evaluation by the target college with the dean's approval; (4) Preliminary review by the Academic Affairs Office; (5) Review by the university leadership responsible for undergraduate education; (6) Final approval by the president's office.

For special circumstances, they include: (1) Having specific expertise or special interests in the proposed new major; (2) Being affected by a certain disease or physical defect; (3) Being a student returning after military service or entrepreneurial leave; (4) The original major being discontinued or abolished during the student's leave of absence; (5) Other special circumstances not mentioned above. Students who encounter any of the above situations during their studies may apply for a major transfer. The specific process for transferring majors is as follows: (1) Students sign up; (2) Students take the major transfer exam or assessment after the first semester of the first year; (3) The Academic Affairs Office conducts a preliminary review of the list of students applying for a major transfer; (4) Review by the university leadership responsible for undergraduate education; (5) Public announcement by the Academic Affairs Office; (6) Final approval by the president's office; (7) Complete the formalities for the major adjustment.

For special cases such as students returning after military service or entrepreneurship, or students whose original major has been discontinued during a leave of absence, the application for a major transfer will follow higher-level policies. After approval from both the originating and target colleges, the Academic Affairs Office will review the application, and it will be finalized by the university leadership responsible for undergraduate education.

Students approved for transfer to a new major must handle the payment of tuition and other requirements for the new major before they can officially register and begin their studies in the new program. After a major transfer, students must meet the graduation qualifications as per the talent development plan of the new major. If the credits previously earned align with the talent development plan of the new major, the student must complete the "Hunan City University Credit Recognition Application Form for Transferred Students", and after confirmation from the target college, the form will be submitted to the Academic Affairs Office for recognition. Credits for courses that have

not yet been taken but are required by the new major must be earned by retaking the courses.

4. Examination System, Concepts, and Organization

4.1 Examination Methods

To standardize the management of undergraduate course assessments, promote classroom teaching reforms, enforce examination discipline, establish a positive teaching and learning atmosphere, improve the academic evaluation system, and enhance the quality of talent development, HNCU has developed the *Measures for the Assessment of Undergraduate Courses and Grade Management of Full-time Regular Higher Education in Hunan City University* (see **Appendix C-1**) in accordance with relevant policies and adapted to HNCU's situation.

Assessments are divided into two categories: exams and assessments. Students are required to participate in the assessments specified in the curriculum plan. Exams are primarily written, closed-book exams, though open-book exams may be conducted depending on the course requirements. Assessments for courses cannot be conducted in the form of closed-book exams, and the distinction between exams and assessments will be based on the curriculum plan. The exam content must cover the expected learning outcomes specified in the course syllabus (**Appendixs B-2 to B-12**), and must be indicated in the *Course's Proposition Review Form in Hunan City University* (**Appendix C-2**).

Assessment courses may adopt various forms such as oral exams, reviews, and defenses, emphasizing students' learning process and understanding of the knowledge. Practical components such as graduation comprehensive training, course design, orientation internships, and production internships generally use review or defense methods for assessment. Assessment results follow a 5-level grading system. For conversion standards, refer to the *Hunan City University Student Academic Management Regulations* (**Appendix C-3**).

Examination courses are planned and arranged by the Academic Affairs Office, primarily using closed-book written exams, with open-book exams conducted based on course requirements. The course exam score generally accounts for 60% of the total evaluation, with the regular grade accounting for 40% of the total evaluation. The ratio of final exam scores to regular grades may be adjusted according to course teaching requirements. A process evaluation mechanism must be established for the assessment of regular grades. Process assessments should include at least three different assessment

forms, and the content should be diversified, standardized, verifiable, and traceable. Assessment methods include: online pre-study and discussion before class, classroom questioning, classroom discussions, mid-term tests, unit tests, experiments, assignments, course papers, attendance, etc. Among them, the proportion of experimental scores should comply with the requirements of the teaching (exam) syllabus. Regular grade assessments must be recorded in the *Hunan City University Student Grade Registration Form* (In **Appendix C-4**), and once determined, regular grades cannot be changed. The proportion of self-study hours can be found in the course syllabus (**Appendixs B-2~B-12**), with the self-study portion reflected in various types of regular assessments, such as online pre-study, assignments, and course content. The final score is reflected in the *Hunan City University Student Grade Registration Form* (In **Appendix C-4**).

The course assessment result will be recorded as an overall evaluation score in the student's academic file. The overall evaluation score includes regular performance and final exam scores. In principle, the regular performance score accounts for 30%-50% of the overall course evaluation, while the final exam score accounts for 50%-70% of the overall course evaluation. A total score of 60 points or higher indicates passing. Only those with a passing or higher overall evaluation score can earn the corresponding course credits. Starting from the second semester of 2024, students with a final exam score below 45 points (previously 40 points) will not have their regular scores counted in the overall course grade evaluation and will not receive credit. The score will be based solely on the written exam result.

The specific composition of the exam format and overall grade has been clearly stated in the course syllabus. Therefore, students will know the exam format and the specific components of the overall grade immediately after course selection.

The assessment of students' moral character is based primarily on the *Code of Student Conduct in Higher Education Institutions*, with individual summaries and democratic evaluations, writing comments based on the student’s actual performance and assigning a grade.

Public physical education is assessed according to the national *University Student Physical Fitness Standards and Implementation Measures* and the *Hunan City University Physical Education Assessment Measures*. The university physical education assessment combines regular grades (40%) and final exam scores (60%). The regular assessment is based on the morning run results: 70 kilometers is a passing grade, 110 kilometers is full marks, and other results are calculated accordingly. The final exam consists of three parts: 1) Target shooting (30% of the final grade); 2) 1000-meter run

for males / 800-meter run for females (40% of the final grade); 3) Push-ups for males / sit-ups for females (30% of the final grade).

The public service labor course grade is mainly based on a comprehensive evaluation of the student's attendance, work attitude, labor discipline, and completion of tasks.

The military training assessment grade is primarily based on the student's completion of the military training curriculum.

Appendix C-4 provides the grade reports for course exams and make-up exams, while the "*Hunan City University Student Academic Management Regulations*" (**Appendix C-3**) provides methods for converting grade points, credit points, and average credit points. The corresponding relationship between grade points and assessment grades is shown in Table 4-1.

Table 4-1: Grading Conversion Method

Assessment Grade	Five-Level Grading	Grade Points Earned	Grade Point Median
90~100	Excellent	4.0-5.0	4.5
80~89	Good	3.0-3.9	3.5
70~79	Satisfactory	2.0-2.9	2.5
60~69	Pass	1.0-1.9	1.5
59 and Below	Fail	0	0

Note: For a percentage system, a score of 90 is converted to a 4.0 grade point, 91 to a 4.1 grade point, and so on; scores below 60 receive 0 grade points. For a letter grading system, an "Excellent" grade is equivalent to a 4.5 grade point, "Good" is equivalent to a 3.5 grade point, "Satisfactory" is equivalent to a 2.5 grade point, "Pass" is equivalent to a 1.5 grade point, and "Fail" is equivalent to a 0 grade point.

The eighth semester will include 14 weeks of comprehensive graduation training for the bachelor’s degree, requiring students to independently complete tasks under the guidance of a supervisor, following the *Management Measures for Comprehensive Graduation Training* (**Appendix C-5**). The graduation training supervisors must prepare the topics for the comprehensive training themselves, submit them for review by the department chair, and then submit them to the graduation training system. The comprehensive training topics, the tasks students need to complete, and the schedule are detailed in the graduation training task book (**Appendix C-6**), and students can find all the information in the task book once their thesis topic is selected. The assessment of the

graduation training is conducted independently by both the supervisor and the reviewer, with independent grade submissions. The supervisor's grade (40%) and the reviewer's grade each account for 30% of the overall thesis grade, and the defense grade accounts for 30% of the overall thesis grade.

Examination papers shall be graded in strict accordance with the *Hunan City University Examination Management Measures* (**Appendix C-7**). The lead teaching team shall systematically align the assessment content with the expected learning outcomes specified in the course syllabus and the specific assessment requirements of the current cycle. The degree of achievement of the prescribed learning outcomes within each course module shall be determined through an analysis of the weight distribution of key assessment points and the corresponding scores obtained. Upon completion of grading, instructors shall complete the *Hunan City University Course Examination Paper Analysis Form* (**Appendix C-8**) to evaluate whether the intended learning outcomes have been effectively achieved.

All course assessment results can be viewed by students through the teaching system using their student ID and password. The student grade inquiry interface is shown in Figure 4.1. If a student has any doubts regarding the grade of a course, they can submit a written application to the Academic Affairs Office for a grade re-evaluation (see **Appendix C-9**).

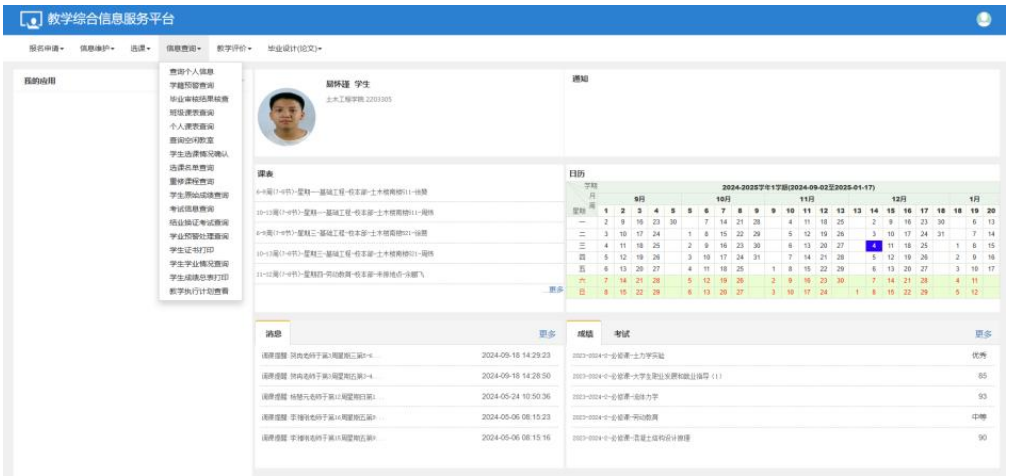

Figure 4.1 Student Grade Inquiry Interface

4.2 Examination Organization

The assessment for public courses is planned and arranged centrally by the Academic Affairs Office, with exams generally scheduled for the 19th and 20th weeks (finals) of each semester. The assessment for specialized and fundamental professional courses is organized by the respective colleges offering the courses. Assessments for non-exam courses are typically scheduled within the teaching period or within two weeks after the

course ends, with exams for courses typically completed before the 18th week. The time and location for exams are meticulously arranged by secondary colleges and the Examination and Student Status Management Center of the Academic Affairs Office to ensure that exam venues meet normal exam requirements and are published in the teaching management system.

Exams are organized in accordance with the "*Hunan City University Full-time Undergraduate Course Assessment and Grading Management Measures*" (**Appendix C-1**). The grading of public course exam papers is coordinated and organized by the offering secondary colleges, while the grading of professional and fundamental professional course papers is handled by secondary colleges. Secondary colleges must follow the uniform requirements set by the Academic Affairs Office and organize course instructors to grade papers in designated locations. It is strictly prohibited for instructors to take papers home for grading. Paper grading should be based on the reference answers and grading criteria. No modifications to the grading criteria are allowed during the grading process. After grading is completed, the grading instructors should analyze the course papers, fill out the *Hunan City University Exam Paper Grade Analysis Form* (**Appendix C-8**), and provide comments and suggestions for improvements regarding student performance, question design, and teaching.

Exams are organized according to the "*Hunan City University Examination Management Measures*." The management measures are as follows, with detailed rules in the **Appendix C-7**.

- Hunan City University Undergraduate Education Assessment and Grading Management Measures
- Hunan City University Examination Paper Review Form
- Hunan City University Regulations on Student Registration and Academic Records Management
- Hunan City University Student Grade Registration Form
- Hunan City University School of Civil Engineering Regulations on Comprehensive Graduation Training Management
- Hunan City University School of Water Supply and Drainage Science and Engineering Regulations on Comprehensive Graduation Training Management
- Hunan City University School of Civil Engineering Comprehensive Graduation Training Task Book
- Hunan City University Course Examination Paper Analysis Form

- Hunan City University Examination Management Measures
- Hunan City University Student Application for Grade Inquiry and Modification Review Form

For exams graded by multiple instructors, all must follow the reference answers and grading criteria established by the exam question group. The same instructor should grade the same question to ensure fairness in grading, and papers should be exchanged and calibrated for review.

4.3 Course Deferred Exams, Make-Up Exams, and Retakes

In general, students cannot apply for deferred exams unless they meet the relevant requirements set by HNCU. Students applying for a deferred exam must submit a request with valid documentation to their respective college (department) before the exam. The application must be approved by the academic leader in charge of teaching and then approved by the Academic Affairs Office's deputy director before the deferred exam is granted; otherwise, it will be considered an absentee exam. The deferred exam application must be submitted to the course instructor, the Examination and Student Status Management Center, and the student's respective college. (Note: Deferred exams must be handled by the student personally, except in the following circumstances where classmates or teachers may assist: 1. If a student is unable to apply for a deferred exam due to illness, a classmate may help, provided the student submits medical or hospital documentation; 2. In urgent situations where a direct relative has passed away, a classmate may assist in requesting leave. 3. Handled collectively by related faculty of the College.) Students applying for deferred exams should do so, in principle, three days before the exam. In special cases, the application can be submitted within one week after the exam. Deferred exams are not allowed for assessment courses. If a student cannot attend the deferred exam at the regular makeup time due to special reasons, they can apply for deferral again, but this is limited to one instance. The deferred exam grade is composed of both regular grades and exam grades, weighted accordingly, with the teacher entering the regular grades for deferred exam students when recording final exams.

Students who received a failing grade in courses from the previous semester (except for courses with centralized practical teaching components such as course design) may take the makeup exam in the following semester. Makeup exams for courses are based on reserved final exam questions. The Academic Affairs Office, together with relevant secondary colleges, organizes makeup exams, which are scheduled before the start of the next semester. Makeup exam grades are entered into the grading system based on the actual exam scores.

For courses not passed in the makeup exam, students must apply and pay the fee to retake the course within the specified time, with no limit on the number of retakes. In principle, a student may retake no more than six courses in one semester (not including labs, practicals, internships, or course design). Course retakes are generally completed in the corresponding semester of the next academic year and require participation in course assessments. There are two types of retakes: retake classes or retaking with a regular class. Retake classes follow standard attendance and assessment policies, with grades comprising final and regular performance scores. Students permitted to retake courses due to failing grades receive credit upon passing the retake exam, with scores recorded and marked "retake," detailed in **Appendix C-1**.

5. Resources

5.1 Faculty

5.1.1 Faculty Composition

1. Civil Engineering

The Civil Engineering major boasts a teaching team with a balanced age and academic background, high comprehensive quality, and deep academic expertise. The Civil Engineering major has 82 full-time faculty members, including 15 professors, 37 associate professors/senior engineers, and 30 lecturers/experimental teachers, with 51.2% being younger than 45. The faculty includes 49 with doctoral degrees, and 96.3% possess a master’s degree or higher. The department includes one expert receiving a special allowance from the State Council, one second-tier participant in Hunan Province's New Century 121 Talent Program, one Hunan Province Science and Technology Innovation Talent (Hejian), one academic leader in Hunan Province ordinary colleges, five young backbone teachers in Hunan Province, and 20 master's supervisors. The academic structure covers fields such as road engineering, bridge engineering, construction engineering, urban rail engineering, underground engineering, and geotechnical engineering, meeting the needs of the civil engineering course instruction. Faculty resumes for the Civil Engineering major are provided in **Appendix D-1**.

2. Water Supply and Drainage Science and Engineering

The Water Supply and Drainage Science and Engineering major has established a team of teachers with high academic levels, diverse academic backgrounds, and a reasonable age structure. The department consists of 21 full-time teachers, including 6

professors, 7 associate professors, and 8 lecturers, with young teachers under the age of 45 making up 61.90% of the faculty. Among them, 10 hold doctoral degrees, and 8 have master's degrees, with 85.71% of the faculty holding a master's degree or higher. There are 5 master's student advisors, one person selected for Hunan Province's 121 Innovative Talent Project, one leading scholar of Hunan universities, two young backbone teachers from Hunan universities, and one skilled young teacher from Hunan Province. Teachers proficient in both professional and technical skills account for 85.71% of the faculty. The academic structure of the faculty covers fields such as water supply and drainage, environmental engineering, municipal engineering, and smart water services, encompassing areas such as water treatment system design, comprehensive water environment treatment, water resource utilization and management, and technical operations, fulfilling the teaching needs of the Water Supply and Drainage Science and Engineering major. See **Appendix D-1** for the professional teachers' resume.

5.1.2 Faculty Teaching and Research Development

1. Civil Engineering

The Civil Engineering major offers more than 80 specialized courses. In recent years, the Civil Engineering major has actively promoted teaching reform and course development: four provincial and ministerial-level teaching achievement awards were obtained, eight courses were approved as top-tier undergraduate courses in Hunan Province, more than 100 teaching and research reform papers were published, and eight professional textbooks were published (see **Appendix D-3**).

Over the past five years, Civil Engineering faculty have completed 67 research projects, including 11 provincial and above-level research projects (5 National Natural Science Foundation projects, 32 Hunan Provincial Natural Science Foundation projects), and 30 enterprise cooperation projects, with a total research funding of nearly 13.8 million RMB. More than 120 core journal research papers have been published, including over 100 indexed by SCI and EI, 39 invention patents granted, and 4 science and technology achievement awards. Some of the research papers, national and provincial-level research projects, and science and technology achievements are listed in **Appendix D-4**.

2. Water Supply and Drainage Science and Engineering

The Water Supply and Drainage Science and Engineering major offers more than 30 specialized courses, not only for undergraduates in this major but also for those studying in related fields such as Civil Engineering, Environmental Engineering, and Building Environment and Energy Application Engineering. In recent years, this program has undertaken 19 educational reform and curriculum development projects, including 12

teaching reform projects funded by the Hunan Provincial Department of Education, resulting in the establishment of five university-level quality courses. It has received five provincial teaching awards, published over 40 educational papers, and authored nine textbooks and monographs. Details on provincial and ministerial-level course development projects, university-level and higher quality courses, excellent teaching awards, and published textbooks and monographs can be found in **Appendix D-**5.

In the past five years, faculty in the Water Supply and Drainage Science and Engineering program have completed 44 research projects, including 39 funded by national and provincial organizations such as the National Natural Science Foundation of China and the Hunan Provincial Natural Science Foundation, as well as 31 corporate collaborative projects. The total research funding amounts to approximately 2.4 million yuan. They have published over 120 papers in core journals, including more than 60 indexed by SCI & EI, and have been granted 26 patents for inventions, winning 10 scientific and technological achievement awards. For a sample of the research outputs, details on national and provincial research projects, and awards for scientific achievements, please see **Appendix D-6**.

5.1.3 Faculty Workload

The standard teaching workload for each professional faculty member is as follows: professors are required to teach 300 hours per year, associate professors 320 hours per year, senior lecturers 320 hours per year, and junior lecturers 300 hours per year. The actual workload requirements may vary slightly depending on the position and academic rank. Deans and Party Secretaries of secondary colleges (who select teaching and research positions) are required to complete no less than 40% of the corresponding academic rank's task hours, while other senior administrative leaders must complete no less than 50% of the corresponding academic rank's task hours. Part-time department heads, office directors, laboratory directors, directors of teaching and research offices, Party branch secretaries of faculty branches, and part-time deputy secretaries of the university's Youth League Committee must complete no less than 65% of the corresponding academic rank's task hours. Part-time deputy department heads and deputy Party branch secretaries must complete no less than 80% of the corresponding academic rank's task hours. In addition, if a full-time teacher completes 60% of the required teaching workload in a given year but fails to meet the required task hours, research credits can be used to offset the teaching task hours. 1 research credit equals 10 teaching hours. If the teaching task hours fall below 60%, research credits cannot be used to offset the teaching workload. The calculation method for workload is outlined in the *Calculation and Management Measures for Undergraduate Teaching Workload of*

Hunan City University (**Appendix D-7**). In the teaching workload completed by professional teachers, theoretical teaching hours should account for 30% of the required task hours. In addition to necessary theoretical teaching, each teacher must provide adequate guidance for students, including homework grading and practical guidance. These measures ensure that every student in the program receives sufficient guidance on courses and extracurricular assignments, helping students meet the curriculum requirements, acquire the necessary competencies for the program, and achieve the educational goals outlined in the training plan.

To cultivate students' international communication skills, the program has equipped faculty members who can teach in English and offers several English-language practice courses to create a favorable environment for professional English learning and communication.

5.2 Faculty Development

5.2.1 Relevant Training

HNCU has established a Faculty Development Center. The main responsibilities of the center include: strengthening and improving the ideological and political work for faculty, enhancing teacher ethics and teaching styles, organizing faculty training, guiding faculty career development, conducting teaching competitions and seminars, and addressing faculty mental health education issues. The organization is affiliated with the Personnel Office and has an administrative office under its structure. The purpose is to provide services for enhancing teaching competence through teacher training, teaching exchanges, teaching evaluation, teaching research, and teaching consultation, as well as conducting teaching quality assessments and diagnostics, advancing teaching reform and innovation, and continuously improving teaching quality. Currently, various forms of teaching training, teaching forums, and teaching demonstration observation activities have been organized. Additionally, several internal and external education and teaching experts, as well as renowned teachers, have been invited to give lectures.

(1) Pre-job Training for New Teachers: In compliance with relevant Hunan Province and university regulations, all newly hired individuals engaged in education and teaching work, including full-time faculty, counselors, experimental technical staff, other professional technical positions, administrative staff, and personnel transitioning from non-teaching to teaching roles, are required to participate in the pre-job training organized by HNCU. Pre-job training consists of two parts:

The first part includes 136 total hours of course training, covering 24 hours for Professional Ethics and Self-Cultivation for University Teachers, 36 hours for Higher

Education Studies, 32 hours for Higher Education Psychology, 15 hours for An Overview of Laws and Regulations for Higher Education, and 29 hours for Teaching Skills for University Faculty.

The second part is school-based training. Newly hired teachers undergo education in areas such as moral and professional integrity, university culture and history, rules and regulations, as well as teaching skills. Each participating teacher is assigned a mentor with exemplary professional ethics, extensive teaching experience, and a title of associate professor or higher by their respective department. This mentor provides guidance for the comprehensive assessment of the course *Teaching Skills for University Faculty*. After completing the pre-job training, new teachers must obtain a qualification for university faculty in order to meet the basic eligibility requirements for teaching undergraduate courses.

The qualification recognition for teaching courses is organized by the college (or department/center). A team of experts, formed by the College's Professors' Committee and key faculty of relevant courses, reviews and evaluates trial teaching sessions conducted by applicants to determine if they meet the qualification requirements for teaching the course. Instructors identified as "qualified to teach the course" can independently take on the task of delivering the course. Instructors identified as "basically qualified to teach the course" require further improvement in teaching abilities, and the college (or department/center) should assign course mentors. Under the mentorship of these course mentors, they may take on the responsibility of delivering the course.

(2) Mentorship System for Young Faculty: To enhance the development of young faculty members, colleges are required, under the *Implementation Measures for the Mentorship System of Young Teachers in Hunan City University (Revised)* **(see Appendix D-8)**, to assign each newly hired young teacher a mentor with an associate professor or higher title. This leverages the expertise and mentorship of senior teachers to guide, assist, and support the growth of young faculty, aiming to develop their moral and professional integrity, teaching capabilities, and research competencies, ensuring steady improvement in the quality of talent cultivation. Mentors provide guidance and training to mentees in areas such as professional ethics and integrity, teaching research and reform, and scientific research, helping mentees master the principles and methodologies of higher education. The mentorship period generally lasts for two years. After new teachers enter the school, they must quickly familiarize themselves with teaching processes, and acquire and master basic methods and skills for engaging in

teaching and research work under the guidance of a mentor, becoming qualified university-level educators.

The list of mentors for the young teacher mentoring program in the Civil Engineering major and Water Supply and Drainage Science and Engineering major can be found in **Appendix D-9**.

(3) Personal Career Plan for Teachers: To further strengthen faculty team development and enhance HNCU's overall competitiveness, the school has developed and implemented the *Personal Career Plan for Teachers*, clearly defining aspects such as personal research fields and key research directions, research goals (including short-term, medium-term, and long-term targets), further study and social practice plans, teaching plans, and the application for teaching and research projects. Additionally, HNCU has introduced the *Hunan City University Management Measures for Teaching Staff Pursuing Doctoral Degrees while Employed (Trial)*, encouraging young faculty to pursue doctoral degrees while working, further optimizing the faculty structure, reserving a group of young innovative talents with international perspectives and development potential, and encouraging doctoral students to produce high-level research achievements, to promote the high-quality development of HNCU.

(4) Work Experience and Overseas Study:

To further strengthen faculty development, the school seeks to cultivate a high-level teaching staff with "dual professional and technical abilities" and an international perspective to meet the educational and teaching needs of applied universities. It aims to improve the professional skills and comprehensive quality of young teachers by encouraging them to engage in external field training at school-industry-research collaboration units or public companies and high-tech enterprises or to visit and study at well-known domestic and international universities or institutions, typically for a period of 1 year. Many faculty members in this program have technical cooperation projects with enterprises, assisting them in solving practical technical challenges, and some teachers have industry work experience. Each professional teacher in this program has the opportunity to visit and study at renowned universities or institutions domestically and abroad. The College has a set number of teachers each year who can receive support from the Hunan Provincial Department of Education for up to 12 months of training and study. HNCU encourages faculty, especially young teachers, to receive training and study at high-level universities or institutions both domestically and internationally.

The Civil Engineering and Water Supply and Drainage Science and Engineering faculty's industry work experience, part-time work, as well as domestic training and international exchange experiences, can be found in **Appendix D-10**.

5.2.2 Relevant Funding

The Hunan Provincial Department of Science and Technology provides multi-level and various forms of funding support for Hunan City University faculty, including domestic and overseas study visits, industry-academia-research collaborations, and experimental team-building plans, to enhance their professional academic research and teaching capabilities. Specifically, funding support is given for young teachers in Hunan Province to carry out research activities, with funding amounts varying according to the location of the host unit or institution. The school allocates special expenditure from the faculty training budget or from relevant provincial key discipline programs and teaching and research platform funds. For those selected by higher authorities, the school funds tuition and accommodation costs beyond those subsidized by the Ministry of Education and the Department of Education, reimburses monthly round-trip transportation costs within the province, and reimburses transportation costs once per semester for travel outside the province, with total funding not exceeding 10,000 RMB. HNCU dispatches personnel for study visits with a budget of 10,000 RMB per year for in-province expenses (including tuition, accommodation, materials, and transportation) and 15,000 RMB per year for out-of-province expenses (including tuition, accommodation, materials, and transportation).

Hunan City University provides research start-up funding for newly recruited teachers, granting 100,000 to 200,000 RMB per young faculty member with a doctoral degree in this field. Additionally, HNCU has continuously implemented the "351" talent program, with funding support reaching 40,000 to 100,000 RMB per year.

5.3 Institutional Environment, Financial and Material Resources

5.3.1 University Overview

Hunan City University is a full-time regular undergraduate institution sponsored by the People's Government of Hunan Province. HNCU's predecessor was Yiyang District Normal Junior College, founded in 1970 (renamed Yiyang Normal Junior College in 1992), and Yiyang Basic University, founded in 1978 (renamed Hunan Urban Construction Junior College in 1993). In March 2002, it was approved by the Ministry of Education to merge and form Hunan City University from the then Hunan Urban Construction Junior College (a national exemplary junior college) and Yiyang Normal Junior College. HNCU adheres to the educational policies of the Party and the State, upholding the school motto "Integrated Character and Learning, Unity of Knowledge and Practice," and strives to run a university that satisfies the people. In 2012, it was recognized as the second batch of "National Graduates with Typical Employment

Experience" institutions. In 2014, it was approved to establish a National Experimental Teaching Demonstration Center for Civil Engineering, and became a "Ministry of Education Information Technology Construction Pilot Unit." In 2016, it was approved to co-establish a "Confucius Institute" with the University of Cape Coast in Ghana and was approved as a national maker space. In 2018, it became part of the "High-level Application-oriented Colleges" in Hunan Province. In 2020, it advanced to the first batch of undergraduate admission in Hunan Province and was included in the second batch of "Three Comprehensive Education" comprehensive reform pilot units in Hunan Province. In 2021, it was approved by the Ministry of Education as the only new master's degree granting unit in Hunan Province. In 2022, six disciplines were selected as a "Fourteenth Five-Year Plan" application-oriented disciplines in the province, and 33 first-rate undergraduate programs were approved above the provincial level. In 2023, it recruited its first batch of master's students on its own, achieving a historic leap in educational level, with the Modern Industry Institute of Electronic Information being included in the third batch of Modern Industry Institutes in Hunan Province. In 2024, it added 8 new master's degree authorization points, basically achieving full coverage of disciplines, and officially began the construction of a new campus (Xiyuan District).

HNCU currently occupies a campus area of 1415 mu, with a building area of 592,500 square meters. It possesses fixed assets valued at 1.543 billion RMB. The library holds over 2.84 million volumes of printed books and over 2.28 million electronic books. There are 1,475 full-time teachers, with 141 holding senior professional technical titles and 415 possessing doctoral degrees. There are 138 instances of national and provincial-level high-level talents, including members of the Ministry of Education's Undergraduate Teaching Instruction Committee, State Council special allowance experts, and Ministry of Education New Century Excellent Talents. The university has 1 national course teaching team, 42 provincial course teaching teams, and 1 provincial high-level research team. HNCU has 14 secondary colleges and 56 undergraduate programs, primarily focused on engineering, covering various disciplines including science, literature, management, education, arts, economics, law, and agriculture. HNCU enrolls students from 30 provinces, cities, and autonomous regions. It currently has over 25,000 full-time undergraduate students and 12 authorized master's degree programs, with 114 graduate students enrolled.

HNCU has 40 provincial-level and above teaching platforms, including the National-Level Experimental Teaching Demonstration Center for Civil Engineering and the School-Enterprise Cooperative Talent Cultivation Demonstration Base for Electronic Information-related majors. The National-Level Experimental Teaching Demonstration

Center for Civil Engineering was rated as excellent during the Ministry of Education's inspection (2018-2022) and received construction funding support of 100 million yuan. The Electronic Information Modern Industry College, jointly established with Huawei Technologies Co., Ltd., Hunan Create Technology Co., Ltd., and Hunan Aihua Group Co., Ltd., is a modern industry college in Hunan Province. The university has also partnered with the People's Government of Nanxian County to establish Hunan Province's first "Rural Revitalization Planning College." The university collaborates with enterprises such as The 23rd Metallurgical Construction Group Co., Ltd. of Minmetals and Aoshikang Technology Co., Ltd. to carry out "order-based" talent development and has established "Broad Academy" in cooperation with Broad Homes. The university has signed industry-academia-research cooperation agreements and internship base agreements with over 400 companies, including China National Nuclear Corporation, China State Construction Engineering Corporation, and China Railway Group Limited. It operates two university-run enterprises: the Design Institute Research Co., Ltd. and the Civil Engineering Testing Center. The Design Institute Research Co., Ltd. holds 10 Grade A qualifications in fields such as urban and rural planning, architectural engineering, and municipal roads. It is a "National High-Tech Enterprise" with an annual output value exceeding 200 million yuan. Its business scope covers 122 counties (cities, districts) in Hunan Province, with a national presence and expanding into overseas markets such as Africa, Southeast Asia, and Russia. Each year, HNCU-run enterprises accept 1,000 to 2,000 students for internships and practical training, offering real-world projects, making them a crucial platform for HNCU's talent development.

HNCU adheres to an open schooling strategy and has achieved significant results in international collaboration and exchanges. It has established close partnerships with universities in Singapore, Australia, Ghana, New Zealand, Malaysia, the United States, Macau, and other countries and regions. It collaborates with New Zealand's Whitireia Polytechnic in the field of Visual Communication Design and cooperates with the University of Cape Coast in Ghana to host the Confucius Institute, becoming the first institution of its kind in Hunan Province. HNCU has successfully organized two sessions of the China-Africa International Academic Conference on Urban Construction, inviting representatives from over 20 universities in China and Africa, as well as more than 1,000 scholars, government officials, and international students in China, providing a comprehensive platform for deep cooperation between China and African countries. With the active promotion of HNCU, Chinese has officially been incorporated into Ghana's national education system. HNCU successfully became a member of the Ministry of Education's "China-Africa University Alliance Mechanism." Since 2023,

HNCU has vigorously advanced international cooperative education with universities in South America and Central America.

In recent years, HNCU's distinctive educational practices and comprehensive reform experiences have been prominently featured on national and provincial media platforms. For example, The *China Education News* featured an article titled *Driving Fast Development with Major Reforms – The Path of Hunan City University* that highlighted HNCU's experiences in pushing its "Six Breakthroughs and Six Establishments" comprehensive reforms with the goal of building a high-level application-oriented university. At this new historical juncture, HNCU will uphold the great banner of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, adhere to socialist principles in running the school, fulfill its fundamental task of moral education, bravely take responsibility, and dare to make a difference. It aims to cultivate more high-quality application-oriented talents for Chinese-style modernization and contribute to the great rejuvenation of the Chinese nation!

5.3.2 College Overview

1. College of Civil Engineering

The College of Civil Engineering has a deep foundation in education and a long-standing tradition, refining a distinct educational feature. The college currently offers seven undergraduate majors: Civil Engineering (with specializations in Building Engineering, Road and Bridge Engineering, Urban Rail Transit Engineering), Engineering Cost, Urban Underground Space Engineering, Traffic Engineering, Water Conservancy and Hydropower Engineering, Safety Engineering, and Intelligent Construction. It currently has 3,700 full-time undergraduate students and 53 master's students.

The college possesses over 20 national and provincial teaching and research platforms, such as the National Experimental Teaching Demonstration Center for Civil Engineering, the Hunan Provincial Engineering Research Center for Lecithin Concrete Technology Development and Application, the Hunan Provincial Engineering Research Center for Urban Underground Infrastructure Structure Safety and Disaster Prevention, the Hunan Provincial Key Laboratory of Green Building and Intelligent Construction in General Higher Education Institutions, the Hunan Provincial Technological Innovation Team for Key Green Concrete Structure Technology and Applications, the Hunan Provincial Industry-Education Integrated Application-Oriented Talent Training Research Base, the Hunan Provincial Civil Engineering Virtual Simulation Teaching Center, the Hunan Provincial Civil Engineering Innovation Training Center for Undergraduates, the Hunan Provincial Demonstration Base for University-Enterprise Cooperative Talent Training in

Civil Engineering, and the Hunan Provincial BIM Technology Innovation and Entrepreneurship Education Center. The college also holds the Hunan Provincial "Double First-Class" application-oriented discipline in Civil Engineering, the national first-class undergraduate program construction site for Civil Engineering, and the first-class undergraduate program construction sites in Hunan Province for Civil Engineering and Engineering Cost, as well as the Hunan Province's Excellent Teaching Team in Structural Engineering. The master's program in Civil and Water Conservancy began enrolling students in 2023.

The College has a strong faculty with a well-structured team. Currently, it has 189 staff members, including 185 full-time faculty members. Among the full-time faculty, there are 18 professors, 70 associate professors, and 98 with doctoral degrees. 95% of the faculty hold doctoral or master's degrees. The College includes experts who enjoy special allowances from the State Council (1 person), a Hunan Province Science and Technology Innovation Talent (1 person), a second-tier talent from Hunan Province's New Century 121 Talent Project (1 person), a Hunan Province disciplinary leader in higher education (1 person), 11 young key teachers in Hunan Province, and 31 master's degree supervisors. Additionally, 96 faculty members possess dual professional qualifications, including engineering series and various registered industry professional qualifications.

The College boasts strong educational capabilities and excellent facilities. It has specialized laboratories in materials science, mechanics, geotechnical engineering, structural engineering, road engineering, transportation, BIM, water conservancy, and safety. The College owns 28,000 square meters of civil engineering buildings and 5,400 square meters of structural laboratories. It is equipped with advanced experimental instruments and devices such as the GTS dynamic triaxial test system, multi-channel electro-hydraulic servo loading system, 500-ton pressure testing machine, electro-hydraulic pulsating fatigue testing machine, multifunctional vibration testing system, ultrasonic testing instruments, and IDS ground penetrating radar, with a total value of over 30 million RMB.

The College focuses on the forefront of industry academics and aligns its educational approach with new technologies, processes, and business models that meet the quality requirements for new engineering talent. Since 2016, it has been the first among similar universities in Hunan Province to offer courses in BIM technology and prefabricated buildings. In 2018, the College fully launched an engineering education evaluation (accreditation) for the Civil Engineering major and established a new talent development model based on the OBE (Outcome-Based Education) concept. The College emphasizes

the cultivation of students' innovation awareness and capabilities, launching over 30 national and provincial-level student innovation research projects. It has received over 300 awards in national and provincial-level competitions, including first place in the National College Students' Structural Design Competition, first place in the National College Students' Advanced Drafting Technology Modeling and Product Innovation Competition, and top awards in national BIM graduate design competitions.

The College is committed to quality development and distinctive growth. It has built an application-oriented talent training system based on the “1234” framework: One main line (student capability development); Two integrated elements (integrating ideological and political education and innovation/entrepreneurship education throughout the educational process); Three major course modules (basic courses, core professional courses, and capability development courses); Four characteristics (solid foundation, emphasis on application, distinctive features, and high quality). The College insists on connecting high standards with the main battlefield, maintaining strict teaching and learning discipline, advancing ideological course development, and adopting a student-centered approach to talent development. It is dedicated to enhancing educational and teaching quality and improving talent cultivation outcomes. The College advances deep integration of industry-university cooperation and practical-education integration. Relying on university-run enterprises such as HNCU's Planning and Architectural Design Research Institute, Testing Center, and Supervision Company, it strengthens students' professional internships and practical training programs. Order-based talent training is carried out in collaboration with The 23rd Metallurgical Construction Group Co., Ltd. of Minmetals and China Railway Beijing Engineering Bureau, where enterprises deeply participate in education and teaching processes, including formulating talent training plans, teaching syllabi, course design, and textbook compilation. Moreover, scholarship programs covering tuition fees, accommodation, and financial aid are provided to students of these order-based classes. The College adheres to an open educational approach and international cooperative education, establishing over 300 internship and practical training bases in partnership with enterprises such as CSCEC 5 Civil Engineering Co., Ltd., Hunan Construction Engineering Group, China Railway Guangzhou Bureau, and Broad Homes. Furthermore, it collaborates with renowned universities in countries such as the United States and Australia in the field of civil engineering to broaden students' international perspectives, enabling seamless alignment between graduates' employment and employers' needs.

Graduates of the College demonstrate strong comprehensive qualities and high applied capabilities. Employers praise them as "field-ready, retained, applicable, and

capable," highlighting their exceptional competitiveness in the job market. The hard employment rate of graduates in central and state-owned enterprises exceeds 80%, and the year-end employment rate has surpassed 96% for five consecutive years. According to research by authoritative social organizations, within five years post-graduation, the average salary of graduates from Hunan City University ranks third among universities in Hunan Province. Over the past 40 years, the College has trained more than 20,000 graduates in the field of urban construction. They have become the technical backbones and management elites in large enterprises such as China State Construction, China Communications Construction, China Railway, and China National Nuclear Corporation. Outstanding graduates have participated in major national engineering projects, including the Qinshan Nuclear Power Plant, the Hong Kong-Zhuhai-Macao Bridge, and the "Belt and Road" initiative, earning a high reputation in society. The College is acclaimed as the "Cradle of Urban Construction Talent."

2. College of Municipal and Geomatics Engineering

The College of Municipal and Geomatics Engineering at Hunan City University was established in 1984. With a long history, the school is renowned for its distinctive application-oriented focus in urban construction and its deep integration of industry and education. The faculty currently consists of 68 staff members, including 9 professors and 25 senior professionals. Among them, 28 hold doctoral degrees, making up 41.1% of the faculty. The school is home to one provincial discipline leader, six young provincial key teachers, eight national certified practitioners, and one recipient of the provincial Teaching Contribution Award.

The school offers two major clusters in Municipal Engineering and Geomatics and Geo-Informatics, which include five undergraduate majors: Water Supply and Drainage Science and Engineering, Building Environment and Energy Application Engineering, Geomatics Engineering, Geographic Information Science, and Geospatial Information Engineering, with over 1,300 full-time undergraduates currently enrolled. Over the past 30 years, the school has graduated more than 6,000 students who have become pillars in various industries and sectors.

The Water Supply and Drainage Science and Engineering program, part of the Municipal Engineering discipline, originated in 1984 under the name "Water Supply and Drainage Science and Engineering." It is recognized as a "First-Class Program" in Hunan Province, a pilot program for comprehensive reform under the "13th Five-Year Plan," and a provincial characteristic program. The undergraduate program began enrolling students in 2003, and in 2012, it started a joint graduate training program with

Shantou University and Shenyang Jianzhu University. In June 2021, the program was accredited by the Ministry of Housing and Urban-Rural Development.

Our school started enrolling students in the Municipal Engineering research direction of the Civil and Water Resources Engineering master's program in 2023. In 2024, the school's Resources and Environment major was approved as a new master's degree granting point, including three research directions: Land Space Environmental Planning and Management, Environmental Pollution Monitoring Diagnosis and Remediation, and Environmental Ecological Intelligent Sensing and Simulation.

The school hosts several provincial-level research and teaching platforms including the "Hunan Provincial Rural Drinking Water Quality Security Engineering Technology Research Center," "Hunan Provincial Mapping Engineering Virtual Simulation Laboratory," "Hunan Provincial Mapping Engineering Practice Teaching Demonstration Center," "Hunan Provincial Universities Industry-Education-Research Cooperation Demonstration Base," and "Hunan Provincial University Innovation and Entrepreneurship Base," with over 1200 square meters of laboratory space and experimental equipment worth more than 15 million yuan.

The school has seized significant opportunities presented by the national "Belt and Road" initiative, new urbanization construction, and rural revitalization strategy, with specialty construction closely following the pace of urban comprehensive utility tunnels, sponge city construction, and the demands for professional technical personnel driven by big data, rural land rights confirmation, artificial intelligence, and 5G technology. These five specialties are quite rare among similar programs in provincial universities. The school earnestly implements the school's "1234" applied talent training system, focusing on cultivating students' practical abilities. It has led and successfully held four "Hunan Province Geomatics and Mapping Comprehensive Skills Competitions," winning 19 first prizes and three second prizes. There is close cooperation with enterprises, deep integration of industry and education, influential and competitive, offering a broad employment market for students highly praised by employers, with an annual employment rate above 97%. A long-term mechanism for cooperative education, cooperative training, cooperative employment, and win-win cooperation with enterprises is gradually being established.

The school encourages students to apply for graduate studies, providing dedicated study rooms for exam preparation, arranging tutoring for graduate exams, and setting up high-score awards to actively guide students. Over the past five years, the graduate school admission rate has steadily increased to 12.7%, 17.1%, 13.7%, 18.5%, and 19.3%, maintaining a top-three ranking within the university for five consecutive years. The

school is recognized for its excellent teaching and learning culture and high-quality talent training. Students have won multiple awards at national and Hunan province Geomatics and mapping skill competitions, national GIS skill competitions, the national "Challenge Cup" extracurricular academic and technological competition for college students, and the national electronics design competition.

The school's educational focus is on the national strategy of new-type urbanization and rural revitalization. It aligns with the university's goal of becoming a "high-level, application-oriented university with distinctive features." Adhering to the school's motto "Excellence in both character and scholarship, unity of knowledge and action," and the school's motto "Aspire to virtue, pursue practicality and innovation," the school emphasizes a solid foundation. It is committed to improving the quality of talent development, scientific research, social service, and cultural inheritance and innovation, aiming to cultivate more and better engineering talents for society while continuously advancing the construction of a high-level application-oriented college.

5.3.3 Laboratory

To ensure the smooth and efficient operation of undergraduate experimental teaching, the College has developed a comprehensive experimental teaching management system in accordance with HNCU’s regulations. Relevant management documents are detailed in **Appendix D-11**, and the implementation and oversight of the system are organized and supervised by the Director of the Demonstration Center.

(1) Management Structure

The National Experimental Teaching Demonstration Center for Civil Engineering (Hunan City University) was approved for establishment in 2014. It covers an area of 17,694 square meters, with over 9,800 sets of instruments and equipment, with a total value of more than 48 million RMB. HNCU provides guidance on asset and security management of the Demonstration Center through the Laboratory Asset Management Office and the Security Office, while also offering policy support, job evaluation, project approval, and funding for construction. The College is responsible for the allocation and use of the Demonstration Center’s facilities and assets and conducts performance assessments of the center. The Demonstration Center is primarily responsible for the daily management and maintenance of the laboratory and its equipment. The Demonstration Center implements a director responsibility system, where the primary responsibilities of the center’s director include overall coordination and academic guidance, overseeing experimental teaching and construction, as well as laboratory management and internal and external services.

(2) Management Responsibilities

To strengthen the construction and management of the Demonstration Center and improve the quality of experimental teaching and scientific research, the center is managed in a hierarchical manner by HNCU's Party Committee, the Asset Management Office, the Academic Affairs Office, the Dean of the College of Civil Engineering, the Director of the Demonstration Center, and laboratory administrators. The demonstration center has 7 sub-laboratories: the Building Engineering Laboratory, the Structural Engineering Laboratory, the Geotechnical Engineering Laboratory, and the Safety and Traffic Engineering Laboratory, Water Supply and Drainage Engineering Laboratory, Building Environment and Equipment Engineering Laboratory, Surveying and Mapping Practice Teaching Center. Each sub-laboratory has a designated safety management officer and safety administrator. HNCU's Party committee implements macro-level coordinated and unified management planning. All levels of management staff have clear responsibilities to ensure the smooth progress of laboratory teaching, and actively assist teachers and students in completing teaching and research tasks.

(3) Safety Management

The demonstration center, referring to the *Laboratory Environment and Safety Regulations of Hunan City University*, has developed several safety management systems, including the *Interim Measures for Safety Training and Inspection Management of the Civil Engineering National Experimental Teaching Demonstration Center*, *Safety Training and Inspection Management Interim Measures for Civil Engineering National Experimental Teaching Demonstration Center*, and *Safety Water and Electricity Regulations of the Civil Engineering National Experimental Teaching Demonstration Center*. These regulations, along with other safety rules, instrument operation standards, and safety warning signs, are posted in each laboratory to strengthen safety management. Laboratory safety administrators are fully responsible for the safety and sanitation management of the laboratories and supervise the implementation of safety measures. They focus on the four main safety aspects: fire prevention, water prevention, theft prevention, and accident prevention.

Staff members of the demonstration center participate in 1-2 safety training sessions (or safety discussion meetings) annually. These discussions cover safety practices, proper laboratory protocols, personal protective equipment, safety equipment, electrical safety, and emergency evacuation procedures. Before entering the laboratory, students are given safety education and undergo a safety assessment. Laboratory administrators are responsible for the safety and sanitation of the laboratory sections and assist project leaders in preparing experiments, enhancing safety and sanitation management.

The safety management officer and safety administrator of the demonstration center conduct daily safety checks and fill out the *Laboratory Safety Log of Hunan City University*. They organize weekly safety discussions to identify and address any deficiencies, ensuring the safety of the laboratories.

(4) Equipment Management

The demonstration center emphasizes the management of instruments, equipment, and devices. It has developed several policy documents, such as the *Interim Measures for Instrument and Equipment Usage Management of the Civil Engineering National Experimental Teaching Demonstration Center* and the *Laboratory Asset Management System of the Civil Engineering National Experimental Teaching Demonstration Center*, to improve the efficiency of equipment use, extend the lifespan of instruments, reduce material consumption, prevent damage, loss, accumulation, and waste, and ensure the orderly progression of professional laboratory teaching and research. All equipment manuals and technical documents are strictly entered into the equipment inventory upon receipt, with the purchaser and administrator clearly identified in the records. Daily maintenance of equipment is carried out by laboratory administrators. Specialized equipment is managed by individual sub-laboratories, which are responsible for routine repairs, calibration, and accuracy checks. For precise, costly, rare, and critical instruments purchased with funding for key disciplines, detailed records are kept, including the specific purchaser, storage room, and administrator at the time of receipt. Experienced personnel, assigned by the laboratory, manage the specialized equipment, establishing equipment logs and archives.

(5) Equipment Maintenance and Borrowing

The demonstration center has established the *Interim Measures for the Management of Borrowing Experimental Instruments and Equipment of the Civil Engineering National Experimental Teaching Demonstration Center* and the *Management Measures for Longitudinal Scientific Research Experiments of the Civil Engineering Experimental Center*. Experimental instruments and equipment are centrally managed and stored in various experimental sub-laboratories. The dedicated management personnel of each sub-laboratory are responsible for managing and maintaining the instruments and equipment. After usage, each project must submit a lab report or an experimental summary to the laboratory where the instrument is located. Instruments and equipment that are fixed in the laboratory or high-precision non-portable instruments are not to be lent out. When equipment use is needed, inform the relevant laboratory management personnel. Use is allowed after registration in the *Instrument Usage Logbook*, and departure is permitted once the laboratory management personnel confirms no equipment abnormalities and

signs off in the *Instrument Usage Logbook*. Borrowing of instruments and equipment requires step-by-step approval by four people: the dedicated management personnel of the sub-laboratory, the laboratory director, the center office director, and the center director. Before instruments and equipment leave the center, borrowers must check that the borrowed instruments are functioning properly and that all accessories are complete. Upon return, the instruments and equipment must be clean and tidy. If any accessories are missing, the instrument is not working properly, or if any damage has occurred, the borrower must compensate according to the *Hunan City University Instrument and Equipment Compensation Measures*. After using instruments and equipment, each project must submit a lab report or an experimental summary to the laboratory where the instrument is located. Borrowing instruments and equipment requires making an appointment with the relevant laboratory at least one day in advance. It is strictly forbidden for the borrower to lend the borrowed instruments and equipment to others or rent them out. Otherwise, their future borrowing will be restricted, and the primary borrower will be responsible for all consequences incurred during the borrowing period.

(6) Discipline and Professional Development

he demonstration center has 7 sub-laboratories: the Building Engineering Laboratory, the Structural Engineering Laboratory, the Geotechnical Engineering Laboratory, and the Safety and Traffic Engineering Laboratory, Water Supply and Drainage Engineering Laboratory, Building Environment and Equipment Engineering Laboratory, Surveying and Mapping Practice Teaching Center. It supports fundamental experiments for professional students, teacher research experiments, and open experiments both inside and outside the university for 18 disciplines such as Civil Engineering and Water Supply and Drainage Science and Engineering. Annually, it completes over 40 courses and 283,000 student hours of experiments, involving more than 150 experimental projects. Please refer to **Appendix D-12** for the main laboratory introductions.

5.3.4 Discipline Research Platform

1. Civil Engineering

The college possesses over 20 national and provincial teaching and research platforms, such as the National Experimental Teaching Demonstration Center for Civil Engineering, the Hunan Provincial Engineering Research Center for Lecithin Concrete Technology Development and Application, the Hunan Provincial Engineering Research Center for Urban Underground Infrastructure Structure Safety and Disaster Prevention, the Hunan Provincial Key Laboratory of Green Building and Intelligent Construction in General Higher Education Institutions, the Hunan Provincial Technological Innovation Team for Key Green Concrete Structure Technology and Applications, the Hunan Provincial

Industry-Education Integrated Application-Oriented Talent Training Research Base, the Hunan Provincial Civil Engineering Virtual Simulation Teaching Center, the Hunan Provincial Civil Engineering Innovation Training Center for Undergraduates, the Hunan Provincial Demonstration Base for University-Enterprise Cooperative Talent Training in Civil Engineering, and the Hunan Provincial BIM Technology Innovation and Entrepreneurship Education Center. The college also holds the Hunan Provincial "Double First-Class" application-oriented discipline in Civil Engineering, the national first-class undergraduate program construction site for Civil Engineering, and the first-class undergraduate program construction sites in Hunan Province for Civil Engineering and Engineering Cost, as well as the Hunan Province's Excellent Teaching Team in Structural Engineering. The master's program in Civil and Water Conservancy began enrolling students in 2023.

The College advances deep integration of industry-university cooperation and practical-education integration by capitalizing on school-run enterprises such as the Planning and Architectural Design Research Institute, Testing Center, and Supervision Company. It strengthens students' professional internships and practical training programs by cooperating with China State Construction Railway Investment Engineering Group Co., Ltd., and the China Railway Beijing Bureau for order-based talent cultivation. The enterprises deeply participate in the talent training plan, teaching outline, course design, and textbook compilation, and also provide tuition, accommodation, and scholarships for students in their tailored classes. The College adheres to an open educational approach and international cooperative education, establishing over 80 internship and practical training bases with enterprises such as CSCEC 5 Civil Engineering Co., Ltd., Hunan Construction Engineering Group, China Railway Guangzhou Bureau, and Broad Homes, among which Hunan Yiyang Survey and Design Research Institute Co., Ltd. is an outstanding internship base in Hunan Province.

The College of Civil Engineering has a 28,000-square-meter civil building and a 5,400-square-meter structural laboratory, which provide strong support for scientific research for teachers and students. In recent years, students from this program have participated in the following projects or competitions: the National BIM Graduation Design Innovation Competition for Universities, the National College Students' Mechanics Competition, the National College Students' Structural Design Competition, the "Higher Education Cup" National College Students' Advanced Drafting Techniques and Product Information Modeling Innovation Competition, the National College Students' Industrialized Building and Smart Construction Competition, the National

College Students' Structural Design Information Technology Competition, the National Prefabricated Building Vocational Skills Competition, and the National Rebar Application Skills Competition for Architecture Schools, among others. A total of more than 30 national and provincial-level innovative research projects for university students have been established, and over 300 awards have been received in various national and provincial-level competitions, including first place in the National College Students' Structural Design Competition, first place in the National College Students' Advanced Drafting Techniques and Product Innovation Competition, the Grand Prize in the National BIM Graduation Design Competition for Universities, and numerous other awards.

2. Water Supply and Drainage Science and Engineering

School holds the authority to grant master's degrees in Resources and Environmental Sciences, and independently sets three academic directions: Land Space Environmental Planning and Management, Environmental Pollution Monitoring, Diagnosis, and Treatment, and Environmental Ecology Intelligent Perception and Simulation, relying on the discipline of Water Supply and Drainage Science and Engineering. We have developed a disciplinary and master’s student training system centered on the discipline of Geographic Information Science, supported by Remote Sensing Technology, and anchored by Water Supply and Drainage Science and Engineering. This discipline has been recognized as a Hunan Provincial "First-Class Major," a pilot major for comprehensive reform under the "Thirteenth Five-Year Plan," and a provincial characteristic major. Since 2012, we have collaborated with Shantou University and Shenyang Jianzhu University to train master's students and passed the Ministry of Housing and Urban-Rural Development's professional accreditation in June 2021. Our school boasts five provincial-level teaching and research platforms: the Hunan Provincial Rural Drinking Water Quality Security Engineering Technology Research Center, Hunan Provincial Geomatics and Mapping Engineering Virtual Simulation Laboratory, Hunan Provincial Geomatics and Mapping Engineering Practice Teaching Demonstration Center, Hunan Provincial Colleges and Universities Industry-Research-Teaching Cooperation Demonstration Base, and Hunan Provincial Colleges and Universities Innovation and Entrepreneurship Base. We have established fruitful industry-research-teaching collaborations with multiple off-campus internship bases, including Yiyang City Water Company, Yiyang Tuanzhou Wastewater Treatment Plant, Changde City Wastewater Treatment Plant, Panhua Construction Group Co., Ltd., Hunan Provincial Architectural Design Institute Group Co., Ltd., Beijing Municipal Engineering Design & Research Institute Co., Ltd. Hunan Branch, Hunan Sanyu

Construction Engineering Co., Ltd., and Hunan Urban University Design Institute Co., Ltd.

5.3.5 International Exchange and Collaboration Platform

HNCU adheres to an open schooling strategy and has achieved significant results in international collaboration and exchanges. It has established close partnerships with universities in Singapore, Australia, Ghana, New Zealand, Malaysia, the United States, Macau, and other countries and regions. It collaborates with New Zealand's Whitireia Polytechnic in the field of Visual Communication Design and cooperates with the University of Cape Coast in Ghana to host the Confucius Institute, becoming the first institution of its kind in Hunan Province. HNCU has successfully organized two sessions of the China-Africa International Academic Conference on Urban Construction, inviting representatives from over 20 universities in China and Africa, as well as more than 1,000 scholars, government officials, and international students in China, providing a comprehensive platform for deep cooperation between China and African countries. With the active promotion of HNCU, Chinese has officially been incorporated into Ghana's national education system. HNCU successfully became a member of the Ministry of Education's "China-Africa University Alliance Mechanism." Since 2023, HNCU has vigorously advanced international cooperative education with universities in South America and Central America.

In recent years, the College of Civil Engineering has placed great emphasis on implementing the "Internationalized Education" strategy, focusing on global academic frontiers and strengthening international cooperation. The College has established cooperative educational programs with renowned universities in the United States, Australia, and other countries, sending more than 10 faculty members to visit international universities for academic exchanges, and more than 10 students to participate in international exchange programs. The number of students involved in international cooperation and exchange has been increasing year by year. The cultivation of students' international perspectives and innovation abilities has achieved significant results, laying a solid foundation for further international collaboration.

In order to assist students who are not fluent in Chinese to study in the Civil Engineering major, the College will further improve the English speaking abilities of its faculty and offer more bilingual courses. The College strengthens Chinese language training for students applying to study in China, helping them adapt quickly to campus life and the academic environment at Hunan City University.

International cooperation projects and conferences held by the College and this program in recent years can be found in **Appendix D-13**.

5.3.6 Corporate Practice Platform

1. Civil Engineering

The program has more than 100 off-campus internship and practical teaching bases. The main internship and practical teaching bases are listed in **Appendix D-14**, providing excellent opportunities for practical experience. Both the university and the enterprises jointly develop internship teaching outlines, compile internship guides, and establish corresponding support measures according to the talent training goals and curriculum requirements. Each base is equipped with a stable enterprise internship supervisor who works alongside the university instructors to guide and manage the students' internship activities. University supervisors are responsible for clearly outlining the internship content, tasks, schedules, and management regulations to the students. Enterprise supervisors, based on university requirements and enterprise operational realities, ensure the education on safety production, company rules, confidentiality systems, and other necessary topics. These off-campus practice bases meet the needs of civil engineering students for professional internships and graduation internships. The program annually accommodates approximately 300 students, allowing them to receive ample engineering practice and training, improving their ability to handle real-world problems and achieving the teaching goal of enhancing overall competencies.

2. Water Supply and Drainage Science and Engineering

The Water Supply and Drainage Science and Engineering program places high importance on the tri-dimensional development model of industry, academia, and research. In alignment with the specialty's characteristics and adhering to the "Hunan City University Off-campus Internship Teaching Base Construction and Management Measures" and "Hunan City University's Plan to Deepen Collaboration Between School and Local Enterprises," it has established strong cooperative relationships for industry-academia-research purposes. Collaborations include entities such as the Yiyang City Water Company, Tuanzhou Wastewater Treatment Plant in Yiyang, Changde Wastewater Treatment Plant, Panhua Construction Group Co., Ltd., Hunan Architectural Design Institute Group Co., Ltd., Beijing Municipal Engineering Design & Research Institute Co., Ltd. Hunan Branch, Hunan Sanyu Construction Engineering Co., Ltd., and Hunan City University Design Institute Co., Ltd. These collaborations have led to the establishment of multiple undergraduate practice teaching bases, providing students with internship opportunities. During internships, enterprise technical leaders deliver lectures on relevant technological knowledge to meet educational requirements for observational internships, productive internships, graduation internships, and graduation project (comprehensive training), effectively promoting the achievement of the program's

educational objectives. Currently, there are 12 off-campus internship and practice teaching bases for this program (**Appendix D-15**), cooperation agreements or certificates provided in **Appendix D-16.**

5.3.7 Library and Information Resource Platform

The library holds an extensive collection of print and electronic books, journals, and other reference materials. It is managed effectively, highly shared, and meets the learning needs of students as well as the teaching and research needs of faculty members. A sufficient number of computers and a rich information resource platform are available. Students can access the internet and use online resources through computer labs, classrooms, and campus wireless networks. Students can access the needed teaching resources through various channels. By setting explicit requirements for literature retrieval in components such as core course topics, experimental teaching, course designs, and graduation designs, students are encouraged to make full use of the library and online resources for literature searches, problem analysis, and domestic and international research status analysis, supporting the achievement of graduation requirements.

(1) Library Resources

Hunan City University has established a "1+1+13" centralized library system, comprised of Shuyufu Library (Main Building), the Planning and Architecture Branch Library, and 13 secondary college resource rooms. The Shuyufu Library (Main Library) has a building area of 20,200 square meters with 9 floors. The Planning and Architecture Branch Library has a building area of nearly 900 square meters. The library system provides over 2,900 reading seats (including seats in resource rooms of secondary colleges) and more than 60 seats in the electronic reading room. The library implements open-shelf borrowing and is open from Monday to Sunday, 7:00 a.m. to 10:00 p.m., providing 105 hours of service per week. The library is equipped with a lecture hall, conference rooms, and 14 faculty study rooms. It offers wireless internet access within the library and VPN remote access for off-campus users. Based on HNCU’s disciplinary structure of "engineering and technology as the focus, complemented by economics, management, and art design," the library collects a variety of professional literature. Currently, the library holds over 2.845 million copies of Chinese and foreign-language print materials, nearly 400 types of print journals, and close to 9.75 million master’s and doctoral theses.

In recent years, the library has intensified its efforts in building a digital library. Accessible electronic books exceed 4.7 million copies, and there are around 120,000 types of Chinese and foreign-language electronic journals. More than 60 electronic

document databases are available, including Chinese databases such as CNKI, Wanfang Data, DuXiu, and Superstar Journals, as well as foreign databases like ScienceDirect, IEEE, ACS, SciFinder, ASME, SpringerLink, EBSCOHost, Emerald, Ei, PQDD, Web of Science, ESI, JCR, and Incites. Additionally, multimedia databases like Online Lecture Hall (https://wb.bjadks.com/home) and Global English (http://www.englibrary.com/userLogin.htm) are provided. This diversified collection structure has broadened its service channels, effectively ensuring access to academic resources for teaching, research, discipline development, and management throughout the university. To ensure the full utilization of library resources, the library offers the following services: literature borrowing, literature copying, printing, binding, interlibrary loan, document delivery, electronic reading, audio-visual materials, subject navigation, new scientific and technological achievement inspection, thematic search, surrogate document search, literature citation query, and information retrieval training.

In recent years, the school has intensified the construction of the digital library, launching the "Superstar Mobile Library," allowing faculty and students to use library resources anytime, anywhere via mobile phones or iPads, without IP address range restrictions. The download address for the Mobile Library client version is: http://m.5read.com/appdown.html (see Figure 5.1). A detailed introduction to the library can be found in **Appendix D-17**.

The program requires teachers to make full use of computers, networks, and library resources in course teaching. In all phases, including experimental courses, course design, internships, and graduation design, as well as in most professional courses over four years, teachers require students to use reference books and network resources for learning. This mainly includes collecting and filtering relevant literature, browsing reference books, translating foreign literature, and initially formulating experimental plans. Teachers assess students' learning outcomes through submitted assignments and course reports. The Academic Affairs Office and the library provide multiple computer network service stations to accommodate students lacking resources. Teachers can fully utilize the school's library and network resources to promptly obtain global scientific developments, cutting-edge knowledge, and related professional information, thereby improving the quality of teaching and research. The Chinese and foreign language databases in the library are listed in **Appendix D-17**, along with a list of academic journals related to this program in **Appendix D-17**. The lectures offered to students by the library are listed in **Appendix D-17**.

Figure 5.1 Mobile Library Client Version Download Address

The school offers rich and well-managed library resources relevant to this program, with a high degree of sharing. These resources fully meet the learning needs of students and the daily teaching and research needs of faculty, as well as the support conditions required by program accreditation standards.

The school has established relevant management systems and measures for computer, network, and library resources, including the *Hunan City University Library Violation Handling Rules*, *Hunan City University Library Borrowing Rules*, *Hunan City University Campus Card Management Measures*, *Hunan City University Information Office Core Machine Room Rules*, *Hunan City University Network Server Hosting Measures*, *Hunan City University Campus Information and Network Security Management Regulations*, *Hunan City University Website Management and Information Release Regulations*, *Hunan City University Campus Network Email Application and Usage Rules*, *Hunan City University Book Loss, Damage, and Theft Handling Rules*, *Hunan City University Library Security Management Rules*, *Hunan City University Library Fire Safety Management Rules*, *Hunan City University Library Graduate School Study Room Management Rules*, and *Hunan City University Electronic Reading Room*

Management System. The shared usage of computer, network, and library resources includes the following aspects:

1) Establishing a dynamic departmental webpage to enhance service modules, such as adding friendly links and an information-sharing space. The library's WeChat platform sends out nearly 60 posts annually, publishing around 100 articles. Readers' online queries are answered 2-3 times weekly on average, totaling nearly 100 responses annually.

2) An information-sharing space has been established, covering over 1,200 square meters and divided into multimedia, recreational, experiential, and discussion areas. The multimedia area is equipped with computers and ergonomic chairs, the recreational area provides network access and power outlets, the experiential area features computers and high-precision 3D printers, and the tiered step area facilitates experiences with new technologies, lectures, and film screenings. The discussion area includes discussion rooms and semi-open discussion spaces. The information-sharing space functions efficiently.

3) The library has multiple self-service terminals for printing, copying, and scanning, processing nearly 200,000 pages annually (reaching 220,000 pages in 2019), significantly enhancing convenience for faculty and students to retrieve and utilize resources.

4) Modernized management of reading room seat resources is implemented through a seat management system, with nearly 500,000 seat selections made annually via the swipe system.

5) Annual user logins to the Mobile Library APP reach 275,000, with 1.2 million clicks, and 74,000 books downloaded from digital library borrowing machines.

(2) College Library Resources

The College of Civil Engineering is equipped with a first-tier public library reading room located in Room 813 of the Civil Engineering Building (approximately 116m^2), holding 26,600 Chinese books and 3,600 foreign books. Its collection includes content such as cutting-edge information from journals like *China Civil Engineering Journal*, *China Journal of Highway and Transport*, *Journal of Building Engineering*, *Engineering Mechanics*, and *Rock Mechanics*. The resources generally meet the requirements of the program. Books are updated promptly, satisfying students' daily learning needs. The reading room is managed by designated staff from the College and is open long-term. Faculty and students can freely access and read books upon registration. Tables and chairs are provided for on-site reading, but books cannot be borrowed.

(3) Computer Resources

Hunan City University has ample computer resources, with program-related resources primarily housed in the library and the Engineering Training Center computer labs. These computer resources are sufficient to support students' learning, as well as faculty teaching and research needs.

(4) Other Information Resource Platforms

① Campus Network Infrastructure

Multiple measures have been implemented to significantly improve instructional informatization conditions. Projects such as the upgrade of the campus one-card system and the renovation of the academic lecture hall have been completed. Projects like upgrading the academic affairs system, the second phase of multimedia teaching equipment upgrades, and the development of smart classrooms are underway. With the completion of these projects, network infrastructure, teaching equipment, and instructional monitoring conditions have been further enhanced.

② Campus Information Infrastructure

HNCU has established a unified identity authentication platform as part of its smart campus development initiative. Realized data resource sharing and exchange application services, enabling public data sharing across five departments: Human Resources, Scientific Research, Academic Affairs, Student Affairs, and Graduate School. The system provides comprehensive information services for students and faculty, including student affairs, academic affairs, financial services, library services, campus cards, and daily life. It also offers a unified user management platform and identity authentication services for various network services and application systems within the smart campus.

③ Campus One-Card System

Faculty and students use the campus one-card system, primarily for dining in the cafeteria, borrowing books on campus, attendance tracking, meeting sign-ins, access control, and on-campus medical services. The card functions as a substitute for work ID cards, student ID cards, and library cards, making it an indispensable tool for both students and faculty in their academic and work-related activities on campus.

④ Hunan City University Course Center

A course management center has been established to oversee the digitalized course teaching across the university. Using intelligent teaching platforms such as "Learning Pass," "Rain Classroom," and "Smart Tree," the university offers live-streamed and blended courses, providing full-process teaching assistance before, during, and after classes. Relying on the Superstar Pan-Yah Platform, 884 SPOC courses have been developed, and 469 courses have been accumulated using Rain Classroom. Additionally,

18 online open courses have been established through Smart Tree and XuetangX, with 6 of them operating on the National Smart Education Platform. The “Golden Course Plan” has been implemented, with 238 university-level "Golden Courses" established. Faculty members have created over 600,000 digital teaching resources, including electronic lesson plans, PPT presentations, and instructional videos on key topics. An online course management platform at the university level has been established, with more than 180 university-level and above courses launched online. In collaboration with Wisdom Tree and Sunflower Company, the university has built two on-campus teaching resource centers, providing on-demand support for digital teaching.

⑤ Teaching Management Information System

HNCU has established a Teaching Management Information System, which serves as the main platform for implementing teaching management and ensuring the smooth operation of teaching activities. This system is responsible for resource allocation, faculty scheduling, and full-process academic records for students.

This system comes with various personalized features that cover all aspects of teaching management, meeting both HNCU's teaching management needs and the daily operational requirements. The platform is powerful and easy to use, making it the primary tool for managing teaching activities. Through this platform, students can select courses, evaluate teaching quality, and check course evaluation results. Through this platform, faculty can publish teaching calendars, access student information, and manage exam grades.

⑥ Graduation Design Management Platform

The College has established a management system for undergraduate graduation thesis and design, known as the Bachelor's Thesis Management Information Platform. Faculty can publish thesis topics through this platform, and students can freely choose topics of interest. This system monitors the quality of graduation theses, ensuring full-process management from topic selection to mid-term checks and defenses.

⑦ Barrier-Free Facilities

All offices, laboratories, lecture halls, and libraries on campus are fully covered by wireless networks. Computers in the computing center are updated annually according to actual needs to meet development requirements. Network and virtual reality technology facilitate the remote operation of high-end computer-assisted devices. All newly constructed laboratories, classrooms, office buildings, etc., are equipped with accessibility features to ensure smooth access for students with disabilities to teaching facilities.

In summary, to meet the needs of educational informatization, HNCU has comprehensively built a secure, efficient, scalable, and open information infrastructure on campus. Wireless network coverage is fully extended across public areas, and network-based administrative office operations, teaching informatization management, and resource sharing functions are in place. These efforts meet the learning needs of students, the teaching requirements of faculty, and the research needs of the academic staff.

5.3.8 Teaching and Office Facilities

This program's main teaching venues consist of three types: HNCU's teaching buildings, the engineering training center, and the College of Civil Engineering's practice (laboratory) center.

The total area of classroom spaces is 96,700 m² (518 classrooms); laboratory and internship areas cover 85,500 m²; sports facilities span 66,500 m², including one sports training hall, two standard athletics tracks, two standard soccer fields, 24 basketball courts, six tennis courts, and six gymnastics equipment areas. The arts venue area is 23,200 m². The construction of the Industry-Education Integration Building, Sports Teaching Center, and other facilities has begun, adding a total of 67,400 m² of new construction area. HNCU has also acquired 1,100 acres of land on the west side for future development.

As of October 2024, HNCU has successfully built 96 high-quality recording studios, smart classrooms, observation rooms, and micro-lesson classrooms. Additionally, 281 classrooms are equipped with high-definition cameras with audio pickup. One intelligent teaching monitoring platform, one intelligent classroom patrol platform, and an intelligent teaching monitoring center have been established to enable real-time monitoring and online listening/viewing of classroom sessions.

The College of Civil Engineering has 58 specialized laboratories designed to meet teaching needs, external communication and collaboration, and faculty requirements for public and office spaces. Additionally, the College is equipped with several medium- and small-sized meeting rooms for hosting visiting scholar seminars and academic presentations. The industrial design program's laboratory is available for students to engage in independent academic research and experimental studies.

5.3.9 Accessibility Features

All offices, teaching areas, laboratories, lecture halls, and libraries on campus are fully covered by wireless networks. Computers in the computing center are updated annually according to actual needs to meet development requirements. Network and virtual reality technology facilitate the remote operation of high-end computer-assisted devices.

All newly constructed laboratories, classrooms, office buildings, etc., are equipped with accessibility features, ensuring students with disabilities can easily access these teaching facilities.

In summary, to meet the needs of educational informatization, HNCU has comprehensively built a secure, efficient, scalable, and open information infrastructure on campus. Wireless network coverage is fully extended across public areas, and network-based administrative office operations, teaching informatization management, resource sharing, and accessibility features have been implemented, meeting the learning needs of students, the teaching needs of faculty, and the research needs of academic staff.

5.3.10 Other External Collaborations

HNCU has fully implemented strategic cooperation with the government and large enterprises. The Electronic Information Modern Industry College, jointly established with Huawei Technologies Co., Ltd., Hunan Create Technology Co., Ltd., and Hunan Aihua Group Co., Ltd., is a modern industry college in Hunan Province. HNCU has also partnered with the People's Government of Nanxian County to establish Hunan Province's first "Rural Revitalization Planning College." The university collaborates with enterprises such as The 23rd Metallurgical Construction Group Co., Ltd. of Minmetals and Aoshikang Technology Co., Ltd. to carry out "order-based" talent development and has established "Broad Academy" in cooperation with Broad Homes. The university has signed industry-academia-research cooperation agreements and internship base agreements with over 400 companies, including China National Nuclear Corporation, China State Construction Engineering Corporation, and China Railway Group Limited. It operates two university-run enterprises: the Design Institute Research Co., Ltd. and the Civil Engineering Testing Center. The Design Institute Research Co., Ltd. holds 10 Grade A qualifications in fields such as urban and rural planning, architectural engineering, and municipal roads. It is a "National High-Tech Enterprise" with an annual output value exceeding 200 million yuan. Its business scope covers 122 counties (cities, districts) in Hunan Province, with a national presence and expanding into overseas markets such as Africa, Southeast Asia, and Russia. Each year, HNCU-run enterprises accept 1,000 to 2,000 students for internships and practical training, offering real-world projects, making them a crucial platform for HNCU’s talent development.

The Civil Engineering major supports the national "dual carbon" strategy, continuously optimizing its discipline direction and strengthening school-enterprise cooperation and exchange. The College deeply promotes school-enterprise cooperation and industry-education integration, relying on university-run enterprises such as the Planning and Architectural Design Research Institute, Testing Center, and Supervision

Company. It enhances students' professional internships and practical training, collaborates with The 23rd Metallurgical Construction Group Co., Ltd. of Minmetals and China Railway Beijing Bureau for order-based talent development. Enterprises actively participate in talent development plans, teaching syllabi, course design, and textbook writing. They also provide tuition, accommodation, and financial aid for order-based class students. The College adheres to an open-door educational philosophy and international cooperation by establishing over 80 internship and training bases in collaboration with companies such as CSCEC 5 Civil Engineering Co., Ltd., Hunan Construction Engineering Group, China Railway Guangzhou Bureau, and Broad Homes. The College engages in in-depth exchanges and discussions with cooperative enterprises in areas such as faculty development, talent cultivation, school-enterprise cooperation, and industry-education integration, achieving joint talent development, resource sharing, and promoting effective connections between the education chain and the industrial chain.

The Department of Water Supply and Drainage Science and Engineering actively serves national strategic needs and the beautiful blueprint of Hunan's "Three Highs and Four News," aligning with industry and sectors, strengthening the internal development of the discipline, and focusing on building a stronger presence in smart water management and water environment fields. In June 2021, the Department of Water Supply and Drainage Science and Engineering passed the professional accreditation by the Ministry of Housing and Urban-Rural Development. At the same time, the department continuously optimizes its disciplinary direction, strengthens school-enterprise cooperation and exchanges, and engages in in-depth discussions with partner companies on faculty development, talent cultivation, school-enterprise cooperation, and integration of industry and education. This collaboration achieves joint talent cultivation, resource sharing, and promotes the effective connection of the education and industrial chains. By partnering with smart water management companies and closely cooperating with leading enterprises in the Yiyang industry, the department addresses local economic development needs. Some graduates have become technical backbones in county- and city-level water supply and drainage companies. Wang Xiaoyu, a 2014 graduate of the Department of Water Supply and Drainage Science and Engineering, was featured in a long report on CCTV4 for his involvement in the construction of the Mombasa-Nairobi railway in Kenya under the China Belt and Road Initiative.

5.3.11 Teaching Investment in the Last Five Years

The Civil Engineering major has adequate teaching funds, allocated for basic undergraduate teaching operations, teaching construction, student innovation practice

activities, and teaching reform project funding, with an annual increase in the teaching budget to ensure the normal conduct of teaching activities. Over the past five years, the program has invested over 5 million yuan in teaching funds, with 10.7 million yuan spent on laboratory construction. Detailed information on the program's teaching expenditure in the last five years can be found in **Appendix D-18**.

The teaching funds for the major of Water Supply and Drainage Science and Engineering are sufficient and guaranteed. The funding for undergraduate teaching basic business expenses, teaching construction, students' innovative practice activities, and teaching reform projects has increased year by year, and there are sufficient teaching funds to ensure normal teaching activities. In the past five years, professional teaching funds have been invested 7.6602 million yuan, laboratory construction has been invested 5.023 million yuan, daily teaching and curriculum construction have been invested 336,500 yuan, and college students' innovation projects and subject competitions have been invested 990,300 yuan. Detailed information on the program's teaching funding investments and expenditures in the past five years is provided in **Appendix D-19**.

6 Quality Assurance Measures

6.1 Quality Assurance and Further Development

6.1.1 Internal Teaching Quality Evaluation

Each semester, under the unified arrangement of HNCU’s Academic Affairs Office, each college and program will implement routine teaching inspections. The teaching inspections include the following areas: classroom theory teaching, practical teaching, and graduation design. Specific content to be evaluated includes textbooks, teaching plans, teaching style, learning atmosphere, exam papers, teaching process, teaching materials, and student feedback on course objectives. Student-centered, identifying and addressing potential issues in teaching and student learning processes. Taking the exam paper check as an example, at the end of each semester, each secondary college conducts a comprehensive analysis from three aspects: exam scores, paper analysis, and improvement measures, combined with the results of student surveys. This leads to proposed improvement actions and suggestions for teachers to enhance teaching quality. The Academic Affairs Office also conducts random checks on the exam papers for the semester and provides comprehensive improvement recommendations.

Additionally, the Civil Engineering and Water Supply and Drainage Science and Engineering majors have established a complete system for process quality management

and assurance, starting from course objectives, to graduation requirements, and finally to cultivation goals. The first aspect is quality monitoring and continuous improvement of course teaching. In this process, before the course begins, the College Teaching Advisory Committee reviews the syllabus; during the course, the teacher conducts formative assessments of the process; after the course, evaluations or surveys are conducted by supervisors, peers, and students. The second aspect is a survey on graduation requirements conducted for graduating students, used to continuously improve the curriculum system. The third aspect involves field visits to alumni and employers to conduct comprehensive surveys on cultivation goals, which help improve graduation requirements and the curriculum system. The fourth aspect combines feedback from graduation requirements and cultivation goals, and based on the characteristics of the course system and individual courses, continuous improvements are made regarding issues such as laboratories and faculty. The process is shown in Figure 6.1, and detailed system documents are provided in **Appendix E-1**.

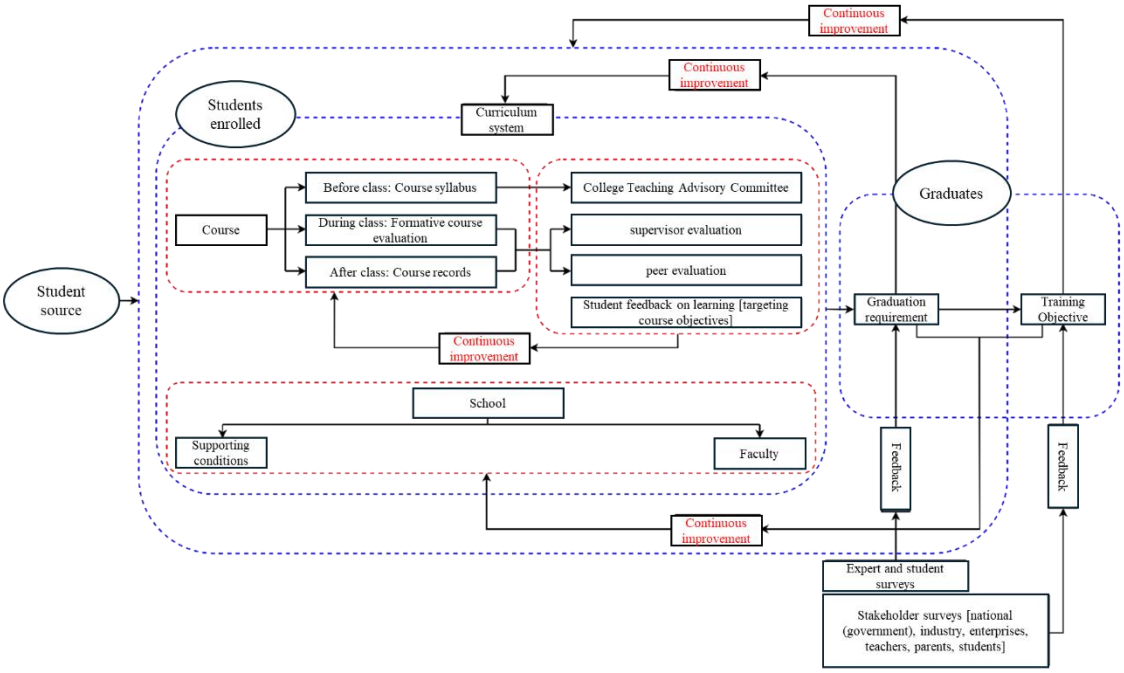

Figure 6.1 Quality Monitoring and Continuous Improvement Process Diagram

6.1.2 External Teaching Quality Evaluation

HNCU uses a feedback system from employers to gather their opinions. Each academic year, the program's teaching and research office uses opportunities such as student internships and graduation practice to visit companies and gather feedback from employers regarding interns and graduates. Each academic year, the teaching and research office conducts a comprehensive survey targeting graduating students, gathering feedback on their semester performance and learning expectations over the past four years. Approximately every two years, the teaching and research office

organizes faculty visits to production enterprises and other universities to collect their opinions and suggestions, taking advantage of the revision of the talent development program. The information is summarized and used to improve the program's talent development plan and specific course offerings. Additionally, HNCU has introduced external supervision. For instance, HNCU participates in the undergraduate teaching evaluation for higher education institutions initiated by the Ministry of Education of China, forming a teaching quality evaluation mechanism that combines internal evaluation with external evaluation, involving the Ministry of Education's governing body, employers, faculty, and students. Here, we define the roles of the Ministry of Education and employers as external evaluation, while the authority of teachers and students, as well as HNCU itself, are defined as internal evaluation. Based on practical results, we consider this evaluation method effective.

6.2 Tools, Methods, and Data

6.2.1 Student Enrollment and Graduation Rate

According to the regulations of Hunan City University, the normal study period for students is 4 years, with a maximum of 6 years. Students who do not graduate within 6 years will receive a certificate of attendance or be withdrawn from the university.

The start and end dates of the spring and fall semesters are generally the same each year, so the annual schedule is fixed. Table 6-1 lists the student enrollment and graduation numbers for the Civil Engineering major from 2020 to 2024, as well as the career destinations of its graduates. Table 6-2 provides detailed information on the initial graduation rate/cumulative graduation rate rate for 2022.

Table 6-1 Statistics on Graduate Career Destinations

Civil Engineering					
Last 5 years	Class of 2020	Class of 2021	Class of 2022	Class of 2023	Class of 2024
Number of Students	336	329	366	380	307
Number of Graduates	318	308	335	361	289
Percentage of Graduates	94.64%	93.61%	91.53%	95%	94.13%
Employment Rate of Graduates	96.13%	95.44%	97.82%	99.47%	91.80%
Percentage of Graduates Continuing Education in China	8.30%	10.64%	12.54%	13.42%	18.62%
Percentage of Graduates Going Abroad for Further Education	0.60%	0	0.54%	0	1.38%
Percentage of Unemployed	3.87%	4.56%	2.18%	0.53%	8.20%

Graduates					
Water Supply and Drainage Science and Engineering					
Last 5 years	2020	2021	2022	2023	2024
Number of Students	96	80	88	75	88
Number of Graduates	96	79	87	74	79
Percentage of Graduates	100%	98.75%	98.86%	98.66%	89.77%
Employment Rate of Graduates	94.7%	96.2%	94.3%	96%	98.9%
Percentage of Graduates Continuing Education in China	12.6%	28.7%	19.3%	33.3%	19.1%
Percentage of Graduates Going Abroad for Further Education	0%	1.25%	0%	0%	0%
Percentage of Other Graduates	5.26%	3.75%	5.68%	4%	1.12%

Table 6-2 Initial Graduation Rate/Cumulative Graduation Rate /Cumulative Degree Acquisition Rate for 2022-2024

Civil Engineering			
Last 3 years	Class of 2022	Class of 2023	Class of 2024
Number of Students	366	380	307
Number of Initial Graduates	316	345	273
Cumulative Number of Graduates	335	361	289
Initial Graduation Rate	86.34%	90.79%	88.92%
Cumulative Graduation Rate	91.53%	95%	94.13%
Water Supply and Drainage Science and Engineering			
Last 3 years	Class of 2022	Class of 2023	Class of 2024
Number of Students	88	75	88
Number of Initial Graduates	85	74	79
Initial Graduation Rate	86	74	83
Initial Graduation Rate	96.59%	98.67%	89.77%
Cumulative Graduation Rate	97.73%	98.67%	94.32%

*Note: The initial graduation rate reflects the graduation acquisition rates for students within the 4-year study period, while the cumulative graduation rate reflects the rates for students within the 6-year study period.

6.2.2 Student Evaluation

1. Civil Engineering

Each student must complete 232 ECTS (major credits) to graduate. The courses that students fail will be recorded. For students who fail, the school will offer a chance for retake. If they fail the retake, the school will provide an opportunity to retake the course. Students who do not complete 232 ECTS (major credits) will not be awarded a degree. A sample student transcript of Civil Engineering can be found in **Appendix E-2**. For disabled students who face learning challenges, our school has established facilities such as barrier-free restrooms and ramps to create an environment suitable for these students, providing conveniences for their learning and living.

2. Water Supply and Drainage Science and Engineering

Each student must earn 230 ECTS credits in order to graduate. Any courses that students fail will be recorded. For students who fail exams, the university offers opportunities for re-examinations or course retakes, as detailed in **Appendix C-1.** Students who do not complete the required 230 ECTS credits will not be awarded a degree. A sample of the student transcript of Water Supply and Drainage Science and Engineering is provided in **Appendix E-3.** For students with disabilities who face learning difficulties, the university has established accessible facilities such as disabled-friendly restrooms and ramps to provide a conducive learning environment and convenience for them.

6.2.3 Examination Evaluation and Continuous Statistics

After each course exam, teachers are required to submit students' exam results and conduct an analysis of the course teaching. Based on the analysis results, they should provide feasible suggestions for continuous improvement to enhance teaching quality and student learning outcomes. If a student does not pass the course exam, a dedicated professional teacher will be arranged to tutor the student to help them pass the retake. If the retake is also unsuccessful, the student will retake the course with the next cohort. Table 6-3 shows the pass rates for the core courses with an "Application Ability Objective" in the Civil Engineering major in 2023. Table 6-4 shows the examination pass rates for 9 core courses in the 2024 graduating class of the Water Supply and Drainage Science and Engineering Program

Table 6-3 Pass Rates for Core Courses with "Application Objective" in Civil Engineering major, 2023

Serial Number	Ability Domain	Course Code	Course Name	Credits	Contact Hours	Type	Exam Pass Rate
1	Engineering Application	9031113011	Engineering Project Management	1.0	16	Examination	94.3%
2	Engineering	9031113031	Construction Principles and Methods	3.5	56	Examination	85.7%

	Application							
3	Engineering Application	9031112021	Engineering Structure Load and Reliability Theory		1.5	24	Examination	98.6%
4	Engineering Application	9032113041	Road and Bridge	Bridge and Culvert Hydrology	1.5	24	Examination	92.3%
5	Engineering Application	9032113021		Road Survey and Design	2.5	40	Examination	98.7%
6	Engineering Application	9032113031		Subgrade and Pavement Engineering	3.0	48	Examination	96.8%
7	Engineering Application	9032113051		Bridge Engineering	6.0	96	Examination	92.1%
8	Engineering Application	9032113081		Road and Bridge Engineering Construction Technology	2	32	Examination	100%
9	Engineering Application	9032113091		Road and Bridge Engineering Budgeting	1.5	24	Examination Review	99.5%
10	Engineering Application	9031113051	Construction Engineering	High-rise Building Structures	2.0	32	Examination	91.3%
11	Engineering Application	9031113071		Steel Structure Design	3.0	48	Examination	82.8%
12	Engineering Application	9031113091		Concrete Structure Design	3.5	56	Examination	82.6%
13	Engineering Application	9031114100		Prefabricated Buildings	1.5	24	Examination Review	100%
14	Engineering Application	9035113041		Building Engineering Budgeting	1.5	24	Examination	99.5%
15	Engineering Application	9031113051		Building Engineering Construction	2.0	32	Examination	98.5%
16	Engineering Application	9033113011	Urban Rail Transit	Urban Rail Transit Network Planning and Route Design	3	48	Examination	96.7%
17	Engineering Application	9033113021		Track Engineering	2	32	Examination	94.3%
18	Engineering Application	9036113061		Tunnel and Underground Engineering	2.5	40	Examination	88.6%
19	Engineering Application	9033113041		Urban Rail Transit Stations	2	32	Examination	96.3%
20	Engineering Application	9033113061		Urban Rail Transit Engineering Budgeting	1.5	24	Examination	98.6%
21	Engineering Application	9033113071		Road and Railway Engineering Construction Technology	2	32	Examination	100%

Table 6-4 Examination Pass Rates for 9 Core Courses in the 2024 Graduating Class of the Water Supply and Drainage Science and Engineering Program

Serial Number	Competency Area	Course Code	Course Name	Credits	Class Hours	Type	Examination Pass Rate
1	Engineering Fundamentals	9021113431	Water Resource Utilization	2	32	Examination	95.7%

			and Protection				
2	Engineering Fundamentals	9021113081	Water Supply and Drainage Network System (1)	2	32	Examination	79.2%
3	Engineering Fundamentals	9021113091	Water Supply and Drainage Network System (2)	2	32	Examination	89.4%
4	Engineering Fundamentals	9021113101	Building Water Supply and Drainage Engineering	3	48	Examination	86.2%
5	Engineering Fundamentals	9021113111	Water Quality Engineering (1)	2.5	40	Examination	91.9%
6	Engineering Fundamentals	9021113441	Water Quality Engineering (2)	3	48	Examination	92.8%
7	Engineering Fundamentals	9021113450	Water Engineering Construction	2	32	Assessment	96.2%
8	Engineering Applications	9021113460	Water Process Equipment Fundamentals	2	32	Assessment	82.3%
9	Engineering Applications	9021113160	Water Supply and Drainage Engineering Instruments and Control	1.5	24	Assessment	92.4%

6.2.4 Student Evaluation of Teaching Quality

Student evaluation of teaching quality is a key component of the teaching evaluation system. At the end of each term, every student must submit an online "Teacher Teaching Quality Evaluation Form" and "Course Questionnaire Form" in order to view their grades. The teaching suggestions listed in the evaluation forms will be analyzed and used to improve teaching methods. Student evaluations of teaching will also be used to assess teachers' teaching effectiveness and are linked to their job performance. The course target questionnaire reflecting teaching conditions can be found in **Appendix E-4**.

7 Quality Assurance and Transparency

7.1 Course Module Description

HNCU provides a comprehensive and efficient personal management system for all functional leaders, faculty members, and students, aiming to facilitate interconnectedness in work scheduling, processing, modification, and information publication. This system offers rich and highly targeted functional modules based on the different user roles. Faculty, students, and college administrators can achieve seamless communication and feedback through the system. This interactive mechanism ensures the effective transmission of opinions among all parties, promoting internal information flow and decision optimization within HNCU.

For faculty, the system not only supports class schedule retrieval and student roster viewing but also allows faculty to enter student grades, manage capstone projects, and possesses practical functions such as class rescheduling. These tools significantly simplify routine teaching management tasks, aiding faculty in focusing more on enhancing education quality. Student users can retrieve their schedules and grades through the system while also participating in the management of their capstone projects. This design not only facilitates students in timely understanding of their academic status but also provides strong support for their academic planning.

Users can effortlessly access the personal management system through the "Portal Entry" in the top navigation bar of the college's official website homepage. The official website interface is shown in Figure 7.1. The portal login interface is shown in Figure 7.2.

Figure 7.1 College Official Website Interface

Figure 7.2 Portal Login Interface

The portal login interface is intuitively designed and user-friendly, setting a benchmark for usability. On the unified identity authentication platform, users need to input accurate account numbers and passwords (where a student account number is their student ID and a faculty account number is their employee ID) and complete SMS verification to ensure account security. Additionally, the system supports a more convenient and secure QR code login option, further enhancing user experience.

For users who may encounter login difficulties, the page provides a "Forgot Password" feature, detailing steps to retrieve account information, ensuring that every user can smoothly resolve access issues. This thoughtful series of designs not only reflects attention to user needs but also demonstrates the college's commitment to providing efficient, secure, and convenient online service.

7.1.1 Faculty Personal Management System

The interface seen by faculty upon successful login is shown in Figure 7.3.

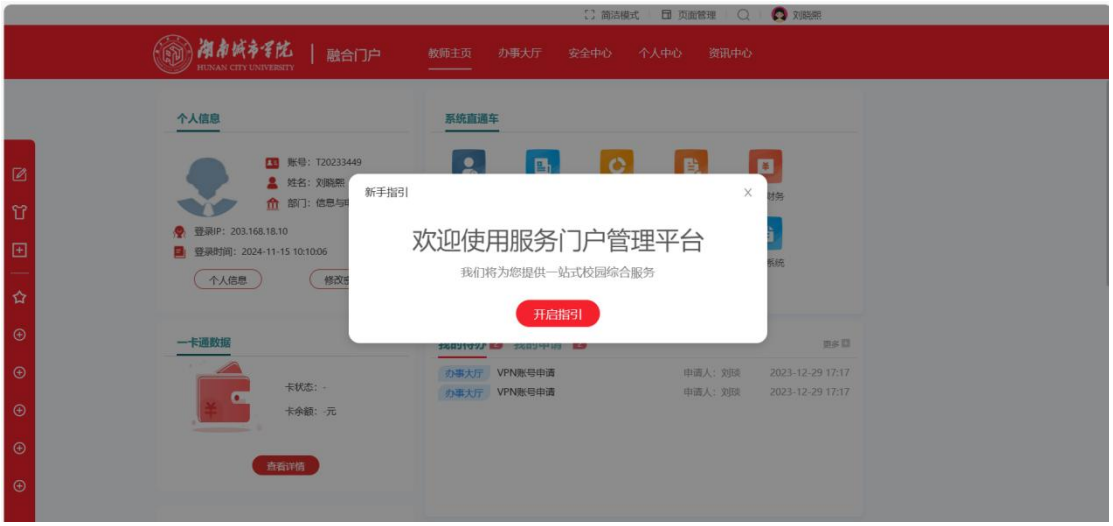

Figure 7.3 New User Guide Interface

The first thing to catch the eye is a meticulously designed new user guide functionality, which undoubtedly greatly benefits first-time users. After completing the new user guide, faculty will enter the main interface as shown in Figure 7.4.

Figure 7.4 Faculty Personal Interface

The "System Express" function in the center of the interface provides quick shortcuts to key modules like the Academic Affairs System and Practical Teaching. Through the Academic Affairs System, faculty can not only retrieve various teaching-related data and information but can also perform a series of operations and management; while in the Practical Teaching module, they can conveniently handle matters related to capstone projects, greatly simplifying workflows, improving work efficiency, and fully demonstrating the college's relentless pursuit of enhancing teaching quality and service level. The Academic Affairs System interface is shown in Figure 7.5. The practical teaching interface is shown in Figure 7.6. The Graduation Comprehensive Training Management System is shown in Figure 7.7.

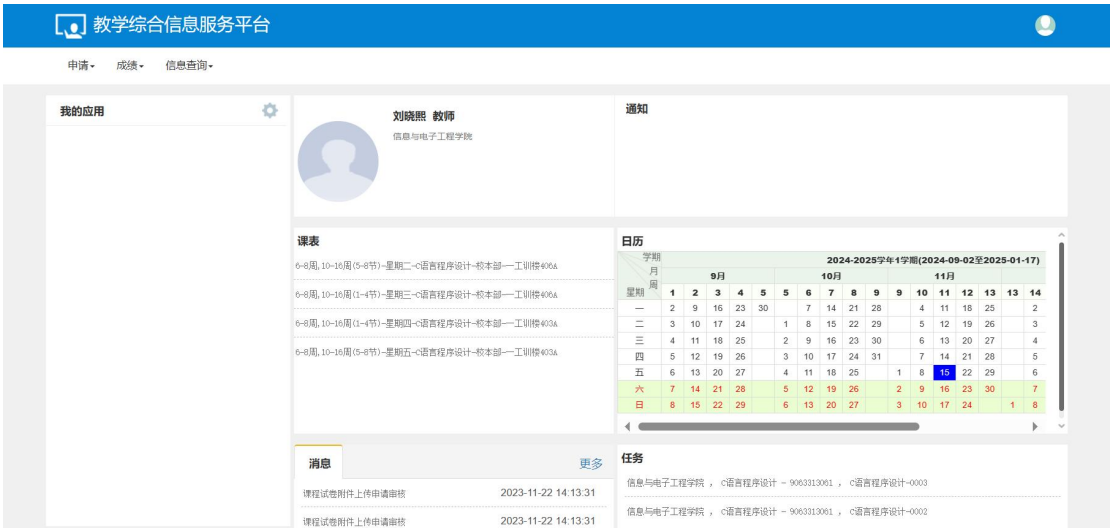

Figure 7.5 Academic Affairs System Interface

Figure 7.6 Practical Teaching Interface

Figure 7.7 Graduation Comprehensive Training Management System

7.1.2 Student Personal Management System

The interface displayed upon successful student login is shown in Figure 7.8. The student personal interface is designed with a high degree of user-friendliness, aiming to deliver a convenient and efficient service experience for each student. This interface is divided into two main modules: the Personal Service Window and the System Express Window. Through these two meticulously crafted windows, not only is the interaction between students and HNCU enhanced, but student satisfaction and campus life quality are also significantly improved.

The Personal Service Window integrates a range of functions closely related to students, such as exam information (see Figure 7.9), grade inquiries (see Figure 7.10), and academic progress status (see Figure 7.11). The aim is to enable students to manage their academic life easily and stay informed about their academic progress. The System Express Window is more focused on providing quick access to university resources and services, such as the Academic Affairs System (see Figure 7.12) and the Practical Teaching System (see Figure 7.13). This allows students to quickly obtain necessary information or complete specific tasks, greatly enhancing efficiency and campus convenience.

Figure 7.8 Student Personal Interface

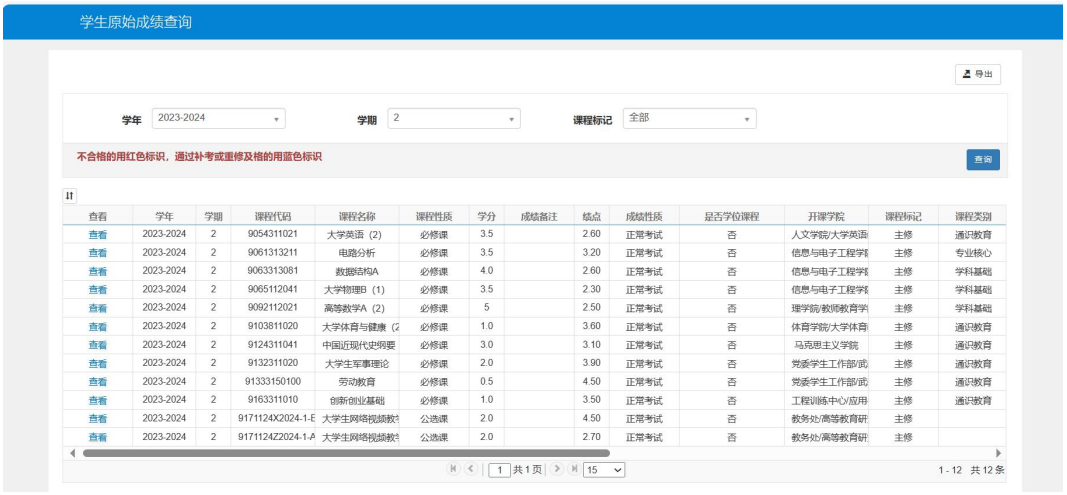

Figure 7.9 Exam Information Query Interface

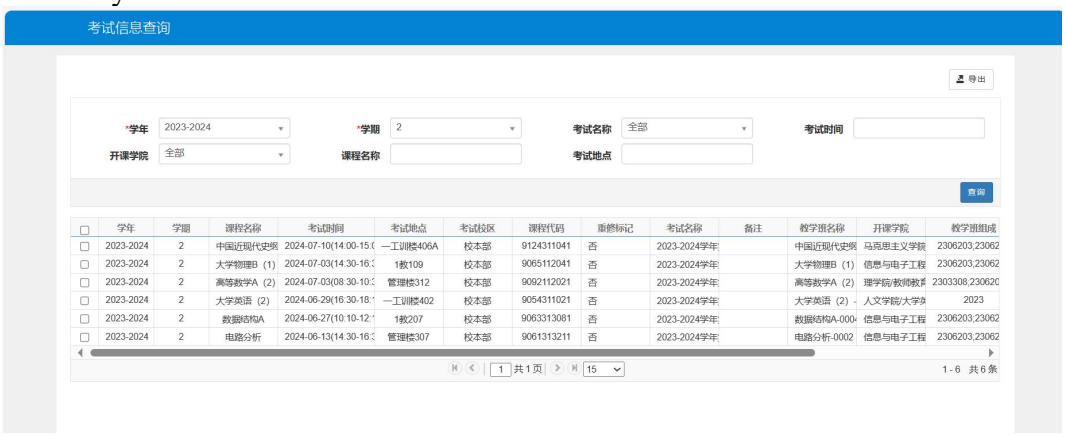

Figure 7.10 Student Grade Inquiry Interface

Figure 7.11 Academic Progress Query Interface

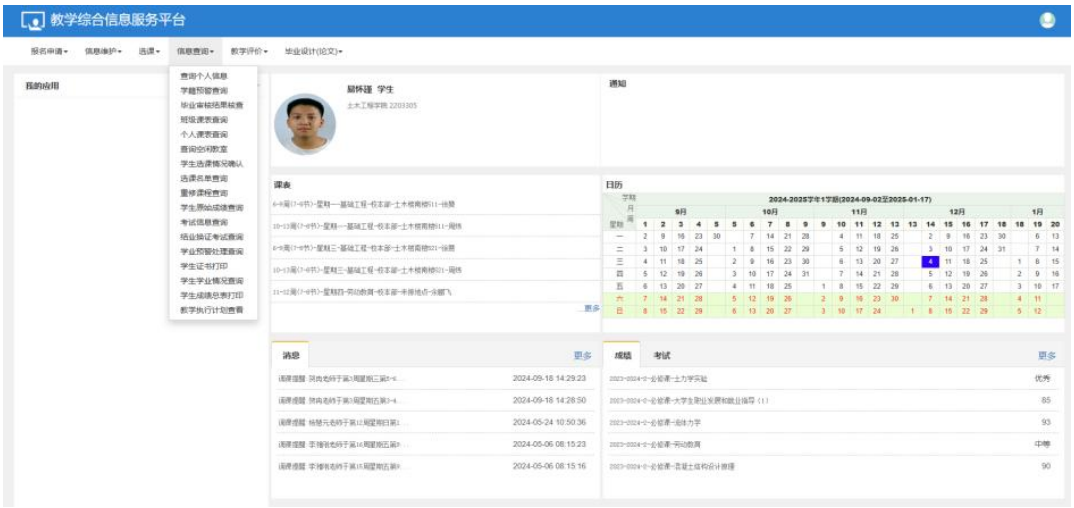

Figure 7.12 Student Academic Affairs System Interface

Figure 7.13 Student Practical Teaching Interface

7.1.3 Effects Achieved After Implementing Quality Assurance Measures

(1) Improvement in Graduate Competency Development

Through the continuous improvement of the training objectives, graduation requirements, curriculum structure, and course goals, the graduation competencies of the students in this program have been strengthened, and the quality of talent cultivation has improved. The graduates have enhanced their ability to apply relevant background knowledge of water supply and drainage engineering to propose reasonable solutions, considering their impact on society, health, safety, law, and culture, and taking on corresponding social responsibilities.

(2) Improvement in Graduate Employment Quality

Through continuous improvement, graduates from this program not only possess a solid theoretical foundation and rich practical experience, but also embody a spirit of unity, friendship, collaboration, and innovation. This enables them to have a broad range of career options and a high employment rate. In recent years, the proportion of graduates entering well-known enterprises has gradually increased, including central state-owned and large enterprises such as Shenzhen Planning and Design Institute, Beijing Municipal Engineering Design and Research Institute Co., Ltd. (Hunan Branch), Changsha Water Industry Group Co., Ltd., China Communications Third Highway Engineering Bureau, China Railway No. 25 Bureau, China State Construction Engineering Corporation (CSCEC) No. 8 Bureau, and China Hydroelectric Engineering Bureau No. 8.

(3) High Overall Quality and Broad Development Prospects of Graduates

Employers generally report that graduates of this program have a solid foundation in both basic and professional knowledge, demonstrate a rigorous and serious work ethic, and possess strong hands-on and practical skills, enabling them to perform well in technical roles related to their field. After five years, many graduates have become

technical backbones or engineering managers. Students exhibit strong self-learning abilities and an awareness of lifelong learning, allowing them to follow industry developments, acquire new professional knowledge, and obtain certifications such as Registered Public Equipment Engineer. In addition, graduates have developed certain project management skills and have been exposed to areas such as extra large bridge construction, sponge city construction and the treatment of black and odorous water bodies through elective courses. As a result, their job prospects are broad, and they enjoy strong employment competitiveness.

7.1.4 Feedback Channels

Through surveys of graduates, industry companies, focus group discussions, site visits, and third-party evaluations, continuous improvements are made in various aspects of the program, including the training objectives, graduation requirements, course structure, and teaching activities. A graduate tracking feedback mechanism and a social evaluation system have been established. Every 2-4 years, the achievement of the training objectives is analyzed through regular assessments.

(1) Graduate Tracking and Feedback Mechanism

1) Responsible Institution: The Admissions and Employment Office of the university formulates the social evaluation mechanism based on the overall development needs of the university. The graduate tracking survey work is organized by the department head, and is implemented through surveys, visits, and other forms of communication. The collected materials are then summarized and analyzed.

(2) Work Cycle: Once per year.

(3) Target Group:

① Students who graduated 1-5 years ago: The survey coverage should reach at least 50% of the graduating class for that year.

② Students who graduated more than 5 years ago: Representative survey subjects should be selected, taking into account differences in geographic location, types of companies, job roles, etc.

(4) Method: The survey is conducted through interviews, focus groups, online platforms, mail, telephone, and other methods, or through alumni meetings, campus visits, and other opportunities to hold alumni discussion sessions.

(5) Information Collected: The survey covers analyses of graduates' qualifications during their studies, career choices, evaluations of current jobs and positions, and assessments of how their education has influenced their career development.

(2) Graduate Social Evaluation Mechanism

(1) Responsible Department: The university's Admissions and Employment Office develops the social evaluation mechanism according to the university's overall development needs. The graduate tracking survey is organized by the department head and is specifically implemented through surveys, visits, and discussions, with relevant data being compiled and analyzed.

(2) Evaluation Cycle: The survey is conducted once every 2-4 years, while visits and discussions are carried out on an irregular basis.

(3) Evaluation Methods: Employer surveys, employer focus groups, recruitment company discussions, and industry expert focus groups.

See **Appendix A-3** for relevant questionnaire samples.

7.2 Relevant Regulations

7.2.1 Teaching Evaluation System

In terms of teaching, the College of Civil Engineering at Hunan City University strictly follows the *Implementation Opinions on Further Strengthening the Construction of the Teaching Management Team of Hunan City University* (see **Appendix F-1**) to review the qualifications of instructors. Instructors must prepare course content according to the basic standards for lesson plans and lecture notes. The college abides by the *Detailed Guidelines for Classroom Teaching Conduct of Hunan City University*, the *Implementation Regulations of the Student Teaching Information Officer System of Hunan City University*, the *Working Procedures of the Teaching Advisory Committee of Hunan City University*, the *Recognition and Handling Measures for Teaching Incidents and Faults of Hunan City University*, the *Classroom Teaching Observation Management Measures of Hunan City University*, the *Calculation and Management Measures for Teaching Workload of Hunan City University*, and the *Implementation Measures for Undergraduate Education Teaching Quality Evaluation and Continuous Improvement of Hunan City University (Trial)* and other related regulations to manage and evaluate the teaching process. See **Appendix F-1** for details.

The school's Academic Affairs Office periodically evaluates the teaching of each course to understand the overall performance of teachers during the teaching process. This includes peer reviews, student evaluations, and supervisory evaluations (i.e., three-party evaluations). See **Appendix F-2** for details. Student evaluation forms are collected and compiled by the school's Academic Affairs Office, submitted to the respective colleges, and notified to the relevant course instructors.

7.2.2 Student Academic Assessment

Since 2020, the admission score of the Civil Engineering and Water Supply and Drainage Science and Engineering major of Hunan City University has been higher than the undergraduate line standard in the national unified examination (college entrance examination) for the admission of ordinary institutions of higher learning in China. For relevant information and the admission situation in the past five years, please refer to **Appendix F-3**. Both majors are strictly in accordance with the relevant provisions of the Ministry of Education, the Hunan Provincial Department of Education, and the Hunan Provincial Education Examination Institute. Admissions are carried out in accordance with the relevant regulations of the admissions policy, and a special admissions leadership group has been established to be fully responsible for admissions matters..

7.2.3 Further Development and Continuous Improvement

To meet the demands of the job market and technological development, the College of Civil Engineering at Hunan City University places high importance on the continuous development of the program. The college continually explores innovation and has introduced a series of supporting management systems to meet the rapidly changing needs of the industry. To this end, Hunan City University has established a dedicated graduate tracking information system aimed at collecting and analyzing feedback from graduates to understand their performance and development in the workplace. Additionally, the college organizes graduate forums every year during the university's anniversary celebrations, providing a platform for communication with alumni, facilitating the continuous improvement of the curriculum, and enhancing teaching quality.

Considering the potential language barriers faced by some students, the college will further enhance the bilingual teaching abilities of professional faculty, increase the number of bilingual courses, and strengthen Chinese language training for students coming to study in China. This will help them quickly adapt to campus life and the learning environment at Hunan City University, ensuring that every student receives a high-quality educational experience.

7.3 Diploma Supplement and Certificates

Appendix F-4 provides samples of the graduation certificate and bachelor's degree certificate for graduates of the Civil Engineering and Water Supply and Drainage Science and Engineering majors at Hunan City University. All certificates become valid only after being stamped with the official seal of Hunan City University and signed by the president. **Appendix F-5** contains a sample of the diploma supplement.