Hunan City University

Water Supply and Drainage Science and Engineering Major

"Water Supply and Drainage Pipeline Network System (2)"

Course Objective Achievement Evaluation Report

(2024-2025-1)

College of Municipal and Surveying Engineering
Major: Water Supply and Drainage Science and Engineering
Course: Water Supply and Drainage Pipeline Network System (2)
Instructor: Yang Hengzhen

1. Evaluation of course information

1.1 Basic Course Information

"Water-Supply and Drainage Engineering (2)" is one of the required courses for the Water Supply and Drainage Science and Engineering major, and it is a core professional course. The prerequisite course "Hydraulics" lays a solid foundation for the study of this course. This course systematically discusses the basic components of sewage, rainwater, and combined sewer systems, the selection of system schemes, the determination of design flow, and the theoretical and design steps for pipe design calculations. Through this course, students will systematically master the design theory and methods of drainage network systems, the steps and methods of engineering design; understand the basic theories and knowledge of drainage network system operation management; understand the process and direction of scientific and technological development of drainage network systems, and initially develop the ability to analyze and solve theoretical and practical engineering problems.

This course totals 2 credits and 32 class hours. The course teaching class information for "Water Supply and Drainage Pipeline Network System (2)" is shown in Table 1.

Table 1 Water Supply and Drainage 2019 Level "Water Supply and Drainage Pipeline Network System (2)" Course Basic Information

Teaching class	Number of course selections	course teacher
2202203	35	Hengzhen Xu

1.2 Course Teaching Objectives and Support for Graduation Requirements

The course "Water Supply and Drainage Pipeline Network System (2)" is an important core compulsory course for the Water Supply and Drainage Science and Engineering major. This course systematically discusses the basic components of sewage, rainwater, and combined sewer systems, the selection of system schemes, the determination of design flow, and the theoretical calculations and design steps for pipeline design. The teaching objectives of this course include three aspects: ideological and moral education and professional norms, solving complex engineering problems, and analyzing and evaluating the impact of water engineering practices on social, environmental, and economic sustainable development, corresponding to the graduation requirements (secondary indicators), as shown in Table 2.

Table 2 Course Teaching Objectives and Support for Graduation Requirements

Course objectives	Graduation requirements (corresponding to secondary indicators)
1. Cultivate students' professional qualities, master the flow calculation and hydraulic calculation theories and methods of drainage pipeline network systems, and systematically apply the knowledge learned for the planning and design of drainage pipeline network systems. For complex problems in this field, be able to use this knowledge and methods to propose economical and effective countermeasures, and possess an awareness of "innovation and entrepreneurship" and the concept of "dual carbon" green development.	2.2 By consulting literature databases, standards, specifications, and manuals, comprehensively analyze complex engineering problems in water engineering planning, design, construction, and operation management, and propose economical and effective countermeasures to obtain practical solutions and conclusions.
2. In the planning and design process of drainage pipe networks, regarding the complex engineering problems in this field, it is possible to analyze and evaluate the impact of water engineering practices on social, environmental, and economic sustainability by utilizing knowledge of pipe network design and calculation theory.	7.2 Able to analyze and evaluate the impact of water engineering practices on social, environmental, and economic sustainability with the help of professional knowledge.

1.3 Course Assessment Plan

The teaching method of this course is offline, with 4 class hours per week, completed over 8 consecutive weeks. The assessment methods for the course include formative assessment and a final exam, with formative assessment consisting of classroom performance and homework grades. The final exam is a closed-book written test.

1. Regular grades (40%)

The usual score of this course accounts for 40% , and the assessment components mainly include classroom performance, independent online learning, and homework. The work content and requirements, scores, and support for course objectives for each assessment component are shown in Table 3.

Table 3 Regular Performance Assessment Links Supporting Course Objectives

Assessment phase	Job content and requirements	Percentage of regular performance scores	Converted score (Total score 100 points)	weight coefficient	Support course objectives
Class discussion	For some key content, difficult content, and open-ended questions, adopt a classroom discussion format. Several small group discussions can be planned, and each group can send a representative to express their group's viewpoints and insights, which is beneficial for deepening understanding and broadening perspectives.	10	4	0.04	Course Objective 1
		10	4	0.04	Course Objective 2
Answer the question	According to the teaching content and key points, 6 to 8 multiple-choice, true/false, and multiple-answer questions will be released irregularly for each class. Students are asked to answer them to understand their grasp of the key content, and explanations will be provided based on their answers.	5	2	0.02	Course Objective 1
		5	2	0.02	Course Objective 2
自主线上学习	Before each class, teachers publish preview courseware and learning videos on the Learning Pass online teaching platform $2 \sim 3$ days in advance. Students learn online outside of class to understand the upcoming course content and learning objectives in advance. Teachers assess pre-class learning performance based on the completion of pre-class videos and the number of chapter study attempts.	10	4	0.04	Course Objective 1
		10	4	0.04	Course Objective 2
Homework	After each chapter of this course is completed, 2 to 3 questions will be assigned as homework to promptly consolidate the knowledge taught in class, with no less than 4 assignments given; students are required to submit their homework within the specified time, and the instructor will complete the grading and analysis of the homework within one week of receiving it. Common issues will be explained in class, pointing out and correcting existing problems to enhance the relevance of classroom teaching. Assessment standards will be based on grading levels and criteria.	25	10	0.1	Course Objective 1
		25	10	0.1	Course Objective 2
	Total	100	40	0.4	

2. Final exam scores (60%)

The standard answers for the final exam are graded on a hundred-point scale. The score for each item and the supporting course objectives are shown in Table 4.

Table 4 Final Exam Assessment Content and Supporting Course Objectives

Exam question types	Key points of examination	Score on the paper	Converted score (full course) Fraction **100** Weight system	Support Course Target
Number				

2. Evaluation methods

This course mainly adopts a method of analyzing the achievement based on course grades: determining course objectives based on the graduation requirement indicators supported by the course, the assessment components of each course objective, and the weight coefficients of the scores in each teaching component, as shown in Table 5, and calculating the achievement of course objectives by combining the average scores of each part of the students.

Table 5 Analysis Basis for Achievement Based on Course Grades

Learning outcomes		Evaluation criteria for achievement degree		weight coefficient
Course objectives	Support indicator point	Assessment method	Observation point	
1	Graduation requirements 2.2	Regular grades	Class discussion	0.04
			Answer the question	0.02
			Independent online learning	0.04
			Homework	0.1
		final exam	Multiple choice question, fill in the blanks	0.24
2	Graduation Requirements 7.2	Regular grades	Class discussion	0.04
			Answer the question	0.02
			Independent online learning	0.04
			Homework	0.1
		final exam	Q&A, calculation	0.36

Three, evaluation results

The course grade consists of regular performance (accounting for 40%) and final exam performance (accounting for 60%). Based on the assessment components of each part of the grade, supporting the course objectives and weight coefficients, and combining the average scores of students in the class for each part, the achievement of the course objectives has been calculated, as detailed in Table 6.

Table 6 Calculation Results of Course Objective Achievement

Learning outcomes		Evaluation criteria for achievement degree		Course objective achievement status		
Course objectives	Support indicator point	Assessment method	Observation point	Target score	Actual score	Degree of achievement
1	Graduation requirements 2.2	Regular grades	Pre-class preparation, classroom learning, classroom quizzes, after-class assignments	20	17.47	0.78
		final exam	Multiple choice questions, Q&A, calculations, etc	24	16.85	
			Total	44	34.32	
2	Graduation Requirements 7.2	Regular grades	Pre-class preparation, classroom learning, classroom quizzes, after-class assignments	20	17.47	0.74
		final exam	Multiple choice questions, Q&A, calculations, fill in the blanks	36	24.05	
			Total	56	41.52	
Total				100.00	75.84	0.76

4. Overall analysis of course achievement 情况

(1) Course Objective 1 is to understand basic concepts, foundational knowledge, and problem analysis skills. Students are required to master the system and selection of drainage systems, the main components of drainage systems, the layout forms of drainage systems, comprehensive treatment of wastewater and regional drainage systems, and the basic construction procedures and planning design of drainage systems. They should systematically grasp the determination of sewage design flow, hydraulic calculations for sewage pipelines, and design calculation methods for sewage pipelines. They should also master the materials, joints, and foundations of drainage pipes, as well as the structures on the drainage pipe system. The expected achievement level is 0.60, and the actual achievement level is 0.78 (achievement distribution is shown in Figure 1), indicating that most students have basically met the requirements of Course Objective 1.

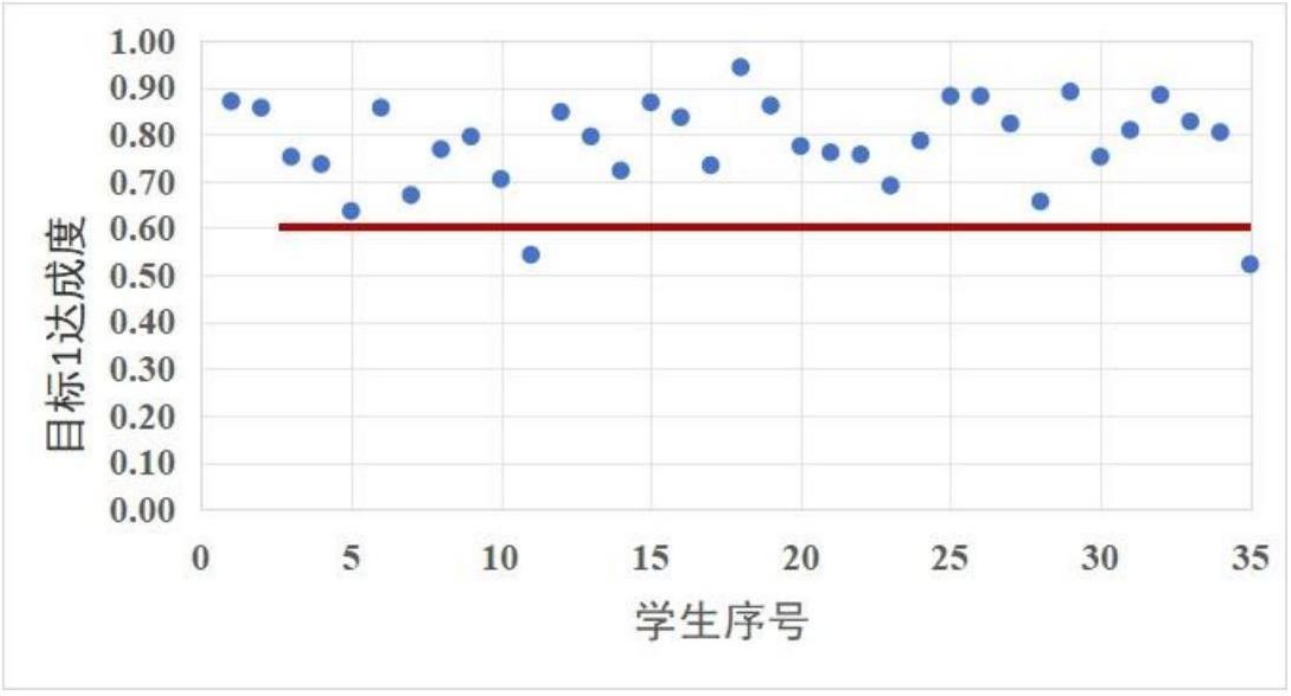
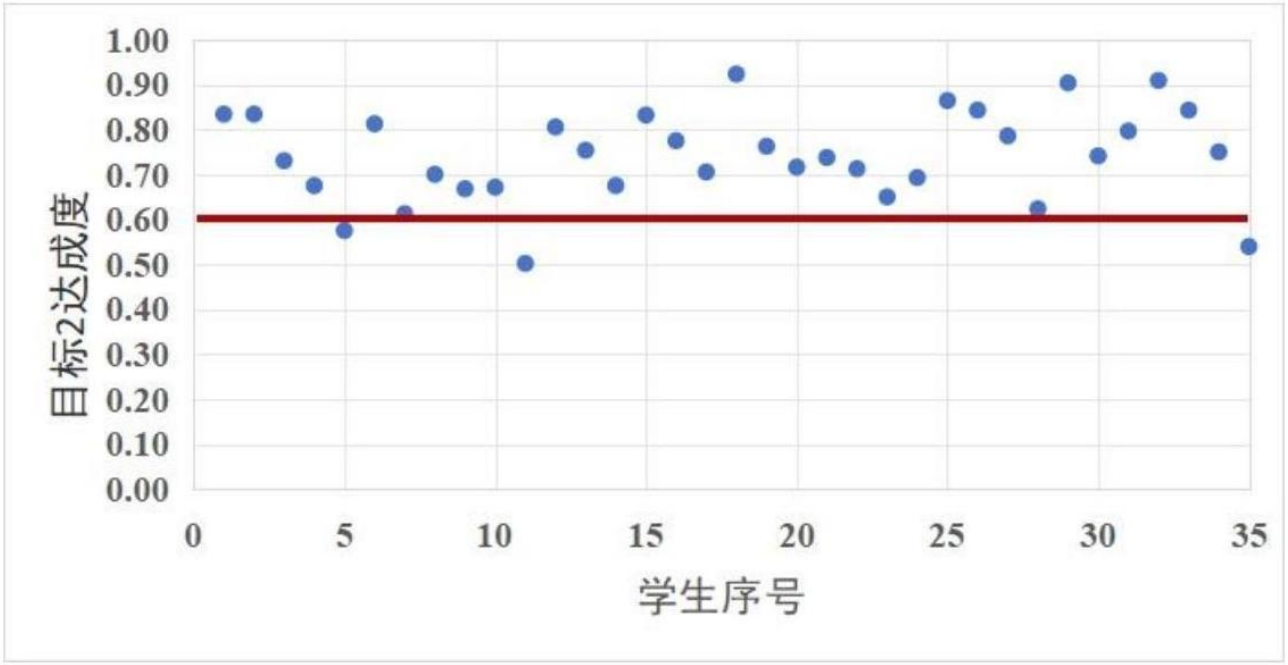


Figure 1 Analysis of Course Objective 1 Achievement

(2) Course Objective 2 Assess students' comprehensive ability to analyze and evaluate the impact of water engineering practices on social, environmental, and economic sustainability. Students are required to systematically master rainfall analysis and storm intensity formulas, determine the flow rate for rainwater drainage design, design and calculate rainwater drainage systems, design and calculate drainage ditches, and design "sponge cities"; understand the usage conditions and layout characteristics of combined sewer systems, design flow rates for combined sewer drainage, key points for hydraulic calculations of combined sewer drainage, renovation of old combined sewer drainage systems in cities, and design of retention basins, etc. Expected achievement level 0.60, actual achievement level 0.74 (achievement distribution see Figure 2), reaching the expected teaching objectives, indicating that most students basically possess the ability.

Develop comprehensive abilities to analyze and evaluate the impact of water engineering practices on social, environmental, and economic sustainable development using the theoretical knowledge acquired.



Analysis of the achievement of Course Objective 2 in Figure 2

The statistical analysis of the achievement of course objectives is shown in Table 7. It can be seen that the proportion of those who did not achieve the course objectives 1, 2 is 5.71%, 8.57% , and the overall achievement of the course is 0.76, indicating a good level of achievement of the course objectives. From Table 8, it can be seen that the number of people with a total score above 90 is 3, and the total score above 90 8.57% . The number of people with a total score between 80 and 89 is 12, accounting for 34.28% of the total scores. The number of people with a total score between 70 and 79 is 13, with a proportion of 37.14% . The number of people with a total score between 60 and 69 is 5, with a proportion of $60-69$ being 14.28% . There are 2 people who failed, accounting for 5.71% , and the proportions of good and average scores are relatively high.

Table 7 Course Objective Achievement Analysis Table

Course Target	Number below target value 0.60	percentage	Number of people below average	percentage	Number of people above average	percentage
1	2	5.71	15	42.86	20	57.14
2	3	8.57	16	45.71	19	54.28

Table 8 Grade Distribution Statistics

Score range	$90-100$ (Excellent)	$80-89$ (Good)	$70-79$ (Medium)	$60-69$ (passing)	Below 60 (Fail)
Total number of reviews	3	12	13	5	2

5. Implementation of improvement measures for the course in the previous year

In response to the phenomenon of some students in the previous grade having low achievement levels, this semester we have strengthened the tutoring for underperforming students, and the proportion of those with achievement levels below the average has decreased.

(2) In response to the phenomenon of a high proportion of students in the previous grade below the average achievement level, this semester we strengthened the analysis and explanation of engineering cases in teaching, enhanced online tutoring, and overall achievement levels have improved.

6. Targeted improvement measures for this evaluation

In this assessment, overall, the achievement of the course objectives is relatively ideal, but there are still some issues that need improvement. The existing problems and continuous improvement measures are as follows:
(1) There are still some students with lower achievement levels, and special attention should be paid to the classroom performance and completion of after-class exercises of underperforming students, with a focus on strengthening the explanation and guidance of basic theoretical knowledge to enhance their interest in the subject.
(2) In response to the phenomenon of a high proportion of students below the average achievement level, next semester's classroom instruction will focus on strengthening the consolidation and training of basic theoretical knowledge, as well as increasing classroom discussions and engineering case analyses.

Signature of the responsible professor of the course (group) teaching team:

Hunan City University
Water Supply and Drainage Science and Engineering Major
"Building Water Supply and Drainage Engineering"
Course Objective Achievement Evaluation Report
(2024-2025-1)

College of Municipal and Surveying Engineering
Major: Water Supply and Drainage Science and Engineering
Course: Building Water Supply and Drainage Engineering
Instructor: Deng Jie

1. Evaluation of course information

1.1 Basic Course Information

"Building Water Supply and Drainage Engineering" is a core course in the major of Water Supply and Drainage Science and Engineering. It studies the supply of domestic water, fire-fighting water, and the collection, treatment, and discharge of sewage (wastewater) in industrial and civil buildings, as well as residential communities, to meet the needs of life and production and to create a sanitary, safe, and comfortable living and working environment. In modern buildings, water supply and drainage is one of the indispensable engineering systems, and the quality of its design directly affects the living conditions of residents and the effectiveness of various activities, as well as the safety of life and property, and the rationality of engineering costs. In practical construction, the demand for building water supply and drainage designers is significantly greater than that for designers in other areas of this major, making the effective teaching of this course one of the prominent important aspects of this specialty. The main task of this course is to cultivate students' ability to design building water supply and drainage engineering and to improve this technology.

This course totals 3 credits and 48 class hours. The course teaching class information for "Building Water Supply and Drainage Engineering" is shown in Table 1.
Table 1 Water Supply and Drainage Level 22 Basic Information of the "Building Water Supply and Drainage Engineering" Course

Teaching class	Number of course selections	course teacher
2202201	36	Deng Jie

1.2 Course Teaching Objectives and Support for Graduation Requirements

The course "Building Water Supply and Drainage Engineering" is a core professional course in the Water Supply and Drainage Science and Engineering major. It studies the supply of domestic water, fire-fighting water, and the collection, treatment, and discharge of sewage (wastewater) in industrial and civil buildings, as well as residential communities, to meet the needs of life and production and to create a sanitary, safe, and comfortable living and production environment. The teaching objectives of this course include three aspects: engineering knowledge, engineering and society, and professional standards, with each course objective corresponding to graduation requirements (secondary indicators), as shown in Table 2.

Table 2 Course Teaching Objectives and Support for Graduation Requirements

Course objectives	Graduation requirements (corresponding to secondary indicators)
Through course study, master the types of building water supply and drainage systems, understand the relationship between the water supply and drainage science and engineering major and the architecture, building environment, and other related majors, comprehend the knowledge framework structure of this major, and be able to apply it to solve complex engineering problems.	1.4 Can apply professional knowledge of water supply and drainage science and engineering, as well as engineering management knowledge, to solve complex engineering problems in water supply and drainage projects.
2. Master the characteristics and requirements of building water supply and drainage systems, master the theoretical calculation methods of building water supply and drainage systems, and master the basic methods and processes of building water supply and drainage design. Familiarize yourself with the design specifications related to building water supply and drainage, master the basis for selecting schemes for water supply systems, drainage systems, fire protection systems, etc., and possess the ability to conduct systematic analysis of complex building water supply and drainage issues using literature retrieval, data consultation, and other means, and propose corresponding solutions and reasoning.	6.1 Able to utilize knowledge of water engineering-related laws and regulations, industrial policies, technical standards systems, etc., to reasonably analyze and evaluate the impact of solutions to complex water supply and drainage engineering problems on society, health, safety, law, and culture.

On the basis of the argument.	
3, able to analyze and evaluate the impact of fire protection and other designs on society and health, the impact of safety, law, and culture, and understand the responsibilities that should be undertaken Responsibility.	8.2 Understanding engineers' responsibility for public safety, health, and welfare Code of ethics, consciously fulfilling responsibilities.

1.3 Course Assessment Plan

The teaching method of this course is offline, with four class hours per week, completed over 12 consecutive weeks. The assessment methods for the course include formative assessments and a final exam. Formative assessments include classroom performance, answering questions, quizzes, and homework grades. The final exam is an open-book written test.

1. Regular grades (20%)

The usual score of this course accounts for 20% , and the assessment components mainly include classroom discussions, answering questions, quizzes, the work content and requirements of each assessment component, scores, and supporting course objectives are shown in Table 2.

Table 2 Regular Performance Assessment Links Supporting Course Objectives

Assessment phase	Job content and requirements	Percentage of regular performance scores	Converted Score (Total score 100 points)	weight coefficient	Support course objectives
Class Discussion	For some key content, difficult content, and open-ended questions, adopt a classroom discussion format. Several small group discussions can be planned, and each group can send a representative to express their group's viewpoints and insights, which is beneficial for deepening understanding and broadening perspectives.	40	8	0.40	Course Objective 1 Course Objective 2
Answer Question	According to the teaching content and key points, students will be asked to answer questions at irregular intervals during each class to understand their comprehension of the key content, and explanations will be provided based on their answers.	20	4	0.20	Course Objective 1 Course Objective 2
Quiz	Students learn about the upcoming course content and learning objectives in advance through extracurricular online learning, and teachers assess pre-class learning performance based on the completion of pre-class videos and the number of chapter study attempts.	40	8	0.20	Course Objective 1 Course Objective 2
	Total	100	20	1.00	

2. Homework (20%)

The homework for this course accounts for 20% of the total, and the assignments are graded on a percentage scale, with the average score calculated according to the corresponding ratio included in the usual grades and overall grades. The grading levels and details are shown in Table 3.

Table 3 Assignment Grading Levels and Guidelines

Assignment evaluation criteria and scoring				
100-90	89-80	79-70	69-60	Failing grade
Fully grasp the key points of the assessment, the homework is completely correct	Basically grasp the key points of the assessment, there are errors or the expression is not complete enough, but can understand and master after correction.	Partially grasp the key points of the assessment, with errors or incomplete expressions, can be corrected after explanation.	There are many errors in the homework, the writing is not neat, but it can be basically corrected after explanation.	There are many errors in the homework, no corrections; the homework is completely plagiarized or not submitted on time

3, final exam scores (60%)

The standard answers for the final exam are graded on a hundred-point scale. The score for each item and the supporting course objectives are shown in Table 4.

Table 4 Final Exam Assessment Content and Supporting Course Objectives

Exam question types	Key points of examination	Score on the paper	折算分值 (课程满分 100)	weight coefficient	Support course objectives
Multiple choice question	The basic characteristics of the knowledge content that needs to be mastered, distinguishing and differentiating, applicable conditions, etc.	20	12	0.20	Course Objective 1
Explanation of noun terminology	Understanding of the level of mastery of professional terminology	20	12	0.20	Course Objective 1
Short answer question	Familiar with simple technical systems, processes, and engineering systems, with a preliminary ability to analyze and design using learned knowledge.	20	12	0.20	Course Objective 2
Design analysis question	Investigating students' ability to analyze problems	10	6	0.10	Course Objective 3
Calculation problem	Assess students' ability to apply automatic control technology to manage the operation of water supply and drainage system treatment equipment.	30	18	0.30	Course Objective 2
	Total	100	60	1.00	

2. Evaluation methods

This course mainly adopts a method of analyzing the achievement based on course grades: determining course objectives based on the graduation requirement indicators supported by the course, the assessment components of each course objective, and the weight coefficients of the scores in each teaching component, as shown in Table 5, and calculating the achievement of course objectives by combining the average scores of each part of the students.

Table 5 Analysis Basis for Achievement Based on Course Grades

Learning outcomes		Evaluation criteria for achievement degree		weight coefficient
Course objectives	Support indicator point	Assessment method	Observation point	
1	Graduation Requirements 1.4	Regular grades	Class discussion	0.16
			Answer the question	0.08
			Small test	0.16
		Homework	Consolidation of the content in each chapter	0.50
		final exam	Multiple choice question	0.20
			Explanation of noun terminology	0.20
2	Graduation Requirements 6.1	Regular grades	Class discussion	0.16
			Answer the question	0.08
			Small test	0.16
		Homework	Consolidation of the content in each chapter	0.50
		final exam	Short answer question	0.20
			Calculation problem	0.30

3	Graduation Requirements 8.2	Regular grades	Class discussion	0.08
			Answer the question	0.04
			Small test	0.08
		final exam	Design analysis question	0.10

Three, evaluation results

The course grade consists of regular performance (accounting for 20%), homework and final (accounting for 20%), and exam scores (accounting for 60%). Based on the assessment of each part's scores, supporting the course objectives and weight coefficients, and combining the average scores of students in the class for each part, the achievement of the course objectives has been calculated, as detailed in Table 6.

Table 6 Calculation Results of Course Objective Achievement

Learning outcomes		Evaluation criteria for achievement degree		Course objective achievement status		
Course Target	Support indicator point	Assessment method	Observation point	Target Score	Actual Score	Degree of achievement
1	Graduation Requirements 1.4	Regular grades	Pre-class preparation, classroom learning, quizzes	8.00	7.16	0.807
		Homework	Consolidation of the content in each chapter	10.00	7.20	
		final exam	Multiple choice questions, explanation of terms	24.00	16.92	
			Total	42.00	31.28	
1	Graduation Requirements 6.1	Regular grades	Pre-class preparation, classroom learning, quizzes	8.00	7.16	0.682
		Homework	Consolidation of the content in each chapter	10.00	7.20	
		final exam	Short answer questions, calculation questions	30.00	17.27	
			Total	48.00	31.63	
2	Graduation Requirements 8.2	Regular grades	Pre-class preparation, classroom learning, quizzes	4.00	3.58	0.736
		final exam	Design analysis question	6.00	3.78	
			Total	10.00	7.36	
			Total	100.00	70.27	0.742

4. Overall analysis of course achievement 情况

(1) Course Objective 1: In terms of interdisciplinary and comprehensive abilities, students are required to initially possess the ability to apply the types of building water supply and drainage systems and understand the relationship between the water supply and drainage science and engineering major and other majors such as architecture and building environment. They should understand the knowledge framework structure of this major and be able to apply it to solve complex engineering problems. Expected achievement level: 0.60, Actual achievement level: 0.807 (Achievement level distribution is shown in Figure 1), reaching the expected teaching objectives, indicating that most students have well met the requirements of Course Objective 1.

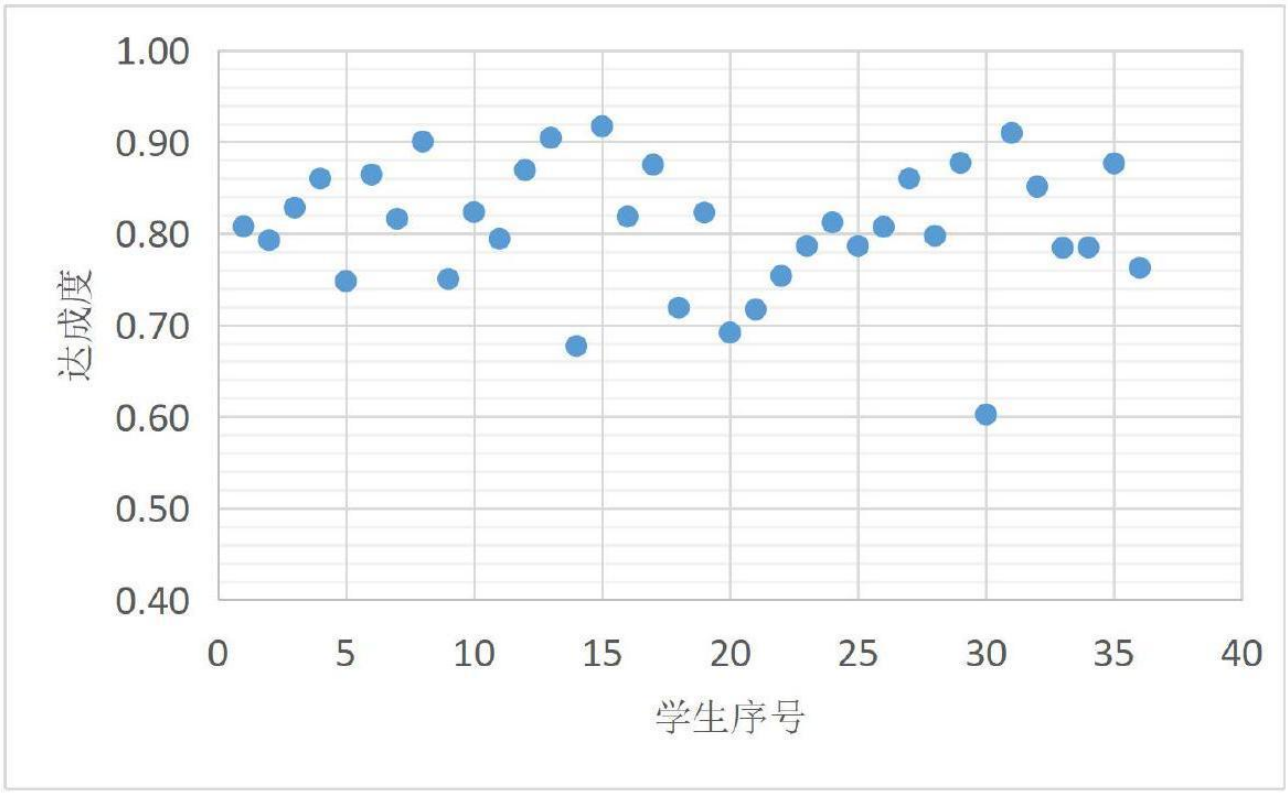
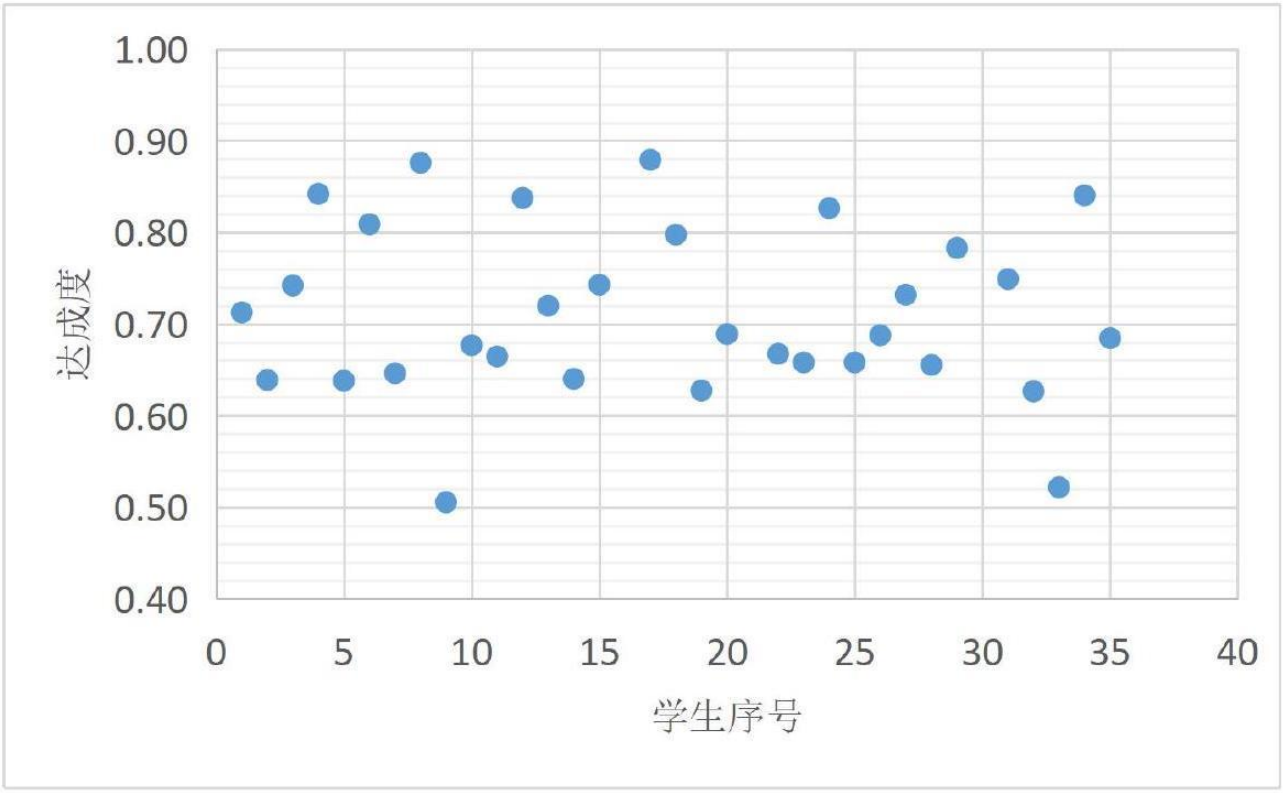


Figure 1 Analysis of the Achievement of Course Objective 1

(2) Course Objective 2 requires students to master the characteristics and requirements of building water supply and drainage systems, the theoretical calculation methods of building water supply and drainage systems, and the basic methods and processes of building water supply and drainage design. Familiarity with relevant design specifications for building water supply and drainage, understanding the basis for selecting schemes for water supply systems, drainage systems, fire protection systems, etc., and the ability to conduct systematic analysis of complex building water supply and drainage issues using literature retrieval and data consultation methods. Expected achievement level 0.60, actual achievement level 0.682 (achievement distribution see Figure 2), reaching the expected teaching objectives, indicating that most students have a deep understanding of interdisciplinary content and possess the ability to apply the theoretical knowledge learned to conduct systematic analysis of complex building water supply and drainage issues. At the same time, since Course Objective 2 is relatively more difficult and comprehensive compared to Course Objective 1, the requirements for students' various abilities are also higher, resulting in a slightly lower achievement level.

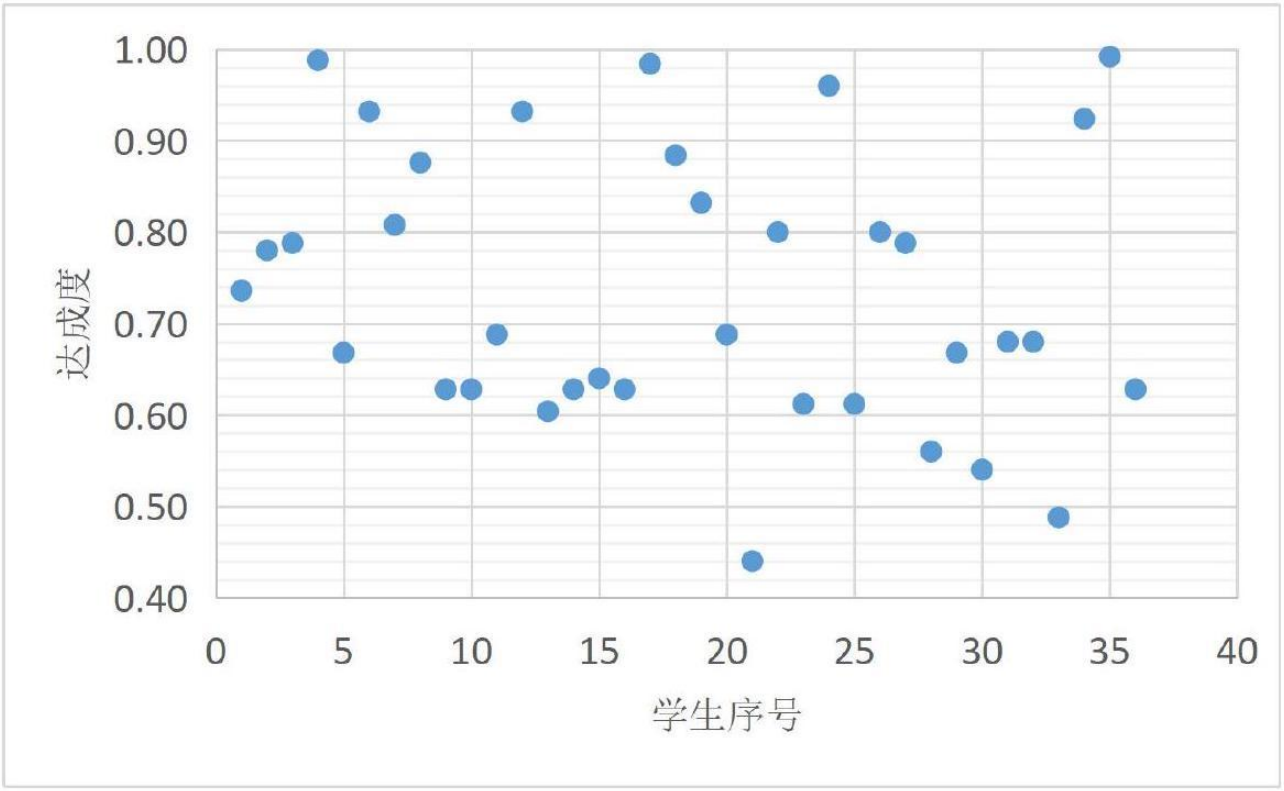


Analysis of the achievement of Course Objective 2 in Figure 2

(3) Course Objective 3: In terms of design analysis and synthesis ability, students are required to initially

possess the ability to analyze and evaluate the impact of fire protection and other designs on society, health, safety, law, and culture, and to understand the responsibilities that should be undertaken. Expected achievement.

Degree 0.60, actual achievement degree 0.736 (see Figure 3 for achievement distribution), reaching the expected teaching goals, indicating that most students have a deep understanding of design analysis and synthesis abilities, and possess the capability to apply the theoretical knowledge learned to analyze and handle building drainage systems. At the same time, since Course Objective 3 is somewhat more difficult and comprehensive compared to Course Objective 1, 2 , the requirements for students' abilities in various aspects are also higher, resulting in a slightly lower achievement degree.



Analysis of the achievement of Course Objective 3

The statistical analysis of the achievement of each course objective is shown in Table 6. It can be seen that the proportions of not achieving the expected teaching objectives for Course Objectives 2 and 3 are 13.89% and 11.11% , respectively, indicating a general achievement level of the course objectives. From Table 7, it can be seen that the number of people with a total score above 90 is 1, the proportion of those with a total score above 90 is 2.78% , the proportion with a total score above 80 is 30.56% , the proportion with a total score above 70 is 69.45% , the proportion with a total score above 60 is 88.89% , and the proportion of failing scores is 11.11% , with the failing proportion being slightly high.

Table 6 Analysis of Course Objective Achievement

Course Target	Number of people below the target value **0.60**	percentage	Number of people below average	percentage	Number of people above average	percentage
1	0	0.0	16	44.44%	20	55.56%
2	5	13.89%	18	50.00%	18	50.00%
32	4	11.11%	19	52.78%	21	47.22%

Table 7 Score Distribution Statistics

Score range	**90 — 100** (Excellent)	**80 — 89** (Good)	**70 — 79** (Medium)	**60 — 69** (passing)	**60** Below (Failing)
Total number of reviews	1	10	14	7	4
Overall evaluation ratio	2.78%	27.78%	38.89%	19.44%	11.11%
Overall average score		71.33	Overall passing rate		

5. Implementation of improvement measures for the course in the previous year

(1) In response to the issue of insufficient completion of self-study content before class and low enthusiasm and initiative in learning, this semester we will increase supervision efforts and remind students to complete their pre-class study on time.
(2) In response to the issue of insufficient classroom atmosphere, this lesson improved classroom interaction through random questioning and small quizzes. Overall, the achievement level is basically similar to last year and still needs to be strengthened.

6. Targeted improvement measures for this evaluation

In this assessment, overall, the achievement of the course objectives is relatively ideal, but there are still some issues that need improvement. The existing problems and continuous improvement measures are as follows:
In the future online and offline blended teaching process, we will continue to adhere to the OBE teaching philosophy, exploring and improving the three-part teaching method of pre-class preparation, in-class learning, and post-class expansion to enhance students' learning enthusiasm and initiative.
In future course assessments, exams or major assignments will continue to be used to improve the relevance and adaptability of the assessment content.

Signature of the responsible professor of the course (group) teaching team:

January 1, 2025

Hunan City University

Water Supply and Drainage Science and Engineering Major

"Biology of Water Treatment"

Course Objective Achievement Evaluation Report
(2024-2025-1)

College of Municipal and Surveying Engineering
Major: Water Supply and Drainage Science and Engineering
Course: Water Treatment Biology
Instructors: Wang Yang, Jiang Haiyan

1. Evaluation of course information

1.1 Basic Course Information

"Biology for Water Treatment" is a required foundational course for the major of Water Supply and Drainage Science and Engineering. The main task of this course is to require students to deeply understand the basic knowledge of microorganisms and the application of microbial principles in water pollution control and water supply, against the background of certain knowledge in chemistry and water treatment engineering. It provides the theoretical and experimental foundation of microbiology for the study of environmental pollution control and drainage engineering. Through the theoretical and experimental teaching of the "Microbiology for Water Treatment" course, students will master the basic concepts and theories of water treatment biology and their applications in water treatment, as well as the research methods and basic operational skills of microbiology, cultivating the ability for theoretical analysis, innovative thinking, and solving practical problems, thus laying a necessary biological foundation for the study of subsequent specialized courses.

This course totals 2.5 credits and 48 class hours. The course information for "Biology of Water Treatment" is shown in Table 1.
Table 1 Basic Information of the "Water Treatment Biology" Course for 2022 in Water Supply and Drainage

Teaching class	Number of course selections	course teacher
2202201	36	Wang Yang, Jiang Haiyan
2202202/2202203	68	Wang Yang, Jiang Haiyan

1.2 Course Teaching Objectives and Support for Graduation Requirements

The course "Biological Treatment of Water" is an important foundational compulsory course for the major of Water Supply and Drainage Science and Engineering. It integrates water supply and drainage engineering with biology, serving as an important tool to enhance practical skills in water supply and drainage engineering and the ability to analyze and solve real-world problems. The teaching objectives of this course include cultivating engineering qualities and establishing the core socialist values, mastering relevant principles and methods to analyze and express complex engineering problems, and conducting scientific experiments to solve engineering issues, with each course objective corresponding to graduation requirements (secondary indicators), as shown in Table 2.

Table 2 Course Teaching Objectives and Support for Graduation Requirements

Course objectives	Graduation requirements (corresponding to secondary indicators)
1. Can understand and recount the types of organisms involved in water treatment engineering, Characteristics, structure, morphology, physiological traits, able to recite and understand Enough to comprehensively apply mathematics, natural sciences, engineering, and give Identification, inspection, and control technologies and related principles and methods for harmful organisms are available The qualitative biological monitoring method can analyze and judge, and has the ability to analyze and express complex engineering problems; The operational issues of the water treatment project are for biological water treatment La base para la gestión operativa del proceso.	
2, can understand microbial nutrition, metabolic principles, and growth characteristics, Principles of genetic variation, domestication conservation, and micro-ecosystems; energy Understanding the role of biological treatment of organic and inorganic pollutants 2. Able to understand the nutrition, metabolic principles, and growth characteristics of microorganisms Genetic variation, principles of domestication conservation and micro-ecosystems; can Understanding the role of biological treatment of organic and inorganic pollutants | 2, being able to understand microbial nutrition, metabolic principles, and growth characteristics, | | :--- | Genetic variation, principles of domestication conservation and micro-ecosystems; can Understanding the role of biological treatment of organic and inorganic pollutants	
1. Can understand and recount the types of organisms involved in water treatment engineering Characteristics, structure, morphology, physiological traits, can recite and understand Able to comprehensively apply mathematics, natural sciences, engineering, and give Identification, inspection, and control technologies for harmful organisms and related principles and methods are available Qualitative biological monitoring methods can analyze and judge, and have the ability to analyze and express complex engineering problems; The operational issues of the water treatment project are for biological water treatment Laying the foundation for the operation management of the program. 2. Able to understand the principles of microbial nutrition, metabolism, growth characteristics, genetic variation, domestication and preservation, and the principles of micro-ecosystems; able to understand the role of biological treatment of organic and inorganic pollutants. 1. Able to understand and recount the types of organisms involved in water treatment engineering | :--- | Characteristics, structure, morphology, physiological traits, can recount and understand Able to comprehensively apply mathematics, natural sciences, engineering, and give Identification, inspection, and control technologies and related principles and methods for harmful organisms Qualitative biological monitoring methods can analyze and judge, and have the ability to analyze and express complex engineering problems The operational issues of the water treatment project for biological water treatment Lays the foundation for the operation management of the program. | 2. Able to understand the principles of microbial nutrition, metabolism, growth characteristics, genetic variation, domestication preservation, and micro-ecosystem; able to understand the role of biological treatment of organic and inorganic pollutants | Basic engineering experiment design, testing, and practical methods for engineering problem design, selection of appropriate capabilities, research 平	

Principles and main functions of microorganisms, mastering the basic research methods and skills of microbial testing, providing a foundation for the design and scientific research of biological water treatment engineering.

Platform, correctly apply analytical testing and detection methods, correctly conduct scientific experiments, correctly collect, analyze, and interpret experimental data;

1.3 Course Assessment Plan

The teaching method of this course is offline, with four class hours per week, completed over 12 consecutive weeks. The assessment methods for the course include formative assessments and a final exam. Formative assessments include classroom performance, assignment grades, online quizzes, and course experiments. The final exam is a closed-book written test.

1. Regular grades (40%)

The usual grade for this course accounts for 40% , and the assessment components mainly include classroom discussions, answering questions, independent online learning, homework, and course experiments. The work content and requirements, scores, and support for course objectives for each assessment component are shown in Table 2.

Table 2 Regular Performance Assessment Links Supporting Course Objectives

Assessment phase	Job content and requirements	Percentage of regular performance scores	Converted score (Total score 100 points)	weight coefficient	Support course objectives
Class discussion	For some key content, difficult content, and open-ended questions, adopt a classroom discussion format. Several small group discussions can be planned, and each group can send a representative to express their group's viewpoints and insights, which is beneficial for deepening understanding and broadening perspectives.	10	4	0.10	Course Objective 1 Course Objective 2
Answer the question	According to the teaching content and key points, 6 to 8 multiple-choice, true/false, and multiple-answer questions will be released irregularly for each class. Students are asked to answer them to understand their grasp of the key content, and explanations will be provided based on their answers.	5	2	0.05	Course Objective 1 Course Objective 2
自主线上学习	Before each class, teachers publish preview courseware and learning videos on the Learning Pass online teaching platform 2 ～ 3 days in advance. Students learn online outside of class to understand the upcoming course content and learning objectives in advance. Teachers assess pre-class learning performance based on the completion of pre-class videos and the number of chapter study attempts.	10	4	0.10	Course Objective 1 Course Objective 2
Homework	After each chapter of this course is completed, 2 to 3 questions will be assigned as homework to promptly consolidate the knowledge taught in class, with no less than 4 assignments given; students are required to submit their homework within the specified time, and the instructor will complete the grading and analysis of the homework within one week of receiving it. Common issues will be explained in class, pointing out and correcting existing problems to enhance the relevance of classroom teaching. Assessment standards will be based on grading levels and criteria.	25	10	0.25	Course Objective 1 Course Objective 2
Course experiment	The experimental part of this course includes 7 experiments, requiring students to complete 7 experiments and write reports; the teacher assesses based on the experimental operations, data processing, and the quality of the reports. The assessment criteria are based on scoring, etc.	50	20	0.5	Course Objective 2

	Conduct according to the level and rules.				
Total	100	40	1.00		

2, final exam scores (60%)

The standard answers for the final exam are graded on a hundred-point scale. The score for each item and the supporting course objectives are shown in Table 3.

Table 3 Final Exam Assessment Content and Supporting Course Objectives

Exam question types	Key points of examination	Score on the paper	Converted score (course full score 100)	weight coefficient	Support course objectives
Fill in the blanks question	Reiterate the types, structures, and forms of organisms involved in water treatment engineering; describe the identification, inspection, and control techniques for harmful organisms in water bodies, as well as the biological monitoring methods for water quality.	10	6	0.1	Course Objective 1
Noun explanation	Restate basic concepts and foundational knowledge;	15	9	0.15	Course Objective 1
Multiple choice question	The basic characteristics of the knowledge content that needs to be mastered, distinguishing and differentiating, applicable conditions, etc.	5	3	0.05	Course Objective 1
Short answer question	Basic principles, methods, classifications, and characteristics that need to be mastered.	37	22.2	0.37	Course objectives 1, 2
Experimental question	Basic research methods and skills in microbiological testing that need to be mastered.	15	9	0.15	Course Objective 2
Essay question	Understand the principles of microbial nutrition, metabolism, growth characteristics, and the mechanisms of biological treatment of organic and inorganic pollutants.	18	10.8	0.18	Course Objective 2
	Total	100	60	1.00	

2. Evaluation methods

This course mainly adopts an analysis method based on the achievement of course grades: based on the graduation requirement indicators supported by the course, determine the course objectives, the assessment components of each course objective, and the weight coefficients of the scores in each teaching component, as shown in Table 4, and calculate the achievement of course objectives by combining the average scores of each part of the students' grades.

Table 4 Analysis Basis for Achievement Based on Course Grades

Learning outcomes		Evaluation criteria for achievement degree		weight coefficient
Course objectives	Support indicator point	Assessment method	Observation point	
1	Graduation Requirements 2.1	Regular grades	Class discussion	0.03
			Answer the question	0.03
			Independent online learning	0.04
			Homework	0.04
		final exam	Fill in the blanks question	0.09
			Noun explanation	0.09
			Multiple choice question	0.06
			Short answer question	0.06
2	Graduation Requirements 4.1	Regular grades	Class discussion	0.02
			Answer the question	0.01
			Independent online learning	0.01
			Homework	0.02
			Course experiment	0.20
		final exam	Short answer question	0.09
			Experimental question	0.09
			Essay question	0.12

Three, evaluation results

The course grade consists of regular performance (accounting for 40%) and final exam performance (accounting for 60%). Based on the assessment components of each part of the grade, supporting the course objectives and weight coefficients, and combining the average scores of students in the class for each part, the achievement of the course objectives has been calculated, as detailed in Table 5.

Table 5 Calculation Results of Course Objective Achievement

Learning outcomes		Evaluation criteria for achievement degree		Course objective achievement status		
Course objectives	Support indicator point	Assessment method	Observation point	Target score	Actual score	Degree of achievement
1	Graduation Requirements 2.1	Regular grades	Pre-class preparation, classroom learning, classroom quizzes, after-class assignments	14.00	11.87	0.81
		final exam	Fill in the blanks, noun explanation, multiple choice questions, short answer questions	30.00	23.78	
			Total	44	35.65	
2	Graduation Requirements 4.1	Regular grades	Pre-class preparation, classroom learning, classroom quizzes, after-class assignments, lab reports	26.00	22.05	0.76
		final exam	Short answer questions, experimental questions, essay questions	30.00	20.53	
			Total	56	42.58	
			Total	100	78.23	0.785

4. Overall analysis of course achievement 情况

(1) Course Objective 1 is to understand basic concepts, foundational knowledge, and problem analysis skills. Students are required to learn the basic concepts of microorganisms involved in water treatment engineering, foundational knowledge of detection technologies, and to master knowledge of the main types, characteristics, structures, forms, and physiological properties of microorganisms. They should understand the identification, testing, and control technologies for harmful organisms in water bodies, as well as biological monitoring methods for water quality. Students should be able to analyze common operational issues in water treatment engineering caused by biological factors, laying a foundation for the operational management of biological water treatment engineering. Expected achievement level is 0.60, actual achievement level is 0.81 (achievement level distribution is shown in Figure 1), reaching the expected teaching objectives, indicating that most students have met the requirements of Course Objective 1 well.

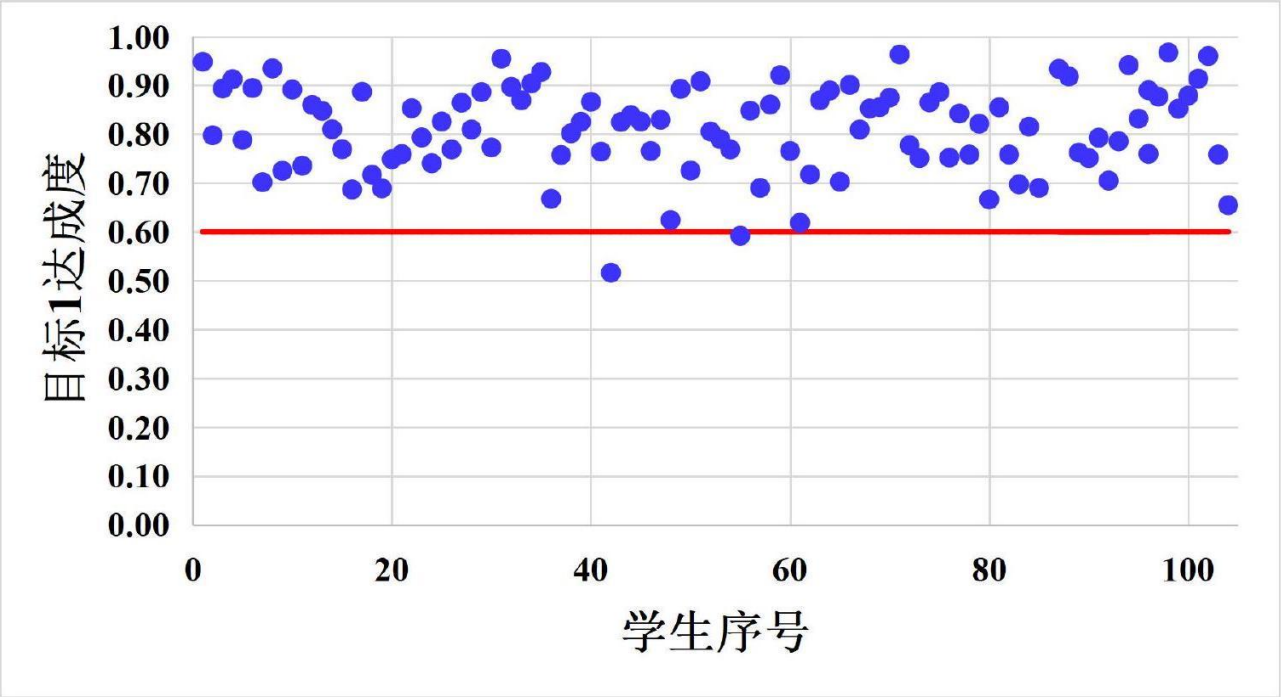
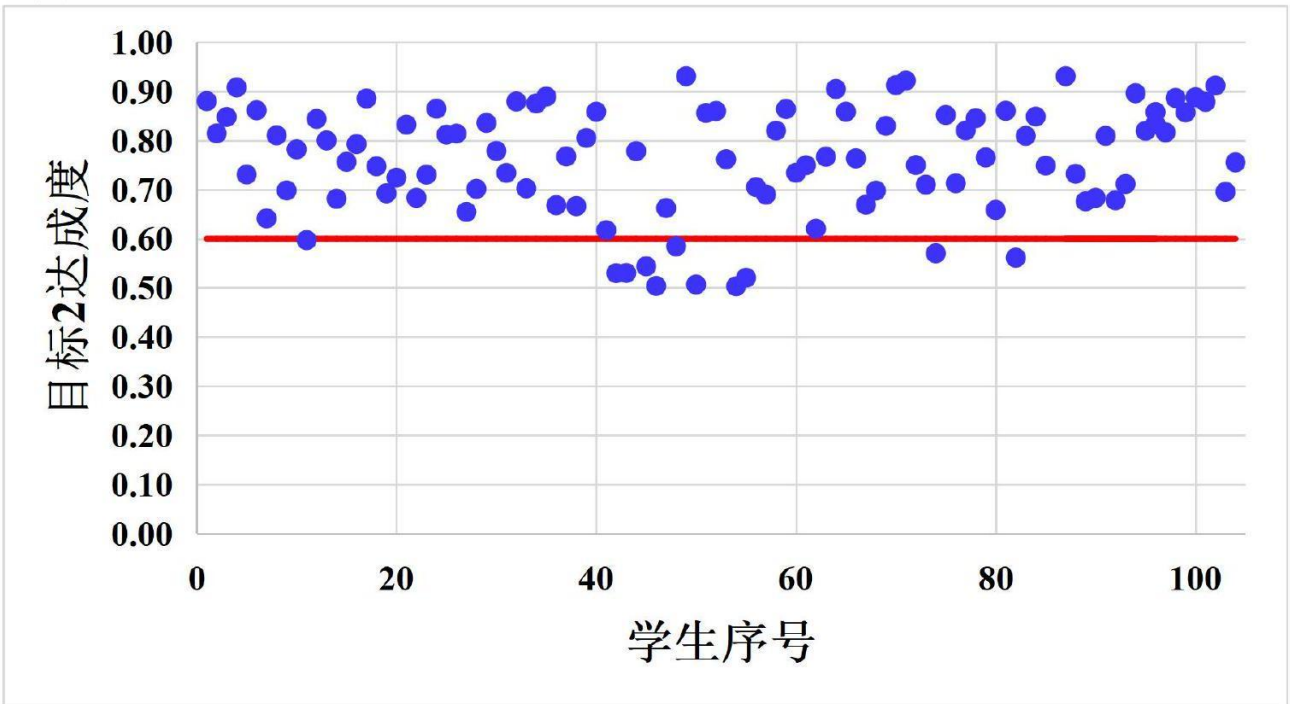


Figure 1 Analysis of Course Objective 1 Achievement

Course Objective 1: (2) Course Objective 2 focuses on comprehensive abilities, requiring students to understand the principles of the growth, reproduction, metabolism, and treatment of pollutants by microorganisms related to water treatment, and to master the basic research methods and skills for microbial testing, providing a foundation for the design and scientific research of biological water treatment engineering. Expected achievement level 0.60, actual achievement level 0.76 (achievement level distribution see Figure 2), basically reaching the expected teaching objectives, indicating that most students have the ability to apply the knowledge learned to carry out the design and scientific research of biological water treatment engineering. At the same time, since Course Objective 2 is somewhat more difficult and comprehensive than Course Objective 1, the achievement level is slightly lower than that of Objective 1.



Analysis of the achievement of Course Objective 2 in Figure 2

The statistical analysis of the achievement degree data for each course objective is shown in Table 6. It can be seen that the proportion of those who did not achieve the course objective 1, 2 of the expected teaching goals is 0.0% , and the overall achievement degree of the course is 0.785, indicating a good achievement degree of the course objectives. From Table 7, it can be seen that the number of people with a total score above 90 is 9, and the number of people with a total score above 80 is 41, with a total score of 80.

The proportion above 60 points is 39.42% , the number of people with a total score above 70 is 35, accounting for 33.65% , the number of people who failed the total score is 2, and the failure rate is 1.92% , with a high proportion of good and average scores.

Table 6 Analysis of Course Objective Achievement

Course Target	Number below target value 0.60	percentage	Number of people below average	percentage	Number of people above average	percentage
1	2	1.92	47	45.19	57	54.81
2	10	9.61	47	45.19	57	54.81

Table 7 Score Distribution Statistics

Score range	90 – 100 (Excellent)	80 – 89 (Good)	70 – 79 (Medium)	60 – 69 (passing)	Below 60 (Fail)		
Total number of reviews	9	41	35	17	2		
Overall evaluation ratio	8.66%	39.42%	33.65%	16.35%	1.92%		
Overall average score					77.94	Overall passing rate	100%

5. Implementation of improvement measures for the course in the previous year

(1) In response to the unsatisfactory completion of student assignments and the lack of seriousness in completing lab reports, we implemented teaching reforms this semester. We have increased the weight of lab assessment scores and assignment scores. At the same time, we remind students to preview the experimental content before class to better participate in the experimental process.
(2) In response to the issue of insufficient classroom atmosphere, this lesson implemented a series of measures to enhance classroom interaction. We strengthened the random questioning segment, encouraging students to actively participate in answering questions to stimulate their thinking and expression skills. In addition, we also set up classroom quizzes, hoping to use this method to assess students' understanding of the knowledge learned in class, prompting them to actively engage in interactive discussions and improve the liveliness of the classroom atmosphere.

6. Targeted improvement measures for this evaluation

In this assessment, overall, the achievement of the course objectives is relatively ideal, but there are still some issues that need improvement. The existing problems and continuous improvement measures are as follows:
(1) In response to the issue of some students having a low achievement level in course objective 2, we analyzed these students and found that their understanding of the experimental part and its connection to classroom knowledge is insufficient. We plan to strengthen measures in this regard.
(2) For last year's course objective 1, there are still a small number of students whose achievement is not ideal. After analysis, we found that the main reason is that students treat homework as a formality and do not seriously digest it, resulting in instances of plagiarism and a perfunctory approach. We plan to improve regular contact in the next year.