Self-Assessment Report for an International ASIIN Program Accreditation

For the Bachelor Degree of Water Supply and Drainage Science and Engineering

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1. About the Accreditation Procedure

1.1 General Data

Website of the Higher Education Institution	https://www.hncu.edu.cn/
Faculty/Department offering the Degree program	School of Munipal and Geomatics Engineering Department of Water Supply and Drainage Science and Engineering

1.2 Seals applied for

Name of the degree program (in original Language)	**(Official) English translation of the name**	**Labels applied for**	**Previous accreditation (issuing agency,validity)**	**Involved Technical Committees (TC)**
给排水科学与工程	Water Supply and Drainage Science and Engineering	ASIIN Seal for a bachelor's degree program	Evaluation Committee for the Higher Education in Water Supply and Drainage Science and Engineering of the Ministry of Housing and Urban-Rural Development 05.2024 – 05.02030	TC03

1.3 Characteristics of the Degree program

Table 1-1 program Overview

Name	Water Supply and Drainage Science and Engineering
Final degree (original/English translation)	工学学士 / B. Eng.
Areas of Specialisation	Civil Engineering
Corresponding level of the EQF	6
Mode of Study	Full time
Double/Joint Degree	/
Duration	8 semesters
Credit points/unit	230 ECTS
First time of offer	Sep. 01, 2003
Intake rhythm	Fall semester
Intake Capacity per cohort	Max. 150 students
Average starting cohort size	113 students
Average number of graduates per cohort	49 students
Tuition	5,900 yuan per year
Initial Enrollment Date	September 1, 2003
Person in charge	Professor Chi Nianping
Phone	+86-18075161238
E-Mail	chinianping@163.com

2. Training Program Content and Implementation

The Water Supply and Drainage Science and Engineering major was established in 1984, under the School of Municipal and Geomatics Engineering, and is one of the university's key programs to strengthen urban construction disciplines.

In 2003, the major began enrolling undergraduate students, was recognized as a Hunan Province Distinguished Major for Ordinary Colleges in 2009, started jointly training master's students with Shenyang Jianzhu University in 2014, was approved as a pilot project for comprehensive reform under Hunan's "Thirteenth Five-Year Plan" for ordinary colleges in 2016, and was designated a Hunan Province "First-Class Major" construction site in 2019 (see Figure 2-1). To date, the major has graduated over 1,400 undergraduates.

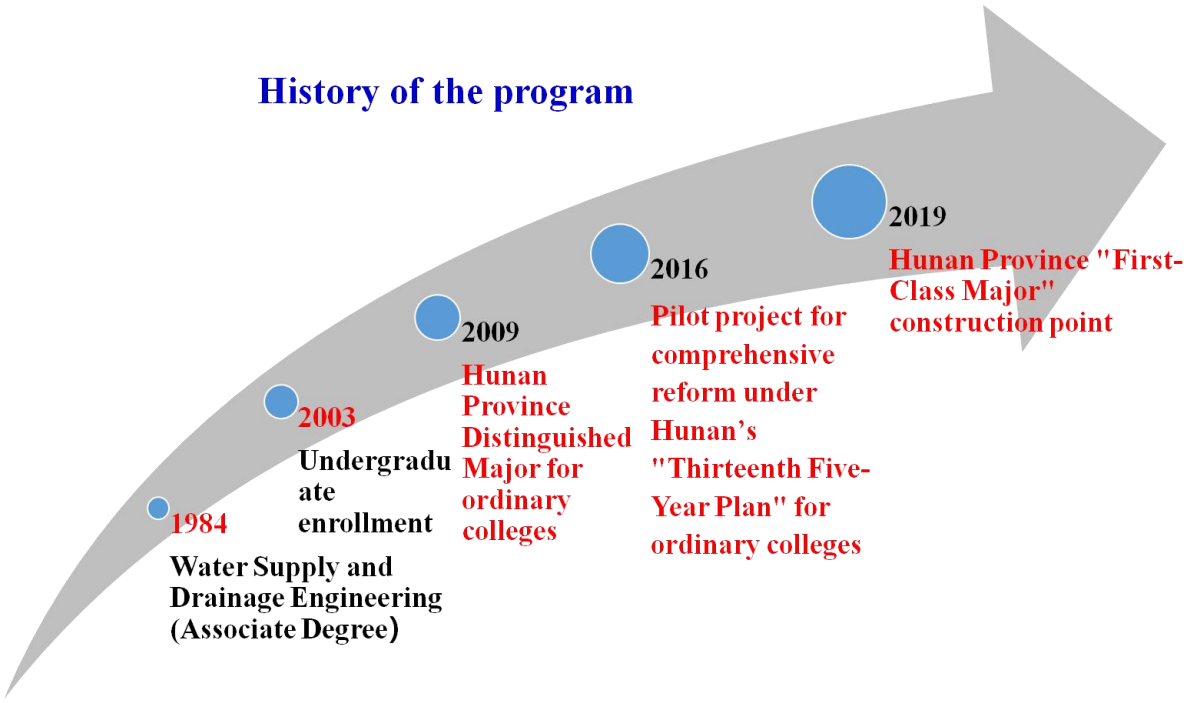


Figure 2-1 History of the Major's Development

The major relies on eight provincial and higher level teaching and research platforms, including the Hunan Provincial Rural Drinking Water Quality Security Engineering Technology Research Center, the National Civil Engineering Experimental Teaching Demonstration Center, and the National Mass Innovation Space, as well as enterprises like the Hunan City University Design Research Institute Co., Ltd., to conduct research and education. It has developed a diverse, multi-tiered practical education system, termed "one line, two combinations, four levels" (see Figure 2-2).

This major closely follows the rapid development of the water supply and drainage science and engineering field, aligning with Hunan's "4X4" modern industrial system development strategy. It upholds an educational philosophy that deeply integrates theory with practice, aiming to build a seamless interface system between academic disciplines and industry chains. The program seeks to

cultivate high-quality talents with solid foundational theories, deep professional knowledge, and superb skills. These individuals are not only capable of applying their knowledge to solve fundamental problems in engineering practice but are also geared toward comprehensive personal development, becoming versatile talents with "engineering practice abilities, applied technical expertise, and an international perspective." During the training process, the program emphasizes enhancing students' overall innovation consciousness, independent working skills, and team spirit, while also focusing on improving their cultural literacy, professional ethics, social responsibility, and global outlook. Moreover, the major prioritizes developing students' competitiveness and innovative abilities to ensure they meet the future development needs of the water supply and drainage science and engineering industries, thus equipping them with internationally recognized professional qualifications and engineering credentials, laying a solid foundation for international mutual recognition of engineer qualifications.

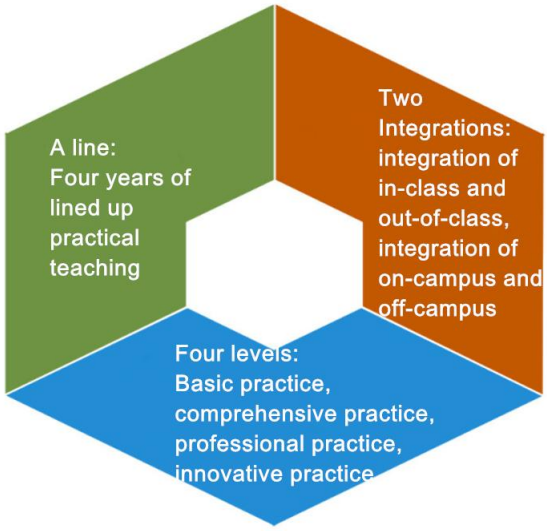


Figure 2-2 "124" **Practical Teaching System**

2.1 Training Objectives

This 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:

Objective 1: To practice socialist core values, uphold the concept of sustainable development, actively fulfill social responsibilities, maintain sound character and good literacy in humanities and social sciences, and adhere to professional ethics and engineering ethical standards.

Objective 2: To meet the developmental demands of the water supply and drainage science and engineering field, possess comprehensive knowledge related to the specialty, and be capable of engaging in design, construction, operation, and management in related fields, with the ability to undertake initial R&D and the capability to serve as an engineer or a technical leader.

Objective 3: To possess good team collaboration spirit and adequate organizational communication skills, capable of performing team and management roles in engineering projects related to water planning, design, construction, operation, and management.

Objective 4: To have an awareness of innovation, entrepreneurship, self-directed learning, and lifelong learning, continually acquire and apply new theories, methods, technologies, and equipment in water supply and drainage science and engineering to solve complex engineering problems in related fields.

The professional training objectives can be found in the Professional Training Plan **Appendix A-1** 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. Engineering Knowledge: Possesses the capability to apply mathematics, natural sciences, foundational engineering, and specialized knowledge to solve complex engineering issues in water supply and drainage science and engineering, including planning, design, construction, operation, and management.

a) Mastery of mathematical knowledge related to water supply and drainage science and engineering for understanding the fundamental principles of the major.

b) Able to use knowledge of physics, chemistry, and biology to describe and explain important phenomena in complex problems within water supply and drainage science and engineering.

c) Able to apply knowledge of mechanics and engineering to the planning, design,

construction, and operational management of projects.

d) Capable of using specialized knowledge and engineering management principles in the field of water supply and drainage science and engineering to address complex engineering challenges. Skill 2: Engineering Skills Proficiently master natural science knowledge, specialized knowledge, and skills demanded in the field of water supply and drainage science and engineering, capable of applying them to professional engineering principles and technology, and designing feasible and reasonable solutions for complex engineering problems.

2. Problem Analysis: Capable of applying mathematics, natural sciences, engineering principles, and the basic principles of water supply and drainage science and engineering to identify and analyze complex issues in water science and engineering through literature review, propose viable approaches, and achieve effective conclusions.

a) Able to comprehensively utilize principles and methods from mathematics, natural sciences, engineering, and water supply and drainage science and engineering, equipped with the ability to identify, judge, analyze, and articulate complex engineering problems.

b) By consulting databases, standards, norms, and manuals, can analyze complex engineering problems in water project planning, design, construction, and operational management, proposing economical and effective strategies to develop feasible solutions and conclusions. Skill 4: Collaboration and Communication Capable of playing a significant role in the field, solving complex engineering problems, with strong professional collaboration, technical cooperation, and teamworking skills.

3. Design/Development of Solutions: Capable of proposing effective and reasonable design solutions for complex problems in the field of water supply and drainage science and engineering, designing systems, processes, or units that meet specific needs, demonstrating innovation in the design phase, and considering the impact of social, health, safety, legal, cultural, and environmental factors.

a) Masters analytical and design methods for units (components) or processes, develops reasonable solutions tailored to the special requirements of water supply and drainage science and engineering, and meets the specific needs of actual engineering projects.

b) Considers the impacts of social, health, safety, legal, cultural, and environmental factors on the solutions and demonstrates a degree of innovation during the design phase.

4. Research: Capable of using basic principles of water supply and drainage science and engineering, employing scientific methods to design experiments, collect, analyze, and interpret data for complex issues, and synthesizing information to reach reasonable and effective conclusions.

a) Able to utilize fundamental principles of natural sciences and engineering to master

methods and skills for basic engineering experiment design, testing, and inspection; designs experiments based on engineering problems, selects appropriate research platforms, applies correct analysis, testing, and inspection methods, conducts scientific experiments properly, and accurately collects, analyzes, and interprets experimental data.

b) For complex water supply and drainage engineering issues, capable of using fundamental principles of the science and applying scientific methods to comprehensively analyze data and derive effective conclusions.

5. Use of Modern Tools: Capable of developing, selecting, and using appropriate technologies, resources, modern engineering tools, and information technology tools for complex problems in water supply and drainage science and engineering. Able to employ models and methods from mathematics, engineering, and management for simulation, modeling, analysis, prediction, and optimization of complex engineering problems, and understands their limitations.

a) Masters the use of modern engineering tools, information technology tools, engineering techniques, and resources, and can reasonably select modern tools for complex engineering problems; understands the basic methods for developing engineering techniques and modern engineering tools.

b) Able to use 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 understands their limitations.

6. Engineering and Society: Capable of conducting reasonable analyses and evaluations of the impacts of engineering practices and complex engineering solutions in the water supply and drainage science and engineering field on society, health, safety, law, and culture, and understands the responsibilities that should be assumed.

a) Able to utilize knowledge of water engineering-related laws, industry policies, and technical standards to reasonably analyze and evaluate the impacts of complex water supply and drainage engineering solutions on society, health, safety, law, and culture;

b) understands the responsibilities involved throughout the implementation of engineering solutions.

7. Environment and Sustainable Development: Possesses an awareness of harmonious development between humans and nature, knowledge of environmental protection, upholds the concept of sustainable social development, and can understand and evaluate the impacts of engineering practices in solving complex engineering problems on social, environmental, and economic sustainability.

a) Understands the concepts and significance of environment and sustainable

development, able to evaluate the impacts of water engineering practices on the environment and nature.

b) Able to use professional knowledge to analyze and evaluate the impacts of water engineering practices on social, environmental, and economic sustainability.

8. Professional Ethics: Practices socialist core values, possesses literacy in humanities and social sciences, and a sense of social responsibility, able to understand and adhere to professional ethical norms and engineering ethics in the practice of their specialty, fulfilling responsibilities.

a) Practices socialist core values, possesses literacy in humanities and legal awareness, and conscientiously abides by them in water engineering practice.

b) Understands the engineer's responsibility to the public for safety, health, and welfare, and environmental protection, able to adhere to professional ethical norms and engineering ethics, conscientiously fulfilling responsibilities.

9. Individual and Team: Capable of taking on roles as an individual, team member, and leader in teams with multidisciplinary backgrounds, with strong collaborative spirit and some organizational management ability.

a) Understands the multidisciplinary interconnections within the water engineering field, possesses team consciousness and collaborative spirit, correctly understands their role and responsibilities within the team.

b) Capable of being a responsible leader with organizational management ability in teams with multidisciplinary backgrounds.

10. Communication: Able to effectively communicate and interact with peers and the public on complex issues in water supply and drainage science and engineering, including writing reports and design documents, creating drawings, making presentations, and responding to commands both in writing and verbally. Proficient in a foreign language with listening, speaking, reading, and writing abilities, and possesses an international perspective, capable of communicating across cultural backgrounds.

a) Regarding complex problems in water supply and drainage science and engineering, can communicate professionally through design drawings, design documents, research reports, and presentations; able to correctly understand the relationship between water supply and drainage science and engineering and multidisciplinary fields, and clearly and accurately respond to queries from peers and the public.

b) Proficient in a foreign language, aware of the international trends and research advancements in urban and rural water engineering, understands and respects the impact of different cultural backgrounds on engineering practice, and can communicate effectively across

cultural backgrounds.

11. Project Management: Understands and masters the principles of water engineering project management and economic decision-making, and can apply these in a multidisciplinary environment. Possesses certain organizational and management skills.

a) Masters the principles and methods of engineering management, operational management, and economic decision-making related to the water engineering field.

b) Able to apply principles and methods of engineering management, operational management, and economic decision-making to water engineering practices in a multidisciplinary environment, possessing the capability to organize and manage engineering projects.

12. Lifelong Learning: Possesses awareness of self-directed and lifelong learning, capable of continuously learning and adapting to meet personal development needs.

a) Correctly recognizes the importance of self-directed learning and keeping abreast of new knowledge, has a consciousness for independent learning, and understands the pathways and methods for knowledge expansion and skill enhancement.

b) Possesses the ability for self-directed and lifelong learning, able to align with industry developments and personal growth needs, continually learning and adapting to societal and personal development.

2.2.2 Evaluation and Needs

1) Professional Evaluation

The Water Supply and Drainage Science and Engineering major is one of the undergraduate programs at Hunan City University, which successfully completed the Ministry of Education's undergraduate teaching quality assessments, teaching reviews, and educational instruction evaluations in 2012, 2018, and 2024, respectively.

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. Details of the graduate questionnaire analysis can be found in **Appendix A-2**.

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. Analysis of job performance among graduates from recent years shows that 75.57% fully or mostly achieved Competency Goal 1, with 23.66% partially meeting it, totaling 99.23%. For Competency Goal 2, 75.57% fully or mostly met the goal, with 22.90% partially meeting it, totaling 98.47%. Competency Goal 3 saw similar results with 75.57% fully or mostly achieved, 22.90% partially, totaling 98.47%, and Competency Goal 4 was fully or mostly met by 77.10% of graduates, with 21.37% partially meeting it, totaling 98.47%.

According to recent salary surveys among graduates, 43.94% earn over 8000 RMB/month, 39.39% earn between 5000 and 8000 RMB/month, and 16.67% earn less, indicating that graduates from this major generally earn a high salary and have promising career prospects. Details of the graduate questionnaire analysis can be found in **Appendix A-2**.

2.3 Learning Outcomes of Each Course Module

2.3.1 Training Program Module

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.

2.3.2 Objective Matrix

Table 2-1 Water Supply and Drainage Science and Engineering Professional Objective Matrix

Training Objectives	Anticipated Learning Outcomes of the Entire Course	Corresponding Courses
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.
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	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

	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 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. **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.	Chemistry.
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.	**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.
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	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

	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, cultural, and environmental factors on solutions, and possess a certain level of innovative thinking. **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	Management.
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.		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.

Possesses awareness of self-directed and lifelong learning, and the ability to continuously learn and adapt to personal development needs.	and limitations of the results. **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 industry.	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, Comprehensive Graduation Training, Graduation Education.

2.4 Employment Prospects and Relevance to Practice

2.4.1 Employment Market Prospects and Positioning

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 as outlined in the "Hunan City University Fourteenth Five-Year Development Plan (2021-2025)" **Appendix A-3**.

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, as detailed in the "Hunan City University Water Supply and Drainage Science and Engineering Professional Training and Socio-Economic Development Needs Research Report," **Appendix A-4**.

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 the Graduate Survey **Appendix A-2** and Employer Survey **Appendix A-5.**

Over the past three years, the employment rate for graduates from this program can be seen in Table 2-2, with detailed employment information available in Appendix A-6 through 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 through A-8.

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

Year	Number of Graduates	Employment Rate (%)
2022	85	97.65
2023	75	96
2024	88	93

Note: Employment rates are as of December 1st.

2.4.2 Practical Skills

(1) Experiment

The program offers various specialized course experiments including Water Chemistry Analysis, Water Treatment Biology, Hydraulics, Water Quality Engineering, Pumps and Pump Stations, and Building Water Supply and Drainage Engineering experiments. There are 34 different experimental projects available, of which 24 are comprehensive, design-oriented, and innovative experiments, making up 70% of the total. The total area of the Water Supply and Drainage Science and Engineering program’s laboratories is 1,289 square meters, with equipment and software valued at 5.525 million yuan. The space and equipment quantity meet the needs of experimental teaching, with all devices and instruments being well-maintained and updated timely to fulfill all teaching requirements of the experimental units as per professional standards. Experiments are conducted in groups of 2-4 students, with each class divided into 1-2 batches for experiments. For a summary of the condition of laboratories related to professional course experiments, see **Appendix A-9**, "Summary of Basic Conditions of Undergraduate Teaching Professional Laboratories." For a list of laboratories and equipment related to the program and their teaching responsibilities, see **Appendix A-10**, which meets the needs for hands-on participation, and all experiment standards comply with

current engineering norms.

(2) Internships and Practical Training

Professional internships include Familiarization Internships, Electrical and Electronic Engineering Practical Training A, Geomatics Internship, Metalworking Internship, Production Internship, and Graduation Internship.

The program has established a comprehensive practical teaching system in collaboration with numerous enterprises, providing students with ample internship bases and practical training opportunities to develop their practical skills and innovative thinking. The graduation project (thesis) is closely aligned with real-world engineering issues, emphasizing the cultivation of students' engineering capabilities, teamwork spirit, and problem-solving abilities. During the guidance and assessment process, the program invites industry experts and enterprise representatives to participate, ensuring the quality and practicality of the graduation projects (theses).

The Water Supply and Drainage Science and Engineering program places great emphasis on the "industry-academia-research" tripartite development model, integrating its unique characteristics. According to the "Hunan City University Regulations on the Construction and Management of Off-Campus Internship Teaching Bases" (**Appendix A-11**) and the "Hunan City University Internship Teaching Management Methods" (**Appendix A-12**), the program has established strong industry-academia-research collaborations with several entities, including Yiyang City Water Company, Tuanzhou Wastewater Treatment Plant in Yiyang, Changde City 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 partnerships have led to the signing and creation of multiple undergraduate practical teaching bases, providing students with internship opportunities. During the internships, frontline technical leaders from these enterprises deliver lectures on relevant technical knowledge, meeting the educational requirements for familiarization internships, production internships, graduation internships, and graduation projects (comprehensive graduation training), effectively promoting the achievement of the program's educational objectives. Current internship and practical training bases are listed in **Appendix A-13**.

(3) Course Design and Graduation Projects

Before graduation, each student in this program is required to complete design courses including 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. To ensure the quality of these design courses, the school has established the "Hunan City University Course Design Management Methods" (**Appendix A-14**). Details on the content, workload requirements, corresponding credits, and assessment methods for these design courses can be found in the Appendix "Design Practice Components Required Before Graduation" (**Appendix A-15**).

This program adheres to the "Hunan City University Comprehensive Graduation Training Management Methods" (**Appendix A-16**) and the "Hunan City University Undergraduate Thesis (Dissertation) Writing Standards" (**Appendix A-17**) to further detail the requirements for the design outcomes, defense, and responsibilities of the advising instructors of the graduation projects. 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 graduation project (comprehensive graduation training) topics must align with the professional training objectives and graduation requirements, integrating engineering practice and research frontiers to provide students with comprehensive training. Design projects should have sufficient depth and breadth, be labor-intensive, and utilize computer-aided drawing, with the number of drawings meeting relevant design standards, including at least one hand-drawn diagram. The teaching and research office collects graduation project topics from advisors during the seventh semester and organizes relevant personnel to review and verify them before announcing the topics for selection. At the beginning of the eighth semester, students select their topics and commence their preliminary work under the guidance of their advisors. The topics chosen for student graduation projects over the past three years can be seen in Appendix A-18 to A-20.

(4) Research and Innovation Practice

While cultivating students' engineering practice abilities, the program also emphasizes developing their research and innovation capabilities. To encourage students to engage in innovative and entrepreneurial activities and enhance their practical innovation skills, according to the "Hunan

City University Undergraduate Innovation and Entrepreneurship Practice Credit Recognition and Management Methods" (**Appendix A-21**), all full-time undergraduate students at our university must earn at least 2.0 credits in innovation and entrepreneurship practice to complete their studies and qualify for graduation. Undergraduate students can earn up to 6.0 credits in innovation and entrepreneurship practice, and may apply to exchange credits exceeding the stipulated amount for elective credits in similar categories across the university or up to 3.0 credits in elective professional courses. Students have achieved significant technological innovation results by utilizing engineering practice teaching resources and internship and training platforms. Over the past three years, students in this program have led 13 innovation training plan projects, including four at the national level and seven at the provincial level, and have won 13 awards in various college student technology innovation competitions, as well as published eight papers. Details on the involvement of students in innovative practice activities over the past three years and a brief description of each participant's activities can be found in **Appendix A-22**.

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 legal statutes and regulations set by the Ministry of Education, anyone seeking to pursue an undergraduate degree and obtain a bachelor’s degree at Hunan City University must have a high school diploma or equivalent qualification and must participate in the national unified entrance examination for regular institutions of higher education. Candidates eligible to apply must meet the following conditions: 1) Comply with the Constitution and laws of the People's Republic of China; 2) Have graduated from high school or have an equivalent educational qualification; 3) Be in good health, as required by the chosen major.

2.5.2 Admission Process

The university determines the proportion of student files to be adjusted based on the applicant pool from each province (autonomous region, municipality directly under the central government). For batches submitted by order of preference, the file adjustment ratio is controlled within 110%; for batches submitted by parallel preference, the ratio is controlled within 105%. The principles for submitting student files are implemented according to the regulations of the education authorities of the student's home province (autonomous region, municipality).

The university admits students based on their total scores from the national college entrance examination (Gaokao), considering the comprehensive quality assessment of high school students. The allocation of majors for students who have qualified for admission follows the principles of "score priority, adherence to applicants’ preferences, without differentials in scores between

majors." Admissions are granted on a competitive basis in line with the medical examination results of the college entrance examination. In cases of tie scores, admissions are determined based on the sorting rules of the applicant's home province; where no such rules exist, candidates are ranked by their scores in Chinese, Mathematics, and Foreign Language from highest to lowest. For language-related majors, priority is given to those with higher scores in English. If a candidate's preferences for all desired majors cannot be met and they agree to major adjustment, they may be reassigned to other qualifying majors with available places (adjustments within the same group of majors are allowed for provinces undergoing Gaokao reform); if they do not agree to major adjustment, their application is withdrawn.

Upon enrollment at Hunan City University, new students must provide their admission notification and identification documents, then follow the instructions in the registration guide to register at the respective departments. The typical registration process includes confirmation of attendance, payment of tuition fees, registration of student status, and collection of learning materials and supplies. Relevant documents related to admissions at Hunan City University can be found in **Appendix A-23**.

2.5.3 Transparency of Admission

The admission and enrollment processes for new students at Hunan City University strictly adhere to relevant procedural documents and maintain a high level of transparency. According to the regulations set by the Ministry of Education, the university has established an Admission Work Leadership Group, chaired by the president and vice-chaired by the leader in charge of admissions, with heads of relevant departments as members. This group is responsible for overseeing the university’s admissions, developing and implementing detailed rules for admissions, leading the execution of admissions activities, and coordinating significant issues in the admissions process. Additionally, an Admission Supervision Leadership Group, led by the secretary of the Discipline Inspection Committee and comprising heads of related departments like the Discipline Office, is responsible for overseeing admissions monitoring.

To ensure the smooth operation of undergraduate admissions, standardize procedures, improve communication channels, and protect candidates' legal rights, the university annually develops and publicly announces the "Hunan City University Admission Guide." This guide provides detailed information to prospective students about the university’s educational philosophy, teaching features, and admission policies. Related documents and systems include the "Hunan City University 2024 Admission Regulations for Regular Higher Education Institutions" (see **Appendix A-24**), "Hunan City University Regulations on On-Site Management of Online Admissions" (see **Appendix A-25**), and "Hunan City University Guidelines for Online Document Review" (see **Appendix A-26**).

2.6 Training Program/Content

The training program plays a crucial role in education and teaching. It not only serves as an essential means for realizing educational goals within a major but also as a vital safeguard for promoting individual student development, enhancing educational quality, and meeting the needs of societal development.

The rationality evaluation of the training program is an important basis for revising the major's training plan. Hunan City University has established relevant systems and measures including the "Hunan City University Talent Training Program Management Methods" (see **Appendix A-27**), "Guidance on Revising Undergraduate Talent Training Programs at Hunan City University" (see **Appendix A-28**), and "Implementation Methods for the Rationality Evaluation of Talent Training Programs at Hunan City University" (see **Appendix A-29**). To ensure the rationality of the training objectives and the quality of student training, the university has established a comprehensive mechanism for evaluating the appropriateness of the training objectives of the program in relation to national and social development needs, industry technical development requirements, and the university's positioning.

During the revision process of the training program, evaluations are conducted from both social and internal university perspectives, involving both school and department levels. On one hand, opinions from employers and industry experts are solicited through visits, research, and questionnaires. On the other hand, suggestions from teachers, recent graduates, and current students are gathered through discussions and surveys. Based on the advice collected from these social and internal evaluations, the rationality of the professional training objectives is assessed and considered in the development of the training program (see **Appendix A-30**).

Details of the training program for Water Supply and Drainage Science and Engineering can be found in **Appendix A-1**.

3 Degree Courses: Structure, Methods, and Implementation

3.1 Structure and Modules

3.1.1 Structure

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**.

3.1.2 Modules

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**). The credit distribution for each module as a percentage of the entire training plan is illustrated in Figure 3-1.

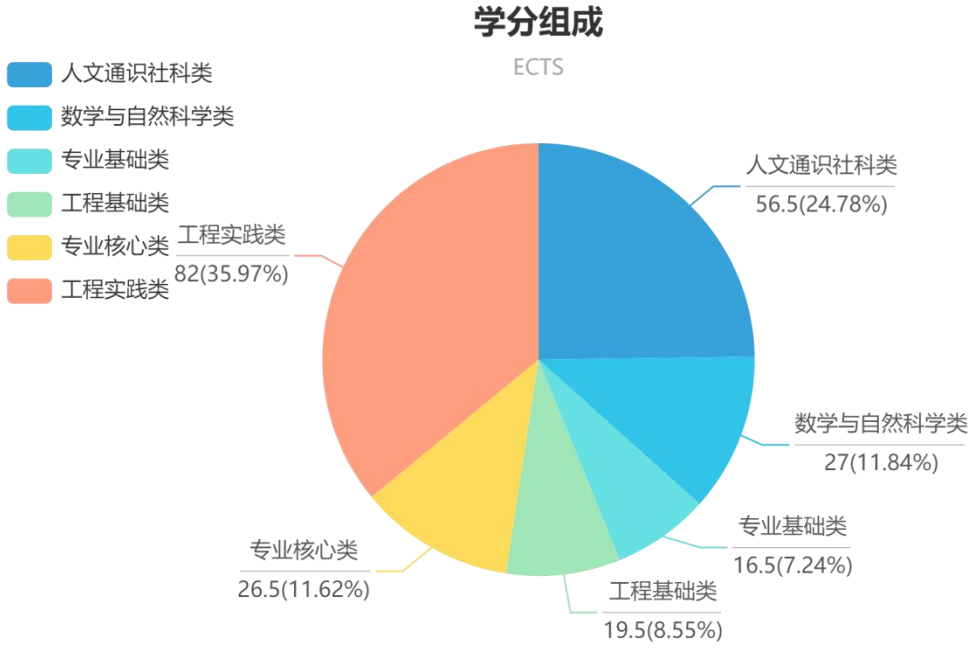


Figure 3-1: Credit Composition of Different Module Courses

3.2 Workload and Credits

At Hunan City University, completing 16 contact hours of theoretical module courses is equivalent to one Chinese credit. For practical training courses, completing 30 contact hours of study per week is equivalent to one Chinese credit. Chinese credits account only for contact hours, whereas the European Credit Transfer and Accumulation System (ECTS) also includes self-study hours. From the ECTS perspective, the student workload comprises the total of contact and self-study hours. Typically, 30 hours (including contact and self-study hours) equate to one ECTS credit, though the two credit systems differ in their accounting of self-study hours. When converting Chinese credits to ECTS credits, the average credit per academic year is 57.5 ECTS credits or 1725 hours (workload).

3.2.1 Learning Time (Workload) / Contact Time, Credits, and Self-study

For details on the hours and credits of each course module in Water Supply and Drainage Science and Engineering, see (**Appendix A-1**). Course syllabi can be found in **Appendix B-1**. To illustrate the workload structure and classification of different course modules, Table 3-1 provides a four-year statistical breakdown of student hours.

Table 3-1 Four-Year Hourly Statistics Table

Course Module	Contact Hours	Self-study Hours	Total Hours
Humanities and Social Sciences	978	717	1695
Mathematics and Natural Sciences	424	386	810
Professional Foundation	280	215	495

Engineering Foundation	288	297	585
Professional Core	448	407	855
Engineering Practice	1312	1148	2460
Total Hours	3730	3170	6900

3.2.2 Credit System

Student learning outcomes are primarily quantified through credits. Each undergraduate is required to accumulate the equivalent of 230 European Credit Transfer System (ECTS) credits over four years of study, which averages about 29 ECTS credits per semester. To ensure consistency in progress, the credit variation between semesters should be controlled within three ECTS credits. The scheduling of hours per semester is kept relatively balanced to avoid structural burdens on student academic performance and teaching quality (see **Appendix B-2**).

Examination grades are assessed by the course instructors, while the time students invest in their studies is verified through surveys conducted by counselors and academic advisors, to accurately measure the actual learning load each semester and ensure it aligns with the planned workload. Specifically, each student is required to complete about 860 hours per semester (i.e., workload), where 30 hours of workload is equivalent to one ECTS credit. Students' thoughts on study time (workload) will also be surveyed regularly (see **Appendix B-3**).

3.2.3 Teaching Methods

Humanities, social sciences, mathematics, and natural sciences courses along with subject foundation classes are typically taught in large groups (about 70 students), while professional and foundational courses are usually taught in smaller classes (about 35 students). Some courses include both theoretical content and in-class experiments, with the experiments often conducted in small groups of no more than four students. Elective courses are available for students to choose based on their interests and developmental needs. Classroom teaching is supplemented by face-to-face homework sessions, tutoring, and Q&A.

The program also extensively utilizes online teaching methods. Using online course platforms and open online course websites provides students with a wealth of learning resources, encouraging self-directed learning and enhancing their ability to study independently.

Teachers are actively exploring different teaching methods across courses and encourage students to use the "flipped classroom" approach for demonstrations in some courses. For online courses, some teachers have experimented with tweaking the timing distribution to integrate video learning, discussion, and practice into a single session to enhance student engagement and teaching efficiency. They also focus on case studies, extracting real cases from actual water supply and

drainage engineering projects and current engineering trends, incorporating them into the coursework and designs to spark student interest and help them understand current hot topics in engineering.

To deepen understanding and stimulate interest, teachers require students to research materials around a theme. Depending on the course characteristics, students are expected to engage in exercises and discussions post-class, write short academic papers summarizing the course knowledge system, analyze the internal relationships between different parts, or create presentation PPTs in groups. These methods train students in literature review, critical thinking, academic writing, mind mapping, and PPT creation and presentation skills, which are also crucial for their future studies or professional development.

Due to the broad scope and high applicability of this course, students may engage in significantly different roles after graduation. Thus, for professional degree courses (including basic engineering courses, applied engineering courses, and elective courses), the emphasis is consistently on strengthening theoretical learning through practical application, developing students' capabilities in real-world contexts; students are required to participate in comprehensive experiments, professional design classes, on-site practical training, innovation and entrepreneurship training, and capstone projects. Details are as follows:

• In course design, each professional degree course includes hands-on training sessions such as field trips, training at practical bases, or project design.

• After more than forty years of development, this program hosts the Hunan Provincial Demonstration Base for Industry-Academia-Research Cooperation in Ordinary Colleges, the Hunan Provincial Research Center for Drinking Water Quality Safety in Rural Areas, and, in collaboration with other disciplines, has established a National Demonstration Center for Civil Engineering Experimental Teaching and a Virtual Simulation Technology Lab.

• External practice bases have been established with enterprises to align teaching with industry. The primary internship base is at the Hunan City University Design and Research Institute Co., Ltd. Depending on project characteristics and course needs, we also collaborate with Yi Yang City Water Company, Tuanzhou Wastewater Treatment Plant in Yi Yang, and Changde City Wastewater Treatment Plant, providing students with practical opportunities.

• The professional course design utilizes software such as AUTO CAD and Guanlide, enabling students to quickly become familiar with essential design software and content, laying a solid foundation for their future careers.

• The Architectural Water Supply and Drainage Engineering projects are conducted through online teaching. Students and teachers can use apps like XueTong and ZhiHuiShu on mobile phones,

tablets, or computers. Most courses have dedicated web pages that provide teaching videos or courseware, reference materials, exercises, and other resources to enhance students' self-learning capabilities.

Teachers continually improve and enrich the online teaching resources and methods. On the XueTong APP online learning platform, teachers can upload teaching videos and reference materials, conduct check-ins, distribute educational notices, and engage in active discussions with students. Students are required to complete exercises and discussion questions, subject assignments, and online tests. Additionally, the XueTong APP can quickly analyze the accuracy of exercises and tests, aiding teachers in subsequent instructional analysis. We integrate the XueTong APP with other online communication software, such as Tencent Meeting, WeChat, and QQ, to enhance classroom communication and online interaction. The main limitation of online teaching is the restricted teacher-student communication, but the rich online resources provide opportunities for students to repeat lessons and deepen their understanding. In the future, we will combine the strengths of online and offline teaching to enhance educational outcomes.

3.2.4 Support and Consultation

The school, committed to the fundamental task of "fostering character and civic virtue," centers its approach on students, focusing on learning outcomes and student abilities as its main thread. Through organizing various themed educational activities, the school nurtures students' self-learning and self-development capabilities, fully engaging their initiative and enthusiasm. Students receive continuous guidance in learning, career planning, employment, and psychological counseling. The Academic Affairs Office and the Assets Office provide support for the submission of top-tier and first-class courses, as well as for the construction of off-campus internship teaching bases and laboratories. The school library, catering to the specific needs of each major, regularly updates its collection of books, literature, and databases relevant to the field, providing a platform for professional teaching and ongoing development. The Logistics Support Department ensures the professional development of academic disciplines by maintaining infrastructure, utilities, and network equipment, thereby ensuring the safe and reliable operation of the school’s water and electrical systems. A brief description of the services provided by the school’s main departments follows.

(1) Teaching Management

The Academic Affairs Office is primarily responsible for the management of undergraduate education. In addition to overseeing the university's teaching activities, the office has significantly enhanced the quality of education through teaching reforms and improvements to teaching facilities in recent years. To better provide educational services, the Academic Affairs Office includes several departments: General Affairs,

Specialty Construction, Teaching Operations, Practical Teaching, and the Student Status Management and Examination Center, which serve various faculties and majors, ensuring the smooth operation of all educational activities.

The website of the academic administration information system: https://jwc.hncu.edu.cn/. In addition, the college has a dedicated teaching and academic affairs office, which is led by the associate dean in charge of teaching management.

(2) Student Management

The Student Affairs Department, in accordance with the characteristics of higher education talent training in China, formulates, improves, and actively implements various student management regulations. The main responsibilities of the Student Affairs Department include recruiting and managing student counselors, building the team of student political workers, organizing various ideological education activities, and providing employment guidance and services for graduates. They continually collect and analyze student ideological trends through inspection and supervision, feeding this information back into the teaching process to promote educational development. Additionally, they actively conduct student psychological counseling to focus on the mental and physical health of students.

The Party Committee's Teacher Work Department, Human Resources Office, and Teacher Development Center timely formulate and revise teacher management regulations according to actual needs, continuously improving standards for teacher training, assessment, and promotion to ensure the enhancement of educational and teaching quality. New teachers undergo pre-job training, continuing education, Mandarin training, and other short-term in-house training to clarify their responsibilities and standardize their behavior. Additionally, new teachers are required to attend classes taught by experienced teachers, and teaching supervision groups are organized to observe the new teachers' classes, both aimed at improving their teaching skills. Moreover, this department also leads the school's secondary unit target management efforts, sorting out core, key, and significant indicators of undergraduate education and talent cultivation, and setting related directive and guidance tasks to motivate faculties and staff.

Student Affairs Management Information System website: https://xsc.hncu.edu.cn/.

(3) Party Committee Teacher Work Department / Human Resources Office / Faculty Development Center

The Party Committee's Department of Faculty Affairs, Personnel Department, and Teacher Development Center develop and revise teacher management regulations in a timely manner based on actual conditions, continually improving teacher training, assessment, and promotion standards to ensure the improvement of education and teaching quality. Upon joining the institution, new teachers are required to undergo pre-service training, continuing education, Mandarin training, and

other short-term internal programs, clarifying their responsibilities and regulating their behavior. At the same time, new teachers are required to observe classes taught by experienced teachers and are also evaluated by teaching supervision teams to enhance their teaching skills. Additionally, this department is responsible for leading the implementation of goal management at the university's secondary units, organizing, breaking down, and establishing the core, key, and important indicators for undergraduate education and talent cultivation, and setting related mandatory and guiding target tasks to stimulate the enthusiasm of the faculty and staff.

Website for the Teacher Information System for the Water Supply and Drainage Major: https://szch.hncu.edu.cn/szdw/jsfc.htm.

(4) Other Departments

The university has departments such as the Planning and Financial Office, the Department of Infrastructure and Logistics, the Asset Office, and the Library. These departments are responsible for monitoring and ensuring the quality of education and teaching, and they handle the construction and management of teaching resources.

The library regularly updates books, documents, and databases specific to various academic disciplines to provide a necessary information resource platform for the teaching and sustainable development of this field.

Library Information System website: https://tsg.hncu.net/index.htm.

The Assets Office provides robust support in the construction of teaching laboratories, the procurement and renewal of instruments and equipment, and the allocation of teaching resources. The Research Affairs Office and the Planning and Finance Office offer services, guidance, and support in the areas of discipline development, scientific research by faculty, and the allocation and use of funds.

Assets Office Information System website: https://www.hncu.edu.cn/xzcc/.

Departments such as Infrastructure and Logistics are responsible for the maintenance of buildings and other infrastructure, maintenance of water and electricity pipelines, and network equipment, ensuring the safe operation of water and electricity systems and supporting the construction and development of this academic discipline.

Infrastructure and Logistics Office Information System website: https://jjglc.hncu.edu.cn/.

(5) Transfer of Major System

To adapt to the evolving societal and economic demands for skilled professionals, and to offer students more opportunities for self-directed choices and personal development, Hunan City

University has established the "Hunan City University Regulations for Changing Majors for Full-Time Undergraduate Students (Revised)" (see **Appendix B-4**). This regulation allows students to change their major according to relevant policies and procedures. The selection process is based on student autonomy and voluntary choice, adhering to the university's requirements within a specified timeframe, and follows principles of fairness and equity in selecting students for transfer.

(6) Credit Recognition System

After transferring majors, students must follow the curriculum of the new major. If the credits earned meet the conditions specified in the curriculum of the new major, students may fill out the "Hunan City University Application Form for Credit Recognition for Students with Changes in Registration" (see **Appendix B-5**). This requires confirmation from the relevant college (department) and approval by the Academic Affairs Office before credits are officially recognized. For courses that have been completed in the new major but have not yet been taken, students must retake and pass these courses to earn credits. These measures ensure that students meet the graduation requirements of their new majors upon completion of their studies.

4. System, Concepts, and Organization of Examinations

4.1 Examination Methods

To standardize the management of undergraduate course assessments, promote classroom teaching reform, enforce examination discipline, establish good teaching and learning practices, and improve the system of academic evaluations to enhance the quality of talent cultivation, Hunan City University has developed the "Hunan City University Regulations for Undergraduate Course Assessments and Grade Management in Full-time Higher Education" (**Appendix C-1**), in accordance with relevant document guidelines and the actual circumstances of our institution.

Assessments are categorized into two types: examinations and evaluations. Examinations primarily involve closed-book written tests, although open-book exams may be administered as required by the course. Evaluation courses must not use closed-book exams. The distinction between examination and evaluation courses is defined according to the curriculum plans. Exam content must cover the expected learning outcomes specified in the course syllabus (**Appendix B-1**) and must be detailed in the Hunan City University Exam Question Development Review Form (**Appendix C-2**).

Evaluation courses may utilize various forms such as oral exams, reviews, and defenses, emphasizing the students' learning processes and understanding of the material. Practical components like comprehensive graduation training, course design, educational internships, and production internships are generally assessed through reviews or defenses (**Appendix A-12**). Course evaluation grades can be calculated using a percentage system, or a five-level grading scale: 90–100 for excellent, 80–89 for good, 70–79 for average, 60–69 for pass, and below 60 as fail. Special types of courses may adopt other grading systems upon approval. For instance, in the case of comprehensive graduation training, the assessment includes instructor review, reviewer's evaluation, and a live defense. The total score (percentage system) is calculated as follows: Instructor's review score × 40% + Reviewer's evaluation score × 30% + Defense panel score × 30%. The grading by the instructor and reviewer, as well as the live defense score, are conducted according to the corresponding scoring standards. The final outcome is assessed using the five-level grading system.

Examination courses primarily employ closed-book written exams, though open-book exams may be conducted as required by the course. Typically, exam scores account for 60% of the final grade, while continuous assessment makes up 40%. The proportion of final exam scores to continuous assessment can be adjusted based on the course's instructional requirements. Continuous assessment must establish a process-oriented evaluation mechanism, involving three or more assessment types to ensure diversity, standardization, verifiability, and traceability. Assessment methods include pre-class online preparation and discussion, in-class questions, class discussions,

mid-term tests, unit tests, experiments, homework, course papers, and attendance. The experiment component's score must comply with the teaching (examination) syllabus. Regular grades must be documented and reflected on the "Hunan City University Student Grade Record Form" (**Appendix C-3**), and once established, these grades are not subject to change. For example, in the Water and Sewage Network Systems (1) course, assessments include formative evaluations and a final exam. Formative assessments cover class performance and homework. The final exam is a closed-book written test. The weighting and calculation of the total score are as follows: Total course grade = Continuous assessment × 20% + Homework × 20% + Final exam × 60%. Attendance is calculated based on attendance rate, using a deduction system where full marks are 100, each absence deducts 10 points, and four absences set the attendance score to zero; being late or leaving early deducts 5 points per occurrence. Homework is graded on a percentage scale, with the average score factored into the continuous and total grades according to the respective weights. The final exam is graded according to exam paper scoring standards.

Course assessment results are recorded as a comprehensive evaluation score in the student's records. This overall score includes regular performance and final exam scores. Principally, regular performance accounts for 30% to 50% of the overall course evaluation, while final exam scores make up 50% to 70%. A total score of 60 points indicates a pass; only those who pass the overall evaluation will earn credits for the course. Starting from the second term of 2024, if the final exam score is below 45 points (previously 40 points), regular performance will not be considered in the course's total evaluation, nor will credits be awarded, with the score calculated based on the exam results alone.

The specific composition of the examination format and total evaluation score is clearly outlined in the course syllabus, allowing students to understand the examination format and the specifics of the total evaluation score upon course enrollment.

Assessments of students' moral character are primarily based on the "Code of Conduct for Students in Higher Education Institutions," employing individual summaries and democratic evaluations to write comments and assign scores based on actual performance.

Physical education at Hunan City University is assessed according to the national "Standards for Physical Education and Its Implementation Methods" and the "Hunan City University Physical Education Assessment Methods." The assessment for university sports combines regular performance (40%) with end-of-term performance (60%). Regular performance assessment includes morning run scores: 70 kilometers for passing, 110 kilometers for full marks, and so on; end-of-term performance consists of three parts: 1) fixed-point basketball shooting (30% of the end-term score);

2) 1000 meters for males / 800 meters for females (40% of the end-term score); 3) push-ups for males / sit-ups for females (30% of the end-term score).

The grade for public service work is primarily based on the student's attendance, work attitude, discipline, and task completion.

The assessment score for military training is mainly based on the completion of the military training teaching plan.

All courses are assessed using a credit point system. The credit point is a measure of the quality of student learning, and the "Hunan City University Full-Time Undergraduate Course Assessment and Grade Management Measures" (**Appendix C-1**) provides the relationship between assessment grades and grade points, as shown in Table 4-1:

Table 4-1 Relationship Between Assessment Scores and Grade Points

Percentile Score Percentile results	Grade Level Grade	Grade Points Grade point	Median Points Median Grade point
90～100	Excellent	4.0-5.0	4.5
80～89	Good	3.0-3.9	3.5
70～79	Average	2.0-2.9	2.5
60～69	Pass	1.0-1.9	1.5
Scores below 59	Fail	0	0

Note: For a percentile system, an assessment score of 90 equates to a 4.0 GPA, 91 equates to a 4.1 GPA, and so forth; scores below 60 equate to a 0 GPA. For a grading system, an assessment score of Excellent equates to a 4.5 GPA, Good to a 3.5 GPA, Average to a 2.5 GPA, Pass to a 1.5 GPA, and Fail to a 0 GPA.

The formula for calculating GPA is:

Score < 60, GPA = 0

Score ≥ 60, GPA = (Score - 50) / 10

The formula for calculating the GPA of a course is:

GPA of a course = Grade Points x Course Credits

The formula for calculating the average GPA for a semester, academic year, or graduation is: Average GPA = ∑ (Grade Points x Course Credits) / ∑ Course Credits. See **Appendix C-4** for the failure rates of some representative courses and the statistical failure rate data of each grade.

Comprehensive graduation training is an integral part of the undergraduate professional training undertaken before graduation. It is a vital practical segment where students apply their foundational knowledge, basic theories, and skills, learn fundamental methods of scientific research or engineering design, receive basic training in scientific research, and cultivate their innovation,

practical abilities, and entrepreneurial spirit.

In the eighth semester, a 14-week bachelor's degree thesis is scheduled, requiring students to independently complete their projects under the guidance of a supervisor, following the "Hunan City University Undergraduate Comprehensive Training Management Regulations" (**Appendix A-13**). The thesis topic, student tasks, and timeline are detailed in the task description for the graduation thesis (**Appendix C-5**). Once the thesis topic is chosen, students can access all pertinent information through the task description. During the thesis process, students are required to maintain contact with their supervisor both online and offline, providing at least a weekly written update on progress and main issues needing resolution. Supervisors are expected to assess progress and address issues in these reports to ensure timely completion and the accuracy and appropriateness of the thesis. The final grade for the comprehensive graduation training is determined by combining evaluations and grades from the supervising teacher, reviewers, and defense panel (refer to the Graduation Design Grade Evaluation Form, **Appendix C-6**). After the comprehensive training concludes, each department must report the results to the academic affairs office promptly, conduct a self-evaluation, and summarize the activities. The school conducts special inspections or spot checks on the comprehensive graduation training. For papers, reports, comprehensive graduation training and other assignments of some representative courses, see **Appendix C-7**.

Students can view the results of all course assessments by logging into the educational system using their student ID and password. The student grade inquiry interface is illustrated in Figure 4.1.

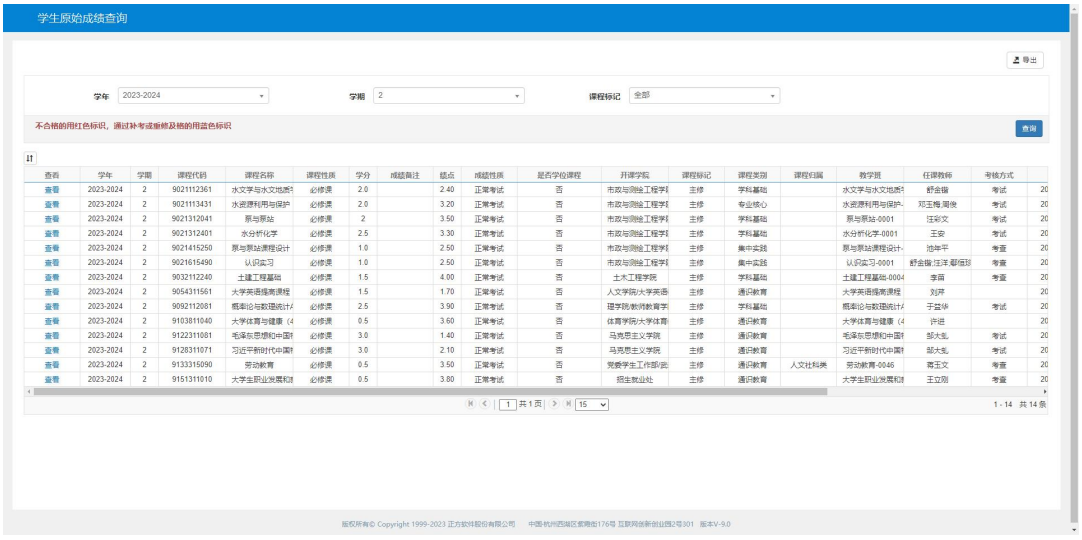


Figure 4.1 Student Grade Inquiry Interface

4.2 Organization of Examinations

Exams for general education courses are centrally planned and scheduled by the Academic Affairs Office, typically during weeks 19 and 20 of each semester (finals week). Assessments for major and foundational courses are organized by the respective faculties, with course evaluations

typically completed within or two weeks after the end of teaching. Examinations should ideally be concluded by week 18. Exam schedules and locations are meticulously arranged by each department and the Academic Affairs Office's Exam and Student Records Management Center to ensure that the facilities meet the requirements for regular examinations, with details published in the teaching management system. If there is any violation of discipline or cheating in the examination, it shall be handled in accordance with the Measures for Handling Students' Violation of Discipline and Cheating in the Examination of Hunan City University (**Appendix C-8**).

Exams are organized according to the examination management organization method of Hunan City University (**Appendix C-9**). The evaluation of exam papers for general courses is centrally organized by the college offering the course, while the evaluation for major and foundational courses is managed by the respective faculties. Faculties must organize instructors to grade papers at designated locations as required by the Academic Affairs Office, and instructors are strictly prohibited from taking exam papers home for grading. Grading must be based on the answer key and scoring criteria, and these standards cannot be altered during the grading process. After grading, instructors must analyze the exam papers, complete the "Hunan City University Exam Paper Grade Analysis Form" (**Appendix C-10**), and provide feedback and suggestions for improvement regarding student performance, question quality, and teaching methods.

4.3 Course Deferred Examinations, Make-up Examinations, and Retakes

Under normal circumstances, students are not eligible to request deferred examinations. However, if they meet the relevant university requirements, they can apply for deferrals, which should typically be processed three days before the scheduled exam date. In exceptional cases, applications can be processed within one week after the exam date. Deferred examinations are not permissible for assessment courses. If a student is unable to take the deferred exam within the standard makeup exam period due to special reasons, they may apply for one additional deferral. The deferred exam grade is calculated by weighting the continuous assessment and the exam score, with teachers entering the continuous assessment grades for deferred exams at the end of the term. The grade point for a deferred exam credit is calculated as 1.0.

Any student who fails the assessment of a course from the previous semester (excluding courses such as course design and other concentrated practical teaching components) may take a make-up examination for the same course in the following semester. The make-up examination will use a backup version of the final exam paper. The make-up exam is organized by the Academic Affairs Office in coordination with the relevant departments (schools/centers), and the exam will be scheduled before the start of the next semester. The make-up exam scores will be recorded in the grading system according to the actual exam results. If the make-up exam score reaches 60 (on a

100-point scale) or "pass" (on a grading scale), the GPA will be calculated as no higher than 2.0, as per Article 38.

For courses not passed in the supplementary examination, students may apply and pay for a retake within a specified period, without a limit on the number of retakes. In principle, students should not retake more than three courses in one semester (excluding experiments, practical training, internships, and course design). Course retakes are generally completed and assessed during the corresponding semester of the next academic year, with two methods of retake: class-based retakes and batch-based retakes. Retake classes are treated like regular classes, with attendance and assessments conducted normally, consisting of both final and continuous assessment grades. Students permitted to retake due to unsatisfactory grades are recorded with the actual grade earned upon passing the retake exam and are awarded the respective credits with the note "retake" indicated, as detailed in **Appendix C-1**.

4.4 Review and Appeal of Exam Results

Once students' grades are submitted, they should not be changed in principle. If errors are indeed present, they must be corrected strictly according to the specified procedures. Adjustments for the original final grades by teachers, competition scores weighting, and talent scores weighting must be completed within one month after the start of the second semester; no changes to grades will be made after this deadline. Grade adjustments apply only to errors from the previous semester and changes in weighted competition scores. If students fail to meet the weighting deadline, the Academic Affairs Office will no longer accept requests, and any expired awards for grade weighting will be voided, with students bearing responsibility. If teachers fail to make the necessary grade changes within the stipulated time without a valid reason, or if failure to change grades results in harm to students' rights, it will be handled in accordance with the "Hunan City University Teaching Incident and Teaching Negligence Identification and Handling Procedures."

Students who have legitimate concerns about their course grades may apply for a review. The application for review must be submitted within one month of the start of each semester; requests at other times will not be considered. Grade reviews are limited to final assessment courses from the previous semester and are restricted to total score reviews only. Any changes from a grade review must be finalized within one week after the review period ends.

Procedure for Review and Modification of Exam Results:

(1) Students must download the "Hunan City University Student Application for Grade Inquiry and Change Review Form" from the Academic Affairs Office website, fill in the reasons for requesting a grade review, and submit the form to the academic office of their college.

(2) After the deadline for accepting applications, the academic office of the student's college should forward the application to the college leader in charge of academic affairs for signature approval. The leader will then arrange for a teacher to review the exam papers, and the results must be signed by both the reviewing teacher and the academic leader.

(3) If there is a change in the reviewed grade, the reviewing teacher must fill in the grade change details in the "Hunan City University Student Application for Grade Inquiry and Change Review Form" and attach the relevant supporting documents (such as copies of the student's exam papers). The document, signed by the reviewer and the academic leadership, should be stamped with the college's seal. The form is then submitted to the deputy director of the Academic Affairs Office for approval, and then to the Examination and Academic Records Management Center for the change of grade. For further details, see the Student Appeal Handling Measures of Hunan City University (**Appendix C-11**).

5. Resources

5.1 Faculty Strength

The School of Municipal and Geomatics Engineering boasts a teaching faculty characterized by an appropriate age and academic structure, high overall quality, and deep academic expertise. The school currently has a total of 68 staff members, all of whom are full-time teachers, with a student-to-teacher ratio of 27:1. Among these teachers, 28 hold doctoral degrees, constituting 41.18% of the faculty, and 25 have senior professional titles, representing 36.76% of the staff. The team includes 38 young teachers under the age of 40, making up 35.19% of the faculty. Additionally, 80 teachers are both professionally and technically skilled, accounting for 74.77% of the faculty. The academic team includes one recipient of the State Council Special Allowance, one Furong Scholar, four provincial leaders in science and technology entrepreneurship, one leading scholar of Hunan universities, six young backbone teachers from Hunan universities, and four skilled young teachers from Hunan Province.

5.1.1 Composition of Faculty

The Department of Water Supply and Drainage Science and Engineering 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. The faculty structure is as follows:

Title Structure: Among full-time teachers, 6 are senior professors, accounting for 28.5%, 7 are associate professors, representing 33.5%, and 8 are at an intermediate level, comprising 38%.

Educational Structure: Among the full-time teachers, 10 hold doctoral degrees, representing 47.6%, 8 hold master's degrees, accounting for 38%, and 3 have bachelor's degrees, comprising 14.4%. In total, 85.6% of the faculty possess at least a master's degree.

Age Structure: 8 teachers are over 45 years old, accounting for 38%, 8 are between 35 and 45 years old, also making up 38%, and 5 are under 35, representing 24%. Teachers under the age of 45

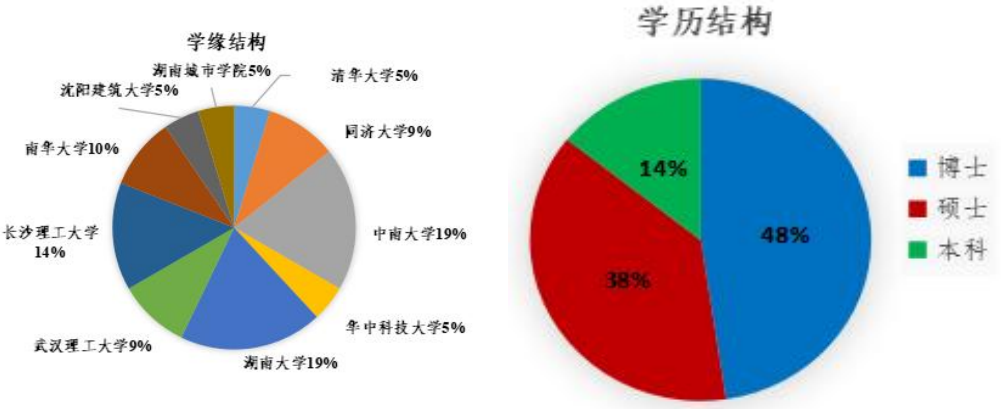
constitute 62% of the faculty, resulting in a balanced team with a combination of older, middle-aged, and younger members, primarily centered around mid-career and younger faculty.

Academic Background: The faculty graduated from prestigious institutions such as Tsinghua University, Tongji University, Hunan University, Central South University, and Wuhan University of Technology. The primary academic disciplines are municipal engineering and environmental engineering, ensuring a well-rounded academic structure.

Professional Background: Currently, there are 17 full-time teachers specializing in this field, including 14 whose first academic degree was in water supply and drainage engineering, accounting for 80% of the faculty; an additional 4 teachers have backgrounds in closely related fields, comprising 20% of the department.

All faculty involved in teaching courses and practical sessions in this program have clear research directions and experience in research within this field. All 21 faculty members (100%) have at least six months of engineering practice experience, five have industry work experience, and four hold Registered Equipment Engineer qualifications. All teachers possess extensive engineering experience and communication skills, ensuring their engineering backgrounds meet the professional teaching requirements.

In summary, the faculty composition of this program, including aspects such as academic titles, educational background, age distribution, and academic affiliations, meets the accreditation standards. The structure of the faculty is shown in Figure 5.1.



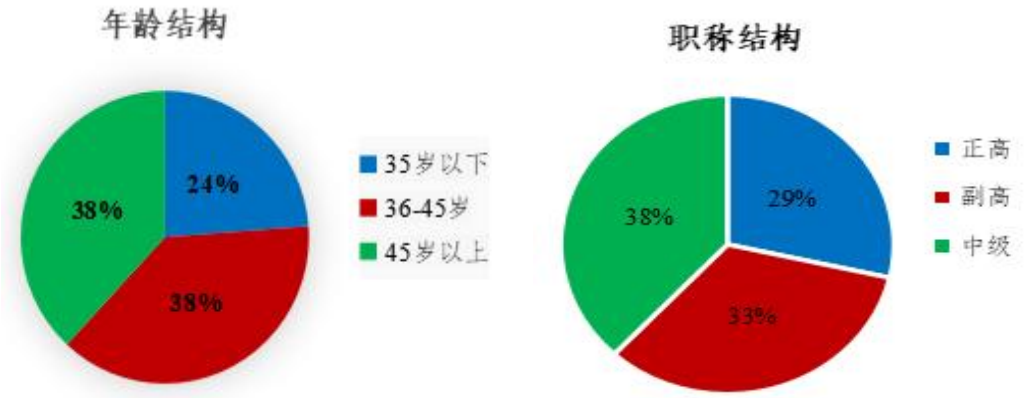


Figure 5.1 Faculty Structure of the Program

5.1.2 Faculty Teaching and Research Development

The Water Supply and Drainage Science and Engineering program 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-2**.

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-3**.

5.1.3 Teaching Workload

Hunan City University has set specific requirements for faculty teaching loads as part of title evaluation and job performance assessments. The "Hunan City University Job Performance Evaluation and Distribution Methods" stipulate that professors and associate professors in teaching and research positions must undertake undergraduate teaching duties, delivering at least one undergraduate course, with a yearly average teaching workload of over 300 standard hours in the last three years. The "Hunan City University Higher Education Faculty Title Recommendation and Review Implementation Methods (2022 Revised Version)" mandates that faculty up for promotion

to professor or associate professor must have completed over 300 teaching hours in the past five years, while lecturers must reach over 280 teaching hours. The performance evaluation and distribution methods specify workloads for various ranks: full professor at 300, associate professor at 320, and assistant professors at 320 standard hours. The university also has regulations in the "Hunan City University Teaching Workload Calculation and Management Methods," which clearly define how teaching loads are calculated. Full-time faculty in this program must meet the annual standard workload set by the university. The majority of faculty are involved in supervising graduation projects (theses), ensuring that no supervising faculty member oversees more than eight graduates per academic year. Beyond essential theoretical instruction, each teacher must provide ample guidance, homework grading, and mentorship on innovation and entrepreneurship. Serving as an academic mentor and guiding students in accredited projects for scientific innovation is a significant factor in faculty promotions. These measures ensure that every student in this program receives sufficient guidance on coursework and extracurricular assignments, helping them meet the curriculum requirements of the training plan and achieve the competencies needed for their discipline, as stipulated by the training objectives.

In addition to general English courses, specialized English courses like "Professional English for Water Supply and Sewerage Engineering" have been established to cultivate students' international communication skills and provide a conducive environment for learning and exchanging professional English.

5.2 Faculty Development

5.2.1 Relevant Training

New teacher pre-service training: In accordance with the requirements of the Hunan Provincial Department of Education's notice on organizing the pre-service training and examination (review) for university teachers in 2024, all newly employed personnel engaged in educational and teaching activities at universities, including full-time teachers, counselors, laboratory technicians, other professional technical positions, administrative staff, and those transitioning from non-full-time to full-time teaching positions, are required to participate in pre-service training organized by the school. The training consists of two parts:

(1) Pre-service Training for New Teachers: According to the requirements of the Hunan Provincial Department of Education's "Notice on the Pre-service Training and Examination (Verification) Work for University Teachers in 2024," all newly employed individuals engaged in education and teaching at universities, including full-time teachers, counselors, laboratory technicians, other professional technical staff, administrative personnel, and those transferring from part-time to full-time teaching positions, must participate in the pre-service training organized by the

university. The pre-service training consists of two parts:

The first part includes 136 hours of course training, with 24 hours dedicated to "Professional Ethics for University Teachers," 36 hours to "Higher Education Studies," 32 hours to "Psychology of Higher Education," 15 hours to "Introduction to Higher Education Regulations," and 29 hours to "Teaching Skills for University Teachers."

The second part involves campus-based training. Each participating teacher is paired with a mentor who possesses high moral standards, extensive teaching experience, and at least an associate senior professional title. The mentor guides the comprehensive assessment of the "Teaching Skills for University Teachers" course. The pre-service training assessment consists of two parts: the course examination and the comprehensive evaluation. The course examination covers the subjects taught during the course training. The comprehensive evaluation is organized by the school and conducted by experts who assess the trainee's course training information, notes from classroom observations during their internship, a 15-minute micro-teaching video, and materials related to the video such as the teaching plan and reflective analysis.

The recognition of qualifications for teaching courses is organized by the faculty (department/center). A panel of experts, consisting of committee members and key faculty of the respective courses, evaluates the applicant's trial lecture to determine their eligibility to teach the course. Teachers recognized as "qualified to teach the course" may independently handle the teaching responsibilities of the course. Those recognized as "basically qualified" are deemed to need further enhancement of their teaching skills; hence, the faculty (department/center) or department (teaching and research office) should arrange for a course mentor to guide and assist them in teaching the course.

(2) Young Teacher Mentorship System: To enhance the development of young teachers, Hunan City University implements the Young Teacher Mentorship System as per the "Implementation Methods for the Mentorship System for Young Teachers (Revised)" (see **Appendix D-4**). The university assigns a mentor with at least an associate professorship to each newly appointed young teacher to fully utilize the mentor's role in "transmitting, helping, and leading." This mentorship aims to foster the ethical, pedagogical, and research capabilities of young teachers, ensuring the steady improvement of teaching quality and overall faculty development. Mentors guide their mentees in understanding the principles and methodologies of higher education and research, with the mentorship typically spanning two years. Upon their entry, new teachers must quickly familiarize themselves with the teaching process and acquire the necessary skills for teaching and research under the guidance of their mentors to qualify as proficient university educators.

The list of mentors for young teachers in the Water Supply and Drainage Science and

Engineering program is detailed in **Appendix D-5**.

(3) Individual Career Planning for Teachers: To further strengthen faculty development and enhance the university's overall competitiveness, Hunan City University has established and implemented "Individual Career Planning for Teachers." This plan provides clear guidance on teachers' research disciplines, key research directions, research objectives (including short-term, medium-term, and long-term goals), plans for further education and social practice, teaching plans, and applications for teaching and research projects. Additionally, the university has introduced the "Regulations on In-service Ph.D. Studies for Faculty Members (Trial)" to encourage young faculty to pursue doctoral degrees while working. This initiative aims to optimize the faculty structure, cultivate a reserve of young innovative talents with international perspectives and potential for development, encourage doctoral candidates to produce high-level research outcomes, and promote the high-quality development of the university.

(4) Secondment and Overseas Study Programs: To strengthen the development of "dual-profession" and high-level faculty, Hunan City University encourages teachers to intern at companies for one year or serve as regional enterprise science and technology envoys for three years, and to study at other universities for one year. The university aims to establish a new integration mechanism for teachers to act as both educators and engineers. Many faculty members in this discipline collaborate on technological projects with enterprises, helping to solve practical technical challenges, and some have industry experience. Additionally, in accordance with the "Hunan Province Policy for Mid-Career and Young Faculty Members as Domestic Visiting Scholars" and "Hunan City University Management Regulations for Scholarly Visits and Studies," the university annually selects young key faculty members to study and research at prestigious universities, typically for one year, with the aim of strengthening the development of leading academics and enhancing academic standards.

5.2.2 Relevant Funding

The Education Department of Hunan Province provides multi-level and diverse forms of financial support to teachers in Hunan's general higher education institutions to enhance their professional academic research and teaching capabilities. Among these, the department implements the "Hunan Province Policy for Mid-Career and Young Faculty Members as Domestic Visiting Scholars," which offers financial support for young key faculty participating in domestic visiting scholar programs, with funding of 0.5 thousand RMB per project.

Hunan City University provides research start-up funds to newly hired faculty members, offering 100,000 RMB per person for young teachers with a doctoral degree. Since 2019, the university has implemented the "351 Talent Program," which includes three levels of talent plans for

academic leaders, academic pioneers, and academic backbone personnel. The funding amounts range from 160,000 to 400,000 RMB. For details, see **Appendix D-6** (Human Resources Department).

5.3 Institutional Environment, Financial and Material Resources

5.3.1 Introduction to the University

Hunan City University is a full-time undergraduate institution sponsored by the Hunan Provincial Government. In March 2002, with approval from the Ministry of Education, it was established through the merger of Hunan Urban Construction College (a national model higher vocational college) and Yiyang Teachers College. The university adheres to the Party's educational policies, upholds the fundamental task of fostering virtue through education, and embraces the motto "Excellence in character and learning, unity of knowledge and action," striving to be a university that satisfies the people. In 2012, it was recognized as one of the second batch of "National Model Universities for Graduate Employment." In 2014, it became a pilot unit for informational construction under the Ministry of Education. In 2018, it was listed among the "High-Level Application-Oriented Colleges" in Hunan Province. In 2020, it was upgraded to the first-tier of undergraduate admissions in Hunan and included in the province's "Comprehensive Reform Pilot of Holistic Education." In 2021, it was authorized as the only new institution in Hunan Province to confer master's degrees. In 2022, six disciplines were selected for the provincial "Fourteenth Five-Year Plan" for application-oriented specialties, and it received approval for four national and provincial top-tier undergraduate programs and 29 top-tier undergraduate programs in Hunan. In 2023, it began independently recruiting its first batch of master's students. In 2024, it added eight new master's degree authorization points, covering all disciplines comprehensively, and officially commenced the construction of its new campus (West Garden District).

Hunan City University spans 1415 acres with a built-up area of 592,500 square meters and fixed assets totaling 1.543 billion yuan. The library houses over 2.84 million volumes of printed books and more than 2.28 million electronic books. The university employs 1475 full-time faculty members, including 141 senior professors and 429 with doctoral degrees. It boasts 138 instances of national and provincial high-level talents, including members of the Ministry of Education's Undergraduate Teaching Guidance Committee and recipients of the State Council Special Allowance. The university offers one national-level top-tier undergraduate course, 66 provincial-level teaching teams, and one high-level provincial research team. It comprises 14 faculties and offers 56 undergraduate programs primarily in engineering, but also in sciences, humanities, management, education, arts, economics, law, and agriculture, making it the most comprehensive institution for urban construction in Hunan Province and known as the "cradle of urban construction

talent." The university recruits students from 30 provinces, municipalities, and autonomous regions, with a current full-time undergraduate student body of 25,178. It has 12 authorized master's degree points and 114 postgraduate students enrolled.

Hunan City University aims to cultivate high-quality applied talents and has developed a "1234" system for applied talent education. This approach prioritizes the development of student capabilities, integrates ideological and political education, and innovation and entrepreneurship education throughout the talent training process. Through three major course modules—fundamental abilities, professional skills, and developmental capabilities—the system meets the education requirements of solid foundations, strong applications, distinct characteristics, and high quality. The university proactively serves national strategic needs and Hunan's "Three Highs, Four News" vision, aligning with industry and industrial needs while enhancing professional content in urban construction, strengthening information manufacturing, innovating management services, and solidifying teacher education. The Urban and Rural Planning program is a national-level featured and comprehensive reform pilot program. Urban and Rural Planning, Electronic Information Engineering, Civil Engineering, and Engineering Management are national-level top-tier undergraduate programs, while Mechanical Design, Manufacturing and Automation, Landscape Architecture, and Sports Education are provincial-level top-tier undergraduate programs, with 78 provincial or higher-level top courses and elite courses. The university has amassed three national-level and 39 provincial-level teaching achievement awards.

The university boasts 52 provincial-level or higher teaching platforms, including a national-level experimental teaching demonstration center for civil engineering and a school-enterprise cooperative talent training model base for electronic information majors. The civil engineering national-level experimental teaching demonstration center was rated as excellent during the Ministry of Education's on-site inspection and received funding of 100 million yuan for further development. In partnership with Huawei Technologies Co., Ltd., Hunan Keruite Technology Co., Ltd., and Hunan Aihua Group Co., Ltd., the university established the Electronic Information Modern Industry Academy, which is recognized as a modern industry academy in Hunan Province, and founded the first "Rural Revitalization Planning Academy" in Hunan. The university has signed over 400 cooperation agreements for industry, study, and research, and internship bases with companies, including China National Nuclear Corporation (CNNC), China State Construction Engineering Corporation (CSCEC), and China Railway Engineering Corporation (CREC). It operates two school-owned enterprises, a Design Research Institute and a Civil Engineering Testing Center. The Design Research Institute holds Class A qualifications in urban-rural planning, architectural engineering, and municipal roads, among others. Recognized as a "National High-tech Enterprise,"

the institute generates over 200 million yuan in annual output value and has provided planning and design services to over 200 counties and townships throughout the province and beyond.

The university boasts six Hunan Province "Double First-Class" application-oriented disciplines in civil engineering, urban and rural planning, information and communication engineering, management science and engineering, chemical engineering and technology, and Chinese language and literature. It hosts 43 provincial-level or above scientific research and innovation platforms, including a national-level makerspace, the Hunan Provincial Key Laboratory for Digital Urban-Rural Spatial Planning, the Hunan Provincial Key Laboratory for Dark Tea Golden Flowers, the Hunan Provincial Research Center for the Chinese Socialism Theoretical System, and a collaborative R&D center with post-doctoral research stations. Recently, the university has secured 60 national projects from the National Natural Science Foundation and the Social Science Fund, among others. It has received 24 national and provincial awards for scientific and technological achievements and excellent social science project results. Planning and architectural design achievements have garnered over 150 industry awards at the provincial level and above, including 14 national awards. The achievements in rural revitalization planning for the New Ximen Village in Turpan city were highly praised by President Xi Jinping; the "Spatial Development Strategy for the Ecological Green Heart Region of Changsha-Zhuzhou-Xiangtan" won first place in an international tender; the "Township and Village Green Space Classification Standards" developed by the university were approved as a national industry standard by the Ministry of Housing and Urban-Rural Development. The "Global Cynics" doctoral team from the School of Information and Electronic Engineering has acquired over 40 intellectual property rights in core technologies for wildlife satellite tracking and three internationally advanced-level achievements, which have been reported by CCTV's Xinwen Lianbo and featured in National Geographic. The university was granted a Provincial College Intellectual Property Center, ranking among the top in the province for technology contract transactions. It leads the Provincial Urban Science Research Society and the newly established Hunan Institute of New Urbanization, selected as a provincial specialized characteristic think tank. The university's Urban Studies Journal is ranked among the "Top 100 University Social Science Journals in China," "Top Ten Journals of Local Universities in China," "China's High-quality Social Science Journal of Humanities," and is a core journal in the Chinese social sciences, serving as the official journal of the Urban-Rural Governance and Policy Research Committee of the Chinese Society for Urban Studies.

The university upholds an open education approach, achieving significant outcomes in international cooperation and exchanges. It has established a joint undergraduate program in Visual Communication Design with Victoria University of Technology in New Zealand and has

collaborated with the University of Cape Coast, Ghana, to set up a Confucius Institute, making it the first among similar institutions in the province. With the university's proactive efforts, Chinese has officially been incorporated into Ghana's national education system. The university has hosted two international academic conferences on urban construction in China and Africa, inviting over 20 universities and more than 1,000 scholars, government officials, and international students from China and Africa, providing a comprehensive platform for deepening cooperation between China and African countries. The university has been successfully approved as a member of the "China-Africa Universities Consortium" by the Ministry of Education.

5.3.2 Introduction to the School

The School 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.

The Building Environment and Energy Application Engineering major originated from the "Hydroelectric Equipment Installation" program started in 1997, renamed "Building Equipment Engineering" in 1998, and began enrolling undergraduates in 2005, finally being renamed "Building Environment and Energy Application Engineering" in 2013. Graduates from this major can work in municipal, design, construction, environmental protection, research institutions, and other

government departments and enterprises in planning, design, management, research, and teaching.

The Geomatics and Geo-Informatics major group traces its origins to the Geomatics Teaching and Research Section established in 1984, began enrolling students in Geographic Information Systems in 1999, Geographic Information Science undergraduates in 2004, Geomatics Engineering undergraduates in 2005, and was approved to enroll students in Geospatial Information Engineering in 2022. Geomatics Engineering is designated as a "First-Class Major" construction site in Hunan Province, and our school is the only institution in the province that offers a major in Geospatial Information Engineering. Graduates of this major group can engage in data collection, analysis, and application development in government departments such as natural resources, planning, environmental protection, forestry, transportation, and meteorology, or work in Geomatics institutes, GIS, and related urban construction companies doing data processing, technical support, and software 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 Laboratories

To ensure the normal and efficient conduct of undergraduate laboratory teaching, the school has established a comprehensive experimental teaching management system in accordance with the university's regulations and policies. The details of the relevant management system documents are outlined in **Appendix D-7**. The director of the Experimental Center is responsible for organizing the implementation and overseeing compliance.

(1) Management Organization

The Laboratory Center of the School of Municipal and Geomatics Engineering was established in 2017, with a total building area of 3,185.06 square meters and equipment assets valued at 11 million RMB. The laboratory center is jointly managed by the university and the school. The university provides guidance on asset and safety management through the Laboratory Asset Management Office and the Security Office, while offering policy support, staff appointments, project approvals, and funding for construction. The school is responsible for the allocation and use

of laboratory rooms and assets, as well as for performance evaluations of the laboratory center. The laboratory center is primarily responsible for the daily management and maintenance of laboratories and equipment. It operates under a director responsibility system, where the main duties of the director include overall coordination and academic guidance, overseeing laboratory teaching and development, managing the laboratory, and providing both internal and external services.

(2) Management Responsibilities

To enhance the construction and management of the laboratory facilities at the school of Civil Engineering and Geomatics, strengthen the laboratory team, and improve the quality of experimental teaching and research, the management of the Experimental Center involves multiple levels: the university's Laboratory Asset Management Office, the school's associate dean responsible for laboratories, the directors and assistant directors of the Experimental Center, and laboratory administrators. This tiered management structure ensures systematic and coordinated operations. The university's Laboratory Asset Management Office oversees macro-level coordination and unified planning, with each management tier having clearly defined responsibilities to ensure the normal functioning of experimental teaching. This approach fosters scientific management, teamwork, and continuous improvement in the quality of experimental teaching, research, and administrative efficiency.

(3) Safety Management

The school of Civil Engineering and Geomatics has established the "Laboratory Environment and Safety System" to strengthen safety education and practice for students and ensure the normal conduct of experiments. In addition to posting computer usage rules and laboratory safety protocols, it also provides essential safety reminders to ensure students operate safely during experiments. Before entering any laboratory, students must undergo safety training, understand the regulations regarding safe laboratory operations, sign a safety commitment, and complete a safety training course and exam. Only those who pass the safety test are allowed to enter the laboratories. The university's security office and the school's safety officers aim to enhance students' safety awareness by conducting various forms of safety training. These include watching safety videos, completing fire safety questionnaires, and learning to use fire extinguishers on-site. All faculty and students participate in biannual fire safety and evacuation drills in the laboratory building to ensure constant preparedness.

The school closely adheres to university and national safety management regulations, including "Hunan City University Laboratory Safety Management Methods," "General Regulations for the Safe Management of Hazardous Chemicals in University Laboratories," "Hunan City University Laboratory Work Regulations," and the "school of Civil Engineering and Geomatics Laboratory

Environment and Safety System." In collaboration with the Security Office and the Asset and Laboratory Management Office, the school participates in an annual safety meeting. These meetings cover topics such as safety practices, laboratory norms, personal protective equipment, safety devices, electrical and chemical safety, waste management, and emergency evacuation procedures. Additionally, a safety self-inspection report is submitted to the university following these discussions.

(4) Equipment Management

The laboratory places high importance on the management of instruments, equipment, and devices. It has established the "school of Civil Engineering and Geomatics Management Methods for Experimental Materials and Low-value Consumables" and the "school of Civil Engineering and Geomatics Equipment Management System." These regulations aim to enhance the efficiency and extend the lifespan of instruments and equipment; they also reduce material consumption and prevent damage, loss, accumulation, and waste, ensuring the orderly progress of professional experimental teaching and research. All equipment manuals and technical documents are meticulously registered in the equipment ledger upon receipt, clearly assigning the purchaser and custodian. Routine maintenance is handled by the lab custodians, while usage and maintenance during the teaching period are primarily the responsibilities of the purchaser and user, with custodians facilitating coordination. Special equipment is kept in specific laboratories, which are responsible for regular maintenance, calibration, and accuracy checks. For high-value, rare, and sensitive equipment purchased with key subject funds, the specific purchaser, storage room, and custodian are designated at the time of inventory. The laboratory assigns experienced personnel for exclusive management, responsible for establishing and maintaining the equipment ledger and records.

(5) Equipment Maintenance and Borrowing

The school has implemented the "school of Civil Engineering and Geomatics Equipment Management System." Routine maintenance of the experimental equipment is conducted by the custodian, who reports the condition of the equipment at the end of each semester. If equipment is damaged or malfunctions, the custodian must report the issue within a week, determine the cause, and arrange for timely repairs. Maintenance records should be meticulously kept and filed in the equipment archives. Lending out equipment is permitted only under conditions that do not hinder teaching or research activities and must be approved by the relevant supervisory leaders. Upon return, the custodian must promptly inspect the equipment; any damages must be compensated for by the borrower. A register is maintained to record the dates of loan and return, with proper clearance procedures conducted upon the item's return.

(6) Discipline-Specific Laboratories

In our department, practical training involves metalworking internships and basic experiments, such as metalworking and chemical experiments. The school of Civil Engineering and Geomatics's Experimental Center houses three specialized labs: the Water Supply and Drainage Engineering Lab, the Building Environment and Equipment Engineering Lab, and the Geomatics Practice Teaching Center. The center features 28 undergraduate teaching laboratories and offers over 40 different experimental courses annually to more than 4,000 students. The Geomatics and Civil Engineering Experimental Teaching Center is equipped with various labs, including experiments for water analysis chemistry, water treatment biology, hydraulics, water quality engineering, pumps and pumping stations, and building water supply and drainage engineering. These labs primarily conduct fundamental and comprehensive professional experiments, with the rate of comprehensive and design-based experiments reaching 95%. For a detailed introduction to the main laboratories, please refer to **Appendix D-8**.

5.3.4 Discipline-Specific Research Platforms

Our 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.

The School of Municipal and Geomatics Engineering currently houses over 20 research laboratories, offering strong support for the scientific research of both faculty and students. In the past five years, students from the Water Supply and Drainage Science and Engineering program have actively participated in various competitions, including national college students' energy conservation and emission reduction social practice and science and technology competition, the "Beikong Water Affairs Cup" and the "Challenge Cup" national college students' extracurricular academic and scientific works competition, the National College Students' Internet Plus Innovation and Entrepreneurship Competition, and college students' innovation and entrepreneurship training projects. Details on participation and awards can be found in **Appendix D-9**.

Currently, the school has signed internship base agreements with twelve companies, including Yiyang City Water Company, Yiyang Tuanzhou Wastewater Treatment Plant, Ningxiang Water Company, Hunan Fourth Engineering Co., Ltd., Beijing Municipal Engineering Design & Research Institute Co., Ltd. Hunan Branch, Panhua Construction Group Co., Ltd., Hunan Provincial Architectural Design Institute Group Co., Ltd., and Zhongxiang Overseas Construction Development Co., Ltd., providing internship bases for students of Water Supply and Drainage Science and Engineering. Further details are available in **Appendix D-10**.

5.3.5 International Exchange and Collaboration Platforms

The university is committed to openness in education, achieving significant success in international cooperation and exchange. It has established close collaborations with institutions in Singapore, Australia, Ghana, New Zealand, Malaysia, the United States, and Macau. The university has partnered with the Wellington Institute of Technology in New Zealand to offer a program in Visual Communication Design and operates a Confucius Institute with the University of Cape Coast in Ghana, the first among similar institutions in the province. The university has hosted two editions of the Sino-African Urban Construction International Academic Conference, inviting over 20 universities from China and Africa, more than a thousand scholars, government officials, and international students to the events, providing a comprehensive platform for in-depth cooperation between China and African countries. With the university's efforts, Chinese has been formally integrated into the Ghanaian national education system. The university was approved as a member of the "China-Africa University Alliance Mechanism" by the Ministry of Education. Since 2023, the university has been actively promoting cooperation with universities in South and Central America.

In recent years, the School of Municipal and Geomatics Engineering has prioritized

implementing an "international exchange" strategy, aiming to enhance international cooperation and keep pace with global advancements. The school maintains close relations and exchanges with numerous foreign universities, including the University of Cape Coast, Ghana. The number of students participating in international cooperation and exchanges has been increasing yearly, significantly enhancing their global perspectives and innovative abilities, laying a solid foundation for international collaborations.

To assist non-native Chinese speakers in studying Water Supply and Drainage Science and Engineering at our university, we are committed to improving the English proficiency of our faculty and offering more bilingual courses. We also enhance Chinese language training for international students to help them quickly adapt to the campus life and academic environment at Hunan City University.

5.3.6 Enterprise Practice Platform

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, detailed in Table 5-1, with cooperation agreements or certificates provided in **Appendix D-11**.

Table 5-1: Co-construction of Internship and Training Bases with Enterprises

Serial Number	Base Name	Responsibilities Teaching Tasks	Enterprise Type	Internship Base Introduction	Number of Enterprise Mentors

Serial Number	Base Name	Responsibilities Teaching Tasks	Enterprise Type	Internship Base Introduction	Number of Enterprise Mentors
1	Yiyang Municipal Water Supply Company	Orientation Internship Production Internship,	State-Owned Enterprise	Includes drinking water production, centralized water supply, installation of water and drainage engineering facilities, high-rise building water supply design and installation	4
2	Hunan Shou Chuang Investment Co., Ltd., Yiyang Branch	Orientation Internship Production Internship Graduation Internship	State-Owned Enterprise	Affiliated with the state-owned controlling enterprise Beijing Shouchuang Co., Ltd., specializing in urban industrial and domestic wastewater treatment, with over ten self-developed projects and wastewater treatment patents, it is a wastewater treatment plant focused on efficient operations driven by science and	4
3	Changde Beikong Bihai Water Affairs Co., Ltd.	Production Internship, Graduation Internship	State-Owned Enterprise	Includes water pollution control, environmental protection project construction and operation, construction, operation, and maintenance of wastewater treatment facilities and associated pipelines, environmental protection monitoring,	4
4	Hunan Longxi Construction Co., Ltd.	Production Internship	Private Enterprise	Pan-China Group's ecological development segment encompasses services like watershed management, mine restoration, sponge city construction, treatment of polluted and odorous water bodies, as well as the creation of cultural tourism, sports health, and a comprehensive water ecosystem management system integrating seven elements—water resources, water safety, water environment, water ecology, water landscapes, water culture, and water	6
5	Hunan Provincial Architectural Design Institute Group Co., Ltd.	Production Internship	State-Owned Enterprise	It is one of the first large-scale comprehensive design institutes established in China, ranked among the top provincial-level design institutes nationwide, with its headquarters in Changsha. Its business spans across 27 provinces and cities in China and 42 countries overseas. It has completed over 15,000 architectural engineering services both domestically and internationally, winning more than 760 international, national, and provincial-level awards for scientific and technological progress, as well as excellence in engineering design and consulting.	4

Serial Number	Base Name	Responsibilities Teaching Tasks	Enterprise Type	Internship Base Introduction	Number of Enterprise Mentors
6	Beijing Municipal Engineering Design and Research Institute Co., Ltd., Hunan Branch	Production Internship	State-Owned Enterprise	The company holds comprehensive Class A qualifications for engineering design and engineering survey, Class A qualifications for urban and rural planning preparation, and a Class I general contractor qualification for municipal public works. It is a modern consulting and design group primarily focused on consulting and design, equipped to provide comprehensive technical services covering the entire lifecycle of engineering projects. In the field of urban infrastructure, the company aims to provide industry-leading, world-class modern integrated technology services, offering superior "one-stop, multi-domain, all-around" comprehensive solutions.	4
7	Hunan Runfeng Smart Water Co., Ltd.	Production Internship	Private Enterprise	Hunan Runfeng Smart Water Co., Ltd. is a national high-tech enterprise that provides integrated solutions for smart water supply, drainage, water conservation, and water conservancy information platforms.	4
8	Hunan City University Design Institute Co., Ltd.	Production Internship	State-Owned Enterprise	The Design Institute currently holds a Class A qualification in architectural engineering and a Class B qualification in municipal engineering. It is a comprehensive design and research institution that integrates "industry, academia, and research." The institute boasts a high-quality, highly educated, and highly skilled professional team, with 152 employees. The main office is located at the new campus of Hunan City University.	6
9	Zhongxiang Overseas Construction Development Co., Ltd.	Production Internship	State-Owned Enterprise	Zhongxiang Overseas Company is a subsidiary of Hunan Construction Investment Group responsible for international engineering contracting and international trade. Its international engineering services cover sectors such as building construction, roads and bridges, municipal services, electric power, ports and waterways, and new energy. International trade activities include the import and export of electromechanical building materials, bulk commodity trading, re-export trade, service trade, and service exhibitions.	4

Serial Number	Base Name	Responsibilities Teaching Tasks	Enterprise Type	Internship Base Introduction	Number of Enterprise Mentors
10	Ningxiang Water Group Co., Ltd.	Graduation Internship	State-Owned Enterprise	Ningxiang Water Group Co., Ltd. operates in the fields of tap water production and supply, construction project contracting, municipal facility management, water quality pollutant monitoring and detection instrument manufacturing, energy management services, water resource-specific machinery manufacturing, smart water system development, and smart instrument and meter manufacturing.	4
11	Changde Tap Water Co., Ltd.	Graduation Internship	State-Owned Enterprise	Changde Tap Water Co., Ltd. operates in the areas of tap water production and supply, pipeline installation and maintenance, urban pipeline construction, building decoration engineering, municipal engineering construction, and environmental sanitation management services.	4
12	Taoyang County Urban Water Supply Co., Ltd.	Production Internship	State-Owned Enterprise	Taojiang County Urban Water Supply Co., Ltd. specializes in the production and sale of potable water and water heating equipment. Its operations include the installation, maintenance, and repair of urban water supply pipelines. The company is primarily engaged in the construction of urban roads, bridges, tunnels, public squares, water supply projects, drainage systems, sewage treatment plants, urban gas, thermal energy, and municipal waste management facilities.	4

Both the university and the enterprise collaborate according to the objectives and requirements of the talent training program to jointly develop the internship syllabus and compile internship manuals, while also establishing corresponding support measures. Each base is equipped with dedicated enterprise internship instructors who work in concert with university faculty to guide and manage the students' internships. University instructors are responsible for clarifying internship content, tasks, planned progress, schedules, and regulations; while enterprise instructors focus on imparting knowledge about safe production practices, company regulations, and confidentiality policies based on the university’s requirements and the realities of production. These external training bases meet the practical training needs of students in the Water Supply and Drainage

Science and Engineering program for professional and graduation internships, admitting about 180 students from this major annually, enabling them to fully engage in professional practice and training. This enhances their ability to tackle real-world problems, thereby achieving the educational goal of improving their overall competencies. For details on the specific students admitted to the internship bases, see **Appendix D-12**.

5.3.7 Library and Information Resource Platform

The library boasts a rich collection of both print and electronic books, journals, and other reference materials, managed according to high standards and with a high degree of shared access, meeting the learning needs of students as well as the daily teaching and research requirements of faculty. There is a sufficient number of computers and a rich information resource platform available; students can access the internet through computer labs, classrooms, and campus Wi-Fi to utilize online resources. Students have multiple channels to acquire the necessary educational resources. Through explicit requirements for literature searches in core courses, research topics, experimental teaching, course design, and thesis projects, students are encouraged to fully utilize library and online resources for literature searches, problem analysis, and analysis of current research trends both domestically and internationally, supporting the achievement of their graduation requirements.

(1) Book Resources

Hunan City University has established a "1+1+13" library system, comprising the Yifu Library (Main Library), the Planning and Architecture Branch Library, and 13 departmental library rooms in the various schools. The Yifu Library (Main Library) covers a building area of 20,200 square meters and has nine floors. The Planning and Architecture Branch Library occupies nearly 900 square meters. The library provides over 2,900 reading seats (including seats in the departmental libraries), and more than 60 seats in the electronic reading room. The library operates an open-shelf lending system and is open from 7:00 AM to 10:00 PM, seven days a week, with a total weekly opening time of 105 hours. The library is equipped with an academic lecture hall, conference rooms, and 14 faculty research rooms. It offers wireless internet access and VPN remote access off-campus. In line with the university's discipline structure, which focuses on engineering technology with economic management and art design as its supporting fields, the library houses a wide range of professional literature. The current collection includes over 2.845 million volumes of Chinese and foreign-language printed materials, nearly 400 types of Chinese and foreign-language periodicals, and close to 975,000 theses and dissertations.

In recent years, the library has significantly enhanced its digital library development, with access to over 4.7 million electronic books and 120,000 types of Chinese and foreign electronic

journals. It utilizes over 60 electronic literature databases, including Chinese databases such as CNKI, Wanfang Data, Duxiu, and Chaoxing Journals, as well as foreign databases like ScienceDirect, IEEE, ACS, SciFinder, ASME, SpringerLink, EBSCOHost, Emerald, Ei, PQDD, Web of Science, ESI, JCR, and Incites. The library also features multimedia databases like an online lecture hall (https://wb.bjadks.com/home) and Global English (http://www.englibrary.com/userLogin.htm), which broaden the resource structure and service channels. These collections effectively support the teaching, research, academic development, and management needs of all university faculty and students. To ensure the full utilization of library resources, the library offers services including document lending, copying, printing, binding, interlibrary loans, document delivery, electronic browsing, audio-visual materials, subject navigation, scientific achievement novelty checks, topic-specific searches, proxy document retrieval, literature inclusion inquiries, and information retrieval training.

In recent years, the university has enhanced its digital library infrastructure by launching the "Chaoxing Mobile Library," allowing faculty and students to access library resources from any location without IP address restrictions, using mobile phones or iPads. The mobile library client can be downloaded from: http://m.5read.com/appdown.html (see Figure 5.1). For a detailed introduction to the library, see **Appendix D-13**.

The library has compiled statistics on book loans for students of the Water Supply and Drainage Science and Engineering program from 2022 to 2024 and has shared these results with the department, as shown in Table 5-2.

Table 5-2: Book Loan Statistics for Students in the Past Three Years

Academic Year	Student Enrollment	Number of Books Loaned		
		2021-2022 Academic Year	2022-2023 Academic Year	2023-2024 Academic Year
Class of 2020	75	487	554	672
Class of 2021	89	513	523	713
Class of 2022	75	-	492	683

In addition to the university library, the school has established a departmental resource room with a floor area of about 100m². It holds 520 titles and over 4,700 volumes related to this major and its related fields. The resource room contains a complete set of 30 sets of current professional and related field design manuals, over 1,000 design standards (specifications), with regular updates of newly published books and materials, as detailed in Table 5-3. The school also possesses a comprehensive set of teaching models and reference books complementing the textbooks, as well as

over 10 types of teaching software such as BIM, Tianzheng Water Supply Teaching Software, Hongye Water Supply and Drainage Software, Water Treatment Plant Simulation Teaching Software, and Sewage Treatment Plant Simulation Teaching Software. These resources meet the teaching requirements and are regularly updated with new materials. All resources are accessible to all students within the major and school, providing a convenient way to consult materials in a conducive reading environment.

Table 5-3: Statistics of Design Standards, Specifications, and Manuals in the school Resource Room

Category	Design Standards and Specifications as of 2023 (Volumes)	Design Manuals as of 2023 (Sets)	Design Atlases or Drawings as of 2023 (Volumes)
Water Supply and Drainage Science and Engineering and Related Fields	1470	509	733

This program explicitly requires teachers to make full use of computers, the internet, and library resources in course instruction. In all stages of the program, including experimental courses, course design, professional internships, and graduation projects, as well as in most major courses throughout the four years of study, students are required to use reference books and online resources for learning. This primarily includes collecting and screening relevant literature, reviewing reference books, translating foreign literature, and preparing preliminary experimental plans. Teachers assess students' learning outcomes through assignments, course reports, and other forms of submission. Multiple computer network service stations are set up by the Academic Affairs Office and the library to meet the needs of students who lack the necessary conditions for access. Teachers are able to make full use of the university’s library and online resources to stay updated on global scientific developments, cutting-edge trends, and related professional knowledge and information, thereby improving the quality of teaching and research. The foreign and Chinese language databases in the university library are listed in **Appendix D-13**, and the list of academic journals related to this major is also provided in **Appendix D-13**.

The university has abundant library resources related to this major, with well-established management and a high level of sharing, fully meeting the learning needs of students in this program as well as the daily teaching and research needs of faculty members. These resources also meet the requirements for supporting conditions set out by the program’s accreditation standards.

Figure 5.1: Mobile Library Client Version Download Link

The university has established relevant management systems and measures for computer, network, and library resources, including the following regulations: **"Regulations for Handling Violations at Hunan City University Library," "Library Borrowing System at Hunan City University," "Campus Card Management Measures at Hunan City University," "Core Computer Room Rules at Hunan City University Information Office," "Network Server Hosting Measures at Hunan City University," "Regulations for Campus Information and Network Security Management at Hunan City University," "Website Management and Information Release Regulations at Hunan City University," "Regulations for Campus Email Application and Use at Hunan City University," "Regulations for Handling Lost, Damaged, or Stolen Books at Hunan City University," "Library Safety and Security Regulations at Hunan City University," "Fire Safety and Security Regulations at Hunan City University Library," "Regulations for the Postgraduate Self-Study Room at Hunan City University Library," and "Regulations for the Electronic Reading Room Management at Hunan City University."** The shared use of computer, network, and library resources includes the following aspects:

1) The establishment of dynamic department web pages, with added service modules such as links to other websites and information sharing spaces. The library's WeChat platform pushes nearly 60 updates annually, including around 100 articles. Online responses to reader inquiries occur an average of 2-3 times per week, totaling nearly 100 times each year.

2) An information-sharing space covering over 1,200 square meters has been established,

divided into multimedia areas, leisure areas, experience areas, and discussion areas. The multimedia area is equipped with computers and ergonomic chairs, while the leisure area provides internet access and power outlets. The experience area is equipped with computers and high-precision 3D printers, and the stepped area is designed for new technology experiences, lectures, film appreciation, and more. The discussion area includes seminar rooms and semi-open discussion zones. The information-sharing space operates efficiently.

3) The library has multiple self-service printing, copying, and scanning terminals. Each year, nearly 200,000 pages are printed, copied, or scanned (220,000 pages in 2019), greatly facilitating the retrieval and use of materials by faculty and students.

4) The library uses a seat management system to modernize the management of reading room seating. Each year, nearly 500,000 seat selections are made through the system using swipe cards.

5) The mobile library app receives 275,000 logins each year, with a total of 1.2 million clicks. The digital book borrowing machine sees 74,000 books downloaded annually.

(2) Computer Resources

The university has sufficient computer resources, with those closely related to this major primarily located in the Engineering Training Center and the multimedia computer rooms of the school.

The library has multiple computers for book and thesis retrieval, as well as information inquiry, which significantly enhances students' ability to access information resources.

The school has a multimedia computer room with over 100 computers available for students to use free of charge throughout the day. These computers are primarily used for regular classes, graduation design (thesis), and other professional teaching activities. They also provide hardware support for professional design competitions in the field of water supply and drainage science and engineering. Currently, the platform includes software mainly used for water supply and drainage engineering design, such as: PipeMaster, Hongye, Glodon, Tianzheng Water Supply and Drainage, AutoCAD, etc.

The computer resources at both the university and the school can fully meet the needs of students' learning, teachers' instruction, and research work.

(3) Information Resource Platform

1) Campus Network Infrastructure Platform

The university's campus network has an export bandwidth of 2.5G, with a core backbone reaching 10G and desktop access at 1G. The wired network covers all teaching, research, and office environments across the campus. The university has fully implemented internal identity authentication for internet access. In 2016, the university completed the first phase of wireless

network construction, providing comprehensive Wi-Fi coverage. The advanced campus network infrastructure platform plays a crucial role in supporting the improvement of undergraduate teaching quality and management standards.

2) Campus Information Infrastructure Platform

The university has established three foundational platforms, including the shared database platform, the comprehensive service portal for teachers and students, and the unified identity authentication platform. The shared database platform serves as a unified data resource sharing and exchange application service platform, enabling public data sharing across five departments: human resources, research, academic affairs, student affairs, and graduate studies. The comprehensive service portal provides students and faculty with a wide range of integrated information services, including student affairs, academic affairs, finance, library, campus card services, and other daily life-related services. The unified identity authentication platform is one of the core foundations of the smart campus initiative, offering 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

The campus one-card system is used by both faculty and students for various purposes, including dining in the cafeteria, borrowing books, and accessing buildings. It functions as a substitute for staff IDs, student IDs, and library cards, and has become an indispensable tool for students and faculty in their academic and work-related activities on campus.

4) Hunan City University Course Center

Building an online teaching platform is one of the key ways to guide students in independent learning. The university's Course Center is a new network-assisted teaching platform that brings together numerous undergraduate teaching resources. It serves as a creative teaching support platform for teachers, a personalized self-learning support platform for students, and also functions as a teaching service information platform, a teaching achievement display platform, and a teaching management application platform. The university has purchased online teaching platforms such as Chaoxing, Yuku Classroom, and Zhishitu, with all courses at the university level and above having established course websites on these platforms. A Course Management Center has been set up to integrate all the university's course teaching platforms, combine digital teaching resources, and promote online teaching and student self-study. More than half of the students engage in in-depth learning on these websites each year. Through the Course Center, teachers can manage courses, and students can study online. As of now, over 600 courses have been conducted with digital resources, offering online or blended online-offline teaching. More than 30,000 student participations have been recorded, making it a high-quality shared platform for teaching resources between teachers and

students. This platform facilitates teachers in transforming their teaching and educational concepts, allows for timely updates to teaching content, and encourages continuous improvement of teaching methods. It also promotes interaction between teachers and students. For students, it enhances their ability and interest in independent learning and research, creating conditions for the development of more innovative talents. The core courses of this major have already established teaching websites on the university's Course Center, with all electronic teaching materials for the courses available online. The use of the internet helps break the constraints of time and space, increasing opportunities for communication between teachers and students.

Through the construction of digital course resources, the teaching capabilities of university faculty have significantly improved. Teachers involved in course development have won a total of 32 provincial-level or higher teaching competition awards, including one national second prize, one provincial special prize, and six provincial first prizes, accounting for more than 95% of all awards received by the university. The quality of talent cultivation has shown remarkable results, with over 1,500 provincial-level or higher student competition awards, including 38 national first prizes and 268 provincial first prizes. The graduate school admission rate has increased fourfold compared to the end of the "13th Five-Year Plan." Graduates are highly praised by employers, and the employment rate has consistently exceeded 95%. In the provincial rankings of graduate salaries five years after graduation, the university has ranked first among provincial undergraduate universities in recent years.

5) Teaching Management Information System

The university has established a Teaching Management Information System, which serves as the primary platform for implementing teaching management and ensuring the smooth operation of teaching activities. It is responsible for resource allocation for various teaching tasks, teacher scheduling, and recording the entire academic process of students. The system is equipped with numerous personalized features, covering all aspects of teaching management, and meets the university's requirements for teaching management as well as the day-to-day operational needs. This platform is powerful and user-friendly, serving as the main platform for conducting teaching management. Students can use this platform to select courses, evaluate teaching quality, and check course evaluation results. Through the platform, teachers can access student information, view class schedules, and manage exam grades.

6) Graduation Project Management Platform

The school has established an undergraduate thesis and design management system, also known as the Bachelor's Thesis Management Information Platform. Through this platform, teachers can publish topics for bachelor's theses, and students are free to choose topics of interest. The

system can monitor the quality of graduation theses, providing comprehensive management from topic selection, mid-term checks, to the defense process.

7) Barrier-Free Facilities

All offices, laboratories, lecture halls, and the library on campus are fully covered by wireless networks. The computers in the computing center are updated annually based on actual needs to meet the requirements of development.

Network and virtual reality technologies can conveniently enable remote operation of high-end computer-assisted equipment.

All newly constructed laboratories, classrooms, office buildings, and other facilities are equipped with barrier-free access, allowing students with disabilities to easily enter these teaching spaces.

In summary, to meet the needs of educational informatization, the university has comprehensively built a secure, efficient, scalable, and open information-based campus infrastructure. It has achieved full wireless network coverage in public areas on campus, and implemented functions such as networked administrative offices, teaching information management, and resource sharing, thus meeting the needs of students' learning, teachers' teaching, and research work.

5.3.8 Teaching and Office Facilities

There are three main teaching venues for this major: the school’s teaching building, the engineering training center, and the school (Municipal Survey Building) laboratory center. The total floor area of the school’s classrooms is 96,700 square meters (518 classrooms). The classrooms are equipped with flexible, combinable desks and chairs, a smart classroom system (Rain Classroom), and automatic recording and broadcasting functions. A total of 96 high-quality recording studios, smart classrooms, observation rooms, and micro-teaching classrooms have been built. HD cameras with audio pickup have been installed in 281 classrooms. An intelligent teaching monitoring platform, an intelligent classroom inspection platform, and a smart teaching monitoring center have been established to enable real-time monitoring of classroom teaching and online observation. All general classrooms are equipped with multimedia computers and projectors. Instructors can control the multimedia equipment in the classroom through the networked control system. Smart classrooms are comprehensive teaching environments composed of multiple subsystems, mainly used for specialized courses, flipped classrooms, and emphasize student engagement, collaborative learning, and interaction between teachers and students. The Asset and Laboratory Management Office has set up several duty rooms in the teaching building to manage, maintain, and repair the facilities, ensuring the proper functioning of teaching equipment. To enhance the management and

accessibility of teaching facilities and improve resource utilization, the usage schedule for all multimedia classrooms can be accessed through the teaching management information system. Teachers can submit requests through the system to ensure the needs of undergraduate teaching are met.

The School of Municipal and Geomatics Engineering Laboratory Center currently has three professional laboratories: the Water Supply and Drainage Engineering Laboratory, the Building Environment and Equipment Engineering Laboratory, and the Geomatics Practical Teaching Center. It boasts a total of 28 undergraduate teaching laboratories to support teaching, external exchanges, and cooperation, as well as meeting the needs of faculty for public and office spaces. Over 40 experimental courses are offered in these undergraduate laboratories, with more than 4,000 students coming to the laboratory center each year for learning. In addition, the school also has several small conference rooms for hosting seminars and academic reports by visiting scholars. The laboratory center is open to students in the program for independent academic and experimental research. The laboratory teaching center includes various labs such as the Electrochemical and Analytical Chemistry Lab, Water Treatment Biology Lab, Hydraulics Lab, Water Quality Engineering Lab, Pumps and Pump Stations Lab, and Building Water Supply and Drainage Engineering Lab. These labs primarily conduct basic professional experiments and comprehensive professional experiments, with a 95% completion rate for comprehensive and design-based experiments.

For more information on teaching and office spaces, please refer to **Appendix D-14**.

5.3.9 Other External Collaborations

The university has comprehensively developed strategic partnerships with governments and large enterprises. It has established extensive strategic cooperation with cities such as Yiyang, Qiyang, and Heshan, as well as major companies including Huawei Technologies Co., Ltd., Hunan Aihua Technology Group, China National Nuclear Corporation, China State Construction Engineering Corporation, and China Railway Engineering Group, among others. The university hosts 40 provincial-level or higher teaching platforms, including the National Demonstration Center for Civil Engineering Laboratory Teaching and the Demonstration Base for Industry-University Cooperation in Civil Engineering and Architecture. The National Civil Engineering Laboratory Teaching Demonstration Center was rated as excellent during the Ministry of Education’s inspection for the 2018-2022 phase and received 100 million yuan in construction funding support. In collaboration with the Nanxian People's Government, the university co-founded Hunan Province's first "Rural Revitalization Planning Academy." It also carries out "order-based" talent training programs with enterprises such as the 23rd Metallurgical Construction Group and Aoshikan Technology Co., Ltd. Additionally, it established the "Yuan University College" in partnership with

Broad Homes Industrial Group. The university has signed industry-university-research cooperation agreements and internship base agreements with over 400 companies, including China National Nuclear Corporation, China State Construction Engineering Corporation, and China Railway Engineering Group. The university operates two school-run enterprises: the Design Institute Research Co., Ltd. and the Civil Engineering Testing Center. The Design Institute Research Co., Ltd. holds 10 Class-A qualifications in urban and rural planning, construction 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 and international presence, extending to Africa, Southeast Asia, and Russia. These school-run enterprises annually accept 1,000 to 2,000 students for internships and practical training, offering real-world projects. They have become an important platform for student development at the university.

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.

The list of external cooperating enterprises and partners for the Department of Water Supply and Drainage Science and Engineering is provided in **Appendix D-10**.

5.3.10 Teaching Investment in the Past Five Years

The Department of Water Supply and Drainage Science and Engineering has sufficient and guaranteed teaching funding, which is used for basic teaching business expenses, teaching

construction, student innovation and practical activities, as well as funding for teaching reform projects. The investment in teaching funding has increased year by year, ensuring the normal conduct of teaching activities. Over the past five years, the total investment in teaching funding for the program has reached 7.6602 million yuan.

The investment in laboratory construction (consumables) has been 5.023 million yuan, while daily teaching and curriculum development expenses totaled 336,500 yuan. Additionally, 990,300 yuan was invested in student innovation projects and academic competitions. Detailed information on the program's teaching funding investments and expenditures in the past five years is provided in **Appendix D-15**.

6 Quality Assurance Measures

6.1 Quality Assurance and Further Development

6.1.1 Internal Teaching Quality Evaluation

Each semester, under the school's unified arrangement, each college and program implements routine teaching inspections. These inspections evaluate teachers' classroom instruction, practical sessions, the graduation design process, teaching order, lesson plans, exam papers, and other essential teaching materials. The aim is to identify and address any potential issues in the teaching management process. For example, regarding exam paper inspections, at the beginning of each semester, the Academic Affairs Office of Hunan City University conducts random checks on the previous semester’s exam papers. The evaluation focuses on three aspects: exam scores, paper analysis, and improvement measures, to promote standardization of exam papers. Each semester, the college also analyzes teachers' exam score distributions, student performance, and other related factors, providing teachers with suggestions and requirements for improving teaching quality. For more details, refer to the **"Hunan City University Full-Time Undergraduate Course Assessment and Grading Management Measures" (Appendix C-1)**. Peer and supervisor evaluations and summary of professional work plan are provided in **Appendix E1**.

Teaching quality evaluation includes three aspects: evaluation of teacher teaching quality ("evaluation of teaching"), evaluation of student learning quality ("evaluation of learning"), and evaluation of teaching management quality ("evaluation of management").

The evaluation of teacher teaching quality is mainly organized by the teaching quality monitoring department and the secondary teaching departments, conducted through classroom instruction. Classroom instruction includes both theoretical teaching and practical teaching. The evaluation of classroom teaching quality is primarily based on classroom observation, adopting a comprehensive approach that combines student evaluations, peer evaluations by teachers, and expert evaluations. The university has established both university-level and college-level supervisory teams

to periodically and randomly assess and inspect teaching quality. Reports are issued monthly, and any identified teaching issues are promptly summarized and communicated to the vice-deans and individual teachers, who are then required to address and correct the problems.

The evaluation of student learning quality is mainly organized by the student management department and secondary teaching departments, using platforms such as "Excellent Class with Good Study Habits," "Outstanding Student Individuals," and "Scholarships," "Financial Aid," etc., as vehicles for assessing students' learning status and outcomes. The main components of student learning quality evaluation include classroom discipline, exam results, the pass rate of qualification certificates, participation in academic and skill competitions, and evaluations of course instructors.

The evaluation of teaching management work is mainly organized by the teaching management department, with the assistance of the teaching quality monitoring department and the teaching evaluation department. This evaluation is combined with related award activities such as "Advanced Teaching Management Unit," "Outstanding Teaching Grassroots Organization," "Excellent Laboratory," and "Outstanding Individual in Teaching Management."

6.1.2 External Evaluation of Teaching Quality

The school uses a feedback system from employers to gather their opinions. Additionally, the school has introduced external supervision, such as participation in the undergraduate teaching evaluations initiated by the Ministry of Education and the excellent undergraduate course evaluations organized by the Hunan Provincial Education Department. This has created a teaching quality evaluation system that combines internal evaluation with external evaluation, involving contributions from higher authorities, employers, teachers, and students. In this context, the role of the Ministry of Education, employers, external experts, and third-party organizations is defined as external evaluation, as detailed in the **"Third-Party Social Evaluation Implementation Plan (Trial)"** (**Appendix E-2**). The powers of teachers and students, as well as the school itself, are considered part of the internal evaluation. We believe this evaluation method is 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 four years, but not exceeding six years. Students who do not graduate within six years will receive a certificate of incomplete studies or be dismissed. Table 6-1 lists the number of students and graduates for this program from 2020 to 2024. The start and end dates for the spring and autumn semesters each year are basically the same, so the annual schedule is fixed. The career paths of the graduates of this program are shown in Table 6-1. Table 6-2 provides a detailed description of the first-attempt graduation rate/first-attempt degree attainment rate for the years 2022-2024.

Table 6-1 Graduate Career Paths

Past 5 years	2020	2021	2022	2023	2024
Student Enrollment	78	79	85	75	76
Number of Graduates	78	79	85	75	76
Graduate Proportion	85.7%	100%	100%	100%	98.2%
Graduate Employment Proportion	100%	97.5%	97.6%	96%	86.7%
Proportion of Graduates Continuing Studies in China	11.2%	29.1%	20%	32%	14.8%
Proportion of Graduates Going Abroad for Further Studies	0%	0%	0%	0%	0%
Other Graduate Proportions	26%	24.1%	35.3%	29.3%	23.3%

Table 6-2 First Attempt Graduation Rate/First Attempt Degree Attainment Rate for 2022-2024

	Class of 2022	Class of 2023	Class of 2024
Student Enrollment	85	75	76
Number of First Attempt Graduates	78	67	69
First Attempt Graduation Rate	91.7%	89.3%	90.8%
Number of First Attempt Degree Attainments	82	71	73
First Attempt Degree Attainment Rate	96.5%	94.7%	96.1%

6.2.2 Student Evaluation

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 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.

In the practical teaching process, a duty system is implemented for supervising teachers. In stages such as orientation internships, metalworking internships, graduation internships, and production internships, both external and internal instructors are involved in guidance. Additionally, internship guidance and defense groups have been established to address students' questions and concerns at any time. For course design and graduation projects, group-based guidance is carried out

with a blended approach of both online and offline mentoring. During working hours, supervising teachers follow a rotating duty schedule to ensure that students can seek face-to-face assistance for any questions. Outside of working hours, communication is facilitated through the established QQ group.

6.2.3 Examination Results Evaluation and Ongoing Statistics

After each course exam, teachers are required to submit students' exam results along with an analysis of the course teaching. Based on the analysis, feasible suggestions for continuous improvement are provided to enhance teaching quality and student learning outcomes. If a student fails the course exam, a dedicated academic advisor will be assigned to monitor and guide the student's course learning. Table 6-3 shows the exam pass rates for 9 core courses in the 2024 cohort of the Water Supply and Drainage Science and Engineering program. From the data in the table, it is evident that through the teaching reform "promoting through assessment" and comprehensive teaching supervision and evaluation, 88% of the core courses in the program have an exam pass rate of over 80%, indicating a high level of student mastery of professional knowledge. The relatively low pass rate for the "Water Supply and Drainage Pipeline System (1)" exam is attributed to students' common shortcomings in answering questions about ring networks and calculation errors in pipeline adjustment problems. These two topics are key points and difficulties in the course, and mastering them fully requires time. In ongoing improvements, the course instructor has implemented teaching reforms targeting these areas to ensure that future students can thoroughly understand and master this content. The "Water Quality Engineering" course is offered after the orientation internship. By this time, students have already gained a basic understanding of the teaching content through the internship. During the course, they are able to integrate theory with practice, resulting in better mastery of the knowledge and a higher exam pass rate.

Table 6-3 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 and Protection	2	32	Examination	95.7%
2	Engineering Fundamentals	9021113081	Water Supply and Drainage	2	32	Examination	79.2%

			Network System (1)				
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 vital component of the teaching assessment system. Before selecting courses each semester, every student must submit a teacher evaluation form, otherwise, they will not be allowed to choose courses. The teaching suggestions listed in the evaluation forms will be analyzed and used to improve teaching methods. Student evaluations are also used to assess the effectiveness of teachers' teaching and are linked to their work performance. See **Figure 6.1** for the evaluation table of teachers' teaching quality.

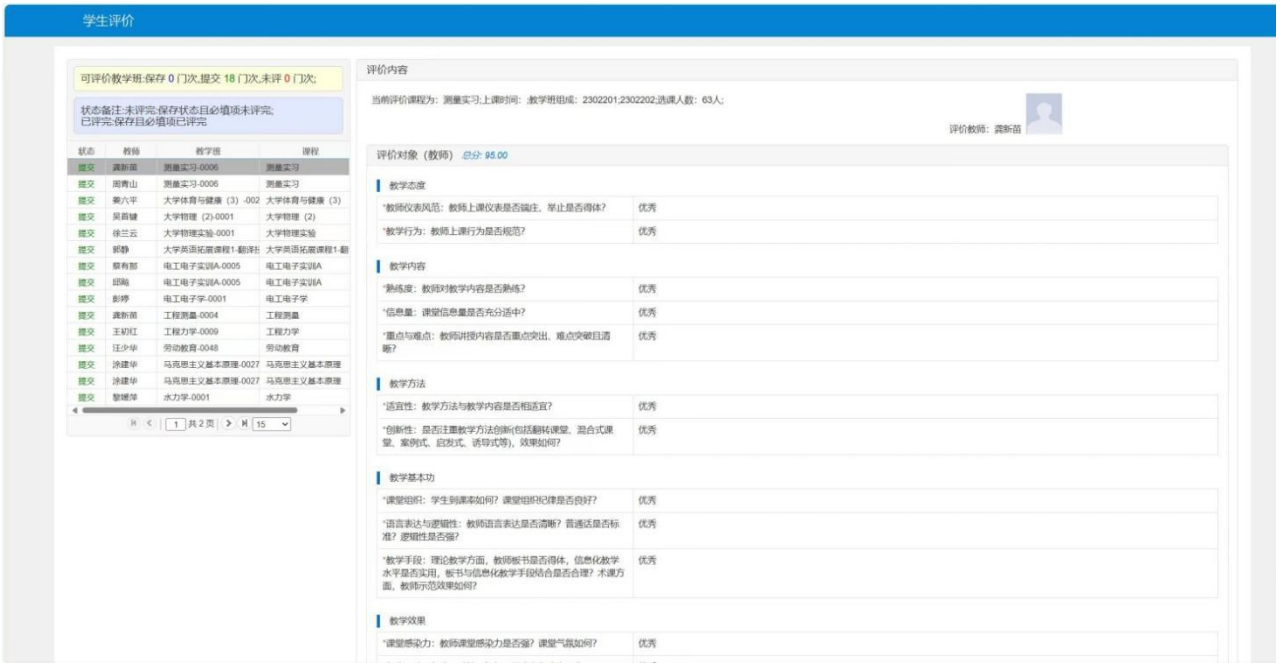


Figure 6.1 The interface for students' evaluation of teachers

7 Quality Assurance and Transparency

7.1 Transparency of Course Modules

The college has provided a comprehensive and efficient personal management system for faculty, staff, and students, aimed at enhancing connectivity in areas such as work scheduling, processing, modifications, and information sharing. This system offers a rich and targeted set of functional modules based on different user roles. Teachers, students, and college administrators can smoothly communicate and provide feedback through the system. This interactive mechanism ensures the effective transmission of opinions and promotes internal information flow and decision-making optimization.

For teachers, the system not only supports course schedule queries and student roster views but also allows for grade entry, management of graduation projects, and practical functions like class schedule adjustments. These tools significantly simplify daily teaching management tasks, helping teachers focus more on improving educational quality. Students, on the other hand, can check their schedules and grades through the system, and can also participate in the management of graduation projects. This design not only helps students stay updated on their academic progress but also provides strong support for their academic planning.

Users can easily access the personal management system through the "Portal Entrance" in the top navigation bar on the college’s official website homepage. The official website interface is shown in Figure 7.1, and the portal login interface is shown in Figure 7.2.

Figure 7.1 School Official Website Interface

The portal login interface is intuitively designed and user-friendly, setting a model for ease of use. On the unified identity authentication platform, users are required to enter their correct account and password (students use their student ID, while teachers use their staff number) and complete a verification through a text message code to ensure account security. Additionally, the system supports a more convenient and secure QR code login option, further enhancing the user experience.

For users who may encounter login difficulties, this page specifically provides a "Forgot Password" feature, which lists the steps to retrieve account information, ensuring that each user can smoothly resolve access issues. These thoughtful design features not only reflect the attention to user needs but also demonstrate the college's commitment to providing efficient, secure, and convenient online services.

Figure 7.2 Portal Login Interface

7.1.1 Teacher's Personal Management System

After a successful login, teachers will see the interface shown in Figure 7.3.

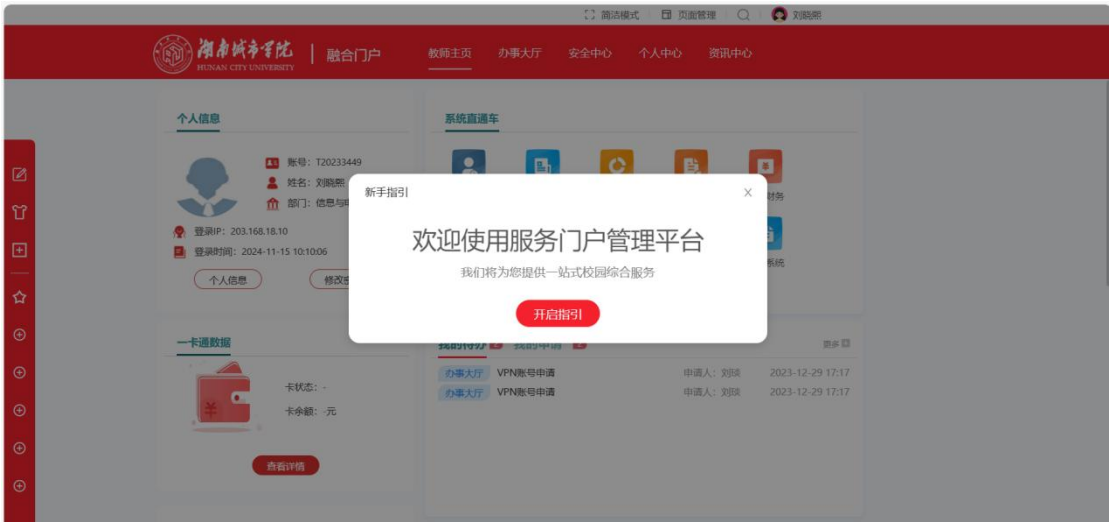


Figure 7.3 New User Guide Interface

The first thing users encounter is a carefully designed new user guide feature, which greatly facilitates first-time users. After completing the guide, teachers will enter the main interface, as shown in Figure 7.4.

Upon successful login, students are presented with the interface shown in Figure 7.8. The student personal interface is designed with user-friendliness in mind, aiming to provide each student with a convenient and efficient service experience. This interface is primarily divided into two major modules: the personal service window and the system shortcut window. Through these two thoughtfully designed windows, not only is the interaction between students and the school enhanced, but it also greatly improves student satisfaction and the overall quality of campus life.

Figure 7.4 Teacher's Personal Interface

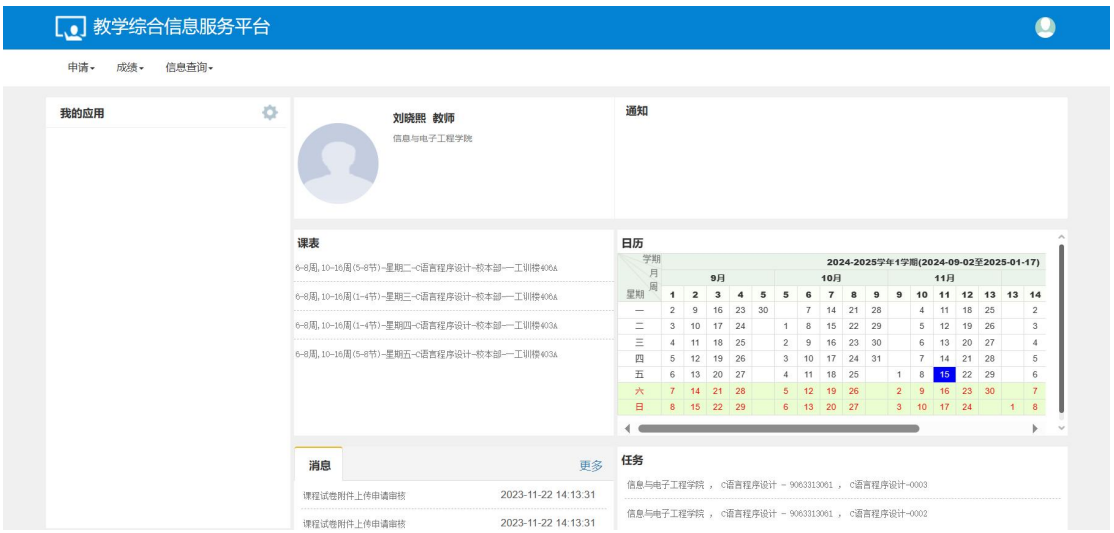


Figure 7.5 Academic Affairs System Interface

Figure 7.6 Practical Teaching Interface

Figure 7.7 Graduation Comprehensive Training Management System

7.1.2 Student Personal Management System

After logging in successfully, students will see the interface as shown in Figure 7.8. The student personal interface is designed to be highly user-friendly, aiming to provide each student with a convenient and efficient service experience. The interface is mainly divided into two major modules: the Personal Service Window and the System Direct Access Window. Through these two carefully designed windows, not only is the interaction between students and the school enhanced, but it also greatly improves student satisfaction and the quality of campus life.

The personal service window integrates a series of functions closely related to the students' personal needs, such as exam information (as shown in Figure 7.9), grade inquiry (as shown in Figure 7.10), academic progress inquiry (as shown in Figure 7.11), etc. The aim is to allow students to easily manage their academic life and stay updated on their academic progress. The system expressway window, on the other hand, focuses more on providing quick access to school resources and services, such as the academic affairs system (as shown in Figure 7.12), practical teaching system (as shown in Figure 7.13), etc. This enables students to quickly obtain the information they need or complete specific tasks, significantly improving efficiency and the convenience of campus life.

Figure 7.8 Student Personal Interface

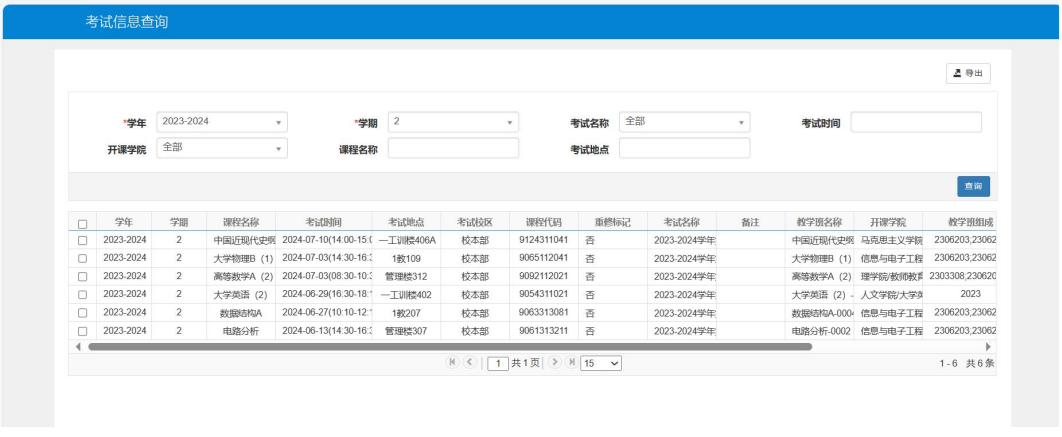


Figure 7.9 Exam Information Inquiry Interface

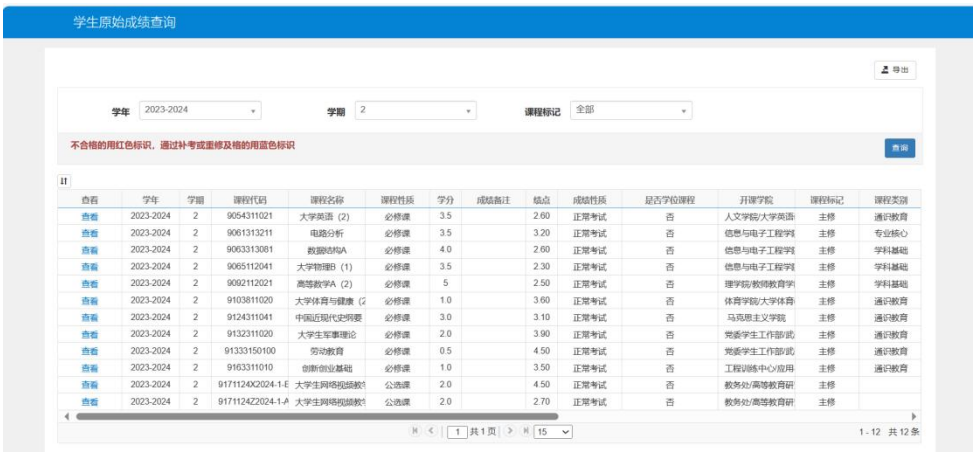


Figure 7.10 Student Grade Inquiry Interface

Figure 7.11 Academic Progress Inquiry Interface

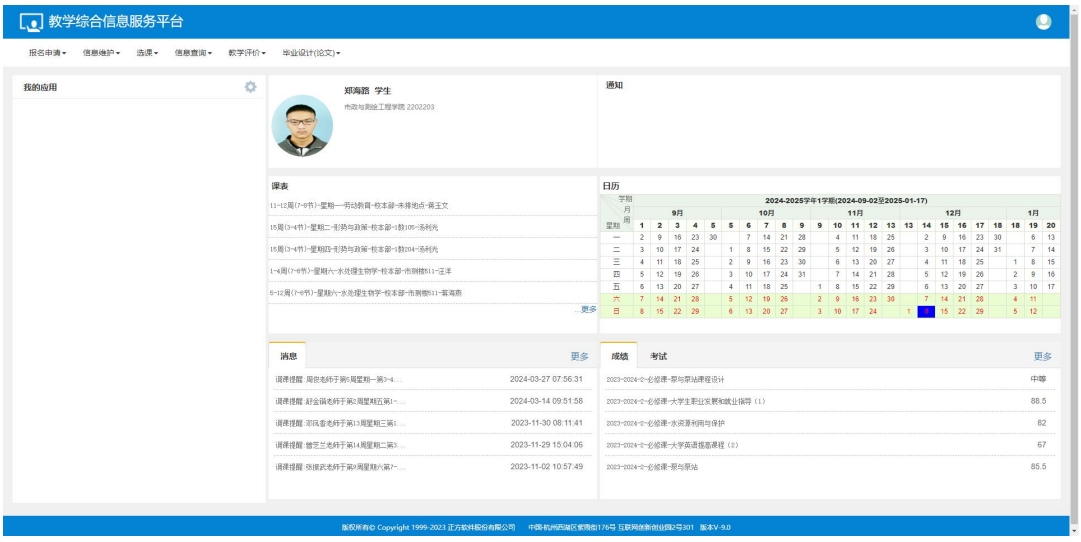


Figure 7.12 Student Academic Affairs System Interface

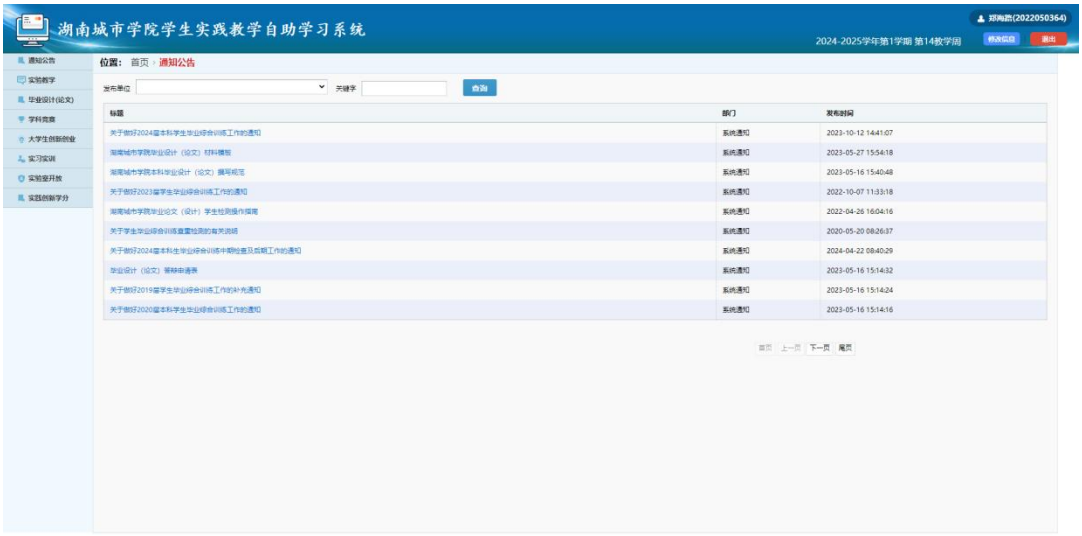


Figure 7.13 Student Practical Teaching Interface

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 achievement of graduation requirement 5, "Use of Modern Tools," increased from 0.76 for the class of 2021 to 0.78 for the class of 2023. Similarly, the achievement of graduation requirement 11, "Project Management," increased from 0.74 for the class of 2021 to 0.77 for the class of 2023. These improvements indicate that 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 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.

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-1** for relevant questionnaire samples and analysis report.

7.2 Relevant Regulations

7.2.1 Teaching Evaluation System

In terms of teaching, the College of Municipal and Geomatics Engineering at Hunan City University strictly follows the "Implementation Opinions on Further Strengthening the Construction of the Teaching Management Team at Hunan City University" (see **Appendix F-1**) to carry out qualification reviews for instructors. Teachers must prepare course content based on the basic standards for teaching plans and lecture notes. The college manages and evaluates the teaching process in accordance with relevant regulations such as the "Guidelines for Classroom Teaching Behavior at Hunan City University," "Regulations on the Student Teaching Information Officer System at Hunan City University," "Working Procedures of the Teaching Guidance Committee at Hunan City University," "Regulations for Identifying and Handling Teaching Accidents and Mistakes at Hunan City University," "Classroom Observation Management Measures at Hunan City University," "Teaching Workload Calculation and Management Measures at Hunan City University," and the "Implementation Measures for Teaching Quality Evaluation and Continuous Improvement for Undergraduate Education at Hunan City University (Trial)." Further details can be found in **Appendix F-2**.

The university's Academic Affairs Office regularly conducts teaching evaluations for each course to assess the performance of instructors in various aspects of their teaching. This includes peer evaluations, student evaluations, supervisory evaluations, and leadership evaluations (the "four-way evaluation"). The results of the four-way evaluation are collected and compiled by the Academic Affairs Office of the respective college and are then feedbacked to the relevant departments and course instructors. Additionally, both teachers and administrative staff can access the evaluation results for each course—covering supervisory, student, leadership, and peer evaluations—through the college's teaching management system.

7.2.2 Student Admission Assessment

Since 2020, the admission score line for Hunan City University has consistently been higher than the first-tier score standard in the National College Entrance Examination (Gaokao) in China. Relevant information and the admission statistics for the past five years can be found in **Appendix F-3**. The College of Municipal and Geomatics Engineering strictly follows the relevant regulations in the admission policies issued by the Ministry of Education of China, the Hunan Provincial Department of Education, and the Hunan Provincial Education Examination Authority. A dedicated admissions leadership team has been established to manage all aspects of the admissions process. For detailed information regarding the university's admission regulations, promotional activities, supervision and implementation rules, examination work discipline, and the avoidance system, please refer to **Appendix F-4**.

7.2.3 Further Development and Continuous Improvement

To meet the demands of the job market and technological developments, the College of Municipal and Geomatics Engineering at Hunan City University places great emphasis on the continuous development of its programs. The college constantly explores innovation and has introduced a series of supporting management systems to adapt to the rapidly changing industry needs. To this end, Hunan City University has established a dedicated graduate tracking information system, which aims to collect and analyze feedback from alumni to understand their performance and career development. Additionally, the college organizes an annual alumni forum during the university’s anniversary celebration, providing a platform for communication with graduates, promoting the continuous improvement of the curriculum, and enhancing the quality of teaching.

Considering the potential language barriers some international students or non-native Chinese-speaking students may encounter during their studies, the College of Municipal and Geomatics Engineering will further enhance the bilingual teaching capabilities of its faculty, increase the number of bilingual courses, and strengthen Chinese language training for international students. This will help them quickly adapt to campus life and the academic environment at Hunan City University, ensuring that every student receives a high-quality educational experience.

7.3 Diploma Supplement and Qualification Certificates

Appendix F-5 provides samples of the graduation certificate and bachelor's degree certificate for graduates from the Water Supply and Drainage Science and Engineering program at Hunan City University. All certificates must be stamped with the official seal of Hunan City University and signed by the university president to be valid. **Appendix F-6** is a sample of the Diploma Supplement; **Appendix E-3** is a sample of the student transcript.

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AppendixF-6: Sample of the graduation certificate and bachelor's degree certificate for students graduating from the Water Supply and Drainage Science and Engineeri