

Hunan City University School of Municipal and Surveying  
Engineering

Research Report on the Training of Talents in Water Supply and  
Drainage Science and Engineering and the Demand of Socio-  
Economic Development

(2021year)

**Specialty Name: Water Supply and Drainage Science and Engineering**

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**Student Vice Secretary: Chen Yiping**

**Department Head: Sheng Jianwu**

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1. Research Purpose

In order to keep up with the times and grasp the pulse of the era, meet social needs, and provide professional technical talent and scientific and technological support for national and local economic construction, industry development, and social development, we implement the school's talent cultivation positioning of "based on the needs of regional economic and social development, facing the main battlefield of new urbanization, rural revitalization, and intelligent manufacturing, cultivating applied talents with solid foundation, strong application, distinctive features, high quality, and solid practical ability and innovative entrepreneurial spirit." We conduct research on the talent cultivation of the major in Water Supply and Drainage Science and Engineering and the demand for social and economic development. Through the research, we analyze the changing trends of relevant enterprises and industries in this major regarding professional talent in the next 3~5 years, providing guidance information for the college's professional setup, enrollment scale, and student employment guidance, and offering a basis for reform and improvement of professional cultivation goals, graduation requirements, capability achievement, and curriculum system setup.

2. Research Content and Methods

1Research Content

In response to the new requirements for professional talent capabilities-qualitiesandnewextensions of abilitiesrelated to national water resource and water environment protection development strategies, new urbanization and rural revitalization development plans, and industry development, this research focuses on several aspects such as "requirements for professional capability qualities,

quantity demands, and curriculum system support.” Through discussions, visits, and online research methods, guidance is provided for the development and construction needs of the profession over the next3-5years. For specific discussion and visit survey content, see attachment1, and the questionnaire is in attachment2.

2、Research Participants and Responsibility Arrangement

This research is jointly participated by the professional leader, the vice dean of teaching, the deputy secretary of student work, the department head, and professional teachers, with specific responsibilities arranged as follows.

Table1 Professional Researchers and Main Work Arrangements

Personnel	Main task
Professional in charge	Macro goals for professional macro development and talent cultivation
Vice Dean of Teaching	Requirements for professional competence, graduation achievements, and curriculum system
Deputy Secretary of the Student Work Department	Graduate tracking feedback and social evaluation
Department Head andSpecializedTeachers	Unit docking and specific 事务 assistance

3. Research subjects

For the industry research targeting enterprises, this survey utilized offline visits and discussions, as well as online questionnaires to cover employers both within and outside Hunan Province, prioritizing those with a high number of graduate employment and representative units in major employment fields and expected development areas of the profession, totaling20units, including4construction units,4design units,2public institutions,6water operation management units,1real estate development company,3research and development units.The involved professional fields include design, construction, planning, research and development, and operation management. The service areas involved includewater quality safety assurance,wastewater treatment and resource utilization,comprehensive water environment remediation,building water supply and drainage,smart water management, andengineeringmanagement, etc.The participants in the survey mainly included general managers of employers, heads of human resources departments or personnel offices, project leaders, and some graduates from various classes in the profession, as detailed in the table below.

Table2 List of companies and industry research subjects

Serial number	Unit name	Nature of the enterprise	Main field	Location	Research subjects
1	Hunan Runfeng Smart Water Co., Ltd	private enterprise	Smart Water Management System Construction and Operationetc.	Changsha, Hunan	General Manager
2	Ningxiang Water Affairs Group Co., Ltd	private enterprise	Water quality purification, operation and maintenance, construction, managementetc.	HunanChangsha	Vice President

3	Beijing Municipal Engineering Design & Research Institute Co., Ltd	State-owned enterprise	Engineering design, engineering surveying, engineering consulting, engineering cost, etc	Beijing	Vice President
4	Fanhua Construction Group Co., Ltd	private enterprise	Engineering design, real estate development, urban and rural planning preparation etc.	Changsha, Hunan	General Manager
5	China Water Resources and Hydropower Eighth Engineering Bureau Co., Ltd	State-owned enterprise	Water conservancy and hydropower, municipal engineering, construction engineering, etc	Changsha, Hunan	General Manager
6	China Railway Construction Group Co., Ltd	State-owned enterprise	Municipal engineering, construction engineering, etc	Changsha, Hunan	Vice President
7	Changde Beikong Bihai Water Services Co., Ltd	State-owned enterprise	Water resources, environment, and public facilities management, etc	Changde, Hunan	Vice President
8	Hunan Sixth Construction Machinery and Electrical Installation Co., Ltd	State-owned enterprise	Construction engineering, installation, etc	Changsha, Hunan	Project leader
9	Hunan Boschke Environmental Technology Co., Ltd	State-owned enterprise	Management of environment, buildings, and public facilities, etc	Changsha, Hunan	General Manager
10	Loudi Shouchuang Water Affairs Co., Ltd	State-owned enterprise	Water resources, environment, and public facilities management, etc	Loudi, Hunan	General Manager
11	Guangzhou Urban Planning Research Center	Public institution	<b>Public administration, social security, and social organizations</b>	Guangzhou, Guangdong	Planning Leader
12	Changde City Water Supply Company	State-owned enterprise	Water resources, environment, and public facilities management, etc	Changde, Hunan	General Manager
13	Yiyang City Water Supply Company	State-owned enterprise	Water resources, environment, and public facilities management, etc	Yiyang, Hunan	Vice President
14	Peach River County Water Supply Company	State-owned enterprise	Water conservancy, environment, and public facilities management, etc.	Yiyang, Hunan	General Manager
15	Yiyang City Housing and Urban-Rural Development Bureau	Public institution	Construction engineering, municipal engineering, etc	Yiyang, Hunan	Deputy Director
16	Yiyang Yuefa Real Estate Co., Ltd	State-owned enterprise	Real estate	Yiyang, Hunan	Project leader
17	Hunan City University Design Research Institute Co., Ltd	State-owned enterprise	Municipal engineering, construction engineering, landscape architecture, etc	Changsha, Hunan	Vice President
18	Hunan Kelin Hante Environmental Technology Co., Ltd	private enterprise	Equipment Research and Development	Changsha, Hunan	General Manager
19	China Nuclear Twenty-Five Construction Co., Ltd	State-owned enterprise	Municipal engineering, construction engineering, etc	HunanChangsha	General Manager
20	China Municipal North China Hunan Branch	State-owned enterprise	Engineering design, engineering consulting, engineering cost, etc	Changsha, Hunan	General Manager

### 3. Results and Analysis

#### 1 Analysis of the Prospects for Water Supply and Drainage in Countries and Regions

"The 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and 2035 Vision Goals Outline" proposed key ecological areas along the Yangtze River, deepening pollution prevention and enhancing the level of environmental infrastructure construction goals. It specifically proposed basic requirements related to the improvement of surface water environments, the construction of urban black and odorous water bodies, the construction of urban drinking water source areas, and the full coverage of urban sewage pipelines and the upgrading of sewage treatment standards. The "14th Five-Year" National Urban Infrastructure Construction Plan released by the Ministry of Housing and Urban-Rural Development proposed to "benchmark against the strategic goal of basically achieving socialist modernization by 2035 and plan development goals around the systematic, quality, green, low-carbon, and intelligent development of infrastructure," and specified "urban public water supply network leakage," "centralized collection of urban domestic sewage," "reuse of reclaimed water in water-scarce cities," "harmless disposal of urban sludge" 4 indicators for the development of urban water system infrastructure construction, and thus determined the specific construction actions of "sponge city construction," "urban water supply security assurance," "urban waterlogging management," and "sewage quality improvement and efficiency enhancement." 4 specific construction action contents.

Under the national strategic development layout, Hunan Province is an "important component and corridor of the" "Belt and Road" initiative and a key node of the Yangtze River Economic Belt; the water environment of the Dongting Lake basin carries significant tasks for new urbanization construction, beautiful countryside, and rural revitalization. The major of Water Supply and Drainage Science and Engineering extends from traditional water purification and distribution to areas such as water quality safety and resource utilization, comprehensive water environment remediation, and smart water management, evolving from urban infrastructure development to the healthy social cycle of water and the digitalization and informatization of urban water supply and drainage infrastructure. From the national economic development plan and the informatization and digitalization of infrastructure, as well as water environment protection, it can be seen that the training of professionals in Water Supply and Drainage Science and Engineering is crucial for the applicable development of the national economy and society, and for serving the economic construction of the country and regions.

As of 2021, there are more than 180 higher education institutions in the country offering a major in Water Supply and Drainage Science and Engineering. Based on the development positioning of the schools, the training objectives for professional talents are distinct. Hunan City University, as an "application-oriented" undergraduate institution that emphasizes "solid foundation, practical application, unique characteristics, and high quality, with strong practical abilities and innovative entrepreneurial spirit," aims to cultivate high-quality application-oriented engineering and technical talents, serving the urban infrastructure construction and water environment remediation and restoration in the Yangtze River Economic Zone and the Guangdong-Hong Kong-Macao Greater Bay

Area. With national strategies and industry development, our university's Water Supply and Drainage program will continue to explore and accumulate knowledge in areas such as smart water management, watershed water quality safety monitoring and early warning, comprehensive water environment remediation, resource utilization of wastewater and rainwater, and urban stormwater management, contributing more strength and talent to national regional economic development, industry talent needs, new urbanization construction, and rural revitalization.

## 2、Overview of Talent Cultivation in Water Supply and Drainage Science and Engineering

As of 2021, there are a total of 180 higher education institutions in the country offering the major of Water Supply and Drainage Science and Engineering. According to statistics at the end of 2020, the annual enrollment in recent years has been about 10,000~12,000 students, with graduates around 10,000 people/year. In the South China region, there are 38 institutions, and Hunan Province has 6 institutions. Based on the positioning of the schools, the talent cultivation in the Water Supply and Drainage Science and Engineering major can generally be divided into research-oriented, application-oriented, and a balanced focus on both research and application. Taking the Water Supply and Drainage Science and Engineering major of a first-class university in the Central and Southern regions as an example, Hunan University aims to cultivate talents that "serve national industry needs and lead future industry development," while Wuhan University aims to cultivate "leading talents for future social progress and the development of human civilization." As for local undergraduate institutions, Hunan University of Science and Technology aims to cultivate "high-quality application-oriented talents with innovative awareness and sustainable development potential." The goal of Henan University of Urban Construction is to cultivate "high-level engineering technology application talents with preliminary research capabilities, technical development capabilities, and innovative abilities." Whether it is a first-class university or a local undergraduate institution, the talent cultivation in the Water Supply and Drainage major emphasizes contributions to the development of the discipline and the progress of the industry, although the focus may differ slightly; first-class institutions emphasize discipline leadership and foresight in scientific and technological advancements, while local undergraduate institutions emphasize applications suitable for the development of the discipline and industry.

According to the differences in talent training objectives, each university emphasizes different service areas and professional characteristics for the Water Supply and Drainage Science and Engineering major. Research-oriented universities focus not only on planning, design, consulting, construction, and management related to water supply and drainage but also emphasize scientific research, technological innovation, and education. In contrast, applied universities primarily focus on engineering technology applications in areas such as design, construction, operation, management, and preliminary research and development. Similarly, due to different talent positioning and training objectives, the professional characteristics, employment directions, and job positions of graduates from different universities exhibit distinct features. Graduates from applied universities mainly find employment in engineering design and frontline construction, with their employment regions concentrated in the central and southern areas, radiating nationwide, while graduates from top universities primarily work in fields such as scientific research, engineering

research and development, and management, with their employment regions being more dispersed.

According to the national development strategy, regional economic construction requirements, and the demands of industry progress, the talent cultivation goals for the Water Supply and Drainage Science and Engineering major should not only meet the needs of traditional industries but also possess distinct characteristics of the times and the demands of industry development. Therefore, the construction of smart water services based on information and digital technologies, as well as dynamic monitoring and early warning of regional water resources based on remote sensing and modern monitoring technologies, will be the trend for the next stage of the development of the Water Supply and Drainage Science and Engineering major. Some top undergraduate institutions have proposed a professional training goal "oriented towards the era of big data intelligence." Our university's Water Supply and Drainage Science and Engineering major has also timely proposed professional construction ideas based on remote sensing technology and modern monitoring methods for dynamic monitoring and early warning of water resources in the Dongting Lake area and the Xiang, Zi, Yuan, and Li rivers, as well as urban and rural water pollution control and water environment restoration, and smart water service construction based on geographic information systems and information technology in water plants for water quantity, quality, pressure, and safe water distribution. We hope that this major can play a greater role and make contributions in the Dongting Lake ecological economic zone, new urbanization construction, beautiful countryside construction, and rural revitalization.

### 3、Result Analysis

#### (1) Industry, enterprise demand

This research includes all service areas and professional fields expected in the training objectives of this major. The talent demand survey results from various units indicate that different fields have a certain degree of commonality in talent capability requirements, meaning they place considerable emphasis on the development of comprehensive abilities and qualities. While possessing good professional skills, individuals should also have a solid cultural and comprehensive literacy, specifically reflected in organizational management, communication, and written expression. However, the focus varies; design and research units pay more attention to the cutting-edge dynamics of the industry, the extension of professional theoretical knowledge, and research and development management, while operational management units mainly focus on operation, maintenance, and enterprise management. Construction units emphasize the application of basic engineering knowledge and the implementation and management of practical engineering work. This should be given special attention. It is particularly noteworthy that, according to industry development and technological updates, employers have added the following expectations for talent capability requirements:

The basic knowledge and capability reserves related to the informatization, digitalization, and modeling of urban water systems are mainly reflected in the construction and operation of smart water services, the design of building information models for construction projects, and the self-control and management of process equipment.

Basic knowledge and preliminary training in the mastery and practical ability of new processes, new technologies, and new methods in engineering construction and management, especially in pipeline networks and water plant construction.

The expansion of comprehensive quality in the field of the overall environment, the comprehensive management of the water environment is not limited to the water environment, but extends to areas such as soil and microorganisms.

(2) Training Objectives

This research focuses on the professional training objectives from the perspectives of current demands, professional development, school positioning, the rationality of the professional field, and the rationality of career characteristics and expected graduation requirements. The respondents provided positive and proactive evaluations on the above issues, and the specific evaluation results can be seen in the figure1~Figure6.

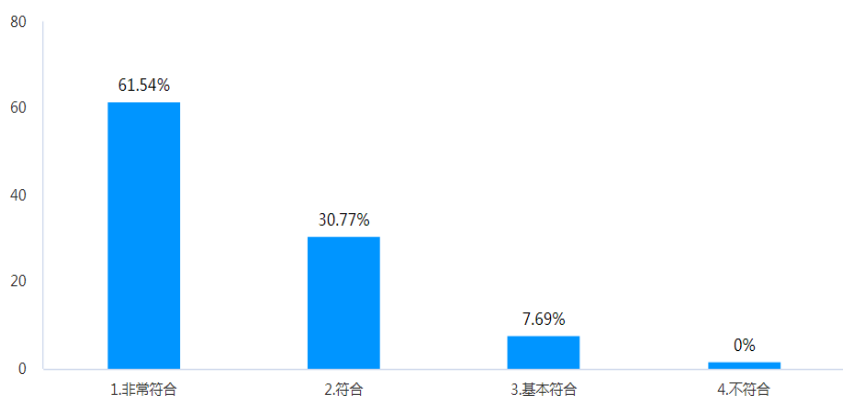


Figure1 Evaluation of Training Objectives and Demand of the Times

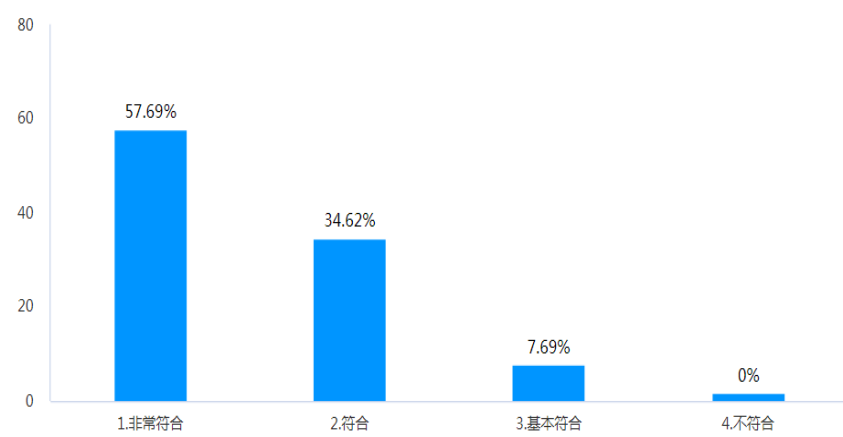


Figure2 Evaluation of Training Objectives and Professional Development Applicability

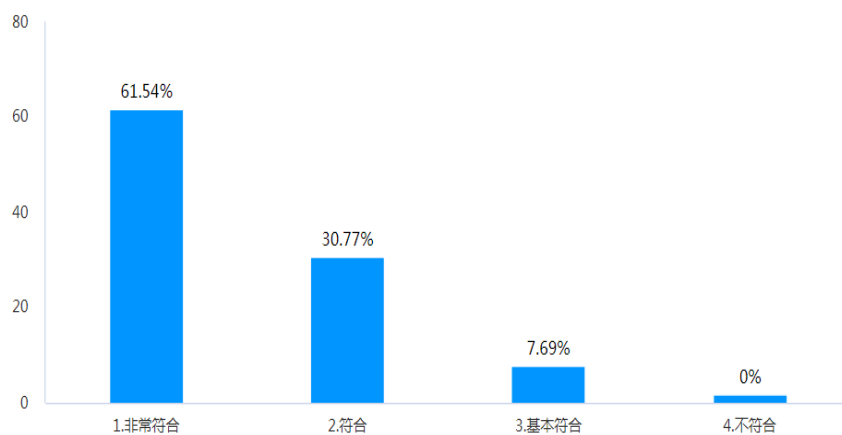


Figure3 Evaluation of Training Objectives and School Positioning

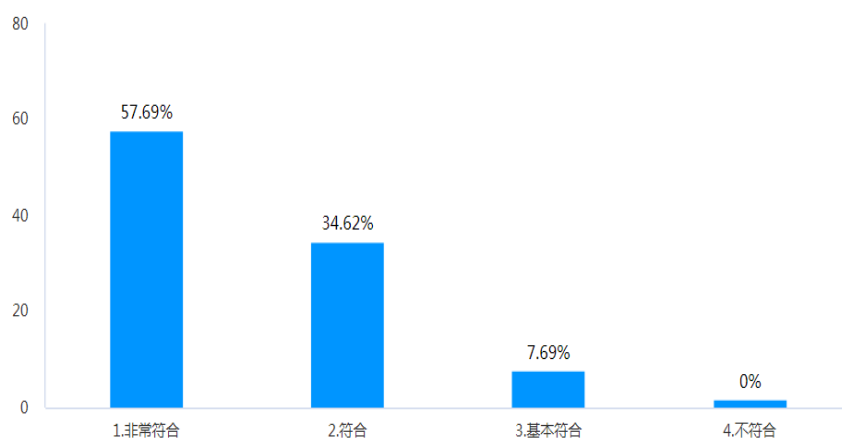


Figure4 Evaluation of Training Objectives and Professional Field Rationality

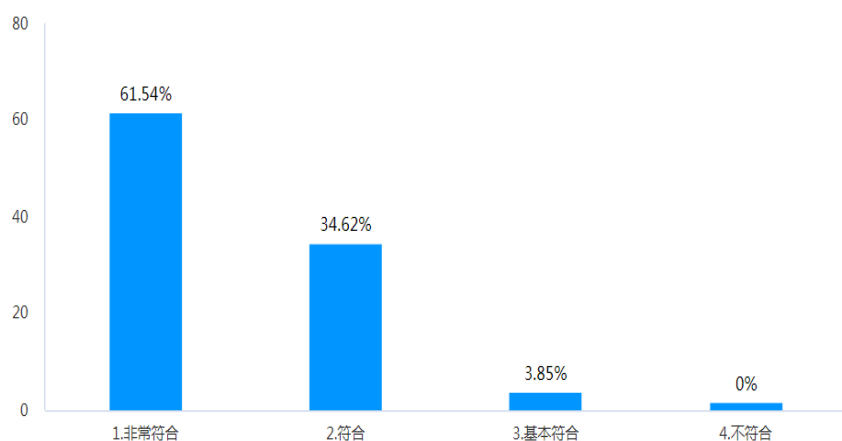


Figure5 Evaluation of the Rationality of Training Objectives and Occupational Characteristics



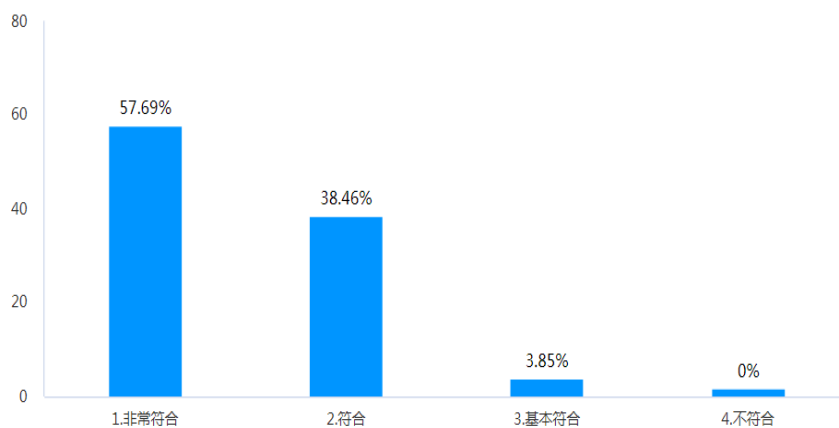


Figure6 Expected Evaluation of Training Objectives and Graduation Requirements

Overall, the talent cultivation goals of this major have a good applicability to social and industry needs, and the overall evaluation is relatively positive, but there are also some shortcomings and areas that need to be strengthened:

①The training objectives and expected professional graduation requirements need to strengthen the teaching or practice in terms of on-site experience accumulation, so that talents can adapt to job requirements more quickly.

The training objectives and professional fields should appropriately consider the cultivation of interdisciplinary talents to enhance the development of professionals in cross-disciplinary areas.

The training objectives and professional characteristics should include topics such as engineering project management and engineering cost to enhance the breadth of professional characteristics.

The training objectives and professional development should incorporate smart water management content to align with the development of the times and professional growth.

### (3) Graduation Requirements

According to the needs of talent cultivation, this survey conducted statistical analysis based on 26 graduation requirements sub-indicators, and the specific statistical results can be seen in Figure 7~Figure 32. The evaluation results for 26 graduation achievement observation points indicate that most respondents are quite satisfied with the achievement of graduation requirements, with the proportion of those who rated it as very consistent or consistent being over 88%. **The evaluations of basic compliance and non-compliance mainly concern the following issues:**

① Graduation Requirements 1 “Engineering Knowledge”: The mastery of mathematics and natural science knowledge needs to be strengthened, especially when facing the need to comprehensively apply mathematics, natural sciences, engineering fundamentals, and professional knowledge to solve complex engineering problems. Therefore, it is necessary for this major to require students to have a good foundation in mathematics and natural sciences during the admission process, and the curriculum should focus on mastering basic principles and applying knowledge, while enhancing the training of the ability to discover scientific essence through engineering problems.

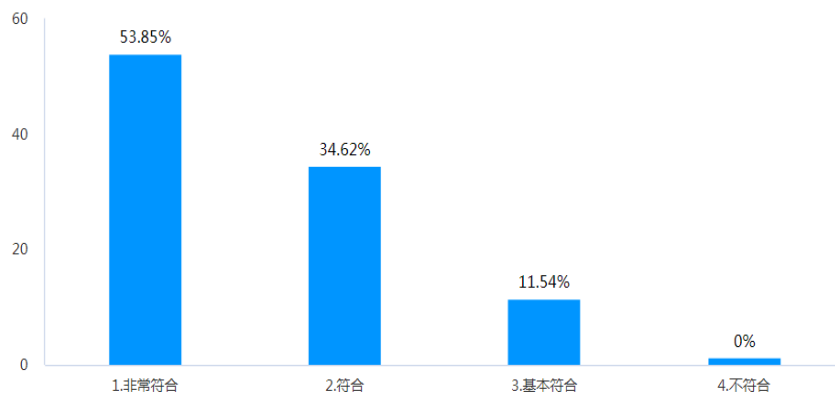


Figure7 Evaluation of Natural Science Knowledge Achievement

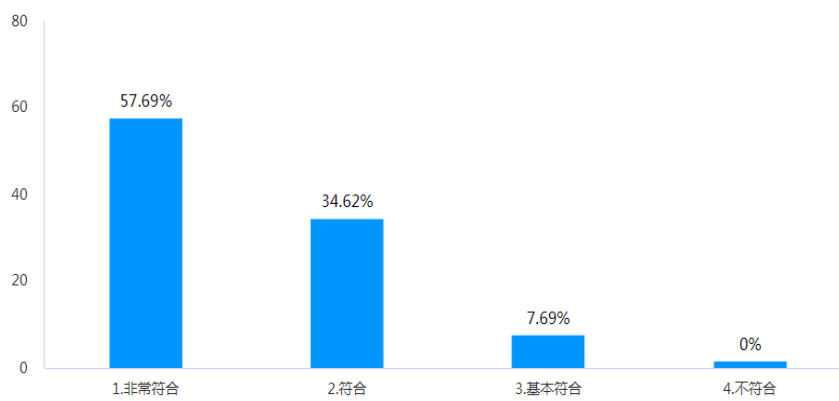


Figure8 Evaluation of Engineering Knowledge Achievement

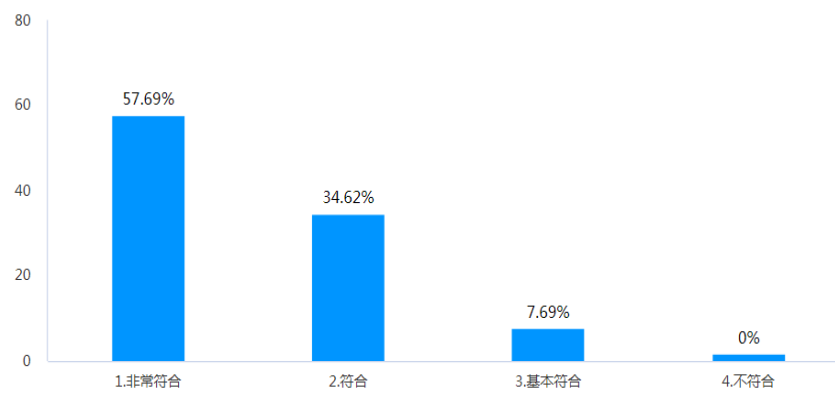


Figure9 Assessment of Professional Basic Knowledge AchievementValue

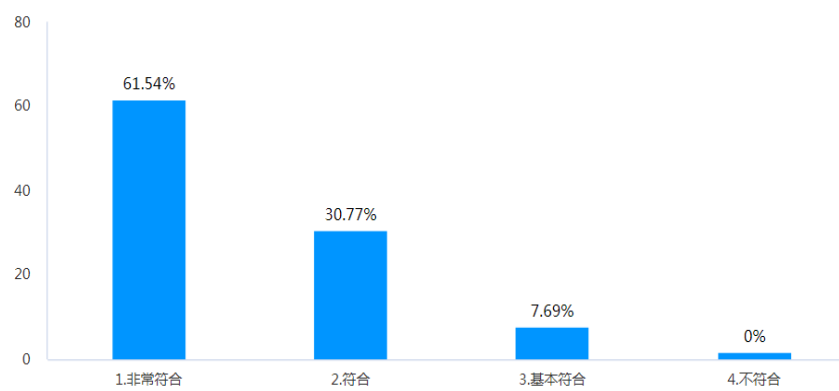


Figure10 Professional Knowledge Achievement Evaluation

② Graduation Requirements2 “Problem Analysis” : The relevance to graduation requirement1 is very obvious, therefore, the evaluation results of this graduation requirement are the same as those of graduation requirement1. It is necessary to have a refined engineering essence in capability development and to propose targeted solutions.

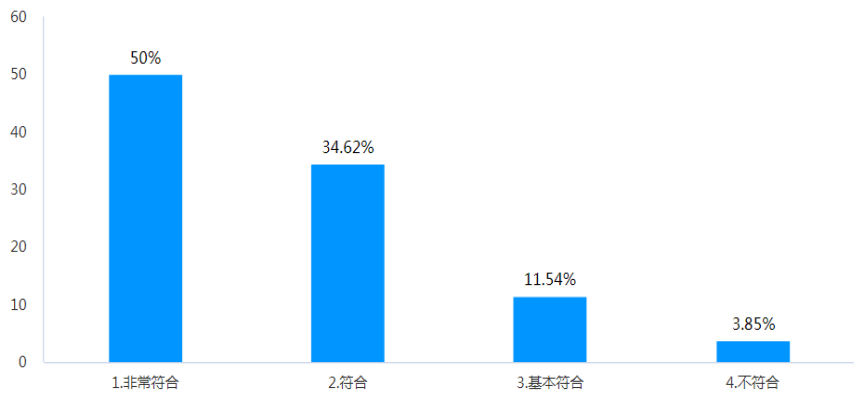


Figure11 Analysis and Evaluation of Engineering Issues

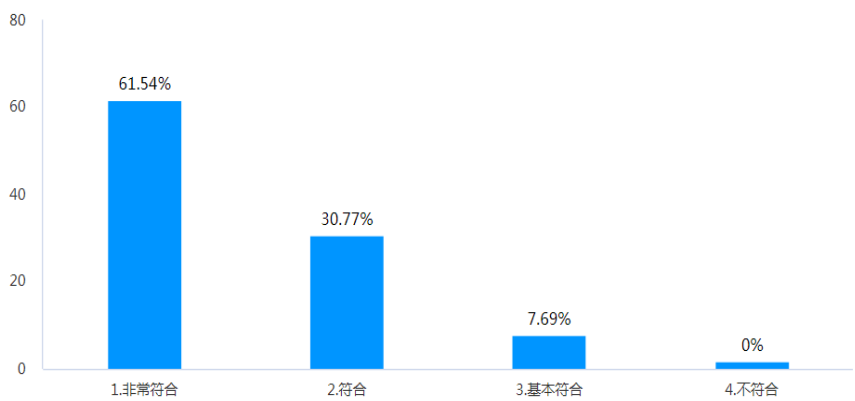


Figure12 Evaluation of Engineering Problem Solving Achievements

③ Graduation Requirements3 “Design/Develop Solutions” : The ability to solve complex engineering problems under multiple influencing factors still needs to be strengthened. The main feedback is that the design of process solutions lacks comprehensive consideration of technical and social, health, safety, legal, cultural, and environmental factors, and there is insufficient training in innovative thinking.

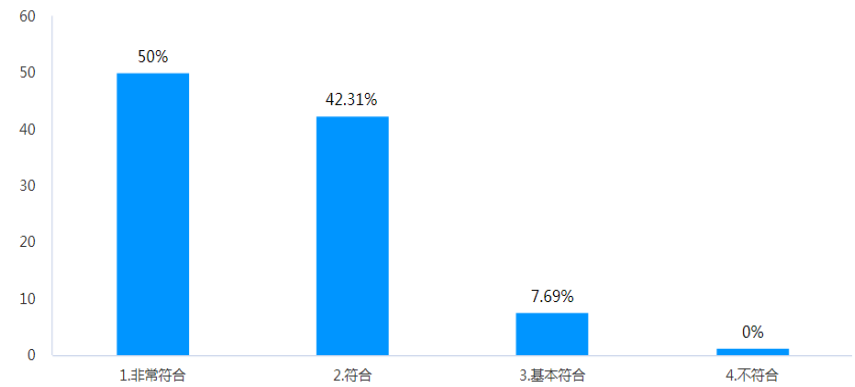


Figure13 Design/Development solutions to achieve evaluation

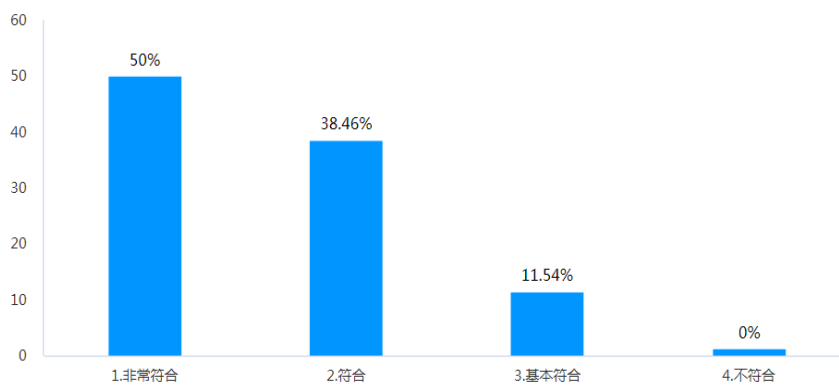


Figure14 Design/Evaluation of Innovation and Constraints in Developing Solutions

④ Graduation Requirements4 “Research” : The proportion of unmet evaluation in this graduation requirement is 3.85%, with feedback directed at design/research and development units, which believe that the experimental/research and design capabilities related to scientific issues need improvement. This is somewhat related to the training orientation of this major as “engineering application-oriented talent.” During their time at school, students have insufficient training in experimental design, data analysis, and application of data results. The objectives and teaching content of subsequent courses related to this capability development, such as “College Physics Experiment” and “Water Quality Engineering Experiment,” should be strengthened.

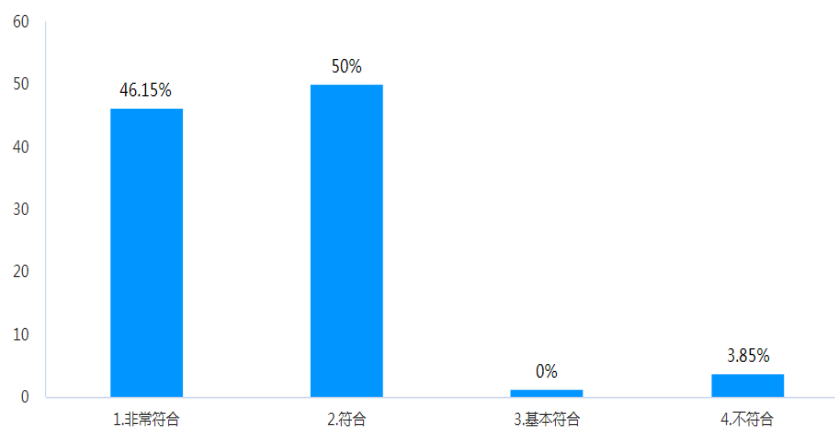


Figure15 Experiment/Research on the Evaluation of Awareness and Skill Achievement

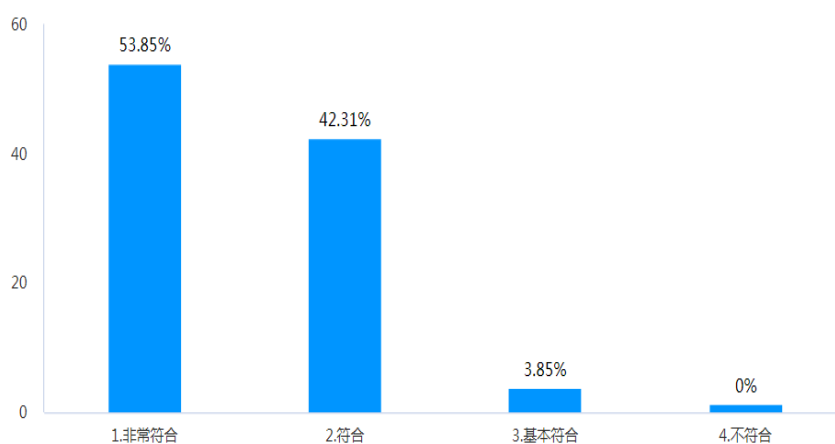


Figure16 Experiment/Research Route and Plan Evaluation

⑤ Graduation Requirements5 “Use of Modern Tools” : There are significant differences in the use of modern tools based on the differences in the service fields of the research subjects. Design and development units often build upon the application of traditional computer-aided design software (CAD), adding applications such as BIM, storm model management, geographic information systems (GIS), computational fluid dynamics (CFD) software, etc. Construction management units, on the other hand, focus on applications related to management, economic accounting, and project cost, such as those provided by Guanglian Da.

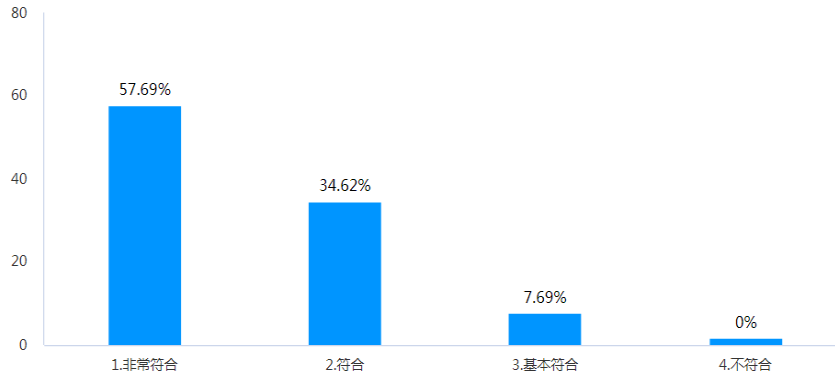


Figure17 Evaluation of Mastery in Modern Engineering and Information Technology

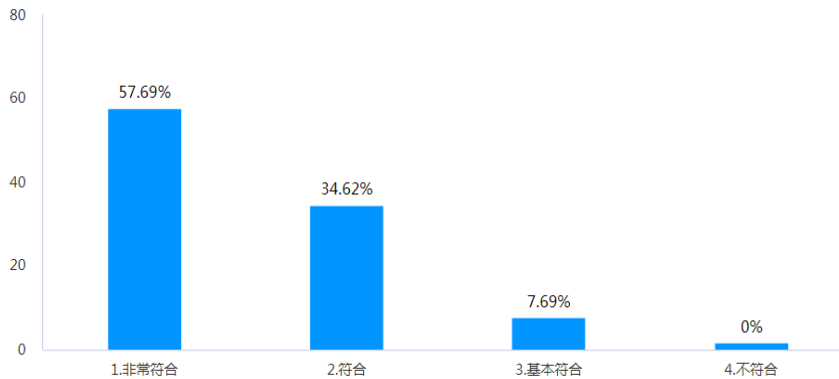


Figure18 Application of Modern Engineering and Information Technology/Solution Achievement Evaluation

⑥ Graduation Requirements6 “Engineering and Society” : Employers have certain expectations regarding students’ understanding of laws and regulations related to water engineering, industrial policies, technical standards systems, etc. System knowledge has a certain degree of expected variance, especially in the understanding of the social, health, safety, legal, and cultural influencing factors in systematic solutions that still need improvement.

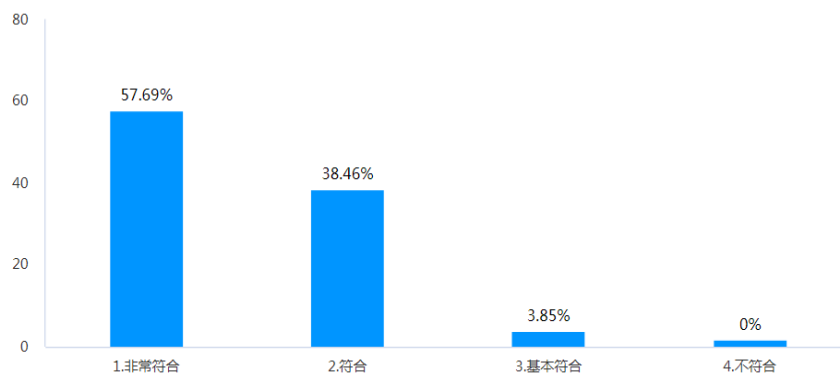


Figure19 Evaluation of legal foundations, technical systems, etc.

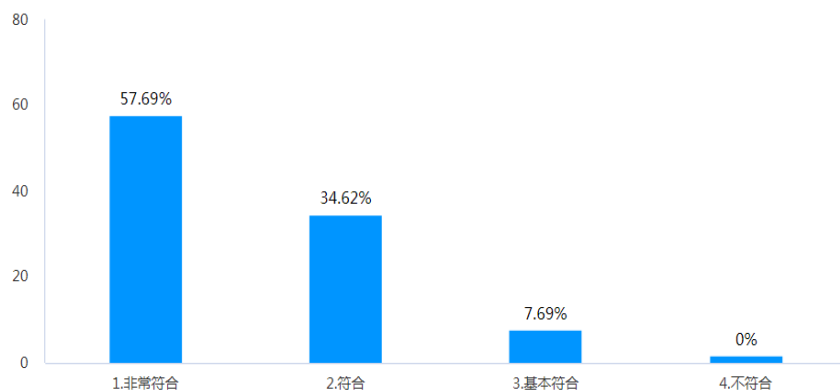


Figure20 Evaluation of engineering and social, safety, legal, and other considerations

⑦Graduation Requirements7 “Environment and Sustainable Development” : This graduation requirement has been evaluated positively.

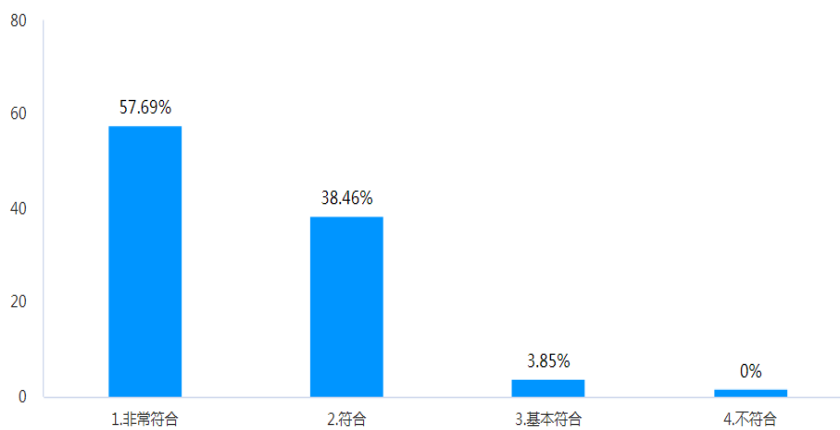


Figure21 Concepts of Environment and Sustainable Development/Evaluation of Connotation Achievement

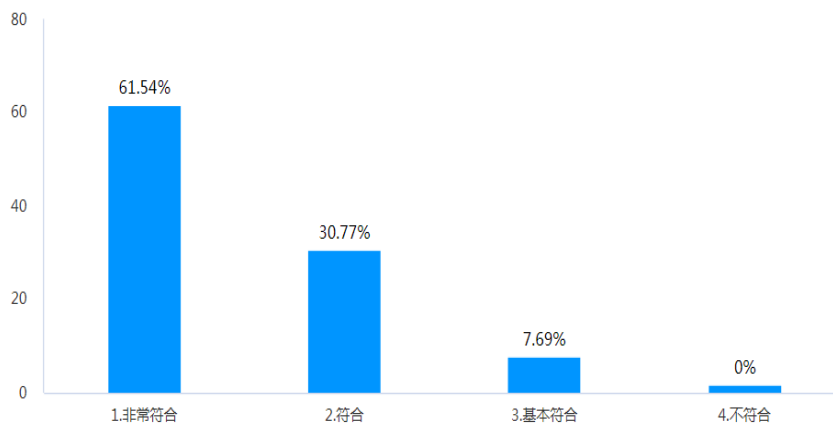


Figure22 Evaluation of Environmental and Sustainable Development Engineering Issues

⑧GraduationRequirements8 “Professional Standards” : Employers’ evaluation of graduates’ social responsibility,professional ethics, and engineering ethics standards is positive.

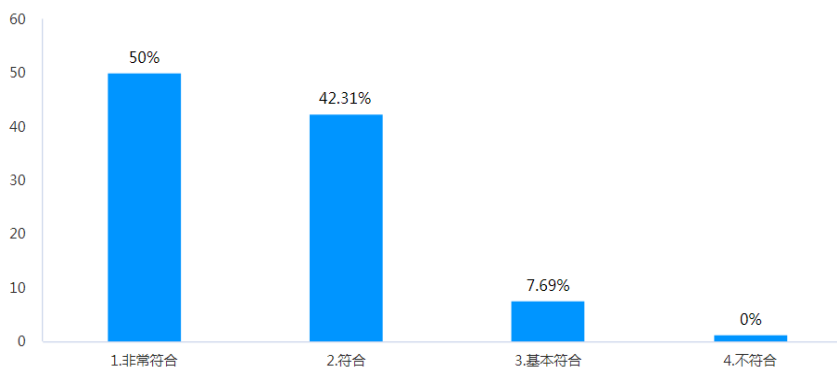


Figure23 Evaluation of scientific literacy, professional ethics, etc.

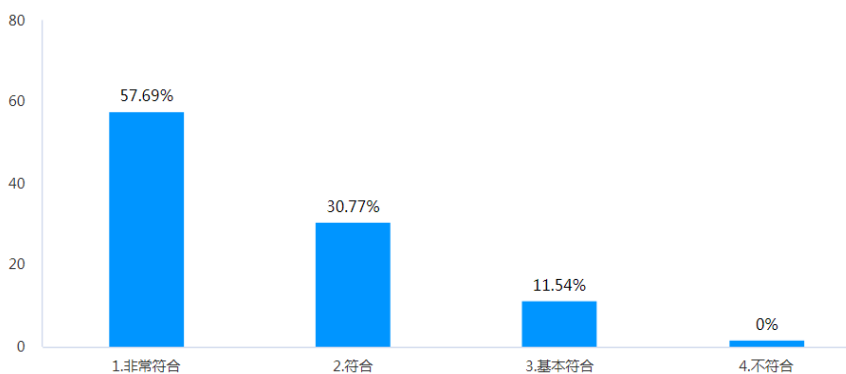


Figure24 Evaluation of Social Responsibility Achievement

⑨ Graduation Requirements9 “Individual and Team” : The employer evaluates the “individual role” positively, as they can complete the tasks assigned to them, but the abilities related to “team roles” such as project organization and management should be strengthened.

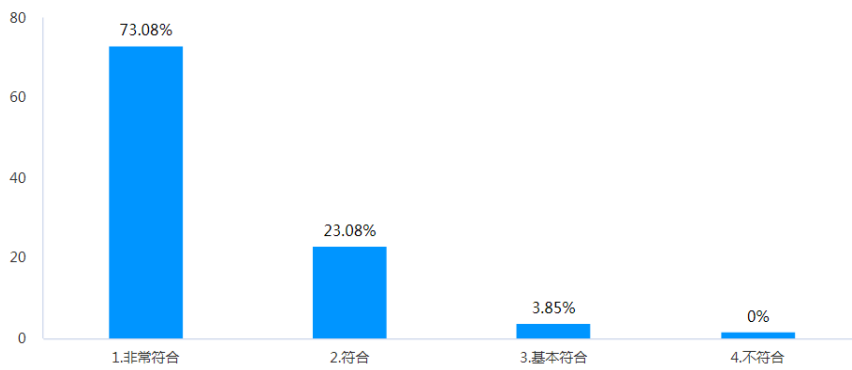


Figure25 Evaluation of the Intrinsic Connections and Mastery of the Subject

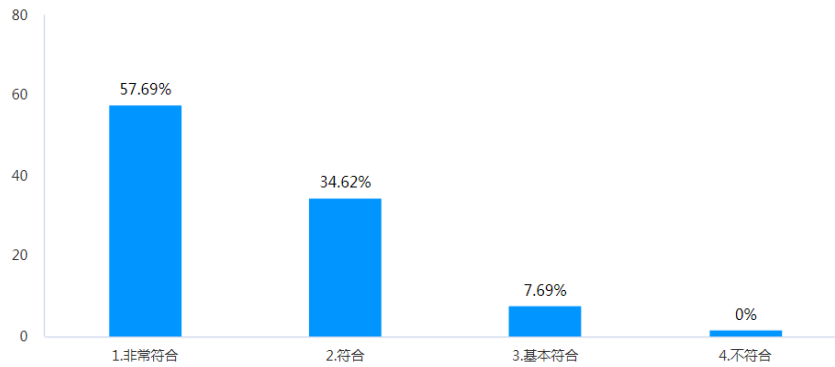


Figure26 Team/Individual Role Achievement Evaluation

⑩Graduation Requirements10 “Communication” : The organizations involved in the research have a positive evaluation of graduates’ reports, presentations, and other personal qualities in both humanities and professional aspects. However, since the student work of the surveyed companies mainly targets the domestic market, communication and interaction in a cross-cultural context have not been effectively evaluated.

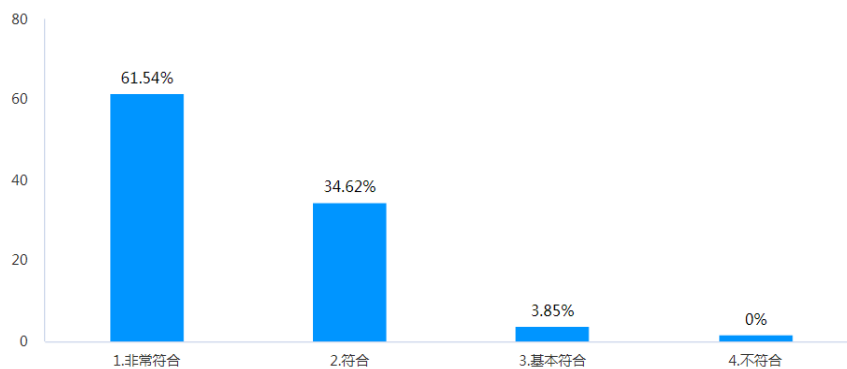


Figure27 Evaluation of Professional Internal Communication and Interaction



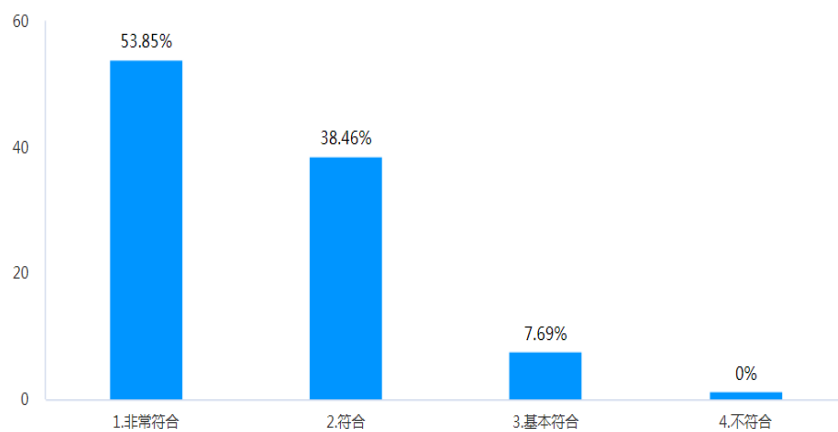


Figure28 International Perspective Evaluation

Graduation Requirements11 “Project Management” : In this graduation requirement evaluation, the project organization and management skills after the engineering economic analysis evaluation need to be strengthened.

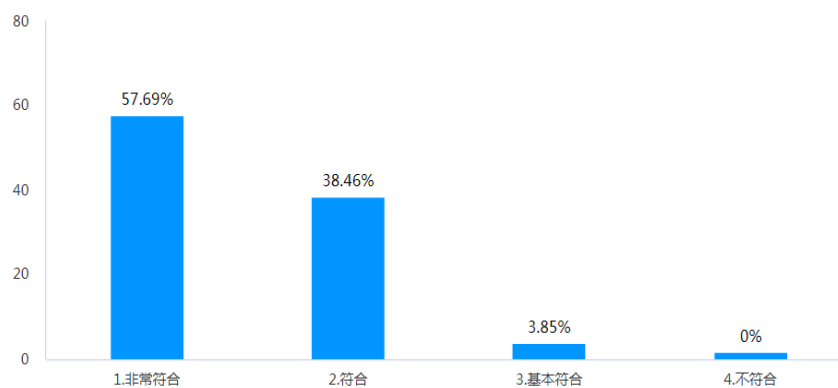


Figure29 Evaluation of Engineering Management and Economic Decision-Making

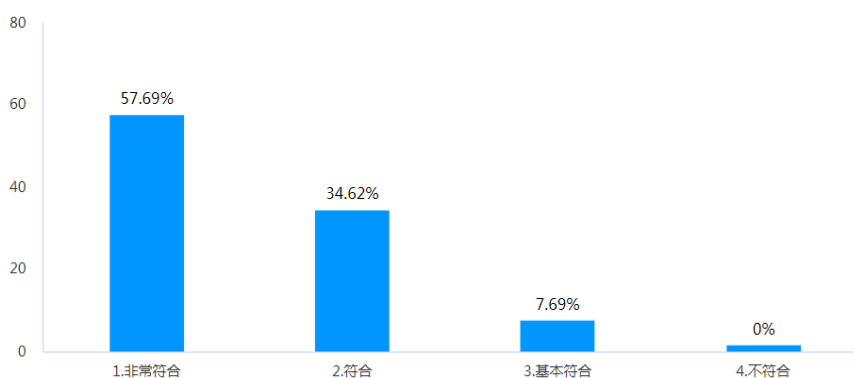


Figure30 Evaluation of the Application of Engineering Management and Economic Principles

Graduation Requirements12 “Continuous Learning” : Employers have a positive evaluation of continuous learning and lifelong learning.

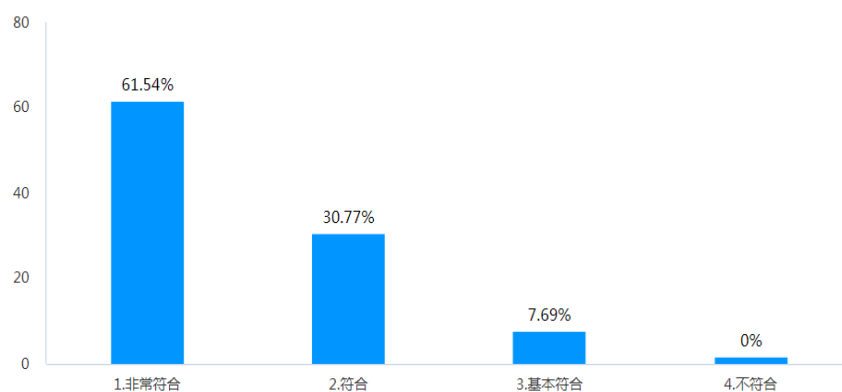


Figure31 Evaluation of Autonomous Learning and Lifelong Learning

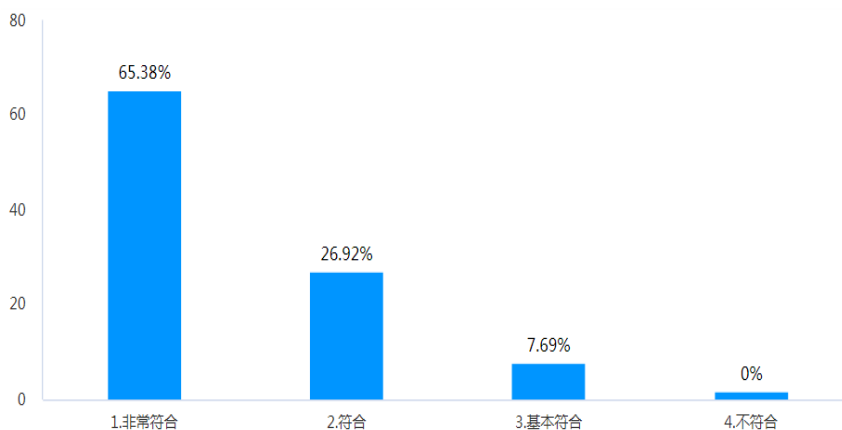


Figure32 Applicable Development Capability Achievement Evaluation

#### (4) Course System

Based on the requirements for the curriculum system set forth in the "National Higher Education Institutions Water Supply and Drainage Science and Engineering Program Evaluation Certification Document" and the requirements for core knowledge areas, knowledge units, and knowledge points in the "Guidelines for Undergraduate Programs in Water Supply and Drainage Science and Engineering," this program constructs a foundational curriculum and a core curriculum for the discipline, and has set up independent development courses in line with our school's talent cultivation positioning and professional talent training objectives. The evaluation results of the curriculum system by the survey subjects are shown in Table3.

Table3 Overview of the Curriculum System Evaluation

Evaluation conclusion	Very suitable (%)	Compliant (%)	Basically meets (%)	Not conforming (%)	Need to add courses or content
Natural Science Course	50	38.46	11.54	0	In the natural science curriculum, it is necessary to add information technology courses;
Humanities general education courses	53.85	34.62	11.54	0	In the basic theoretical courses of the profession, it is necessary to add courses related to various water systems and their

					operating principles under the new situation, sponge cities and black and odorous water content;
Fundamental Theory Courses	61.54	30.77	7.69	0	Professional practice courses should increase social practice courses and internship practice time;
Professional Practice Course	69.23	23.08	7.69	0	Self-developed courses should include building regulations, engineering bidding, engineering consulting, and the application of building model technology courses or content;
Self-Development Courses	57.69	38.46	0	3.85	Basic engineering courses should include building drawing related content;
					Add relevant courses or content on equipment maintenance, management, and operation.

## (5) Employment Situation and Salary Compensation

### ① Salary and compensation

The salary compensation for graduates in the workplace is 6000–10000 Yuan/month, accounting for 38.46% of the total sample size, with the proportion of monthly salaries above 10000 Yuan also being relatively high, accounting for 30.76%. For specific salary compensation statistics, see table 4.

Table 4 Overview of Graduate Salaries and Compensation

Salary range (Yuan/month)	4000 Yuan	4000–6000 Yuan	6000–10000 Yuan	10,000– 15,000 Yuan	15000 Yuan or more
Proportion (%)	7.69	23.08	38.46	15.38	15.38

### ② Employment situation

The industry development status and employment demand statistics of the research subjects are shown in the figure 33–Figure 34. Most enterprises are in a stable development period, so their talent demand is relatively stable. However, affected by the broader environment, some enterprises are currently in a contraction phase, leading to a certain degree of decline in their talent demand. The main industry fields are design units, primarily in the construction and municipal design research institutes. In contrast, water operation management and smart water development and construction units have a high demand for talent, but there are differences in the levels and capabilities required. Water operation management units mainly need frontline and management personnel, with talent capability requirements focused on engineering application and management. Smart water, on the other hand, requires professionals with a strong theoretical foundation in their field, as well as good skills in mathematics and computer science, capable of collaborating with geographic information systems, computers,

and automation specialties to develop and maintain water supply and drainage software or systems.

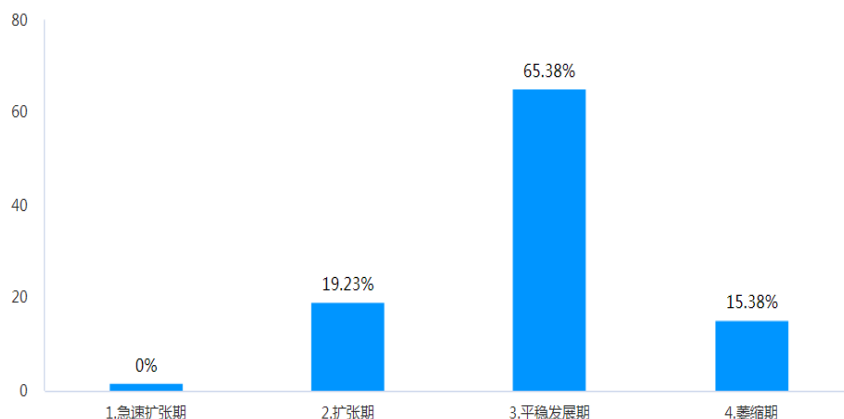


Figure33 Development status of the employer's industry

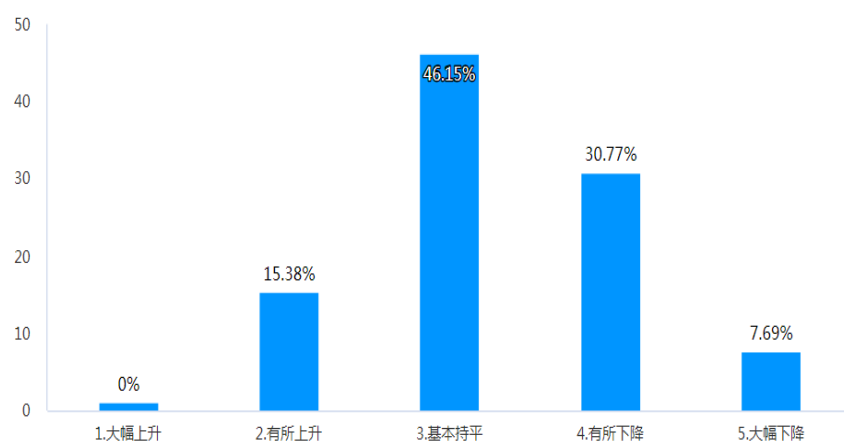


Figure34 Demand for Personnel of Research Subjects

#### Four, Conclusion

Based on the analysis of the prospects of the drainage and sewage profession in various countries and regions, the training situation of talents in the field of drainage science and engineering, and the research on the industry and employers, the following conclusions are drawn:

(1) With the national strategy and industry development, the water supply and drainage major remains one of the most promising fields, especially with our school's high-quality application-oriented engineering talent positioning, serving the Dongting Lake area, the Yangtze River Economic Belt, and the Guangdong-Hong Kong-Macau Greater Bay Area in urban infrastructure construction and water environment remediation and restoration, which has a good competitive advantage in the industry.

(2) With the national strategy and industry development, our school's water supply and drainage major should further explore and accumulate in areas such as smart water management, watershed water quality safety monitoring and early warning, comprehensive water environment remediation, resource utilization of sewage and rainwater, and urban stormwater management, based on its traditional advantages, to meet the needs of national and industry development..

(3) Our school's training objectives for the Water Supply and Drainage Engineering major align well with the national and regional economic development needs. Graduates meet the basic requirements for the industry's and enterprises' talent capability demands, but there is also a need to strengthen training in the graduation requirements of "using modern tools" and "research."

(4) According to the talent capability needs of industry enterprises and the requirements of industry technology development, our school's Water Supply and Drainage Science and Engineering program needs to further improve the curriculum system, adding courses such as Smart Water Management, Building Information Modeling, and Building Regulations, or enhancing the teaching content on Sponge Cities, Black and Odorous Water Bodies, and Architectural Drawing Interpretation.

## 5. Related Attachments

Industry, Enterprise Unit Questionnaire Survey