Appendix A-11: Comprehensive Graduation Training Syllabus

Comprehensive Graduation Training Syllabus

Course title	Comprehensive Graduation Training					Course number	**9032615220**
Applicable specialties	Civil Engineering (construction engineering direction☑, road and bridge direction☑, urban rail transit direction☑)						
Nature of the course	Public courses Basic courses☐, Professional basic courses (elective☐ required ☑) Professional courses (required☐ elective☐), Development courses☐						
Unit offering the course	School of Civil Engineering						
Total class hours	840	credit	28	Contact hours	420	Self-study hours	420
Prerequisite courses	Basic course, professional course and practical teaching link						
Textbooks and teaching resources	Course materials: None Reference materials: road bridge, construction, urban rail and other direction textbooks, technical specifications of various industries Teaching website:						

1. Course description

Graduation comprehensive training is a comprehensive teaching phase that follows the completion of theoretical and related practical teaching as per the curriculum plan. It is an essential component of undergraduate education, marking the final stage of students academic journey and serving as a comprehensive quality assessment. This phase further deepens and broadens professional direction instruction; it is an effective means for cultivating students ability to apply theory to practice and enhance their independent working skills. It is also a crucial teaching stage for developing students engineering practice capabilities, evaluating their mastery and application of fundamental theories, knowledge, and skills, as well as their ability to analyze and solve practical problems. The course aims to comprehensively train students in applying the basic theories, knowledge, and skills they have learned to make professional choices, design engineering projects, develop information models, manage construction, and conduct scientific research. Throughout this process, students should be able to evaluate the impact of civil engineering design and construction, as well as solutions to complex engineering problems, on society, health, safety, law, and culture.

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

(1) The graduation requirements that this course can support

order number	Graduation requirement indicators	Specific content of graduation requirement indicators
1	Graduation requirement 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 requirement 5.2	Be able to use modern tools to analyze, calculate and design complex civil engineering problems, and be able to analyze the effectiveness and limitations of the results.
3	Graduation requirement 5.3	Master the operation of basic software required for the development of construction industry informatization, and have the ability to build and apply information model.
4	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.
5	Graduation requirement 6.2	Ability to analyze and evaluate the impact of civil engineering project design and construction, complex engineering problem solutions on society, health, safety, law and culture.
6	Graduation requirements 7.2	It can think about the sustainability of engineering practice from the perspective of environmental protection and sustainable development, and evaluate the possible damage and hidden dangers caused by civil engineering practice to human beings and the environment.
7	Graduation requirement 10.1	Understand the differences between communication with peers and the public in the industry, and be able to communicate effectively with peers and the public in the industry for complex civil engineering problems.

(2) The implementation path of graduation requirements indicators in this course

1. Course objectives

Through the teaching of this course, students will master the basic knowledge and have certain application ability. The specific objectives of this course are as follows:

Course objective 1: Design scheme. Master the basic construction process, complete virtual design and construction for design tasks, reflect innovative consciousness in the process of design and construction, and complete the design scheme.

Course objective 2: Scheme evaluation. Be able to evaluate the proposed design scheme, and fully consider the constraints of society, health, safety, law, culture and environment in the evaluation.

Course objective 3: Design by hand. Correctly apply the principles and methods in the industry standards and regulations to perform manual calculations for structures and components.

Course objective 4: Design computer. Use industry-related software for calculation, and use the data, graphics and other results of computer for effective expression.

Course objective 5: BIM Model. Correctly apply BIM software such as Revit to build information model.

Course objective 6: Design Summary. Through a complete comprehensive training process, students will be able to evaluate the impact of engineering practice on environment and sustainable development in complex civil engineering problems.

Course objective 7: Communication. Be able to communicate and exchange with industry peers and the public in an effective manner through oral or written means for complex civil engineering problems.

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

Graduation requirement indicators	Course teaching objectives
3.3	Course Objective 1
6.2	Course objective 2
6.1	Course objective 3
5.2	Course objective 4
5 . 3	Course objective 5
7. 2	Course objective 6
10.1	Course objective 7

3. Intended learning outcomes

The intended learning outcomes of this course are as follows

train objective / blocks of knowledge	Ability items	Initial level	Degree of requirement	Intended learning outcomes	Corresponding graduation requirements
1. Design scheme	The scheme design is based on application	L2	L3	**1.** Master the basic constructio n process, complete the virtual design and constructio n according to the design task, reflect the innovative consciousne ss in the process of design and constructio n, and complete the design scheme.	3.3
2. Programme evaluation	project evaluation	L2	L5	**2.** Ability to evaluate the social, health, safety, legal and cultural impact of design solutions.	6.2
3. Design hand calculation	Standard application of hand calculation	L2	L3	**3.** Can apply the principles and methods in the industry standards and regulations, and can manually	6.1

train objective / blocks of knowledge	Ability items	Initial level	Degree of requirement	Intended learning outcomes	Corresponding graduation requirements
				calculate the structure and components.	
4. Design computer	Computerized calculation and analysis	L2	L4	**4.** Can model and analyze structure and components, and can effectively express the results of computer data and graphics.	5.2
5.BIM model	BIM modeling	L2	L4	**5.** Can build information models.	5.3
6. Design summary	Sustainability assessment	L2	L3	**6.** Can evaluate the impact of engineering practice on environment and sustainable development.	7.2
7. Communication	Effective communication	L2	L3	**7.** Be able to communicate and exchange with peers effectively through oral or written means for design topics.	10.1

4. Course assessment

(1) Course assessment structure

Assessment items				Requirements
leading official	**proportion %**	**Assessment items**	**proportion**	
tutor	40	1. Design scheme	25%	The design scheme stage drawings, corresponding calculation instructions and their completion process are comprehensively evaluated according to the completion quality.
		2. Programme evaluation	1 0%	The comprehensive evaluation is carried out according to the completion quality of the scheme evaluation process in the design scheme stage.
		3. Design hand calculation	20%	The comprehensive evaluation is based on the completion quality of the drawings, corresponding calculation instructions and their completion process in the design hand calculation stage.
		4. Design computer	2 0%	The completion quality of the design drawings, the corresponding calculation manual and its completion process are evaluated comprehensively according to the standard.
		5.BIM model	15%	The comprehensive evaluation is carried out according to the completion quality of the model and its completion process in

				the BIM model stage.
		6. Design summary	5%	The comprehensive evaluation is based on the completion quality of environmental and sustainable development impact assessment.
		7. Communication	5%	The comprehensive evaluation shall be made according to the quality of drawings, calculation instructions and other conditions.
Reviewers	30	1. Design scheme	25%	The design scheme stage drawings, corresponding calculation instructions and other completed quality are used as the standard for comprehensive evaluation.
		2. Programme evaluation	1 0%	The comprehensive evaluation is carried out according to the completion quality of the scheme evaluation process in the design scheme stage.
		3. Design hand calculation	20%	The comprehensive evaluation is based on the completion quality of the drawings and corresponding calculation instructions in the design hand calculation stage.
		4. Design computer	2 0%	The comprehensive evaluation is based on the quality of the drawings and corresponding calculation instructions completed in the design computerization stage.
		5.BIM model	15%	The comprehensive evaluation is carried out according to the

				completion quality of the model in the BIM model stage.
		6. Design summary	10%	The comprehensive evaluation is based on the completion quality of environmental and sustainable development impact assessment.
Thesis instructors	30	1. Design scheme 2. Programme evaluation 3. Design hand calculation 4. Design computer 5.BIM model 6. Design summary	40%	The comprehensive evaluation is carried out according to the completion quality of drawings, corresponding calculation instructions, BIM models and design summaries at each stage.
		7. Communication	60%	The comprehensive evaluation is based on the expression and status of the defense.
Total	100			

(2) Course assessment rules

Assessment items	Ability items
1. Design scheme	The scheme design is based on the application
2. Programme evaluation	project evaluation
3. Design hand calculation	Standard application of hand calculation
4. Design computer	Computerized calculation and analysis
5.BIM model	BIM modeling
6. Design summary	Sustainability assessment
7. Communication	Effective communication

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

1. Choose your own topic and determine complex engineering problems;
2. Carry out scheme design and comparison;
3. Carry out structural hand calculation and computer calculation to solve complex

engineering problems;

4. Effective communication to ensure that the design results can be accepted by everyone.

6. Non-technical ability training and observation

1. Communication and communication are cultivated through communication with teachers and classmates in daily life;

2. Cultivate non-technical ability indicators through paper.

3. When evaluating non-technical ability indicators, the students performance is scored independently by the instructor, the reviewer and the defense teacher respectively.

7. Course ideological and political design

Design is a rigorous process. In the whole process, we first cultivate a rigorous and realistic learning spirit, and then cultivate the awareness of rules through design such as scheme and structure. The cultivation is mainly realized through independent learning and communication with instructors. VIII. Course evaluation and continuous improvement mechanism

(1) Course evaluation

The course evaluation is carried out as follows:

blocks of knowledge	**1. Design scheme**	**2. Programme evaluation**	**3. Design hand calculation**	**4. Design computer**	**5. BIM model**	**6. Design summary**	**7. Communication**
program objective	Master the basic construction process, complete the virtual design and construc	Be able to evaluate the proposed design scheme, and fully consider the social,	Correctly apply the principles and methods in the industry standards and regulations to	The industry-related software is used for calculation, and the results of data and	Correctly apply Revit and other BIM software to build information	Through the complete comprehensive training process of graduation, the impact	Be able to communicate effectively with industry peers and the public in oral or

			tion according to the design task, reflect the innovative consciousness in the process of design and construction, and complete the design scheme.	health, safety, legal, cultural and environmental constraints in the evaluation.	carry out manual calculations of structure and components.	graphics are effectively expressed by using the computer.	model.	of engineering practice on environment and sustainable development in complex civil engineering problems can be evaluated.	written form on complex civil engineering problems.
Student ID:			Project name						
Student ID:									
surname and personal name:									
evaluation mode	weight	average	1. Design scheme	2. Programme evaluation	3. Design hand calculation	4. Design computer	5.BIM model	6. Design summary	7. Communication
The instructors score is X1	0.4								
The teachers score is X2	0.3								
The teacher gave X3 for the defense	0.3								

Overall score		Overall rating	

(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 shall be responsible for organizing, implementing and supervising the continuous improvement process.

③ Develop continuous improvement measures.

(b) Establish a course continuous improvement team

Team leader: Professional person in charge Members: All teachers of comprehensive training for graduation

(c) Continuous improvement of the course

① Regular assessment mechanism: teachers understand students learning situation through daily guidance and make records of guidance, and comprehensively consider their regular grades.

② Achievement assessment mechanism: evaluate and analyze the design calculation book and design drawings, count the places where students are likely to make mistakes, analyze the reasons for the mistakes, count and summarize the deficiencies in the cultivation of students abilities, consider the remedial measures to be taken, and make improvements in the next cohort of students.

(d) Continuous improvement measures of the course

① For the regular assessment of grades, measures should be taken to improve the communication with students individually.

② For the assessment of results, unified guidance measures are taken to improve students who take make-up exams according to the problems that appear in their exams.

③ Strengthen the guidance of the next generation of students in order to address the areas where students are prone to make mistakes.

Formulator (signature):

Director of department (office) review

(signature):

Professional person in charge of review

(seal):