Appendix B-9: Subgrade and Pavement Engineering Syllabus

Appendix B-9

Subgrade and Pavement Engineering Syllabus

course title	Subgrade and Pavement Engineering				Course number	9032113031	
Applicable specialties	Civil engineering (construction engineering direction☐ road and bridge direction☐ urban rail transit direction☐)						
Nature of the course	General education courses☐, subject-based courses☐, professional core courses☐ ,Independent development course☐, Concentrated practice course☑ (elective ☐ required☑)						
Unit offering the course	School of Civil Engineering (Department of Road and Bridge Engineering)						
Total class hours	90	credit	3	Contact hours	48	Self-study hours	42
Prerequisite courses	Civil engineering materials, material mechanics, soil and soil mechanics, road survey and design						
Textbooks and teaching materials	Course materials: Huang Xiaoming. Roadbed and pavement engineering [M]. Beijing: Peoples Communications Press, 20 23 reference material: Teaching website:						

1. Course Introduction

"Subgrade and Pavement Engineering" is a required core course for civil engineering majors, primarily covering the fundamental theories and knowledge of subgrade engineering and pavement engineering for highways and urban roads. It includes two main parts: subgrade engineering and pavement engineering. Subgrade engineering mainly covers the characteristics of subgrade soil, subgrade design, slope stability analysis, retaining wall design, and drainage design. The pavement engineering section includes: traffic loads on pavements, properties of pavement materials, base course of pavements, asphalt pavement design, and cement concrete design. Students will master the requirements and design methods for subgrade strength and stability; characteristics and requirements of traffic, environment, and materials related to subgrade and pavement engineering, as well as structural design parameters; determination and value methods for material modulus of pavement structure layers (including soil base), methods for determining traffic volume, and design methods for pavement materials and structures.

2. The graduation requirements supported by this course and the implementation path

(1) The graduation requirements that this course can support

order number	Graduation requirement indicators	Specific content of graduation requirement indicators
1	Graduation requirements 3.3	Master the basic construction process, be able to collaborate or independently complete the virtual design and construction of a certain engineering project, and fully consider the social, health, safety, legal, cultural and environmental constraints in the design and construction process, reflecting the innovative consciousness
2	Graduation requirements 6.1	Familiar with the standards, policies and laws and regulations related to civil engineering professions and industries, understand the impact of different social cultures on engineering activities
3	Graduation requirements 7.3	Have the awareness of using energy-saving and environmental protection new materials and carrying out green construction

(2) The implementation path of the graduation requirement index in this course

1. Course objectives

Through the teaching of this course, students will firmly grasp the basic concepts, theories, and skills of the course; they will be able to perform general subgrade design, subgrade stability calculations, retaining wall design, pavement design, drainage design, and pavement structure design. They will understand the engineering environment of subgrades and pavements, as well as the important factors affecting their working conditions, and gain an understanding of the current status and trends in the development of this discipline. By enhancing their understanding of basic concepts and relevant theories, students will improve their ability to identify and solve problems.

The specific course objectives are as follows:

Course objective 1: Through the study of the types and construction of retaining structures, the arrangement of retaining wall structures, the calculation of soil pressure of retaining wall structures, and the design of gravity retaining wall structures,

students will be trained to master the basic construction process, cooperate in the establishment of BIM 3D model of retaining wall, and demonstrate the ability to reflect innovative consciousness in the design and construction process.

Course objective 2: Through the study of vehicle classification, standard axle load conversion method, and the types, measurement methods, and value methods of road surface material design parameters, students will master the calculation of cement concrete pavement structure thickness, develop the ability to be familiar with the standards, policies, and laws and regulations related to civil engineering professions and industries, and understand the impact of different social cultures on engineering activities.

Course objective 3: Through the study of classification and engineering characteristics of subgrade soil, the role of subgrade drainage facilities, classification and characteristics of asphalt pavement, we will master the design of subgrade, drainage design and structural combination and thickness design of asphalt pavement. We will cultivate the awareness of using energy-saving and environmental protection new materials and carrying out green construction.

2. The corresponding relationship between course teaching objectives and graduation requirements

Graduation requirement indicators / program objective	**Graduation requirements 3.3**	**Graduation requirements 6.1**	**Graduation requirements 7.3**
Course objective 1	√		
Course objective 2		√	
Course objective 3			√

3. Course objectives and teaching content

(1) Intended Learning Outcomes

The expected learning outcomes of this course are as follows

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
1. Retaining wall design	1. Type of retaining wall	L1	L2	**1.** Introduction of types of retaining walls: Explain the types of retaining walls.	1
	2. Stability verification	L1	L 3	**2.** Stability verification of retaining wall: find the relevant manual to calculate the active soil pressure formula and carry out stability verification, which is applied in engineering practice.	1
	3. Arrangement of retaining walls	L1	L 3	**3.** Introduction to the arrangement of retaining walls: Understand the content of the plan, longitudinal and transverse section arrangement of retaining walls.	1
2. Traffic	4. Understanding	L1	L2	**4.** Understandi	2

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
load and cement concrete pavement design	of concepts such as vehicle type, standard axle, traffic volume, axle load spectrum and transverse distribution of wheel gap			ng of concepts such as vehicle type, standard axle, traffic volume, axle load spectrum and transverse distribution of wheel gap: understanding of relevant concepts of vehicle load analysis.	
	5. Conversion of standard shaft load	L1	L2	**5.** Conversion of standard axle load: calculate the equivalent standard axle load of various axle loads by applying the standard axle load calculation formula.	2
	6. Design the calculation of the number of times the shaft load acts	L1	L2	**6.** Calculation of design axle load action times: Calculate the cumulative	2

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
				standard axle load action times for different pavement types.	
	7. The types, measurement methods and value methods of road surface material design parameters	L1	L2	**7.** Types, determination methods and value methods of pavement material design parameters: Remember the pavement material design parameters, select the determination methods and value methods.	2
	8. The structure of cement concrete pavement	L1	L2	**8.** The structure of cement concrete pavement: remember the construction and setting principle of various joints of cement concrete pavement; correctly choose the plan size of	2

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
				the slab.	
	9. Theory of elastic substrate	L1	L2	**9.** Elastic foundation plate theory: Understand elastic foundation plate theory.	2
	10. Concrete pavement structure combination design	L1	L 3	**10.** Concrete pavement structure combination design: according to the traffic and natural environment of the designed section, the materials, thickness and design parameters of each structure layer of concrete pavement should be correctly selected.	2
	11. Verification of thickness of cement concrete pavement structure	L1	L 3	**11.** Verification of thickness of cement concrete pavement structure: apply the design standard to	2

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
				verify the thickness of the proposed cement concrete pavement structure combination and optimize it accordingly.	
3. Roadbed design, pavement base design and asphalt pavement design	12. Structural stratification and natural zoning of highways	L1	L2	**12.** Understanding structural strata and highway natural zones: describe the structural strata of the subgrade and distinguish the materials and compaction requirements of different strata of the subgrade, recite the principles of highway natural zoning and illustrate the determination of highway natural	3

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
				zoning with examples.	
	13. Engineering characteristics of subgrade soil and selection of subgrade fill	L1	L2	**13.** Understand the engineering characteristics of subgrade soil: describe the engineering characteristics of different subgrade soil and select the subgrade fill material.	3
	14. Determine the moisture balance state of the subgrade	L1	L2	**14.** Determination of the balanced humidity state of the subgrade: Explain the working area of the subgrade, remember the type of balanced humidity state of the subgrade, and calculate to determine the balanced humidity state of the subgrade.	3

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
	15. Selection of design parameters of subgrade soil	L1	L2	**15.** Selection of design parameters for subgrade soil: Remember the design parameters that characterize the subgrade soil and select them.	3
	16. The basic composition of the cross section of the roadbed	L1	L2	**16.** Understanding the basic composition of subgrade cross-section: explaining the basic composition of subgrade cross-section and applying it to engineering practice.	3
	17. Stability analysis of roadbed slope	L1	L2	**17.** The derivation and application of slope stability analysis of roadbed slope: derivation of straight line	3

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
				method, circular arc method, unbalanced thrust method slope stability analysis formula and explanation of the scope of application of the formula.	
	18. Selection of slope protection facilities	L1	L2	**18.** Understanding the types and selection of slope protection engineering: Explain and illustrate the types of slope protection facilities and apply them to engineering practice.	3
	19. Types and structure of subgrade drainage facilities	L1	L2	**19.** Types and structure of subgrade drainage facilities: describe the types and structure of subgrade drainage	3

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
				facilities.	
	20. The setting occasion and function of various kinds of roadbed drainage facilities	L1	L2	**20.** The role of subgrade drainage facilities and the setting occasion: understand the setting occasion, role and application of various subgrade drainage facilities in engineering practice.	3
	21. The types of grassroots	L1	L2	**21.** Types of base layers: Remember and understand the types of base layers.	3
	22. Principles of strength formation at all levels	L1	L2	**22.** Principles of strength formation of various types of base: understand the principle of strength formation of granular base and inorganic binder base.	3
	23. The scope of use of various	L1	L2	**23.** Use range and	3

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
	types of grassroots and the selection of grassroots materials			selection of base materials: distinguish the use range of different base materials and correctly select different base materials.	
	24. Classification, characteristics, properties and zoning of asphalt pavement	L1	L2	**24.** Classification and characteristics, properties and zoning of asphalt pavement: Remember and understand the types of asphalt pavement. Understand the characteristics and properties of each type of asphalt pavement and identify the zoning of asphalt pavement.	3
	25. Theory of elastic layered system	L1	L2	**25.** Theory of elastic layered	3

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
				system under double circular uniform load: understanding the theory of elastic layered system.	
	26. Design index and standard of asphalt pavement structure	L1	L2	**26.** Design index and standard of asphalt pavement structure: Understand the design index and standard of asphalt pavement structure. And correctly choose the design index and standard according to specific conditions.	3
	27. Design of asphalt pavement structure combination	L1	L 3	**27.** Asphalt pavement structure combination design: according to the traffic and natural environment of the	3

train objective / blocks of knowledge	knowledge point	Initial level	Degree of requirement	Intended Learning Outcomes	program objective
				designed section, correctly select the materials, thickness and design parameters of each structure layer of asphalt pavement.	
	28. Verification of asphalt pavement structure thickness	L1	L 3	**28.** Verification of thickness of asphalt pavement structure: apply the design standard to verify the thickness of the proposed asphalt pavement structure combination and optimize accordingly.	3

(2) Detailed rules for teaching links

Teaching unit (2 periods)	Intended Learning Outcomes (ILO)	content of courses (knowledge point)	Implementation link (In class, projects, etc.)	instructional strategies
1	**1.** Understanding structural strata and highway natural zones: describe the	1. Structural stratification and natural zoning of highways.	• In-class teaching • Extracurricular practice	● Problem-oriented ● Project guidance

Teaching unit (2 periods)	Intended Learning Outcomes **(ILO)**	**content of courses (knowledge point)**	**Implementation link (In class, projects, etc.)**	**instructional strategies**
	structural strata of the subgrade and distinguish the materials and compaction requirements of different strata of the subgrade, recite the principles of highway natural zoning and illustrate the determination of highway natural zoning with examples.			
2	**2.** Understand the engineering characteristics of subgrade soil: describe the engineering characteristics of different subgrade soil, and select the subgrade fill material.	2. Engineering characteristics of subgrade soil and selection of subgrade fill material	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented
3	**3.** Determinatio	3. Determine	• In-class	• lecture

Teaching unit (2 periods)	Intended Learning Outcomes **(ILO)**	**content of courses (knowledge point)**	**Implementation link (In class, projects, etc.)**	**instructional strategies**
	n of the balanced humidity state of the subgrade: Explain the working area of the subgrade, remember the type of the balanced humidity state of the subgrade, and calculate to determine the balanced humidity state of the subgrade. **4.** Selection of design parameters for subgrade soil: Remember the design parameters that characterize the subgrade soil and select them.	the moisture balance state of the subgrade 4. Selection of design parameters of subgrade soil	instruction • Extracurricular practice	• Problem-oriented • Project guidance
4	**5.** Understanding the basic composition of subgrade cross-section: explaining	5. The basic composition of the cross section of the roadbed	• In-class instruction	• lecture • Problem-oriented guidance • Project guidance

Teaching unit (2 periods)	Intended Learning Outcomes **(ILO)**	**content of courses (knowledge point)**	**Implementation link (In class, projects, etc.)**	**instructional strategies**
	the basic composition of subgrade cross-section and applying it to engineering practice.			
5 (4 class hours)	**6.** The derivation and application of slope stability analysis of roadbed slope: derivation of straight line method, circular arc method and unbalanced thrust method slope stability analysis formula, and explanation of the application range of the formula.	6. Stability analysis of roadbed slope	• In-class instruction • Extracurricular practice •	• lecture • Problem-oriented • deliberate • Project guidance
6	**7.** Understanding the types and selection of slope protection engineering:	7. Selection of slope protection facilities	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented • Project guidance

Teaching unit (2 periods)	Intended Learning Outcomes **(ILO)**	**content of courses (knowledge point)**	**Implementation link (In class, projects, etc.)**	**instructional strategies**
	Explain and illustrate the types of slope protection facilities and apply them to engineering practice.			
7	**8.** Introduction to the types of retaining walls: Explain the types of retaining walls.	8. Type of retaining wall	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented • deliberate
8 (4 class hours)	**9.** Stability verification of retaining wall: find the relevant manual to calculate the active soil pressure formula and carry out stability verification, which is applied in engineering practice.	9. Stability verification	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented • deliberate
9	**10.** Introduction to the arrangement of retaining walls: Understand	10. Arrangement of retaining walls	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented

Teaching unit (2 periods)	Intended Learning Outcomes **(ILO)**	**content of courses (knowledge point)**	**Implementation link (In class, projects, etc.)**	**instructional strategies**
	the content of the plan, longitudinal and transverse section arrangement of retaining walls.			
10	**11.** Types and structure of subgrade drainage facilities: describe the types and structure of subgrade drainage facilities. **12.** The role of subgrade drainage facilities and their setting occasions: understand the setting occasions, functions and applications of various subgrade drainage facilities in engineering practice.	11. Types and structure of subgrade drainage facilities 12. The setting occasion and function of various kinds of roadbed drainage facilities	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented
11	**13.** Understanding of concepts such as	13. Understanding of concepts such as vehicle type, standard	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented guidance

Teaching unit (2 periods)	Intended Learning Outcomes **(ILO)**	**content of courses (knowledge point)**	**Implementation link (In class, projects, etc.)**	**instructional strategies**
	vehicle type, standard axle, traffic volume, axle load spectrum, and transverse distribution of wheel gap: Understanding the relevant concepts of vehicle load analysis.	axle, traffic volume, axle load spectrum and transverse distribution of wheel gap		
12	**14.** Conversion of standard axle load: calculate the equivalent standard axle load of various axle loads by applying the standard axle load calculation formula.	14. Conversion of standard shaft load	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented
13	**15.** Calculation of design axle load action times: Calculate the cumulative standard axle load action times for different	15. Design calculation of the number of times the shaft load acts	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented guidance

Teaching unit (2 periods)	Intended Learning Outcomes **(ILO)**	**content of courses (knowledge point)**	**Implementation link (In class, projects, etc.)**	**instructional strategies**
	pavement types.			
14	**16.** Types, determination methods and value methods of pavement material design parameters: Remember the pavement material design parameters, select the determination methods and value methods. **17.** Types of base: Remember and understand the types of road base.	16. The types, measurement methods and value methods of pavement material design parameters 17. The types of grassroots	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented
15	**18.** Principles of strength formation of various types of base: understand the principle of strength formation of granular base and inorganic	18. Principles of strength formation at all levels 19. The scope of use of all kinds of grassroots and the choice of grassroots materials	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented

Teaching unit (2 periods)	Intended Learning Outcomes (ILO)	content of courses (knowledge point)	Implementation link (In class, projects, etc.)	instructional strategies
	binder base. **19.** Use range of various base layers and selection of base materials: distinguish the use range of various base layers and correctly select different base materials.			
16	**20.** Classification and characteristics, properties and zoning of asphalt pavement: Remember and understand the types of asphalt pavement. Understand the characteristics and properties of each type of asphalt pavement and identify the zoning	20. Classification, characteristics, properties and zoning of asphalt pavement	• In-class instruction • Extracurricular exercises	• lecture • Problem-oriented

Teaching unit (2 periods)	Intended Learning Outcomes **(ILO)**	**content of courses (knowledge point)**	**Implementation link (In class, projects, etc.)**	**instructional strategies**
	of asphalt pavement.			
17	**21.** Theory of elastic layered system under double circular uniform load: understanding the theory of elastic layered system **22.** Design index and standard of asphalt pavement structure: Understand the design index and standard of asphalt pavement structure. And correctly choose the design index and standard according to the specific situation.	21. Theory of elastic layered system 22. Design index and standard of asphalt pavement structure	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented
18	**23.** Asphalt pavement structure combination design:	23. Design of asphalt pavement structure combination	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented

Teaching unit (2 periods)	Intended Learning Outcomes (ILO)	content of courses (knowledge point)	Implementation link (In class, projects, etc.)	instructional strategies
	according to the traffic and natural environment of the design section, correctly select the materials, thickness and design parameters of each structure layer of asphalt pavement.			
19	**24.** Verification of thickness of asphalt pavement structure: apply the design standard to verify the thickness of the proposed asphalt pavement structure combination and optimize accordingly.	24. Verification of asphalt pavement structure thickness	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented
20	**25.** The structure of cement concrete pavement: remember the construction	25. The construction of cement concrete pavement 26. Theory of elastic substrate	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented

Teaching unit (2 periods)	Intended Learning Outcomes **(ILO)**	**content of courses (knowledge point)**	**Implementation link (In class, projects, etc.)**	**instructional strategies**
	and setting principle of various joints of cement concrete pavement; correctly choose the plan size of the slab. **26.** Elastic foundation plate theory: Understand elastic foundation plate theory.			
21	**27.** Concrete pavement structure combination design: according to the traffic and natural environment of the designed section, correctly select the materials, thickness and design parameters of each structure layer of concrete pavement.	27. Concrete pavement structure combination design	• In-class instruction • Extracurricular practice	• lecture • Problem-oriented
22	**28.** Verification	28. Verification	• In-class	• lecture

Teaching unit (2 periods)	Intended Learning Outcomes (ILO)	content of courses (knowledge point)	Implementation link (In class, projects, etc.)	instructional strategies
	of thickness of cement concrete pavement structure: apply the design standard to verify the thickness of the proposed cement concrete pavement structure combination and optimize accordingly.	of thickness of cement concrete pavement structure	instruction • Extracurricular practice	• Problem-oriented guidance

4. Assessment Scheme

(1) Course assessment structure

Examination items		scale	ask
usual performance	Homework	20%	Each knowledge unit should be completed at least twice independently.
	In-class test	30%	Each knowledge unit is tested at least three times, focusing on the students mastery of the core knowledge points, with objective questions as the main part.
	Big assignments	1 0%	In combination with the course tasks, prepare a complete BIM design of retaining wall; complete the task in a group, with 5-8 people in each group, and each group has different tasks. Focus on examining the ability to master the basic construction process and complete the BIM 3D model collaboratively.
final		4 0%	The subjective questions without standard answers are mainly used to focus on the comprehensive analysis ability of students.
amount to		100%	

Note: When the final exam score is lower than (excluding) 5 0 points, the regular score is counted as no more than 6 0 points.

(2) Course assessment rules:

Assessment items	primary coverage	
	Knowledge units/points	**Ability items**
Homework	All knowledge units	Written expression ability/reading and application ability of industry standards/ability of independent learning
In-class test	All knowledge units	Industry standard reading and application ability/autonomous learning ability
Big assignments	All knowledge units	Ability to effectively express complex civil engineering problems with drawings, charts and words/ability to communicate effectively and work in a team/ability to learn independently
final	All knowledge units	Industry standard reading and application ability/autonomous learning ability

5. The tasks undertaken in the cultivation of the ability to solve complex engineering problems

Master the analysis method of retaining wall design and pavement structure design to provide ideas and methods for solving the relevant complex engineering problems of subgrade pavement engineering.

6. Non-technical ability training and observation

Cultivation: Guide students to learn independently, master basic knowledge through pre-class preview, and be able to discuss difficult problems in study groups,

Completing the courses major assignment, the establishment of a BIM 3D model for retaining wall BIM, demonstrates innovative awareness in design and construction processes. It aims to cultivate students ability to find solutions to problems on their own and tackle complex engineering issues, familiarize them with standards, policies, and laws related to civil engineering professions and industries. Additionally, it

strengthens comprehensive skill training, fostering an awareness of using energy-saving and environmentally friendly new materials for green construction.

Observation: the completion of major assignments is the main observation point.

7. Course ideological and political design

Through the study of theories and technologies in roadbed and pavement engineering, as well as learning from typical figures and projects, students patriotic enthusiasm is ignited, deepening their understanding and recognition of the four confidences. This strengthens the education and cultivation of students outlook on life and values, promoting the inheritance and innovation of excellent traditional Chinese culture. By using engineering cases, especially those involving quality accidents, students are cultivated to have a professional spirit and a pragmatic attitude. Through introducing typical engineering cases, students sense of responsibility and legal awareness are enhanced, reinforcing their ethical qualities in engineering. Teachers lead by example, improving their own cultivation, subtly influencing students with their exemplary conduct, conveying a positive demeanor and dedication.

8. Course evaluation and continuous improvement mechanism

(1) Course evaluation

The course evaluation cycle is once per semester.

Course objective 1 is evaluated by regular homework, in-class test, major assignment and final exam.

Course objective 2 is evaluated by regular homework, in-class test and final exam.

Course objective 3 is evaluated by regular homework, in-class test and final exam scores.

The course evaluation is carried out as follows:

program objective	Corresponding graduation requirements	evaluation methodology	remarks
Course Objective 1	3 . 3	The scoring method	Regular assignments, in-class tests, major assignments, final exams
Course objective 2	6. 1	The scoring method	Homework, in-class tests, final exams
Course objective 3	7.3	The scoring method	Homework, in-class tests, final exams

(2) Continuous improvement mechanism

(a) Establish a continuous improvement system

① Establish a continuous improvement group for this course.

② The head of the course continuous improvement group is responsible for organizing and supervising the continuous improvement process.

③ Develop continuous improvement measures.

(b) Establish a course continuous improvement group

Team leader: Chen Xiangliang, team members: Liu Lingyong, MAO Yu, Xiong Yan

(c) Continuous improvement of the course

① Regular grade assessment mechanism: According to the academic situation of each class, teachers of the course group must summarize and calculate all indicators of regular grade assessment every 4 weeks, adjust the status of students in time, and make corresponding records.

② Final examination assessment mechanism: analyze the final examination paper, count the score of each part of the test, and use the statistical results to analyze the course as a whole, so as to make improvements for the next batch of students.

(d) Continuous improvement measures of the course

① For the assessment of regular grades, measures such as symposiums, discussion groups, the establishment of study groups and individual exchanges with students are adopted to improve.

② For the final examination, according to the problems in students examination

and the key content of this course, unified guidance and other measures are taken for students who take the make-up exam to improve.

Formulator (signature):
Director (room) review (signature):
Professional person in charge of review (seal):