Appendix 1-11: The Modules Handbook in Civil Engineering

Architectural Drawing Module Handbook

Module designation	Architectural Drawing		
Semester(s) in which the module is taught	Semester 1		
Person responsible for the module	Fang Yang		
Language	Chinese		
Relation to curriculum	Engineering Fundamentals		
Teaching methods	lesson		
Workload (incl. contact hours, self-study hours)	Contact Hours：48，Self-Study Hours：42		
Credit points	Chinese Credits：3.0，European Credits：3.0		
Required and recommended prerequisites for joining the module			
Module objectives/intended learning outcomes	Course Objective 1: Guide students to explore graphics, help them form scientific thinking methods, cultivate their spatial imagination ability, as well as the basic ability to read and draw engineering drawings. Enable students to recognize the importance of engineering graphics as technical documents, and be able to combine mathematical and natural science languages to describe complex engineering problems in civil engineering in a standardized way using graphics.		
Content	This course mainly studies the theories and methods of reading and draw engineering drawings, and cultivates students' practical ability to read and d drawings. At the same time, it is also an essential basic course for stude subsequent specialized courses. Engineering graphics are an important techn document in the engineering and technical department. It can be expressed two-dimensional graphics or three-dimensional graphics; it can be dra manually or generated by a computer. This course has a rigorous theory strong practicality, and is closely related to engineering practice. It plays important role in cultivating students' ability to master scientific think methods and enhancing their awareness of engineering and innovation. It is important professional basic course for engineering majors in ordin institutions of higher learning.		
Examination forms	Classroom exercises、Extracurricular assignments、Final examination		
Study and examination requirements	Assessment Items	proportion	requirement
	Homework from the exercise collection	40%	Assess each knowledge unit. Students should complete the tasks independently, and this aims to evaluate students' ability to draw graphics by hand.
	Final examination	60%	Assess each knowledge unit, with a focus on evaluating students' mastery of projection characteristics

			and their practical ability to draw engineering drawings.
Reading list	Graphics of Civil and Architectural Engineering (6th Edition), edited by Yuan Guo, Hu Qingchun and Chen Meihua, Hunan University Press Exercise Collection of Graphics of Civil and Architectural Engineering (6th Edition), edited by Yuan Guo, Hunan University Press		

Theoretical Mechanics Module Handbook

Module designation	Theoretical Mechanics
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Zhao Wenjun
Language	Chinese
Relation to curriculum	Professional Foundation
Teaching methods	Lecture,course,symposium
Workload (incl. contact hours, self-study hours)	Contact Hours: 64, Self-Study Hours: 56
Credit points	Chinese Credits: 4 | ECTS Credits: 4
Required and recommended prerequisites for joining the module	Higher Mathematics, College Physics, etc.
Module objectives/intended learning outcomes	Course Objective 1:Proficiently master the knowledge of the simplification of force systems and the laws of force system equilibrium. Proficiently master the knowledge of the composite motion of a point and the planar motion of a rigid body. Proficiently master the knowledge of the momentum theorem, the theorem of angular momentum, the kinetic energy theorem, and D'Alembert's principle.Combine mathematical and mechanical principles to make a standardized description of complex mechanical problems in civil engineering. Course Objective 2:Be able to effectively express and simplify complex force conditions, complex motion, and dynamic problems in civil engineering by using force diagrams, motion analysis diagrams, and text.
Content	Constraints and force analysis diagrams, composition and equilibrium of planar force systems, composition and equilibrium of spatial force systems, equilibrium of objects considering friction, kinematics of a point, composite motion of a point, simple motion of a rigid body, planar motion of a rigid body, momentum theorem, angular momentum theorem, kinetic energy theorem, D'Alembert's principle. Through the study of each teaching link, students will learn to correctly draw the force analysis diagrams of mechanisms and components; explain the translation effect of force and prove the simplified results of any force system by applying the translation

<table>
<tr><td></td><td colspan="3">of force; apply the equilibrium conditions of force systems to solve the constraint forces or the forces on components; apply the method of composite motion of a point to solve the velocity and acceleration of a point in complex motion; apply the instantaneous center method to analyze the velocity of a point on a rigid body in planar motion; apply the base - point method to analyze the velocity and acceleration of a point on a rigid body in planar motion; apply the momentum theorem to solve the dynamic problems of a particle system; apply the angular momentum theorem to solve the dynamic problems of a particle system; apply the theorem of motion of the center of mass and the angular momentum theorem relative to the center of mass to solve the dynamic problems of a rigid body in planar motion; apply the kinetic energy theorem to solve the dynamic problems of a particle system; correctly simplify the inertia force system and use the method of dynamic equilibrium to solve the constraint forces.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Exams, Mid-term Tests, Daily Assignments</td></tr>
<tr><td rowspan="4">Study and examination requirements</td><td>Assessment Components</td><td>Weighting</td><td>Requirements</td></tr>
<tr><td>Assignments</td><td>30%</td><td>Assess the mastery of knowledge.</td></tr>
<tr><td>Mid-term Test</td><td>10%</td><td>Cover the knowledge unit of statics.Cover the knowledge unit of statics.</td></tr>
<tr><td>Final Exam</td><td>60%</td><td>Assess the mastery and application of core knowledge points.</td></tr>
<tr><td>Reading list</td><td colspan="3">Theoretical Mechanics (8th Edition), edited by the Teaching and Research Section of Theoretical Mechanics of Harbin Institute of Technology, published by Higher Education Press, 2016.

Theoretical Mechanics, edited by Ren Shuguang and Dong Wuzhong, published by Hunan University Press, 2020.</td></tr>
</table>

Mechanics of Material Module Handbook

Module designation	Mechanics of Material
Semester(s) in which the module is taught	Semester 3
Person responsible for the module	He Ye
Language	Chinese
Relation to curriculum	Professional Foundation
Teaching methods	Lectures, Case Analysis, Discussions and Practice
Workload (incl. contact hours, self-study hours)	Contact Hours: 56
Credit points	Chinese Credits: 3.5, European Credits: 3.5
Required and recommended prerequisites for joining the module	Advanced Mathematics, College Physics, Theoretical Mechanics, etc.
Module objectives/intended learning outcomes	Course Objective 1: Understand the research tasks and basic assumptions of the course of mechanics of materials, master the methods for calculating internal forces, stresses, and deformations under the four basic deformation forms of members; master the method of combining stress state element analysis for principal stress and strength check; understand the method of stability analysis of columns. Course Objective 2: While learning and applying the knowledge of mechanics of materials, fully recognize the importance of lifelong learning, cultivate self-learning ability, and improve self-learning awareness.
Content	The properties of deformable solids and their basic assumptions, the basic forms of rod deformation, the basic concepts of axial tension and compression, internal forces, the section method, axial force and axial force diagram, stress, the deformation of tension and compression rods, Hooke's Law, the mechanical properties of materials under tension and compression, the strength condition. The internal force, stress, and deformation calculation of circular shafts under torsion. The concept of symmetrical bending and the calculation diagram of beams, the shear force and bending moment of beams, the shear force diagram and bending moment diagram, the stress calculation on the cross-section of beams and the strength condition, the rational design of beams, the displacement calculation of beams, the approximate differential equation of the deflection curve of beams and its integration, the calculation of beam deflection and rotation using the superposition principle. Stress element, stress analysis of plane stress state, principal stress and principal element, Mohr's circle, generalized Hooke's Law, strength theory and its application. The basic

<table>
<tr><td></td><td colspan="3">concept of combined deformation, bending of two mutually perpendicular sections, tension (compression) and bending, practical calculation of connecting pieces. The stability of columns, Euler's formula and its application.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Regular Homework, Midterm Test, Final Exam</td></tr>
<tr><td rowspan="4">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Homework</td><td>20%</td><td>Ongoing assessment of knowledge point mastery</td></tr>
<tr><td>Midterm Test</td><td>20%</td><td>Assess the mastery of key knowledge points at various stages.</td></tr>
<tr><td>Final Exam</td><td>60%</td><td>Assess the mastery and application of all knowledge points.</td></tr>
<tr><td>Reading list</td><td colspan="3">Liu Hongwen. *Mechanics of Materials (I)* (5th Edition) [M]. Beijing: Higher Education Press, 2011.
Gu Zhirong, Wu Yongsheng. *Guide to Learning Methods and Problem Solving for Mechanics of Materials* [M]. Shanghai: Tongji University Press, 2000.</td></tr>
</table>

Structural Mechanics (1) Module Handbook

Module designation	Structural Mechanics (1)		
Semester(s) in which the module is taught	Semester 3		
Person responsible for the module	Yang Shanbo		
Language	Chinese		
Relation to curriculum	Professional Foundation		
Teaching methods	Lectures, courses, seminars, etc.		
Workload (incl. contact hours, self-study hours)	Contact Hours: 48, Self-Study Hours: 42		
Credit points	Chinese Credits: 3 | ECTS Credits: 3		
Required and recommended prerequisites for joining the module	Higher Mathematics, Theoretical Mechanics, Material Mechanics, etc.		
Module objectives/intended learning outcomes	Course Objective 1:Based on the familiarity with the basic concepts of structural mechanics and the geometric composition analysis of bar structures, proficiently master the internal force calculations of different statically determinate structures, including statically determinate beams, rigid frames, trusses, and composite structures. Master the graph multiplication method for calculating the displacements of statically determinate beams and rigid frames.Master the static method and kinematic method for drawing the influence lines of statically determinate beams. Comprehend the basic concepts of the force method, and master the internal force calculations of statically indeterminate beams, rigid frames, and bent frames, as well as the solution of symmetric structures by the force method. Use these to analyze complex engineering problems in civil engineering and identify the key links for problem - solving. Course Objective 2:When learning the knowledge of "Structural Mechanics 1" and its applications, cultivate the awareness of the importance of lifelong learning and form the consciousness of autonomous learning.		
Content	Familiarize yourself with the basic concepts of structural mechanics and the geometric composition analysis of bar structures. Master the methods for calculating the internal forces of different statically determinate structures, namely statically determinate beams, rigid frames, trusses, and composite structures. Also, master the graph multiplication method for calculating the displacements of statically determinate beams and rigid frames. On this basis, learn to calculate the internal forces of statically indeterminate beams, rigid frames, and bent frames, and solve symmetric structures by the force method. Be familiar with the general design analysis method of bar structures to provide ideas and methods for solving complex engineering problems related to structural design.		
Examination forms	Daily Assignments,Mid - term Test,Final Exam		
Study and examination requirements	Assessment Components	Weighting	Requirements

	Daily Assignments	20%	assess the mastery of knowledge
	Mid - term Test	20%	Examine the understanding of core knowledge points.
	Final Exam	60%	Conduct a propositional examination with a combination of various question types, covering most of the knowledge points.
Reading list	Bao Shihua. Structural Mechanics I (5th Edition). Wuhan University of Technology Press, August 2018. Li Liankun. Structural Mechanics I (6th Edition). Higher Education Press, July 2017.		

Structural Mechanics2 Module Handbook

Module designation	Structural Mechanics2
Semester(s) in which the module is taught	Semester 4
Person responsible for the module	Chen Xin
Language	Chinese
Relation to curriculum	Professional Foundation
Teaching methods	Lectures, courses, seminars, etc.
Workload (incl. contact hours, self-study hours)	Contact Hours: 40, Self-study Hours: 35
Credit points	Chinese Credits: 2.5, European Credits: 2.5
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Advanced Mathematics, Theoretical Mechanics, Material Mechanics, Structural Mechanics 1, etc.
Module objectives/intended learning outcomes	Course Objective 2: Understand the basic principles of the displacement method for calculating statically indeterminate structures, master the process of establishing displacement method equations, and solve for each stiffness coefficient and free term. Apply the superposition principle to draw the bending moment diagram of statically indeterminate structures. Understand the physical concepts of single-node and multi-node moment distribution methods, master the basic principles and the entire calculation process of the moment distribution method, and skillfully use the moment distribution method to solve continuous beams and sway-free frames. Understand the concept of unit location vectors, master the unit assembly method, and understand the formation process of the structure's overall stiffness matrix and overall load array. Understand the concept of dynamic degrees of freedom, master the flexibility method and stiffness method for establishing differential equations of free and forced vibrations of single-degree-of-freedom systems, and solve for the natural vibration period and natural frequency of single-degree-of-freedom systems. Understand the impact of damping on vibrations. Understand the two types of stability problems in structures, understand the basic principles of analyzing structural stability using the static method and energy method, and master the solution for the critical load of an elastic column with a constant cross-section. Course Objective 2: Understand the basic principles of other progressive methods, recognize the concept of structural dynamic degrees of freedom, identify the two basic forms of structural instability, and distinguish the differences between bifurcation point instability and limit point instability. While learning and applying knowledge in Structural Mechanics 2, cultivate an awareness of the importance of lifelong learning and develop a consciousness for self-directed learning.
Content	Through the study of various teaching components, students will master the

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<tr><td></td><td colspan="3">determination of the basic unknowns in the displacement method, the establishment of the basic equations of the displacement method, and the drawing of internal force diagrams using the superposition method. They will also master the calculation of internal forces in continuous beams and sway-free frames using the moment distribution method and the drawing of internal force diagrams. Students will understand the principles of drawing influence lines for statically indeterminate structures and master the use of the mobility method to draw influence lines for internal forces in statically indeterminate structures. They will understand the concept of dynamic degrees of freedom in structures and the establishment of differential equations for free and forced vibrations of single-degree-of-freedom systems, and they will master the solution for natural frequency and natural period of single-degree-of-freedom systems. Students will also understand the impact of damping on free vibrations of single-degree-of-freedom systems, understand the two types of stability problems in structures, and master the method for finding the critical load in the elastic stability analysis of structures.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Examination</td></tr>
<tr><td rowspan="4">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Regular Homework</td><td>20%</td><td>Assessment of Knowledge Mastery</td></tr>
<tr><td>Midterm Test</td><td>20%</td><td>Covers all knowledge points of the Displacement Method, Progressive Methods, Influence Lines of Statically Indeterminate Structures, and the Matrix Displacement Method</td></tr>
<tr><td>Final Exam</td><td>60%</td><td>Assess the mastery and application of core knowledge points</td></tr>
<tr><td>Reading list</td><td colspan="3">Bao Shihua, Xin Kegui. Structural Mechanics Tutorial [Volumes I & II]. Beijing: Higher Education Press, 1988.
Li Liankun. Structural Mechanics Tutorial [Volumes I & II], 3rd Edition. Beijing: Higher Education Press, 1996.</td></tr>
</table>

Soil Mechanics Module Handbook

Module designation	Soil Mechanics		
Semester(s) in which the module is taught	Fourth Semester		
Person responsible for the module	Fu Guihai		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, Courses, Seminars, etc.		
Workload (incl. contact hours, self-study hours)	Contact Hours: 32, Self-study Hours: 28		
Credit points	Chinese Credits: 2.0, European Credits: 2.0		
Required and recommended prerequisites for joining the module	Engineering Geology, Material Mechanics, Elasticity Mechanics, etc.		
Module objectives/intended learning outcomes	Course Objective 1: Master the physical and mechanical properties of soil, permeability, stress calculation, strength, and settlement calculation. When solving complex engineering problems in civil engineering, be able to apply the basic concepts, principles, and methods of soil mechanics to address specific soil mechanics issues in the field of civil engineering. Describe the characteristics and drawing methods of two-dimensional seepage networks in soil, understand Darcy's law of water seepage in soil, methods for determining permeability coefficients, forms and conditions of seepage failure, and control methods. Be able to calculate hydrodynamic forces. Course Objective 2: Master the principles and research methods of soil mechanics, learn to use soil mechanics methods to study civil engineering problems, and provide a basis for selecting solutions tailored to specific civil engineering needs. Develop the ability to systematically analyze complex civil engineering problems through literature retrieval,consult data, and other means, propose solutions and theoretical foundations, and draw valid conclusions.		
Content	Includes soil properties and engineering classification, stress and settlement calculations of foundations, shear strength of soil, earth pressure, retaining walls, and slope stability analysis. Through various teaching sessions, students will master the basic physical properties and engineering classification of soil, seepage characteristics of soil, stress calculations in foundations, settlement calculations, soil strength theory, earth pressure calculations, determination of foundation bearing capacity, and slope stability analysis. Students will preliminarily acquire the ability to apply the basic concepts, principles, and methods of soil mechanics to solve problems related to foundation deformation, strength, and stability encountered in civil engineering design and construction.		
Examination forms	Examinations, Regular Assignments, Major Assignments		
Study and examination requirements	Assessment Item	Percentage	Requirements

	Regular Assignments	Twenty percent	Assess knowledge mastery
	Major Assignments	Twenty percent	Independently complete in class based on given conditions
	Final Exam	Sixty percent	Assess mastery and application of core knowledge points
Reading list	Zhao Minghua. Soil Mechanics and Foundation Engineering [M]. Wuhan: Wuhan University of Technology Press, 2014. Gong Xiaonan, Xie Kanghe. Soil Mechanics [M]. Beijing: China Architecture & Building Press, 2014. (Optional)		

Hydrodynamics Module Handbook

Module designation	Hydrodynamics
Semester(s) in which the module is taught	Semester 3
Person responsible for the module	Xiao Hong
Language	Chinese
Relation to curriculum	Engineering foundation
Teaching methods	Lectures, courses, laboratory work, etc.
Workload (incl. contact hours, self-study hours)	Contact Hours: 32, Self-Study Hours: 30
Credit points	Chinese Credits: 2 | ECTS Credits: 2
Required and recommended prerequisites for joining the module	Advanced Mathematics, College Physics, Theoretical Mechanics, etc.
Module objectives/intended learning outcomes	Course Objective 1:Master the physical and mechanical properties of fluids. Understand the derivation of equilibrium differential equations using the infinitesimal element method.Apply the isobaric surface to solve the hydrostatic pressure of fluids.Comprehend hydrostatic force.Understand the representation methods of fluid motion.Use the continuity equation to solve the flow velocity of fluids.Proficiently apply Bernoulli's equation to analyze the position head, pressure head, and velocity head of moving fluids.Comprehend the momentum theorem.Comprehend the similarity principle and dimensional analysis. Course Objective 2:Use the Reynolds number to distinguish the flow regimes of fluids.Calculate the turbulent resistance coefficient and the head loss of fluids using semi - empirical and empirical methods.Apply the actual Bernoulli equation for total flow to solve typical hydraulic problems such as constant orifice outflow, nozzle outflow, and short - pipe flow.Understand series and parallel connections.Differentiate different classifications of open channels, and expound the characteristics and generation conditions of steady open - channel flow. Course Objective 3:Master the measurement methods of main flow parameters and possess preliminary experimental skills.Have necessary experimental skills and certain practical abilities to analyze and solve problems.Cultivate students' analytical thinking in fluid mechanics, enable students to understand a relatively systematic theoretical knowledge of fluid mechanics, be able to raise mechanical problems in relatively typical practical engineering and simplify them to obtain mechanical models, and have certain practical abilities to analyze and solve problems related to fluid mechanics in civil engineering practice.
Content	The main physical properties of fluids,Differential equation of fluid equilibrium,Basic equation of hydrostatics - equation of isobaric surface,Forces acting on plane and curved surfaces,Description of fluid motion and Eulerian method,Continuity equation,Bernoulli's

<table>
<tr><td></td><td colspan="3">equation,Momentum theorem,Similarity principle and dimensional analysis,Flow resistance and energy loss,Orifice and nozzle outflow and hydraulic calculation of pipelines,Hydraulic calculation of pipelines,Open - channel flow,Weir flow and seepage flow.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Exams, experiments, assignments</td></tr>
<tr><td rowspan="4">Study and examination requirements</td><td>Assessment Components</td><td>Weighting</td><td>Requirements</td></tr>
<tr><td>assignments</td><td>20%</td><td>assess the mastery of knowledge</td></tr>
<tr><td>experiments</td><td>20%</td><td>For the designated project, select the experimental equipment and complete it by the cooperation of the group.</td></tr>
<tr><td>final exam</td><td>60%</td><td>Assess the mastery and application of core knowledge points</td></tr>
<tr><td>Reading list</td><td colspan="3">Finnemore E J, Franzini J B. Fluid Mechanics with Engineering Applications[M]. (10th ed.)， Tsinghua University Press, 2003.
Pan Wenquan. Engineering Fluid Mechanics [M]. Tsinghua University Press, 1988.</td></tr>
</table>

Engineering Geology Module Handbook

Module designation	Engineering geology		
Semester(s) in which the module is taught	Semester 2		
Person responsible for the module	Liang Xiaoqiang		
Language	Chinese		
Relation to curriculum	Engineering Foundation		
Teaching methods	Teaching, discussion, problem guidance, understanding and practice		
Workload (incl. contact hours, self-study hours)	Contact hours: 32, self-study hours: 28		
Credit points	Chinese credits: 2, ECTS Credits: 2		
Required and recommended prerequisites for joining the module	University physics, material mechanics, engineering survey, civil engineering drawing, etc		
Module objectives/intended learning outcomes	Course objective 1: Be familiar with the physical properties of minerals and the origin, structure and structure of the three major rocks, grasp the influence of geological structure on engineering; analyze the influencing factors in the process of solving engineering geological problems through the key links of solving engineering geological problems, and obtain effective conclusions. Course objective 2: Familiar with engineering geological exploration and testing methods; able to investigate and analyze solutions to complex engineering problems of civil engineering. Course objective 3: To master the main engineering problems and prevention measures of special soil; and to evaluate the impact of engineering practice on environment and sustainable development.		
Content	Engineering geological conditions, the properties of minerals, three categories of rock, crust movement, rock formation, fold structure, fault structure, geological action of surface water, groundwater, weathering, the nature of rock and special soil, collapse, landslide, debris flow, karst, engineering geological survey task classification and stage, engineering geological exploration and testing methods. Through the above knowledge learning, make students have the following ability level: find out the construction area, construction site of engineering geological conditions, analysis, prediction and evaluation of engineering geological problems and its impact on the building environment and harm, put forward the corresponding prevention and control measures, in order to ensure the engineering construction planning, design, construction, operation to provide reliable geological basis.		
Examination forms	Homework, class test, midterm test, and final exam		
Study and examination requirements	**Assessment Components**	**Weighting**	**Requirements**
	Usually homework	20%	Assessment of knowledge mastery

	classroom testing	12%	Covering all of the knowledge units
	Medium-term test	8%	To investigate the students' understanding ability, mastery ability and application ability of the basic knowledge of geology.
	final	60%	Assess the mastery and application of the core knowledge points
Reading list	[1] Editorial Committee of Engineering Geology Handbook. Engineering Geology Manual (fifth edition) [M]. Beijing: China State Construction Press, 2018.04. [2] The National standard of the People's Republic of China "Geotechnical Engineering Investigation Code" GB50021-2001 (2009 edition). Beijing: China State Construction Press, 2009		

Ethics and Rule of Law Module Handbook

Module designation	Ethics and Rule of Law
Semester(s) in which the module is taught	Semester 1
Person responsible for the module	Lihong Jiang
Language	Chinese
Relation to curriculum	Humanities and Social Sciences
Teaching methods	Thematic Teaching Method: Online Courses, Instructor Guidance, and Student Group Participation
Workload (incl. contact hours, self-study hours)	Contact Hours：48，Self-Study Hours：42
Credit points	Chinese Credits：3.0，European Credits：3.0
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Course Objectives 1：Accurately grasp the theoretical achievements of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era; and develop a profound understanding of patriotism, and the establishment of correct outlooks on life and values. Course Objectives 2：Strengthen ideological and moral cultivation, enhance the consciousness of learning and applying the law, and comprehensively improve the ideological and moral qualities, behavioral cultivation, and legal literacy of college students. Course Objectives 3：Enhance the ability to recognize, analyze, and solve problems using Marxist standpoints, viewpoints, and methods, and fasten the first button of life.
Content	"Thought Morality and the Rule of Law" is a public ideological and political theory course offered to college students and a compulsory course among the ideological and political theory courses in colleges and universities. This course is guided by Marxism-Leninism, Mao Zedong Thought, Deng Xiaoping Theory, the important thought of "Three Represents", the Scientific Outlook on Development, and Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. It mainly focuses on the education of correct worldviews, outlooks on life, values, moral concepts, and the concepts of the rule of law. The core socialist values are integrated throughout the whole teaching process. Through theoretical learning and practical experiences, it helps students to form lofty ideals and beliefs, carry forward the great patriotic spirit, establish correct outlooks on life and values, strengthen their ideological and moral cultivation, enhance their consciousness of learning and using the law, and comprehensively improve the ideological and moral qualities, behavioral cultivation, and legal literacy of college students. The main purpose of studying this course is to start from the practical issues that contemporary college students are facing and concerned about. Taking the education of correct outlooks on life, values, moral concepts, and the concepts of the rule of law as the main thread, through theoretical learning and practical experiences, it helps college students to form lofty ideals and beliefs, carry

<table>
<tr><td></td><td colspan="3">forward the great patriotic spirit, establish correct outlooks on life and values, firmly establish the core socialist values, cultivate good ideological and moral qualities and legal qualities, further improve their ability to distinguish between right and wrong, good and evil, beauty and ugliness, and strengthen their self-cultivation. It lays a solid ideological, moral, and legal foundation for them to gradually become builders and successors of the great cause of socialism with Chinese characteristics who develop morally, intellectually, physically, and aesthetically in an all-round way.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Online learning, testing and examinations</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>proportion</td><td>requirement</td></tr>
<tr><td>test</td><td>20%</td><td>Evaluate the scores according to the points obtained from watching teaching videos, reading learning materials, and taking chapter simulation tests.</td></tr>
<tr><td>Class Performance</td><td>10%</td><td>Evaluate the scores according to the attendance and the situation of teacher-student interaction in class questions.</td></tr>
<tr><td>Practical Teaching</td><td>10%</td><td>All students should participate in groups. Centering around the theme of nurturing students' souls and cultivating talents with Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, grades should be assigned to students on a group basis.</td></tr>
<tr><td>Final Examination</td><td>60%</td><td>1.Assessment Form:
Computer-based closed-book examination, using a 100-point system, and the scores will be graded according to the marking rules of the examination paper.
2.Assessment Question Types:
Single-choice questions, multiple-choice questions, and true-or-false questions.</td></tr>
<tr><td>Reading list</td><td colspan="3">Ethics and Rule of Law (2023 Revised Edition), Higher Education Press
Teaching website：
https://coursehome.zhihuishu.com/courseHome/1000001246#teachTeam</td></tr>
</table>

Outline of Modern Chinese History Module Handbook

Module designation	Outline of Modern Chinese History
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Gang Wang
Language	Chinese
Relation to curriculum	Humanities and Social Sciences
Teaching methods	Thematic Teaching Method
Workload (incl. contact hours, self-study hours)	Contact Hours：48，Self-Study Hours：42
Credit points	Chinese Credits：3.0，European Credits：3.0
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Course Objective 1: Through theoretical teaching, guided by Marxism, educate students to understand the development process and basic laws of modern and contemporary Chinese history, deepen their understanding of China's national conditions, comprehend the historical inevitability of the "Four Choices", and enhance students' historical responsibility to participate in the great cause of realizing the Chinese Dream of the great rejuvenation of the Chinese nation. Course Objective 2: Cultivate students' ability to apply the principles of dialectical materialism and historical materialism in Marxism to discover, analyze, and solve the fundamental issues in modern and contemporary Chinese history, and improve students' humanistic and social scientific literacy. Course Objective 3: In practical teaching, with the theme of promoting the cultivation of the soul and education of people with Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, through activities such as the creation and display of micro-theaters in the "Five Micro" practical teaching mode of our school and the research-based learning competitions for college students across the province, guide students to carry out in-depth social practices, and help students understand and comprehend the truth that "the reason why the Communist Party of China can succeed and why socialism with Chinese characteristics is good ultimately lies in the fact that Marxism works, and it is Marxism adapted to the Chinese context and the times that works."
Content	The Outline of Modern and Contemporary Chinese History course is a core ideological and political theory course that is compulsory for undergraduate students in institutions of higher learning, as determined by the Opinions on Further Strengthening and Improving Ideological and Political Theory Courses in Institutions of Higher Learning and its implementation plan issued by the Publicity Department of the Central Committee of the Communist Party of China and the Ministry of Education in 2005. This course is an excellent ideological and political theory course in Hunan Province and a first-class undergraduate course featuring an online-offline blended teaching mode in Hunan Province. It aims to cultivate students' ability to study and research the development process and basic laws of modern and contemporary Chinese history by applying the standpoints, viewpoints and methods of dialectical materialism and historical materialism, improve students' capabilities of identifying, analyzing and solving problems, and lay a solid foundation for students to study subsequent ideological and political theory courses. It educates students to understand the

<table>
<tr><td></td><td colspan="3">history and national conditions of China, deeply comprehend the historical inevitability of the "Four Choices", and understand and grasp the truth that "the Communist Party of China can succeed, socialism with Chinese characteristics is good, and ultimately it is because Marxism works, and it is the Marxism adapted to the Chinese context and the needs of the times that works".</td></tr>
<tr><td>Examination forms</td><td colspan="3">Online learning, testing and examinations</td></tr>
<tr><td rowspan="6">Study and examination requirements</td><td>Assessment Items</td><td>proportion</td><td>requirement</td></tr>
<tr><td>test</td><td>20%</td><td>Evaluate the grades according to the points obtained from watching teaching videos, reading learning materials, and taking chapter simulation tests.</td></tr>
<tr><td>Class Performance</td><td>10%</td><td>Evaluate the grades according to the attendance and the situation of teacher-student interaction in class questions.</td></tr>
<tr><td>Practical Teaching</td><td>10%</td><td>All students participate and are divided into groups. Centering on the theme of cultivating students' souls with Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, the students' grades are evaluated on a group - by - group basis.</td></tr>
<tr><td>Final Examination</td><td>60%</td><td>1.Assessment form: Computer-based closed-book examination. The scoring system is on a scale of 100, and the scores will be evaluated according to the marking rules of the examination paper.
2.Types of assessment questions: Single-choice questions, multiple-choice questions, and true-or-false questions.</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td>Reading list</td><td colspan="3">Outline of Modern Chinese History(2023 Revised Edition), published by Higher Education Press
Teaching website：
https://coursehome.zhihuishu.com/courseHome/1000001246#teachTeam</td></tr>
</table>

Basic principles of Marxism Module Handbook

Module designation	Basic principles of Marxism		
Semester(s) in which the module is taught	Semester 3		
Person responsible for the module	Xuming Shen		
Language	Chinese		
Relation to curriculum	Humanities and Social Sciences		
Teaching methods	Lecture、discussion		
Workload (incl. contact hours, self-study hours)	contact Hours：48，Self-Study Hours：42		
Credit points	Chinese Credits：3.0，European Credits：3.0		
Required and recommended prerequisites for joining the module	Ethics and Rule of Law、Outline of Modern Chinese History、Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics		
Module objectives/intended learning outcomes	Through the theoretical and practical teaching of this course, students will be equipped with basic knowledge and abilities. The specific course objectives are as follows: Course Objective 1: Master the basic viewpoints, theories and methods of Marxism, strengthen the ideal and belief in building socialism with Chinese characteristics, adhere to the path of socialism with Chinese characteristics, and consciously establish the lofty ideal of communism; view rationally and correctly the new situations and problems emerging in the current capitalist society. Course Objective 2: Apply the basic viewpoints, theories and methods of Marxism to analyze and solve practical problems.		
Content	This course belongs to the public compulsory theoretical courses in general education and is a main course in the ideological and political theory curriculum system of colleges and universities. The purpose and requirements of this course focus on teaching the world outlook and methodology of Marxism, providing students with systematic Marxist theoretical education, and explaining the internal connection between adhering to the Marxist world outlook and methodology and holding high the banner of socialism with Chinese characteristics. It helps students to further understand and grasp the theoretical qualities, basic viewpoints and contemporary values of Marxism from the combination of theory and practice; view rationally and correctly the new situations and problems emerging in the current capitalist society; and lay a solid theoretical foundation for students to establish the ideal and belief in building socialism with Chinese characteristics and consciously adhere to the Party's basic line.		
Examination forms	Classroom assessment, Online learning assessment, Practical teaching evaluation, Final examination		
Study and examination requirements	Assessment Items	proportion	requirement
	Class performance	10%	The teacher will grade students according to their performance in aspects such as the quality of their notes, participation in classroom discussions, performance in

			answering questions, and attendance.
	Online learning	20%	1.It mainly assesses students' degree of understanding of the knowledge points in each chapter. 2.The question bank automatically calculates scores based on students' answers and generates a data file of students' scores, which serves as the final grade for this link.
	Practical teaching	10%	1.Evaluate according to the completion of the research-based learning report. 2.In the absence of unified research-based learning, this course will organize students to carry out a micro-story practical competition. The evaluation will be conducted according to the completion of the micro-stories, and the micro-stories must highlight the core socialist values.
	Final examination	60%	1.Assessment form: Closed-book examination, scored on a 100-point scale, conducted on a computer. The examination papers are assembled by the computer from the question bank, and the scoring rules are set to automatically grade the papers. 2.Types of assessment questions: Single-choice questions, multiple-choice questions, and true-or-false questions.
Reading list	Course textbook: An Introduction to the Basic Principles of Marxism (2023 Edition), published by Higher Education Press		

Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics Module Handbook

Module designation	Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics
Semester(s) in which the module is taught	Semester 4
Person responsible for the module	Huabing Yang
Language	Chinese
Relation to curriculum	Humanities and Social Sciences
Teaching methods	Thematic teaching method
Workload (incl. contact hours, self-study hours)	Contact Hours：80，Self-Study Hours：70
Credit points	Chinese Credits：5.0，European Credits：5.0
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Through the theoretical and practical teaching of this course, it helps students systematically master the theoretical knowledge of Marxism adapted to the Chinese context, and enhance their confidence in the path, theory, system, and culture of socialism with Chinese characteristics: Course Objective 1: Through theoretical teaching, students can accurately grasp the essence of Mao Zedong Thought and the theoretical system of socialism with Chinese characteristics, and have a profound understanding of the historical achievements made by the Party in leading the people during the processes of revolution, construction, and reform. They can also have a thorough comprehension of the Party's basic theories, basic lines, and basic strategies since the reform and opening up. Course Objective 2: Through learning, students can enhance their abilities to recognize, analyze, and solve problems by applying the standpoints, viewpoints, and methods of Marxism. They can increase their recognition of the major principles, policies, and strategies of the Party and the country, and strengthen their confidence in the path, theory, system, and culture of socialism with Chinese characteristics. Course Objective 3: In practical teaching, with the theme of promoting the cultivation of students' souls and the education of people through Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, and in the forms of activities such as the creation and display of the micro-theater in our school's "Five Micro" practical teaching mode and the research-based learning competition for college students across the province, students will be guided to conduct in-depth social practices. They will understand and comprehend the truth that "the Communist Party of China can succeed, socialism with Chinese characteristics is good, and ultimately it is because Marxism works, and it is the Marxism adapted to the Chinese context and the needs of the times that works".
Content	An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics is a general ideological and political theory course offered to all undergraduate majors across the university. It takes as its research objects the theoretical

<table>
<tr><td></td><td colspan="3">achievements formed in the process of adapting Marxism to the Chinese context, as well as the basic theories, basic lines and basic strategies for initiating, upholding and developing socialism with Chinese characteristics. The teaching of this course is an important part of strengthening the ideological and political theory education for college students in the new era. Its main task is to help students systematically master the theoretical knowledge of Marxism adapted to the Chinese context, and enhance their confidence in the path, theory, system and culture of socialism with Chinese characteristics.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Online learning and testing, classroom Q&A interaction, practical teaching, and final examination</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>proportion</td><td>requirement</td></tr>
<tr><td>test</td><td>20%</td><td>The grades are mainly determined by assessing students' degree of understanding of the knowledge points in each chapter and their completion of each online assignment.</td></tr>
<tr><td>Class Performance</td><td>10%</td><td>The grades are evaluated according to the attendance and the situation of teacher-student interaction in classroom questioning.</td></tr>
<tr><td>Practical Teaching</td><td>10%</td><td>All students are required to participate. They will be divided into groups. Centering around the core socialist values, grades will be evaluated for students on a group basis.</td></tr>
<tr><td>Final Examination</td><td>60%</td><td>1.Assessment form: Computer-based closed-book examination, scored on a 100-point scale, and graded according to the marking details of the examination paper.
2.Types of assessment questions: Single-choice questions, multiple-choice questions, and true-or-false questions.</td></tr>
<tr><td>Reading list</td><td colspan="3">Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics (2023 Revised Edition), Higher Education Press
Teaching website: Rain Classroom</td></tr>
</table>

University physical education and health (1) Module Handbook

Module designation	University physical education and health (1)
Semester(s) in which the module is taught	Semester 1
Person responsible for the module	
Language	Chinese
Relation to curriculum	Humanities and Social Sciences
Teaching methods	Lecturing + Self-directed Review + Practice
Workload (incl. contact hours, self-study hours)	Contact Hours：32，Self-Study Hours：13
Credit points	Chinese Credits：1.0，European Credits：1.0
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Course Objective 1: Sports Participation Objective Actively participate in various physical education activities and basically develop the habit of conscious exercise. Basically form the awareness of lifelong physical exercise, be able to formulate a feasible personal exercise plan, and have a certain ability to appreciate sports culture. Course Objective 2: Sports Skill Objective Master proficiently the basic methods and skills of more than two fitness sports. Be able to carry out physical exercise scientifically, improve one's own sports ability, and master the handling methods of common sports injuries. Course Objective 3: Physical Health Objective Be able to test and evaluate the physical health status, and master the knowledge and methods of effectively improving physical fitness and comprehensively developing physical ability. Develop good behavior habits, form a healthy social lifestyle, and have a healthy physique. Course Objective 4: Mental Health Objective Set physical education learning goals according to one's own abilities. Consciously improve the mental state through physical education activities, overcome psychological barriers, and develop a positive and optimistic attitude towards life. Use appropriate methods to regulate one's own emotions, and experience the fun of sports and the feeling of success during exercise. Course Objective 5: Social Adaptation Objective Demonstrate good sportsmanship and a spirit of cooperation, and correctly handle the relationship between competition and cooperation.
Content	The physical education course is a public compulsory course for college students, with physical exercises as the main means. Through a reasonable physical education process and scientific physical training, its main purposes are to enhance physical fitness, improve health, and increase sports literacy. It is an important part of the school curriculum system, the central link of physical education work in institutions of higher learning, and an indispensable and crucial way to implement quality-oriented education and cultivate comprehensively developed talents.

Examination forms	Morning jogging, Classroom grading, Final examination		
Study and examination requirements	Assessment Items	proportion	requirement
	Classroom performance	10%	The teacher will grade students according to their performance in aspects such as classroom attendance, in-class exercises, and getting along with others.
	The completion status of the morning jogging	30%	The teacher will grade students according to their performance in aspects such as the number of times of morning jogging attendance check-ins within the specified time each semester, the distance completed in the morning jogging, the quality of the morning jogging completion, and the integrity of the morning jogging completion.
	Final examination	60%	The teacher conducts the examination by dividing the examination content formulated according to the teaching syllabus and the examination syllabus into different items, and then calculates the total score by statistically analyzing the scores of all examination items and calculating them according to the specified proportions.
Reading list	Course textbook: Bai Jinxiang: College Physical Education and Health Education, published by the Ethnic Publishing House. Reference materials: Bai Jinxiang: A Course in College Physical Education: Theory and Practice, published by the Ethnic Publishing House. Teaching website: None.		

Introduction to Environmental Science Module Handbook

<table>
<tr><td>Module designation</td><td colspan="3">Introduction to Environmental Science</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td colspan="3">The fourth semester</td></tr>
<tr><td>Person responsible for the module</td><td colspan="3">Li Hai</td></tr>
<tr><td>Language</td><td colspan="3">Chinese</td></tr>
<tr><td>Relation to curriculum</td><td colspan="3">General Education Course</td></tr>
<tr><td>Teaching methods</td><td colspan="3">Lecture; Seminar; Case Analysis</td></tr>
<tr><td>Workload (incl. contact hours, self-study hours)</td><td colspan="3">contact hours：16，</td></tr>
<tr><td>Credit points</td><td colspan="3">Chinese credit: 1.0, European credit: 1.0</td></tr>
<tr><td>Required and recommended prerequisites for joining the module</td><td colspan="3"></td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td colspan="3">Course Objective 1: To grasp and understand the basic concepts and principles of environmental science as well as the main ways to prevent and control environmental pollution, and to familiarize with relevant environmental standards. Cultivate the awareness of environmental protection and establish the strategic thinking of sustainable development.
Course Objective 2: Familiarize with environmental impact assessment.</td></tr>
<tr><td>Content</td><td colspan="3">Environmental Overview, Ecology and Environment, Water Pollution Control, Air Pollution and Control, Solid Waste Pollution and Comprehensive Utilization, Soil Pollution and Prevention,Noise Pollution and Other Physical Pollution Control, Environmental impact assessment.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Paper</td></tr>
<tr><td rowspan="4">Study and examination requirements</td><td>Examination Items</td><td>Ratio</td><td>Requirements</td></tr>
<tr><td>Routine</td><td>30%</td><td>Each knowledge unit will be assessed at least once, with a focus on subjective questions.</td></tr>
<tr><td>Classroom test</td><td>10%</td><td>Focuses on examining students' mastery of core knowledge and is based on objective questions.</td></tr>
<tr><td>Paper</td><td>60%</td><td>Focus on assessing students' understanding of environmental science and their ability to look at issues in an integrated way</td></tr>
<tr><td>Reading list</td><td colspan="3">1.Zhang Shengli. Introduction to Environmental Science and Engineering. [M]. Chengdu: Southwest Jiaotong University Press,2022.
2.Global Environment Outlook - GEO 6 : healthy planet, healthy people</td></tr>
</table>

Advanced Mathematics A (1) Module Handbook

Module designation	Advanced Mathematics A (1)
Semester(s) in which the module is taught	Semester 1
Person responsible for the module	
Language	Chinese
Relation to curriculum	Mathematics and Physics
Teaching methods	Theoretical teaching and students' independent learning
Workload (incl. contact hours, self-study hours)	Contact Hours：72，Self-Study Hours：63
Credit points	Chinese Credits：4.5，European Credits：4.5
Required and recommended prerequisites for joining the module	Middle school mathematics
Module objectives/intended learning outcomes	**Course Objective 1: Through students' reading of textbooks and the teacher's instruction, students' understanding of the limits of sequences and functions will shift from an abstract qualitative understanding to a specific quantitative analysis. Students should master the relevant concepts and properties of infinitesimals and infinities, be proficient in using the operation rules of limits to calculate the limits of sequences and functions, and skillfully apply equivalent infinitesimals and two important limits. They should be able to prove the existence of the limits of sequences and functions by using their properties. On the basis of understanding the function limit theory, students should master the concept and properties of function continuity. Course Objective 2: Through teaching, students should understand the concepts and properties of derivatives and differentials. They should be able to derive the derivative formulas and rules of basic elementary functions by using the definition and properties of derivatives. Students should be proficient in calculating the first and second derivatives of general inverse functions, composite functions, and functions represented by parametric equations, and if necessary, be able to calculate higher-order derivatives. They should master the application of derivatives and differentials in approximate calculations and be able to apply them well in professional practice. Regarding the curvature of curves, related rates of change, and the solution of economic problems, students are required to fully understand the inherent meanings on the basis of learning the basic knowledge, concepts, and formulas of derivatives and apply them fully in engineering practice. Course Objective 3: Through learning, on the basis of understanding the conditions and conclusions of several major differential mean value theorems (Rolle's theorem, Lagrange's theorem, Cauchy's theorem, and Taylor's theorem), students should be able to flexibly use them to solve related problems (the monotonicity of functions, the limits of indeterminate forms, the extreme and maximum/minimum values of functions, the concavity and inflection points of functions, and the asymptotes of curves). Course Objective 4: Through the study of derivative knowledge and the understanding of inverse operations, students should understand the concepts of primitive functions and

<table>
<tr><td></td><td colspan="3">indefinite integrals. They should master the substitution integration method, integration by parts of indefinite integrals, and the methods of finding indefinite integrals of some special functions, laying the foundation for the calculation of definite integrals in the next chapter.
Course Objective 5: By putting forward and solving practical problems, students should fully understand the concept and connotation of definite integrals. They should master the basic formula of calculus and the calculation of definite integrals, as well as the idea of the infinitesimal element method, and fully demonstrate the application of definite integrals in geometry and physics. Students should understand the concepts and determination methods of improper integrals, and have a brief understanding of the approximate calculation of definite integrals for future use.
Course Objective 6： The solution of ordinary differential equations mainly relies on the study of integral calculus of functions of one variable. On the basis of understanding the basic concepts of differential equations, students should master the solution methods of first-order differential equations, reducible differential equations, and second-order linear differential equations. Through practical examples, students should understand the application of differential equations in real life, so as to flexibly apply differential theory to practice.</td></tr>
<tr><td>Content</td><td colspan="3">The course of *Higher Mathematics* is an important compulsory basic natural science course, a degree course, and a subject for the entrance examination of postgraduate studies for students majoring in various disciplines in institutions of higher learning. It serves the cultivation of high-quality specialized talents required for China's socialist modernization drive. The purpose of setting up this course is to enable students to acquire the basic concepts, fundamental theories, and basic operational skills in aspects such as calculus of functions of one variable, calculus of functions of several variables, space analytic geometry and vector algebra, infinite series (including Fourier series), and ordinary differential equations. It lays a necessary mathematical foundation for students to study subsequent courses and further pursue other courses.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Usual assignments In-class tests Final examination</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>proportion</td><td>requirement</td></tr>
<tr><td>Usual assignments</td><td>20%</td><td>It should be completed independently by each individual.</td></tr>
<tr><td>In-class test</td><td>20%</td><td>It focuses on examining students' mastery of core knowledge points, and mainly consists of objective questions.</td></tr>
<tr><td>Pre-class study</td><td>10%</td><td>It focuses on examining students' self-learning ability and learning attitude.</td></tr>
<tr><td>Final examination</td><td>50%</td><td>Comprehensive examination</td></tr>
<tr><td>Reading list</td><td colspan="3">Course textbook: Song Yingqing, etc. Higher Mathematics (Volume I) [M]. Changsha: Hunan Science and Technology Press, 2018.
Reference materials: Edited by Huang Lihong, Higher Mathematics (Volume I) [M]. Beijing: Peking University Press, 2018.
Teaching website:None</td></tr>
</table>

Linear algebra A Module Handbook

Module designation	Linear algebra A
Semester(s) in which the module is taught	Semester 3
Person responsible for the module	
Language	Chinese
Relation to curriculum	Mathematics and Physics
Teaching methods	In-class instruction Out-of-class exercises
Workload (incl. contact hours, self-study hours)	Contact Hours：32，Self-Study Hours：28
Credit points	Chinese Credits：2.0，European Credits：2.0
Required and recommended prerequisites for joining the module	Advanced Mathematics
Module objectives/intended learning outcomes	Course Objective 1 Through learning, students should master the relevant concepts and properties of determinants. They should be proficient in using the properties of determinants to calculate determinants and be able to apply two basic methods, namely the triangularization method and the order - reduction method, to calculate determinants. Students should understand algebraic cofactors and Cramer's rule. This course aims to cultivate students' abilities in determinant calculation and deduction. Course Objective 2 Through learning, students should understand the concept of matrices and master various operation rules of matrices, especially the mixed operation rules of square matrices and determinants. They should master the criteria for matrix invertibility and the methods of finding inverse matrices, and be able to use the properties of inverse matrices for matrix operations and solve simple matrix equations. Students should understand the concept of elementary matrices and their relationship with elementary matrix transformations, and be proficient in finding the rank of matrices. This course aims to cultivate students' abilities in matrix calculation and deduction, as well as their ability to identify complex engineering problems in civil engineering using the basic principles of matrices. Course Objective 3 Through learning, students should master the criteria for the solvability of linear equations and the elimination method. They should master the methods for determining the linear dependence of vector groups and be proficient in finding the rank and maximal linearly independent subsets of vector groups. Students should master the conditions for homogeneous linear equations to have non - zero solutions and the structure of the solutions, as well as the conditions for non - homogeneous linear equations to have solutions and the structure of the solutions. They should be proficient in using the elementary transformation method to find the solutions and fundamental solution systems of linear equations. This course aims to cultivate students' ability to model and solve complex engineering problems in civil engineering using the knowledge of linear equations. Course Objective 4 Through teaching, students should understand the concepts and properties of eigenvalues and eigenvectors of matrices, as well as the concepts and

<table>
<tr><td></td><td colspan="3">properties of similar matrices and the necessary and sufficient conditions for a matrix to be similar to a diagonal matrix. This course aims to cultivate students' abilities in matrix diagonalization calculation and deduction.</td></tr>
<tr><td>Content</td><td colspan="3">The course of Linear Algebra is an important public basic theoretical course for various majors in higher engineering institutions. Since linear problems widely exist in all fields of science and technology, and certain non-linear problems can be transformed into linear problems under certain conditions, the methods introduced in this course are widely applied in various disciplines.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Final examination、In-class quiz、Usual homework、Pre-class study</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>proportion</td><td>requirement</td></tr>
<tr><td>Usual assignments</td><td>20%</td><td>Complete it independently by oneself.</td></tr>
<tr><td>In-class test</td><td>30%</td><td>It focuses on examining students' mastery of core knowledge points, and mainly uses objective questions.</td></tr>
<tr><td>Pre-class study</td><td>10%</td><td>Combine with the online examination system of the College of Science to conduct computer-based examinations.</td></tr>
<tr><td>Final examination</td><td>40%</td><td>comprehensively examine</td></tr>
<tr><td>Reading list</td><td colspan="3">Course textbook: Chen Shubo, etc. *Linear Algebra* [M]. Beijing: Peking University Press, 2022. Reference materials: Department of Mathematics, Huazhong University of Science and Technology. *Linear Algebra* [M]. Beijing: Higher Education Press, 2008. Zhou Yong. *Linear Algebra* [M]. Beijing: Peking University Press, 2018. Liu Xianzhong. *Linear Algebra* (Second Edition) [M]. Beijing: Higher Education Press, 2003. Mao Gangyuan. *Induction of Problem-solving Methods and Techniques in Linear Algebra* [M]. Wuhan: Huazhong University of Science and Technology Press, 2015. Teaching websites: http://open.163.com/special/Khan/linearalgebra.html https://www.bilibili.com/video/av29971113</td></tr>
</table>

Probability Theory and Mathematical Statistics A Module Handbook

Module designation	Probability Theory and Mathematical Statistics A
Semester(s) in which the module is taught	Semester 4
Person responsible for the module	
Language	Chinese
Relation to curriculum	Mathematics and Physics
Teaching methods	Theoretical teaching and students' independent learning
Workload (incl. contact hours, self-study hours)	Contact Hours：40，Self-Study Hours：35
Credit points	Chinese Credits：2.5，European Credits：2.5
Required and recommended prerequisites for joining the module	Advanced Mathematics、Linear algebra
Module objectives/intended learning outcomes	Course Objective 1: Through learning, enable students to master the basic concepts of probability theory. Course Objective 2: Through learning, enable students to understand the definitions, properties and calculations of one-dimensional random variables and their distribution functions. Course Objective 3: Through learning, enable students to understand the definitions and properties of two-dimensional random variables and their joint distribution functions, joint distribution laws, and joint density functions. Course Objective 4: Through learning, enable students to understand the definitions of the mathematical expectations, variances, covariances and correlation coefficients of discrete and continuous random variables. Course Objective 5: Through learning, enable students to understand the significance of Chebyshev's inequality and master the application of Chebyshev's inequality to solve probability problems. Course Objective 6: Through learning, enable students to understand the main contents and ideas of mathematical statistics. Course Objective 7: Through learning, enable students to understand the concept of point estimation and master proficiently the two methods of obtaining point estimation. Course Objective 8: Through learning, enable students to understand the concepts of the null hypothesis and the alternative hypothesis.
Content	Probability theory and mathematical statistics is a branch of mathematics that specifically studies random phenomena and their quantitative laws, and it is a powerful tool for solving and handling numerous problems of random phenomena in the field of engineering. Probability theory first transforms random phenomena into individual mathematical models. Then, it studies the properties, characteristics, and laws of each mathematical model. Finally, it gives the probabilities of the occurrence of the corresponding random phenomena, embodying the idea of mathematical modeling. Mathematical statistics, on the basis of people's collection of relevant data

<table>
<tr><td></td><td colspan="3">of random phenomena, uses the theories of probability theory to analyze and study the collected data, and ultimately generalizes and infers the regularities of the corresponding random phenomena. Exploring the statistical regularities of random phenomena and utilizing these regularities to serve humanity is precisely the task of probability and statistics.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Final examination、In-class examination、Usual homework、Pre -class study</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>proportion</td><td>requirement</td></tr>
<tr><td>Usual assignments</td><td>20%</td><td>Complete it independently by oneself.</td></tr>
<tr><td>In-class test</td><td>20%</td><td>It focuses on examining students' mastery of core knowledge points, and mainly uses objective questions.</td></tr>
<tr><td>Pre-class study</td><td>10%</td><td>Conduct a comprehensive test. Focus on examining students' self-study ability and learning attitude.</td></tr>
<tr><td>Final examination</td><td>50%</td><td>comprehensively examine</td></tr>
<tr><td>Reading list</td><td colspan="3">Course textbook: Jin Fang, etc. *Probability Theory and Mathematical Statistics* [M]. Changsha: Hunan Science and Technology Press, 2019.
Reference materials: Huang Xin, etc. *Probability Theory and Mathematical Statistics* [M]. Beijing: China Railway Publishing House, 2016.
Teaching website:
https://www.mosoteach.cn/web/index.php?c=passport&m=index</td></tr>
</table>

College Physics (A1)　Module Handbook

Module designation	College Physics (A1)		
Semester(s) in which the module is taught	Semester 2		
Person responsible for the module			
Language	Chinese		
Relation to curriculum	Mathematics and Physics		
Teaching methods	Instruction、practice、inspiration、discussion、multimedia		
Workload (incl. contact hours, self-study hours)	Contact Hours：48，Self-Study Hours：42		
Credit points	Chinese Credits：3.0，European Credits：3.0		
Required and recommended prerequisites for joining the module	Advanced Mathematics		
Module objectives/intended learning outcomes	Course Objective 1 Through the study of this course, students are required to have a relatively comprehensive understanding as a whole of aspects such as the basic contents and methods, concepts and physical images of physics, the working language of physics, the history, current situation and frontiers of the development of physics, and its role in the development of science and social progress. They should master the essential basic physical knowledge necessary for the study and work in the civil engineering major. Students should proficiently master the representation and application of vectors and calculus in physics. They should understand the applications of physics in natural sciences and engineering technologies, as well as the interpenetration relationships among related sciences. Course Objective 2 By learning scientific thinking methods and research methods, students will be equipped with the ability to comprehensively apply physical and mathematical knowledge to solve practical problems. Their abilities to discover, analyze and solve problems, as well as their qualities of innovation and exploration, will be improved. This will lay a good foundation for students to further study professional knowledge, and also lay a foundation for them to engage in scientific and technological work and scientific research work in society in the future. Through the study of this course, students will establish a scientific materialist world view, methodology and epistemology, possess the ability to independently analyze and deal with related problems, and have strong abilities in self-study and absorbing new knowledge.		
Content	Physics is a science that studies the most universal and fundamental forms of motion and their laws in the material world. It serves as the foundation for many natural sciences and engineering technologies. For higher engineering majors, "College Physics" is an important compulsory basic course, which has close connections with many basic courses and technical basic courses.		
Examination forms	In-class interaction、task、In -class test、Final Examination		
Study and examination requirements	Assessment Items	proportion	requirement

	In-class interaction	10%	Students are required to participate in all aspects of this course and are not allowed to be absent. Random spot checks will be carried out.
	task	10%	Complete the unit assignments in accordance with the required quality and quantity.
	In-class test	10%	It focuses on examining students' mastery of core knowledge points, and mainly consists of objective questions.
	experiment	10%	Design experimental schemes by using modern tools and scientific methods, record, analyze and interpret the data, draw valid conclusions and write experimental reports.
	Final Examination	60%	It focuses on assessing students' ability to apply basic knowledge and conduct comprehensive analysis.
Reading list	Course textbooks: Zhao Jinfang, Wang Denglong. College Physics (Volume I) [M]. Beijing: Beijing University of Posts and Telecommunications Press, September 2019. Yao Yingbo. College Physics [M]. Harbin: Harbin Institute of Technology Press, 2018. Teaching website: https://mooc1-1.chaoxing.com/course/215809534.html		

Mathematical modeling Module Handbook

Module designation	Mathematical modeling		
Semester(s) in which the module is taught	Semester 7		
Person responsible for the module	Wang Jixin		
Language	Chinese		
Relation to curriculum	Mathematical physics		
Teaching methods	Courses, projects, seminars, etc.		
Workload (incl. contact hours, self-study hours)	Contact Hours: 24, Self-Study Hours: 6		
Credit points	Chinese Credits: 1.5| ECTS Credits: 1.5		
Required and recommended prerequisites for joining the module	Advanced Mathematics ,Linear Algebra,Probability and Statistics,Structural Mechanics		
Module objectives/intended learning outcomes	Course Objective 1:Understand the development history, current situation, and trends of mathematical modeling. Also, get to know the main learning contents and forms of mathematical modeling.Master the modeling and calculation methods of data analysis models, optimization models, difference models, and differential models. Be able to effectively express the analysis process and conclusions by applying engineering principles and mathematical models, so as to guide the formulation of solutions. Course Objective 2:Understand and master the use of the mathematical software tool Matlab.Be able to use the Matlab software to calculate and solve various mathematical models.For complex engineering problems in civil engineering, be able to use data analysis models, optimization models, difference models, and differential models for modeling and calculation, and analyze the effectiveness and limitations of the prediction and simulation results.		
Content	Overview and Introduction of the Development of Mathematical Modeling,Installation and Use of Matlab, Basic Syntax Rules and Logical Structure of Matlab,Cases Related to Interpolation Analysis Models,Cases Related to Simple Optimization Models,Cases Related to Difference Models,Cases Related to Differential Models.		
Examination forms	Classroom Test,Major Assignment		
Study and examination requirements	Assessment Components	Weighting	Requirements
	homework	20%	assess the mastery of knowledge
	test	80%	cover all teaching units

Reading list	Zhao Jing, Dan Qi. Mathematical Modeling and Mathematical Experiment (5th Edition). Beijing: Higher Education Press, 2020. Cao Jianli. Mathematical Modeling and Mathematical Experiment (3rd Edition). Xi'an: Xidian University Press, 2022.

College English （1） Module Handbook

Module designation	College English（ 1）
Semester(s) in which the module is taught	Semester 1
Person responsible for the module	
Language	Chinese
Relation to curriculum	Foreign Language
Teaching methods	Communicative teaching method, Task-based teaching method, Cooperative teaching method
Workload (incl. contact hours, self-study hours)	Contact Hours：48，Self-Study Hours：42
Credit points	Chinese Credits：3.0，European Credits：3.0
Required and recommended prerequisites for joining the module	Senior high school English
Module objectives/intended learning outcomes	Listening: Students can basically understand English lectures and conversation materials on familiar topics with a speaking speed of about 150 words per minute. They are able to grasp the main idea of the listening materials and understand the viewpoints and attitudes of the speakers. Speaking: Students can make a simple retelling of appropriate listening materials in terms of their content, and can conduct general daily conversations in English. Reading: Students can read English reading materials related to daily life and other aspects more effectively, with a reading speed of about 90 words per minute. Writing: Students can take notes, answer questions and write outlines when reading written materials with a difficulty level similar to that of the textbooks. They can write a short passage of about 100 words on a certain topic within half an hour. They can also write short messages, notes, etc., expressing ideas clearly without major grammatical errors. Translation: With the help of a dictionary, students can translate English sentences or short passages with a difficulty slightly lower than that of the textbooks into Chinese, or translate Chinese into English, with a translation speed of about 160 words per hour. Ideological and Political Objectives: Through various forms of practical activities both inside and outside the classroom in all aspects of listening, speaking, reading, writing and translation, combining offline classroom teaching by teachers with a variety of online professional teaching platforms such as Sui Xing Classroom, U Campus, Rain Classroom, Yunban Class, Piguaiwang, etc., train and guide students to enhance their autonomous learning ability. Cultivate students to have a relatively solid foundation in English language and strong comprehensive application ability in English. Improve their comprehensive cultural quality, and help them master language knowledge, skills and cross-cultural communication application ability, so as to cultivate compound talents who are adaptable to China's economic development and international exchanges. At the same time, through language knowledge learning and language skill training, guide students to cultivate a sense of patriotism, pursue the spirit of innovation, enhance cultural confidence, and learn from the role models of the times. Help students establish correct worldviews, outlooks on life and values.

<table>
<tr><td>Content</td><td colspan="3">The College English (1) course is a public basic course for undergraduate students majoring in non-English disciplines (excluding majors in music, sports, and art) at our university. In accordance with the spirit of the "College English Curriculum Teaching Requirements" issued by the Ministry of Education, College English is a teaching system guided by foreign language teaching theories. It mainly focuses on English language knowledge and application skills, cross-cultural communication, and learning strategies. It combines offline teaching with various online teaching platforms and integrates multiple teaching models and teaching methods.
The objectives and requirements of the course teaching are as follows: Through the teacher's "thorough explanation" and the students' "extensive practice" (including autonomous learning), students can rapidly expand their vocabulary, gradually standardize their pronunciation and intonation, and significantly improve their comprehensive English application abilities in listening, speaking, reading, writing, and translation. It aims to enhance their comprehensive cultural quality and cross-cultural communication application ability, cultivate students' humanistic qualities and comprehensive abilities, establish correct values, and thus cultivate compound talents who meet the requirements of the economic development of socialism with Chinese characteristics in the new era and international exchanges.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Testing, classroom attendance, final examination</td></tr>
<tr><td rowspan="3">Study and examination requirements</td><td>Assessment Items</td><td>proportion</td><td>requirement</td></tr>
<tr><td>Classroom attendance, homework completion status, unit quizzes, students' performance in answering questions in class, previewing status, etc.</td><td>40%</td><td>Assess the mastery of knowledge</td></tr>
<tr><td>final examination</td><td>60%</td><td>Assess the mastery and application of core knowledge points</td></tr>
<tr><td>Reading list</td><td colspan="3">New Target College English Integrated Course 1 Authors: Liu Zhengguang, Peng PeiluPublisher: Shanghai Foreign Language Education PressPublication Date: March 2021
New Horizon College English Reading and Writing Course 1 Author: Zheng Shutang Publisher: Foreign Language Teaching and Research PressPublication Date: June 2015
New Horizon College English Listening and Speaking Course 1 Author: Zheng Shutang Publisher: Foreign Language Teaching and Research PressPublication Date: July 2017
New Trend College English Band 4 Test Tutorial Author: Liu Mingdong Publisher: The Commercial Press Publication Date: June 2021
A New Practical English Writing Tutorial Authors: Zhou Ruiying, Xia Wangqiu, Liu Pingping Publisher: The Commercial Press Publication Date: August 2022
Authentic Test Papers and In-depth Explanations of College English Test Band 4 Authors: Huang Jian, Liu Li Publisher: Hunan Normal University Press Publication Date: August 2021
New College English Integrated Course 1 Authors: Jones, Goldstein Publisher: Higher Education Press Publication Date: March 2010
New College English Training and Self-assessment (1) Authors: Holly, Metcalf Publisher: Higher Education Press Publication Date: February 2010</td></tr>
</table>

Specialty English of Civil Engineering Syllabus Module Handbook

Module designation	Specialty English of Civil Engineering
Semester(s) in which the module is taught	The seventh semester
Person responsible for the module	Tang Huang
Language	Chinese
Relation to curriculum	Foreign Language
Teaching methods	Course
Workload (incl. contact hours, self-study hours)	Contact class hours: 32, Self-study hours: 28
Credit points	Chinese credits: 2, European credits: 2
Required and recommended prerequisites for joining the module	College English
Module objectives/intended learning outcomes	Through the theoretical teaching of this course, students will have basic knowledge and ability. The specific course objectives are as follows: Course objective 1: Master the professional vocabulary and terminology of civil engineering; understand the construction process of new materials in civil engineering and green buildings; master database search methods and stay informed about the forefront of the discipline; be able to distinguish between professional English and scientific paper writing styles; identify key technical issues in civil engineering structures; master Endnote literature management software and its usage methods. Course objective 2: Master the reading method of scientific and technological literature, and organize and summarize the reading results; master the general principles of scientific and technological literature writing, and use professional vocabulary and sentence style to translate Chinese and English literature.
Content	"English for Civil Engineering" is an essential foundational course in the field of civil engineering. It focuses on civil engineering as its main thread and comprehensively introduces the basic content related to civil engineering and its branches. The main topics include professional vocabulary and expressions in civil engineering, searching for English literature, using English databases, correct citation formats, and English writing standards. Through the study of various aspects, students will be able to explain fundamental concepts in mechanics, materials, structural forms, construction, and management in English, mastering key professional terms, expressions, and sentence structures. Upon completing this foundational learning, students will be able to read scientific literature and standards, initially possess the ability to translate civil engineering-related papers into English, and write professional English sentences by simulating common sentence patterns. They will also compare commonly used Chinese and English expressions in domestic and international standards, ultimately organizing their language to write English papers on civil engineering.
Examination forms	*Homework*、*Big assignments*

Study and examination requirements	**Assessment Items**	**Proportion**	**Requirements**
	Homework	60%	Knowledge units (1-12) at least 4 times, knowledge units 13-16 once; completed independently by individuals
	Big assignments	40%	Read an English paper and translate it. Focus on the ability of students.
Reading list	Course materials: Chen Jingfeng. English for Civil Engineering [M]. Shanghai: China Machine Press, 2015. reference material: Teaching websites: CNKI, ASCE, Web of Science, ACI, ICE, Sciencedirect, Scopus		

Computer fundamentals for university students Module Handbook

Module designation	Computer fundamentals for university students
Semester(s) in which the module is taught	Semester 1
Person responsible for the module	
Language	Chinese
Relation to curriculum	Information Technology
Teaching methods	Lecturing method、Discussion method、Demonstration method、Inspirational method、Problem-guided method
Workload (incl. contact hours, self-study hours)	Contact Hours：32，Self-Study Hours：13
Credit points	Chinese Credits：1.5，European Credits：1.5
Required and recommended prerequisites for joining the module	The basic computer knowledge related in middle school
Module objectives/intended learning outcomes	Course Objective 1 Through theoretical study and practical training, students will master the application of computer-related software in the construction of this major. It aims to cultivate students' abilities in calculation, drawing, and the application of computer software, as well as their practical operation abilities, laying a foundation for the application of computers in this major and other related work. Students will be familiar with modern tools related to this major, understand their limitations, and possess the ability to screen and select appropriate tools. Course Objective 2 By previewing before class, students can master the basic knowledge, conduct discussions on difficult problems within the study group, and communicate effectively with group members and teachers. Strengthening the training of comprehensive abilities, students will have the ability of self-directed learning and the capacity to adapt to the development needs of the industry.
Content	This course is a public basic course for non-computer majors in our universit is a highly practical course that combines theory with practice. It serves a prerequisite course for further study of other computer courses and is set u cultivate college students' awareness of computer culture. The main content this course include basic computer knowledge, the basic use of opera systems, the application of Office series office software, basic knowledg computer networks and network security, basic applications of the Internet, b knowledge and applications of multimedia technology, understanding computational thinking, and the formation of certain computer applica abilities, etc. Based on basic computer operations, the course content focuse introducing the application of Office series office software in practical wor aims to cultivate students' abilities in calculation, drawing, and the applicatio computer software, as well as their practical operation abilities, layin foundation for the application of computers in their respective majors and o related work.
Examination forms	In-class interaction、task、In -class test、Final Examination

Study and examination requirements	Assessment Items	proportion	requirement
	In-class interaction	10%	Students are required to participate in all aspects of this course and are not allowed to be absent. Random spot checks will be carried out.
	task	10%	Complete the unit assignments in accordance with the required quality and quantity.
	In-class test	10%	It focuses on examining students' mastery of core knowledge points, and mainly consists of objective questions.
	experiment	10%	Design experimental schemes by using modern tools and scientific methods, record, analyze and interpret the data, draw valid conclusions and write experimental reports.
	Final Examination	60%	It focuses on assessing students' ability to apply basic knowledge and conduct comprehensive analysis.
Reading list	Course textbook: Mo Zhao. *College Computer* (2nd Edition) [M]. Beijing: Beijing University of Posts and Telecommunications Press, August 2022. Reference materials: Wang Yonghong. *Practical Tutorial of College Computer* (2nd Edition), Beijing University of Posts and Telecommunications Press, August 2022. *Computer Science: An Overview* (Eleventh Edition), written by J. Glenn Brookshear (USA), translated by Liu Yi and others, Published by Posts & Telecom Press, 2018. Teaching website: https://www.ketangpai.com/Interact/index/courseid/MDAwMDAwMDAwMLOsvZmIuclq.html		

Python Module Handbook

Module designation	python		
Semester(s) in which the module is taught	Semester 2		
Person responsible for the module			
Language	Chinese		
Relation to curriculum	Information Technology		
Teaching methods	Lecturing method、Demonstration method		
Workload (incl. contact hours, self-study hours)	Contact Hours：48，Self-Study Hours：27		
Credit points	Chinese Credits：2.5，European Credits：2.5		
Required and recommended prerequisites for joining the module	Computer fundamentals for university students		
Module objectives/intended learning outcomes	Course Objective 1 Through the study of knowledge such as the basic methods of programming design, the syntax of the Python language, and the applications of the Python language in multiple fields, students will be able to master a programming language that can assist in their subsequent professional studies and has broad application value. They will possess the ability to construct and apply information models.		
Content	This course is a general compulsory course that combines theory with practice for the major of safety engineering. The teaching objectives are as follows: Through the study of this course, students will master the basic methods of programming design, grasp the syntax of the Python language, and understand the applications of the Python language in multiple fields. It aims to cultivate students' ability of computational thinking, endow them with the basic qualities and abilities to solve problems using computers, and lay a solid foundation for them to construct and apply information models using computer systems in the future.		
Examination forms	In-class interaction、Homework、Experiment、Final examination		
Study and examination requirements	Assessment Items	proportion	requirement
	In-class interaction	10%	Students are required to participate in all aspects of this course and are not allowed to be absent. Random spot checks will be carried out.
	Homework	10%	Complete the unit assignments with both quality and quantity guaranteed.
	Experiment	20%	The grades will be evaluated according to the completion progress, the independence of completion, the

			correctness of the program and the overall completion status.
	Final examination	60%	It focuses on assessing students' ability to apply basic knowledge and conduct comprehensive analysis.
Reading list	Course textbook: Chen Xuefang, etc. *Programming Design in Python Language* [M]. Hunan University Press, 2021		

Foundations of Innovation and Entrepreneurship Module Handbook

Module designation	Foundations of Innovation and Entrepreneurship
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	
Language	Chinese
Relation to curriculum	Professional Development
Teaching methods	In-class instruction、Online courses、Out-of-class practice、Small assignments
Workload (incl. contact hours, self-study hours)	Contact Hours：32，Self-Study Hours：13
Credit points	Chinese Credits：1.0，European Credits：1.0
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Course Objective 1: Through the study of this course, students will master the basic knowledge required for carrying out innovation and entrepreneurship activities. They will recognize the basic connotations of innovation and entrepreneurship and the particularity of innovation and entrepreneurship activities, and dialectically understand and analyze entrepreneurs, entrepreneurial opportunities, entrepreneurial resources, business plans, and innovation and entrepreneurship projects. Through the study of this course, students will establish a scientific outlook on innovation and entrepreneurship. They will actively adapt to the needs of national economic and social development and the all-round development of individuals, correctly understand the relationship between innovation and entrepreneurship and career development, consciously follow the laws of entrepreneurship, and actively engage in innovation and entrepreneurship practices. Course Objective 2: Through the study of this course, students will possess the necessary capabilities for innovation and entrepreneurship. They will master the methods of integrating innovation and entrepreneurship resources and writing business plans, be familiar with the establishment process and management of new enterprises, and improve their comprehensive qualities and abilities in establishing and managing enterprises.
Content	The Basics of Innovation and Entrepreneurship is a highly theoretical, policy-oriented, scientific, and practical course. It can provide effective support for the cultivation requirements of various majors, especially in terms of graduation requirements and quality and ability requirements such as problem analysis, design/development of solutions, research, use of modern tools, individual and team capabilities, communication, project management, and lifelong learning. It should follow the laws of education and teaching, adhere to the combination of theoretical lectures and case analysis, the combination of group discussions and role-playing experiences, and the combination of experience sharing and entrepreneurial practices. By organically integrating knowledge dissemination and practical experiences, it can stimulate students' enthusiasm, initiative, and creativity in learning, and continuously enhance

	students' innovative spirit, entrepreneurial awareness, and capabilities in innovation and entrepreneurship.		
Examination forms	Small assignment, Final-term Team Entrepreneurial Business Plan		
Study and examination requirements	Assessment Items	proportion	requirement
	Online learning	20%	Complete the study of the online courses.
	Small assignment	30%	Each group of 3 to 5 people should complete the small assignment of product innovation.
	Entrepreneurial Business Plan	50%	There is no standard answer for the team entrepreneurial business plan. It focuses on assessing students' ability to systematically analyze the knowledge they have learned, conduct market-oriented verification, and practice innovation and entrepreneurship projects.
Reading list	Course textbook: Fundamentals of Innovation and Entrepreneurship for College Students. Jiang Dongchu [M]. University of Electronic Science and Technology of China Press, 2021. Reference materials: National College Students Entrepreneurship Service Network https://cy.ncss.cn/ and so on.		

Literature retrieval and research methods Module Handbook

Module designation	Literature retrieval and research methods		
Semester(s) in which the module is taught	Semester 3		
Person responsible for the module	Zheng Liangfei		
Language	Chinese		
Relation to curriculum	Professional development category		
Teaching methods	Lectures, courses, laboratory work, projects, seminars and so on.		
Workload (incl. contact hours, self-study hours)	Contact Hours: 8, Self-Study Hours: 22		
Credit points	Chinese Credits: 0.5 | ECTS Credits: 1		
Required and recommended prerequisites for joining the module			
Module objectives/intended learning outcomes	Course Objective 1:Master the retrieval techniques of web search engines. Learn to use search engines to quickly, comprehensively and accurately query online information resources.Master various retrieval methods of common Chinese online databases. Be able to independently complete the query tasks of various types of information resources such as digital books, digital journal papers, standards, patents, reports, etc. according to retrieval requirements.Be able to write scientific and technological papers in accordance with the requirements of scientific and technological papers.		
Content	The content includes basic knowledge of literature information retrieval and introduction to reference books, retrieval methods of domestic and foreign databases, and writing of scientific and technological papers. Through the study of each teaching link, students should master the methods and techniques of modern information retrieval. Based on a comprehensive understanding of the basic knowledge of information retrieval and information retrieval tools, they should focus on mastering the retrieval and utilization of important domestic and foreign electronic information resources and network information resources. Cultivate students' information awareness and information retrieval skills, endow them with the abilities of information analysis, information retrieval, information acquisition and utilization. At the same time, cultivate students' basic abilities in writing scientific and technological papers, enabling them to independently acquire and utilize literature information resources during their study and future professional activities, solve practical problems, realize knowledge renewal, and cultivate the ability of lifelong learning.		
Examination forms	Exams, Papers, Major Assignments		
Study and examination requirements	Assessment Components	Weighting	Requirements
	After - class Assignments	20%	Submitted online and completed independently by individuals. It mainly examines students' application

			ability of Knowledge Units 3 and 4.
	Process Assessment	20%	Process - based assessment of learning. It is a comprehensive evaluation of students' performance in resource learning, participation in discussion and Q&A, participation in various learning activities, classroom performance, sign - in, etc.
	Non - proposition Final Assessment	60%	Write a scientific and technological paper as required.
Reading list	Course Textbook: Huang Junzuo and Ding Shujiang. Literature Retrieval and Scientific and Technological Paper Writing [M]. Beijing: China Petrochemical Press, 2018. Reference Materials: [1] Wang Hongjun. Introduction to Literature Retrieval and Scientific and Technological Paper Writing [M]. Beijing: Machinery Industry Press, 2018. [2] Hua Fang. Literature Retrieval and Utilization (2nd Edition) [M]. Beijing: Tsinghua University Press, 2014. [3] GB/T 7714—2015 Rules for Citing References in Information and Documentation [S].		

BIM Foundation Module Handbook

Module designation	BIM Foundation		
Semester(s) in which the module is taught	Semester 3		
Person responsible for the module	Liu Jin		
Language	Chinese		
Relation to curriculum	Professional development category		
Teaching methods	Lecture,course,project,symposium		
Workload (incl. contact hours, self-study hours)	Contact Hours: 24, Self-Study Hours: 6		
Credit points	Chinese Credits: 1 | ECTS Credits: 0		
Required and recommended prerequisites for joining the module	Descriptive Geometry,Civil Engineering Drawing (including CAD),Introduction to Civil Engineering		
Module objectives/intended learning outcomes	Course Objective 1: Understand the concept of BIM, be aware of the current development status of BIM, and know the concepts and application scopes of various BIM modeling software, simulation software, analysis software, etc. Comprehend the user interface and file system of Revit, and use Revit to achieve basic operations, as well as the drawing of elevations and grids. Course Objective 2: Be proficient in using the system families and self - built families in Revit software to carry out main structure modeling, and be able to conduct simple model operations such as construction simulation and engineering quantity extraction on this basis.		
Content	BIM Basics is an important software - learning course for civil engineering majors and an emerging course that combines civil engineering disciplines with information technology. Its main content includes the ability to create BIM and related two - dimensional engineering drawings, three - dimensional geometric models, and other relevant graphics, models, and documents for engineering design, construction, and subsequent applications by operating BIM modeling software to process various models and related information generated during the construction of structures such as bridges and buildings. It also involves the ability to comprehensively apply BIM technology through operating professional BIM application software.		
Examination forms	exam,paper,homework		
Study and examination requirements	Assessment Components	Weighting	Requirements
	homework	30%	assess the mastery of knowledge
	classroom performance	10%	cover all teaching units
	final exam	60%	Assess the mastery and application of core

			knowledge points
Reading list	Zhang, Jinyue. Principles and Applications of BIM Technology [M]. Beijing: China Architecture & Building Press, 2022.		

New technology in civil engineering Module Handbook

Module designation	New technology in civil engineering		
Semester(s) in which the module is taught	Semester 5		
Person responsible for the module	Liu Jin		
Language	Chinese		
Relation to curriculum	Professional development category		
Teaching methods	lectures, courses, etc		
Workload (incl. contact hours, self-study hours)	Contact Hours: 16, Self-Study Hours: 14		
Credit points	Chinese Credits: 0.5 | ECTS Credits: 0.5		
Required and recommended prerequisites for joining the module	Introduction to Civil Engineering, Principles and Methods of Construction, etc.		
Module objectives/intended learning outcomes	Course Objective 1: Guided by expert lectures and through consulting relevant literature, understand the cutting - edge trends in the civil engineering industry, expand one's own knowledge, and cultivate the awareness of using energy - saving and environmental - friendly new materials and conducting green construction in engineering practice. Course Objective 2: While expanding knowledge, recognize the importance of lifelong learning and cultivate the behavior habit of self - directed learning.		
Content	New Technologies in Civil Engineering is a professional development course that combines theory with practice for civil engineering majors. Experts with rich practical experience and senior professional titles from relevant enterprises and institutions in the civil engineering field will be invited to introduce, in the form of lectures, new theories, new processes, new equipment, new technologies, and new materials used in the practical process of solving complex engineering problems in civil engineering to students. This course aims to enhance students' understanding of cutting - edge theories, processes, equipment, new technologies, and materials in the civil engineering major, cultivate students' sense of social responsibility, clarify the responsibility and commitment of engineers in contributing to the country and serving society. At the same time, it broadens students' horizons, cultivates students' ability to continuously learn and innovate, and enables students to keep track of the cutting - edge development trends of the civil engineering major and adapt to the development of the industry.		
Examination forms	paper,homework		
Study and examination requirements	Assessment Components	Weighting	Requirements
	Process assessment	40%	assess the mastery of knowledge
	Study Report	60%	Assess the mastery and application of core

			knowledge points
Reading list	Li Zhongfu and Li Jing. New Technologies of Modern Civil Engineering Construction [M]. Beijing: China Architecture & Building Press, 2024		

Construction Principles and Methods Module Handbook

Module designation	Experimental technology of Civil Engineering Structures
Semester(s) in which the module is taught	Semester 5
Person responsible for the module	Hu Zhangqi
Language	Chinese
Relation to curriculum	Independent Development
Teaching methods	Class Sessions, Laboratory Work
Workload (incl. contact hours, self-study hours)	Contact Hours: 16, Self-Study Hours: 16
Credit points	Chinese Credits: 1.5 | ECTS Credits: 1.5
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Structural Mechanics, Mechanics of Materials, Concrete Structure Design Theory, et al.
Module objectives/intended learning outcomes	Course Objective 1: Understand the tasks, purposes, and classifications of structural testing; familiarize students with structural experimentation procedures; enable the scientific design of civil engineering laboratory experiments and on-site inspection plans; and cultivate students' abilities to articulate experimental approaches for complex civil engineering problems, formulate protocols, conduct experiments, and collect data. Course Objective 2: Equip students with data processing skills, allowing them to interpret experimental phenomena based on collected data, make informed judgments, and apply theoretical knowledge to engineering practice. Course Objective 3: Develop students' capacity to function effectively as team members in multidisciplinary settings, demonstrating strong teamwork, organizational coordination, and the ability to communicate efficiently with stakeholders in infrastructure projects.
Content	Tasks, Objectives, Classifications, and fundamental principles of structural testing；Static and dynamic loading methods; structural testing loading devices;Technical specifications and working principles of basic measuring instruments; strain and displacement measurement techniques, vibration measurement techniques, and data acquisition systems; loading protocols, measurement protocols, and test plan development; typical static tests, dynamic tests, and structural dynamic characteristic testing, experimental data processing; selection, quality evaluation, bonding, and testing methods of strain gauges; experimental methods, testing approaches, and instrument reading for flexural capacity of rectangular reinforced concrete beams; experimental methods and testing approaches for shear capacity of rectangular reinforced concrete beams; mechanical behavior of steel trusses and methods/procedures for monotonic static loading tests; mechanical behavior of steel trusses and methods/procedures for monotonic static loading tests.

<table>
<tr><td></td><td colspan="3">Through the study of various teaching modules, students will understand the objectives, significance, and classifications of structural experiments, as well as the procedures for experimental model design. They will comprehend the characteristics of static loading and master common static loading methods, while gaining familiarity with typical displacement measurement instruments and their operating principles. Students will recognize the features of dynamic loading approaches and acquire proficiency in standard dynamic loading techniques. They will understand the characteristics of various support devices and experimental platforms, enabling them to select appropriate bearings and loading equipment. Students will become acquainted with the composition diagrams of measurement systems and grasp the principles of resistance strain gauges, bridge circuits, and temperature compensation. They will demonstrate the ability to properly select strain gauge specifications/models and conduct quality inspections. Students will develop competence in experimental operations, including skilled use of displacement gauges, force sensors, crack width measurement devices, vibration sensors, and other instrumentation.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Examination, school assignments, experimental operations, experimental design, experimental reports.</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Components</td><td>Weighting</td><td>Requirements</td></tr>
<tr><td>Examination</td><td>30%</td><td>Assess students' mastery of core concepts</td></tr>
<tr><td>School assignments</td><td>10%</td><td>Evaluate students' mastery of knowledge points and their ability to access information to solve practical problems.</td></tr>
<tr><td>Experimental Operations</td><td>25%</td><td>Assess students' teamwork skills and laboratory competencies.</td></tr>
<tr><td>Experimental design</td><td>5%</td><td>Evaluate students' ability to design scientifically rigorous experimental protocols.</td></tr>
<tr><td></td><td>Experimental reports</td><td>30%</td><td>Evaluate students' capacity to process and analyze experimental data.</td></tr>
<tr><td>Reading list</td><td colspan="3">（1）Cao Guohui. Civil Engineering Experiments. Beijing: China Architecture & Building Press, 2014.
（2）Cao Guohui. Civil Engineering Experiments. Beijing (Second Edition) [M]. Beijing: China Electric Power Press, 2023</td></tr>
</table>

Construction Principles and Methods Module Handbook

Module designation	Structural inspection technology of civil engineering structures
Semester(s) in which the module is taught	Semester 6
Person responsible for the module	He Ran
Language	Chinese
Relation to curriculum	Independent Development
Teaching methods	Class Sessions, Laboratory Work
Workload (incl. contact hours, self-study hours)	Contact Hours: 16, Self-Study Hours: 16
Credit points	Chinese Credits: 1.5 | ECTS Credits: 1.5
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Structural Mechanics, Mechanics of Materials, Concrete Structure Design Theory, Experimental technology of Civil Engineering Structures, et al.
Module objectives/intended learning outcomes	Course Objective 1: Understand the tasks, purpose classification of structural testing; become familiar with structural testing procedures; scientifically design civil engineering experiments and on-site inspection plans; cultivate students' abilities in experimental expression, plan formulation, experimental operation, and data collection for complex civil engineering problems. Course Objective 2: Integrate theoretical knowledge to complete structural inspection projects such as on-site concrete strength testing experiments, pile foundation integrity detection experiments, concrete crack width and depth detection experiments, reinforcement quantity and concrete cover detection experiments, and subgrade compaction degree testing experiments. Master field operations for conventional structural inspections and methods for analyzing and organizing detection data. Develop students' capabilities in experimental expression and operation for complex civil engineering issues, as well as their ability to collect, process, and analyze inspection data to derive reasonable and valid conclusions. Course Objective 3: Enable students to competently fulfill the role of team members in multidisciplinary teams, complete assigned tasks, and collaboratively execute structural inspection projects including on-site concrete strength testing experiments, pile foundation integrity detection experiments, concrete crack width and depth detection experiments, reinforcement quantity and concrete cover detection experiments, and subgrade compaction degree testing experiments.
Content	The purpose, significance, basic procedures, and management of civil engineering structural testing; Bearing capacity and integrity testing of foundations and pile foundations; On-site concrete strength testing techniques; Concrete structure defect

	detection techniques; Steel bar detection techniques in concrete structures; On-site steel structure testing techniques; Routine building safety assessments; Bridge static and dynamic load testing techniques, bridge technical condition evaluations; Road engineering compaction degree, deflection, and structural layer thickness testing; Tunnel engineering testing and monitoring; Pile foundation integrity testing experiments; On-site concrete strength testing experiments; Concrete crack width and depth detection experiments; Detection experiments for steel bar quantity and protective layer thickness in concrete; Subgrade compaction degree testing experiments; Pavement skid resistance performance testing experiments. Through various teaching modules, students will understand the meaning and purpose of structural testing and comprehend the scope of structural testing. They will learn the methods for detecting the vertical bearing capacity of foundations and pile foundations, and be able to select appropriate reaction systems, loading equipment, and measurement devices for practical static load tests on foundations and piles. Students will become familiar with the basic principles and applications of the low-strain method and crosshole sonic logging method for assessing pile integrity. They will also gain knowledge of concrete structure testing requirements and relevant standards. Students will master the principles, characteristics, and applicable scopes of common concrete strength testing methods. They will learn about concrete crack and defect detection requirements and standards, and gain proficiency in operating tools such as rebound hammers, carbonation depth gauges, ultrasonic testing devices, and compression testing machines. Additionally, they will master the principles, advantages, and limitations of concrete crack and defect detection techniques. Students will grasp the basic principles of electromagnetic induction and understand the fundamental requirements for steel bar detection. They will explore the key aspects of on-site steel structure testing and the primary procedures for building safety assessments, becoming skilled in using ultrasonic testers, crack width gauges, and troubleshooting common equipment issues. They will apply instruments to measure crack depth and width in experimental components and master the critical elements of building safety evaluations. Students will familiarize themselves with the objectives, standards, and workflows for bridge static and dynamic load tests, learn to select appropriate load-testing equipment, position measurement points and cross-sections correctly, and interpret data processing and evaluation methods. They will understand the core components of road engineering field testing, including techniques for measuring compaction, deflection, and structural layer thickness. Students will grasp the principles of compaction testing (e.g., sand replacement method) and deflection measurement using the Benkelman beam, as well as the underlying theories of these methods. This curriculum ensures students develop both theoretical knowledge and practical skills in structural testing, enabling them to address real-world engineering challenges effectively.
Examination forms	Examination, school assignments, Detection scheme design, experimental design, experimental reports.
Study and examination requirements	**Assessment Components** / **Weighting** / **Requirements** Examination / 30% / Assess students' mastery of core knowledge points School assignments / 10% / Evaluate students' mastery

			of knowledge points and their ability to access information to solve practical problems.
	Experimental operations	25%	Assess students' teamwork skills and laboratory competencies.
	Detection scheme design	5%	Evaluate students' ability to design scientifically rigorous experimental protocols.
	Experimental reports	30%	Evaluate students' capacity to process and analyze experimental data.
Reading list	（1）Li Xinle. Civil Engineering Testing and Inspection [M]. Beijing: China Architecture & Building Press, 2014. （2）He Yushan. Professional Qualification Examination Books for Highway and Water Transport Engineering Testing and Inspection Technical Personnel - Bridge and Tunnel Engineering [M]. Beijing: People's Communications Press, 2018. (3)Zhang Chao. Professional Qualification Examination Books for Highway and Water Transport Engineering Testing and Inspection Technical Personnel - Road Engineering [M]. Beijing: People's Communications Press, 2018. (4)Gao Xiaowang. Main Structure (Construction Engineering Quality Testing Series) [M]. Beijing: China Building Materials Industry Press, 2018. （5）Zhao Beilong. Construction Engineering Testing Technology [M]. Beijing: China Building Materials Industry Press, 2014.		

Foundation Engineering Module Handbook

Module designation	Foundation Engineering		
Semester(s) in which the module is taught	semester 5		
Person responsible for the module	Guo Yulin		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, courses, design, seminars, etc. (according to their own courses)		
Workload (incl. contact hours, self-study hours)	Contact hours: 32, self-study hours: 28		
Credit points	Chinese credits: 2, ECTS Credits: 2		
Required and recommended prerequisites for joining the module	Civil engineering materials, structural mechanics, material mechanics, soil mechanics, theoretical mechanics, civil engineering geology, etc		
Module objectives/intended learning outcomes	1. Be familiar with the types of shallow foundation, master the design and calculation of extended foundation, master the design and calculation of continuous foundation, and master the design and calculation of support structure.2. Master the types and structure of pile and pile foundation; master the calculation of vertical bearing capacity of pile foundation, horizontal bearing capacity of pile foundation, settlement of pile foundation, pile cap, and the contents and steps of pile foundation design.3, familiar with the classification of foundation treatment methods, soil replacement cushion method, dynamic compaction method and dynamic compaction replacement method, drainage consolidation method, compaction method and deep compaction method, other reinforcement methods, understand the special land base treatment.		
Content	The main contents include shallow foundation, supporting structure, pile foundation, caisson foundation, underground continuous wall, foundation pit engineering, special land foundation, foundation treatment method, etc. Through the study of each teaching link, students can master the scheme type selection and design calculation of common shallow foundation and pile foundation, master the design of retaining structure, retaining structure design, foundation treatment, etc., understand the caisson and underground continuous wall, and be familiar with the special land foundation. At the same time, it can apply the knowledge and contact the reality; make students have a deep understanding of basic engineering and have the ability to solve general basic engineering problems.		
Examination forms	*Examination, usual homework, big homework*		
Study and examination requirements	**Assessment Components**	**Weighting**	**Requirements**
	Usually homework	20%	Assessment of knowledge

			mastery
	Big homework	20%	According to the known conditions given, the classroom is completed independently.
	final	60%	Assess the mastery and application of the core knowledge points
Reading list	Curriculum materials: Soil Mechanics and Basic Engineering, edited by Zhao Minghua, Wuhan University of Technology Press Basic Engineering, edited by Wang Xiaomou, People's Communications Publishing House (optional)		

Principles of Concrete Structure Design Module Handbook

Module designation	Principles of Concrete Structure Design
Semester(s) in which the module is taught	The fifth semester
Person responsible for the module	Tang Huang
Language	Chinese
Relation to curriculum	Professional Foundation
Teaching methods	Course
Workload (incl. contact hours, self-study hours)	Contact Hours：60，Self - study Hours：4
Credit points	Chinese credits: 4, European credits: 4
Required and recommended prerequisites for joining the module	Shen Pusheng. Principles of Concrete Structure Design [M]. Beijing: Higher Education Press, May 2020. Ye Jianshu. Principles of Structural Design [M]. Beijing: China Communications Press, July 2019.
Module objectives/intended learning outcomes	Through the theoretical teaching and practical operation of this course, students will master basic knowledge, possess innovative abilities and high qualities. The specific course objectives are as follows: Course Objective 1: Master the physical and mechanical properties of steel and concrete materials; master the stress characteristics, failure features, design principles and construction requirements of flexural members, compression members, tension members, torsion members and prestressed members made of reinforced concrete; master the knowledge such as the checking calculation of cracks and deformations of flexural members made of reinforced concrete, and establish engineering thinking and innovative abilities. When solving complex engineering problems in civil engineering, students can apply relevant knowledge to model construction, solution, and comparative analysis. Course Objective 2: Be able to apply the design principles and mathematical models of flexural members made of reinforced concrete to complete the design of simply supported cantilever beams, and effectively express the analysis process and conclusions, so as to guide the formulation of solutions. Course Objective 3: Be able to scientifically design the failure experiment scheme of flexural members and possess experimental operation abilities.
Content	"Principles of Concrete Structure Design" is a core course for the major of civil engineering. Its main contents include the design concepts and principles of concrete structures, as well as the physical and mechanical properties of materials. It also covers the analysis of the mechanical properties and cross-section design and checking of flexural members, compression members, tension members and torsion members made of reinforced concrete, the checking calculation of the deformations and crack widths of concrete members and the analysis of their durability, and the analysis of the mechanical properties and the calculation of the bearing capacity of

<table>
<tr><td></td><td colspan="3">prestressed concrete members. Through the study of various teaching links, students will master the design, calculation and construction handling of commonly used flexural members (general beams and slabs) and compression members made of reinforced concrete. They will understand the mechanical characteristics and key points of calculation of tension members, torsion members and prestressed members, as well as the general development situation of concrete structures. At the same time, they will be able to apply the knowledge they have learned to practical situations.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Process Assessment、In-class Test、Homework、Cooperative Project、F Examination</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Process Assessment</td><td>10%</td><td>The process assessment of learning is comprehensively evaluated according to students' performance in resource learning, participation in online discussions and Q&A sessions, as well as their in-class performance.</td></tr>
<tr><td>In-class Test</td><td>20%</td><td>For all the knowledge points, objective questions are mainly adopted. The test papers are compiled from a question bank, and the scores are automatically graded to examine students' mastery of basic knowledge.</td></tr>
<tr><td>Homework</td><td>10%</td><td>It is divided into two types: group assignments and individual assignments. The focus is on assessing students' abilities in comprehensive analysis and calculation, etc.</td></tr>
<tr><td>Cooperative Project</td><td>20%</td><td>According to the provided design assignment for the simply supported cantilever beam, conduct the structural calculation of the cantilever beam and complete the construction drawing of the</td></tr>
</table>

			cantilever beam structure; conduct group collaborative discussions, and individuals should complete it independently. Carry out the failure test of the flexural member, which should be completed through group collaboration.
	Final Examination	40%	Use subjective questions with engineering backgrounds for the test, and focus on assessing students' ability to comprehensively analyze and handle problems by applying the knowledge they have learned.
Reading list	*Code for Design of Concrete Structures* *Load Code for the Design of Building Structures* *Code for Design of Highway Reinforced Concrete and Prestressed Concrete Bridges and Culverts* *General Code for Design of Highway Bridges and Culverts* *Code for Design of Railway Bridge and Culvert Concrete Structures*		

Construction Principles and Methods Module Handbook

Module designation	Introduction of Civil engineering
Semester(s) in which the module is taught	Semester 1
Person responsible for the module	Ding Xingyu
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Courses, case analysis, problem-led, discussions, etc.
Workload (incl. contact hours, self-study hours)	Contact Hours: 24, Self-study Hours: 21
Credit points	Chinese Credits: 1.5, European Credits: 1.5
Required and recommended prerequisites for joining the module	Engineering Drawing, Theoretical Mechanics, Computer Fundamentals, etc.
Module objectives/intended learning outcomes	Course Objective 1: Introduction to Civil Engineering. Be familiar with the history, development, position, and role of the civil engineering profession; understand the responsibilities of civil engineers and confirm the obligations of civil engineers; understand the concepts and characteristics of civil engineering materials and grasp the related concepts of sustainable development. Course Objective 2: Overview of the main types of engineering fields involved in civil engineering. Be familiar with the concepts and characteristics of building engineering, bridge engineering, road engineering, and rail transit engineering; understand the classification, composition, and characteristics of foundation engineering, tunnel engineering, water supply and drainage engineering, hydraulic engineering structures, and port engineering structures, and understand the classification and characteristics of prefabricated buildings.
Content	Professional basic knowledge in areas such as the responsibilities and obligations of civil engineers, civil engineering materials, foundation engineering, geotechnical and underground construction, building engineering, road engineering, bridge engineering, rail transit engineering, tunnel engineering, hydraulic structures, port engineering structures, and disaster prevention and mitigation in civil engineering. Through the study of various teaching components, students will gain a preliminary understanding of the main types of engineering fields involved in civil engineering and develop an interest in the major. This will help students transition from initial uncertainty about the major to understanding and ultimately loving it. It will also inspire their passion for exploring and pioneering in the field of civil engineering, their dedication to the sustainable development of civil engineering, and their commitment to meeting professional requirements.

<table>
<tr><td>Examination forms</td><td colspan="3">Papers, Homework, In-class Tests</td></tr>
<tr><td rowspan="4">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Homework</td><td>20%</td><td>Assess the level of knowledge mastery</td></tr>
<tr><td>In-class Tests</td><td>20%</td><td>Cover all knowledge units</td></tr>
<tr><td>Papers</td><td>60%</td><td>Assess students' understanding of civil engineering and their ability to think comprehensively about problems</td></tr>
<tr><td>Reading list</td><td colspan="3">Chen Qiang, Yu Fang, Yin Canbin. Introduction to Civil Engineering [M]. Harbin: Harbin Engineering University Press, August 2019.
Yang Chunfeng, Xia Dongzhou. Introduction to Civil Engineering [M]. China Building Materials Industry Press.</td></tr>
</table>

Basic Principles of Steel Structures Module Handbook

Module designation	Basic Principles of Steel Structures		
Semester(s) in which the module is taught	Semester 5		
Person responsible for the module	Zhang Dan		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, courses, seminars, etc		
Workload (incl. contact hours, self-study hours)	Contact hours: 40, self-study hours: 35		
Credit points	Chinese credits: 2.5, ECTS Credits 2.5		
Required and recommended prerequisites for joining the module	Civil engineering materials, structural mechanics, material mechanics, etc		
Module objectives/intended learning outcomes	Course objective 1: understand the characteristics of steel structure, application and development, familiar with the destruction of steel structure engineering form, master the performance index of building steel and related factors, understand the concept of steel structure cross section grade and its application, master the basic structure welding and steel structure, bolt connection stress performance and design calculation points, in solving civil engineering complex engineering problems, can use relevant knowledge in the model construction, solving and comparative analysis. Course objective 2: master the axial stress components, bending component, bending, bending components in strength, stability, stiffness three aspects of design points, can use strength, stability, fatigue, stiffness analysis and design method, complete the basic steel structure component design, and can effectively express the analysis process and conclusion, to guide the formulation of solutions.		
Content	Basic characteristics and design methods of steel structure, mechanical characteristics of steel structure, fatigue and anti-fatigue design of steel structure, force analysis and design calculation of steel structure connection, design and calculation of basic components of steel structure. Cultivate students' ability to make model construction, solution and comparative analysis with the knowledge of the basic principles of steel structure, and have the basic quality and ability to engage in the technical and research work related to steel structure, so as to lay a necessary foundation for the design and management of complex engineering projects in the future.		
Examination forms	Project / assignments, examination, course participation		
Study and examination requirements	**Assessment Components**	**Weighting**	**Requirements**
	school assignment	25%	Homework: to investigate the application of the core knowledge points
	Course participation	15%	Assess course participation and performance
	final	60%	Focus on the assessment of students' ability to comprehensively analyze and deal with problems with the knowledge

			learned.
Reading list	(1) Basic principles of steel structure, Shen Zuyan, Chen Yiyi, Chen Yangji, Zhao Xianzhong. China State Engineering and Construction Press; (2) Steel structure-Steel structure Foundation, Chen Shafan, Gu Qiang, China State Construction Press.		

Introduction to Earthquake Engineering Module Handbook

Module designation	Introduction to Earthquake Engineering		
Semester(s) in which the module is taught	The fourth semester		
Person responsible for the module	Liu Yihong		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, courses, seminars, etc.		
Workload (incl. contact hours, self-study hours)	Contact class hours: 16, Self-study class hours: 14		
Credit points	Chinese credits: 1, European credits: 1		
Required and recommended prerequisites for joining the module	Materials of Civil Engineering, Structural Mechanics, Mechanics of Materials, etc.		
Module objectives/intended learning outcomes	Course Objectives: 1: Master the basic knowledge of engineering seismology. Be able to combine the language of mathematics and natural sciences to make standardized expressions regarding complex engineering problems in civil engineering in the aspect of seismic fortification of engineering structures. 2: Master the theory of seismic response spectra. Be able to apply this theory, combined with the knowledge of structural dynamics, to analyze the seismic actions on engineering structures. Have the ability to select appropriate calculation methods for seismic actions to guide the formulation of structural seismic design schemes. 3: Master the base shear method and have the ability to conduct simple calculations. Be able to correctly solve the seismic actions of regular structures with a height not exceeding 40m.		
Content	This course is a fundamental disciplinary course that combines theory with practice for the civil engineering major. It is an applied course that integrates knowledge from seismology, engineering mechanics, and other fields. Through the study of this course, it helps students become familiar with the basic knowledge of seismology, master the principles of seismic fortification of structures, understand the basic principles of the seismic response of structures, and be able to use this knowledge to calculate the seismic actions on structures. This lays a necessary foundation for future work such as the design and research of complex structures.		
Examination forms	Homework, Examination, Course Participation		
Study and examination requirements	Assessment Items	Proportion	Requirements
	Homework	25%	Complete one piece of pre-class or post-class homework for each unit; it can be completed collaboratively in groups or independently by individuals. Each group has 2 to 6 members. Emphasis is placed on examining students' autonomous learning ability and problem-solving ability.
	Course Participation	15%	Evaluate the degree of participation and performance in the course.

	In-class Tests	20%	Conduct at least one assessment for each knowledge unit. Focus on examining students' mastery of core knowledge points, mainly using objective questions.
	Final Examination	60%	Mainly consist of subjective questions without standard answers, with an emphasis on assessing students' comprehensive analysis ability.
Reading list	(1) Self-compiled lecture notes (2) Seismic Design of Building Structures. Wang Xiaohong, etc. [M]. Beijing: Harbin Engineering University Press (3) Earthquake Engineering. Li Hongnan [M]. Beijing: China Machine Press		

Intensive Study Module Handbook

Module designation	Intensive Study		
Semester(s) in which the module is taught	Semester 3		
Person responsible for the module	Wang Yukui		
Language	Chinese		
Relation to curriculum	Professional foundation		
Teaching methods	course		
Workload (incl. contact hours, self-study hours)	Contact Hours: 32, Self-Study Hours: 43		
Credit points	Chinese Credits: 1 | ECTS Credits: 2.5		
Required and recommended prerequisites for joining the module			
Module objectives/intended learning outcomes	Course Objective 1:Understand the structural systems, configurations, and characteristics of buildings (structures). Course Objective 2: Be aware of the application of new materials, new structures, new construction techniques and equipment, and modern management methods in engineering projects.		
Content	Understand the structural systems, structures and their characteristics of buildings (structures). Also, get to know the application of new materials, new structures, new construction techniques and equipment, as well as modern management methods in engineering projects.		
Examination forms	examination		
Study and examination requirements	Assessment Components	Weighting	Requirements
	log	60%	Record the internship content and personal reflections of each day, with a total of 8 entries.
	Internship Report	40%	Prepare an internship report. It should include a brief introduction to the construction processes of building structures (roads, bridges, and urban rail transit) learned through the Sanhao software. The word count should be no less than 3,000 words. Summarize the internship experience, and conclude the internship insights. Also, conduct an investigation on a professional issue during the internship (investigation methods include but are not limited to consulting materials and asking teachers) and find solutions. The report will be evaluated by the instructor.

Reading list	Descriptive Geometry,Civil Engineering Drawing (including CAD),Introduction to Civil Engineering,Building Engineering Materials

Course Design of Housing Architecture Module Handbook

Module designation	Course Design of Housing Architecture		
Semester(s) in which the module is taught	The seventh semester		
Person responsible for the module	Xie Jin		
Language	Chinese		
Relation to curriculum	Professional Practice		
Teaching methods	Lectures, projects, seminars, etc.		
Workload (incl. contact hours, self-study hours)	Contact learning hours: 32, Self-study hours: 28		
Credit points	Chinese credits: 1, European credits: 1		
Required and recommended prerequisites for joining the module	Materials of Civil Engineering, Civil Engineering Drawing, Building Architecture		
Module objectives/intended learning outcomes	Course Objective 1: Further refine the BIM model of a certain building in the forward design of the theoretical course of Building Architecture. Through practical operations, get familiar with the capital construction process and demonstrate an innovative consciousness in the design and construction. Draw the architectural construction drawings corresponding to the BIM model in accordance with the plane drawing standards, and improve the ability to effectively communicate and interact with industry peers and the public verbally or in writing. Course Objective 2: Cultivate the ability to effectively communicate and interact with industry peers and the public verbally or in writing regarding complex engineering problems in civil engineering. Cultivate the ability to effectively communicate and interact with industry peers and the public verbally or in writing regarding complex engineering problems in civil engineering.		
Content	Use BIM to design relevant building models, and try to adopt the current new technologies and new construction methods for the relevant structures of the building models. Communicate and interact with teachers and classmates about the issues related to the BIM model, raise effective questions, and get answers through communication and interaction. Draw architectural construction drawings. Communicate and interact with teachers and classmates about the issues related to the drawing of architectural construction drawings, raise effective questions, and get answers through communication and interaction.		
Examination forms	*BIM model, architectural construction drawings*		
Study and examination requirements	Assessment Items	Proportion	Requirements
	BIM Model	40%	Evaluate according to the required standards of the completion status.
	Architectural Construction Drawings	60%	Evaluate according to the required standards of the completion status.

Reading list	1. He Dongliang, Cao Weijun. Building Architecture [M]. Xi'an: Northwestern Polytechnical University Press, 2020. 2. Ministry of Housing and Urban-Rural Development of the People's Republic of China. Unified Standard for Design of Civil Buildings: GB 50352-2019 [S]. Beijing: China Architecture & Building Press, 2019. 3. Ministry of Housing and Urban-Rural Development of the People's Republic of China. Unified Standard for Architectural Drawing of Buildings: GB/T 50001-2017 [S]. Beijing: China Architecture & Building Press, 2017. 4. Ministry of Housing and Urban-Rural Development of the People's Republic of China. Code for Fire Protection Design of Buildings: GB 50016-2014 (2018 Edition) [S]. Beijing: China Architecture & Building Press, 2018.

Course Design of Road Survey and Design Module Handbook

Module designation	Course Design of Road Survey and Design		
Semester(s) in which the module is taught	Seventh Semester		
Person responsible for the module	Xiao Ming		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Courses, Projects, Seminars, etc.		
Workload (incl. contact hours, self-study hours)	Contact Hours: 32, Self-study Hours: 28		
Credit points	Chinese Credits: 1, European Credits: 2		
Required and recommended prerequisites for joining the module	"Geomatics, Road Survey and Design, etc."		
Module objectives/intended learning outcomes	Course Objective 1: Be able to determine route plans, horizontal and vertical alignment design parameters based on the key points of route selection for different terrain types and the general methods and requirements of road alignment design. Fully consider social, health, safety, legal, cultural, and environmental constraints in the design, demonstrating innovative thinking. Course Objective 2: For issues encountered during route selection, alignment, and design, be able to draw plan design drawings, longitudinal section design drawings, and cross-section design drawings. Understand the differences in communication with industry peers and the public, and effectively communicate and exchange ideas with industry peers and the public regarding complex civil engineering problems.		
Content	This course is a professional practice-oriented course for the road and bridge direction of civil engineering, serving as the practical component of Road Survey and Design. Its main purpose is to enable students to apply the basic knowledge of road alignment design and relevant road design standards to perform road plan design, longitudinal section design, and cross-section design. It aims to cultivate students' practical abilities in route selection and alignment using large-scale topographic maps and their skills in construction drawing, laying a necessary foundation for future work on complex terrain route design and research. After completing this course, students will possess the basic qualities and abilities required for general road alignment design. It is a comprehensive and practical course that integrates knowledge of mathematics, mechanics, and other disciplines.		
Examination forms	Design Specification, Design Charts		
Study and examination requirements	Assessment Item	Proportion	Requirements
	Design Specification	Fifty percent	Complete project design documentation and design parameters.
	Design Charts	Fifty percent	Complete the plan,

			longitudinal, and cross-section design of the route.
Reading list	Course Textbook: Zhang Chi et al. Road Survey and Design (6th Edition). Beijing: People's Transportation Press Co., Ltd., July 2023. References:Technical Standards for Highway Engineering (JTG B01-2014) Specifications for Design of Highway Subgrades (JTG D30-2015) Specifications for Design of Highway Alignment (JTG D20-2017)		

Course Design of Subgrade and Pavement Module Handbook

Module designation	Course Design of Subgrade and Pavement		
Semester(s) in which the module is taught	Seventh Semester		
Person responsible for the module	Chen Xiangliang		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, Courses, Projects, etc.		
Workload (incl. contact hours, self-study hours)	Contact Hours: 32, Self-study Hours: 28		
Credit points	Chinese Credits: 1, European Credits: 2		
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Material Mechanics, Soil Mechanics and Geotechnics, Road Survey and Design, Subgrade and Pavement Engineering, etc.		
Module objectives/intended learning outcomes	Course Objective 1: Based on different subgrade moisture types and traffic volumes, determine the structural composition of subgrade and pavement, calculate pavement structural thickness, and fully consider social, health, safety, legal, cultural, and environmental constraints in the design. Course Objective 2: For subgrade and pavement structural design issues, be able to draw pavement structural design drawings and effectively communicate and exchange ideas with industry peers and the public through oral or written means.		
Content	Be able to determine the relative height of the subgrade, soil group category, capillary water rise height, and identify the subgrade moisture type; determine the design value of subgrade resilient modulus through reference. Be able to correctly determine the pavement grade and propose surface layer types based on the grade. Be able to correctly propose pavement structural composition and preliminarily determine the thickness of each layer. Be able to determine the material design parameters for each structural layer. Be able to determine pavement structural design indicators based on the proposed pavement composition scheme. Be able to correctly perform axle load conversion, judge whether the initially proposed pavement thickness meets requirements, and optimize the scheme. Be able to draw pavement structural design charts and effectively communicate and exchange ideas with teachers and classmates through charts, annotations, etc.		
Examination forms	Project		
Study and examination requirements	Assessment Item	Proportion	Requirements

	Design Specification	Fifty percent	Assessed according to the standards of the design specification.
	Design Charts	Fifty percent	Assessed according to the standards of the design charts.
Reading list	Huang Xiaoming. Subgrade and Pavement Engineering [M]. Beijing: People's Transportation Press, 2023.		

Design of Retaining Wall Module Handbook

Module designation	Design of Retaining Wall		
Semester(s) in which the module is taught	Seventh Semester		
Person responsible for the module	Chen Xiangliang		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, Courses, Projects, etc.		
Workload (incl. contact hours, self-study hours)	Contact Hours: 32, Self-study Hours: 28		
Credit points	Chinese Credits: 1, European Credits: 2		
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Material Mechanics, Soil Mechanics and Geotechnics, Road Survey and Design, Subgrade and Pavement Engineering, etc.		
Module objectives/intended learning outcomes	Course Objective 1: Select the type of retaining wall structure, determine the location, structural form, and preliminary dimensions of the retaining wall based on specific engineering conditions, and justify the chosen retaining wall design. Develop the ability to master the basic construction process, complete the establishment of a 3D BIM model for the retaining wall, and demonstrate innovative thinking during the design and construction process. Course Objective 2: For retaining wall course design issues, be able to draw the plan, longitudinal section, and cross-section design drawings of the retaining wall. Effectively communicate and exchange ideas with industry peers and the public through oral or written means.		
Content	Retaining Wall Scheme Comparison: Correctly select the location and structural form of the retaining wall, as well as the materials used; fully consider social, health, safety, legal, cultural, and environmental constraints during route selection. Parameter Determination and Calculation Analysis: Be able to consult standards or communicate to determine retaining wall parameters and fill materials; correctly select appropriate calculation and analysis methods, perform earth pressure calculations for the retaining wall, and conduct stability checks. Virtual Design and Construction: Accurately establish a 3D BIM model of the retaining wall. Plan, Longitudinal, and Cross-Section Drawings: Be able to draw plan, longitudinal, and cross-section drawings of the retaining wall, and effectively communicate and exchange ideas with teachers and classmates through charts, annotations, etc		
Examination forms	Project		
Study and examination requirements	Assessment Item	Proportion	Requirements
	Design Specification	Fifty percent	Assessed according to the

			standards of the design specification.
	Design Charts	Fifty percent	Assessed according to the standards of the design charts.
Reading list	Huang Xiaoming. Subgrade and Pavement Engineering [M]. Beijing: People's Transportation Press, 2023		

Bridge Engineering Course Design Module Handbook

Module designation	**Bridge Engineering Course Design**		
Semester(s) in which the module is taught	Semester 7		
Person responsible for the module	Li Miao		
Language	Chinese		
Relation to curriculum	Professional Practice		
Teaching methods	course		
Workload (incl. contact hours, self-study hours)	Contact Hours: 32, Self-Study Hours: 28		
Credit points	Chinese Credits: 1 | ECTS Credits: 2		
Required and recommended prerequisites for joining the module	Theoretical Mechanics,Mechanics of Materials,Structural Mechanics,Principles of Concrete Structure Design,Bridge Engineering (I)		
Module objectives/intended learning outcomes	Course Objective 1: Bridge Structure Design. Devise a design plan for a concrete simply - supported beam bridge, conduct structural internal force analysis and internal force combination, complete the design and calculation of structural components such as main girders. During the design process, fully consider the impacts of constraints from aspects such as society, health, safety, law, culture, and environment. Compile the design calculation book for the concrete simply - supported beam bridge and draw design drawings. Cultivate the ability to complete the single - unit design of structures, components (joints) that meet the specific requirements of civil engineering. Course Objective 2: For problems in bridge structure design, conduct effective communication and exchanges orally or in writing. Cultivate the ability to effectively communicate and exchange with industry peers and the public about complex engineering problems in civil engineering through oral or written means using drawings, charts, language, and text.		
Content	Master the construction treatment and design calculation methods of concrete simply - supported beam bridges. Based on the given basic design conditions (including load standards, building materials, etc.), conduct the design and calculation of highway concrete simply - supported beam bridges, and submit the design calculation instruction manual and drawings.		
Examination forms	Design results		
Study and examination requirements	Assessment Components	Weighting	Requirements
	student peer assessment	It is only included in the achievement evaluation and not included in the	Evaluate the scores on an individual basis through peer assessment. Conduct the evaluation according to

		students' graduation scores.	the required standards for effective communication and interaction.
	Teacher's achievement assessment	100%	Conduct the assessment according to the required standards for structural design, design calculation books and drawings.
Reading list	1. The current relevant codes and specifications for highway bridges and culverts 2. Shao Xudong. Bridge Design and Calculation [M]. China Communications Press, 2007. 3. Shao Xudong. Bridge Engineering [M]. China Communications Press, 2019. 4. Liao Chaohua. Design Manual for Highway Bridges and Culverts - Piers, Abutments and Foundations [M]. China Communications Press, 2013.		

Tunnel and Underground Engineering Course Design Module Handbook

Module designation	Tunnel and Underground Engineering Course Design		
Semester(s) in which the module is taught	The seventh semester		
Person responsible for the module	Zhang Liang		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Design, lectures, laboratory work, projects, seminars, etc. (depending on one's own courses)		
Workload (incl. contact hours, self-study hours)	Contact learning hours: 64, Self-study hours: 32		
Credit points	Chinese credits: 2.0, European credits: 2.0		
Required and recommended prerequisites for joining the module	Principles of Concrete Design, Mechanics of Materials, Structural Mechanics, Tunnels and Underground Engineering		
Module objectives/intended learning outcomes	Course Objective 1: Design of highway or railway tunnel structures. Formulate the design scheme of a highway/railway tunnel, conduct the analysis and combination of internal forces of the structure, and complete the design calculation of the components of the tunnel support structure. During the design process, fully consider the influences of restrictive factors such as society, health, safety, laws, culture, and the environment. Compile the design calculation report of the tunnel structure and draw the design drawings. Cultivate the ability to complete the individual design of structures and components (joints) that meet the specific requirements of urban underground space engineering. Course Objective 2: For the problems in tunnel structure design, conduct effective communication and interaction verbally or in writing. Cultivate the ability to effectively communicate and interact verbally or in writing with industry peers and the public about complex engineering problems in civil engineering by using drawings, charts, languages, and texts.		
Content	Based on the given basic design conditions (including design standards, topographic and geological conditions, etc.), carry out the design calculation of the highway/railway tunnel structure, and submit the design calculation specification and drawings. Students should master the structural treatment and design calculation methods of highway or railway tunnels, comprehensively apply the basic knowledge and theories of the professional basic courses and specialized courses they have learned, learn to think independently, analyze and solve practical engineering problems, and complete the task of tunnel structure design.		
Examination forms	*Examination, thesis, major assignment*		
Study and examination requirements	Assessment Items	Proportion	Requirements
	Achievement Evaluation	100%	Evaluate according to the required standards of structural design, design

			calculation documents and drawings.
Reading list	Course Textbook: "Tunnels and Underground Engineering", Chen Zhimin, Ou Erfeng, Ma Lina, Tsinghua University Press, 2016. Reference Materials: "Code for Design of Highway Tunnels" (JTG 3370.1-2018), "Code for Geotechnical Investigation of Highway Engineering" (JTGC20-2011), "Technical Specification for Construction of Highway Tunnels" (JTG/T 3660-2020), "Code for Design of Railway Tunnels" (TB10003-2016), "General Specification for Engineering Investigation" (GB 55017-2021), "Standard for Classification of Engineering Rock Masses" (GBT50218-2014), "Code for Design of Concrete Structures" (GB50010-2010) (2015 Edition)		

Soil Mechanics Experiment Module Handbook

Module designation	Soil mechanics experiment		
Semester(s) in which the module is taught	Semester 4		
Person responsible for the module	Zhang Yunyi		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, courses, laboratory work, projects, seminars, etc. (according to their own courses)		
Workload (incl. contact hours, self-study hours)	Contact credit hours: 12, self-study credit hours: 0		
Credit points	Chinese credit: 0.5, ECTS Credits: 0.5		
Required and recommended prerequisites for joining the module	Theoretical mechanics, mechanics of materials, soil mechanics, etc		
Module objectives/intended learning outcomes	Course objective 1: Students can have a preliminary understanding of the basic principles and methods of soil mechanics through the basic physical properties experiments, compression experiments, direct shear experiments and liquid-plastic limit experiments. These experiments enable the students to deeply understand and master the theoretical knowledge of soil mechanics. Through the exercise of practical operation, students have a deeper understanding of theoretical knowledge and a more thorough understanding. Course objective 2: In the course of the experiment, carefully collect the original experimental data, and analyze and process the data according to the experimental principle. Through these steps, effective experimental conclusions are drawn, thus improving the ability to solve practical engineering problems.		
Content	Soil mechanics experimental course is a core part of the curriculum system "soil mechanics", and it is a key practical teaching link. Its main goal is deepen students' understanding of the basic theories of the curriculum and promote their mastery of these theories. In addition, the course is dedicated enhancing students' hands-on skills and fostering their innovative spirit. S mechanics experiment is closely connected with the practical application engineering, so it has become an important means to solve many engineer problems. Students can directly apply their experimental skills to engineer practice. To sum up, students will be able to enhance their ability to so practical engineering problems by participating in soil mechanics experime courses.		
Examination forms	*Exams, papers, big assignments, (according to their own courses)*		
Study and examination requirements	**Assessment Components**	**Weighting**	**Requirements**
	experimentation	40%	For the designated projects, the geotechnical experimental equipment is

			selected, which is completed by the group. It is evaluated according to the requirements and standards of the experimental process, and the performance of students in the experimental guidance process is comprehensively considered.
	In-class test	20%	To assess the knowledge mastery, each knowledge unit should be assessed at least once, mainly using objective questions.
	laboratory report	40%	Covering all of the knowledge units
Reading list	Course materials: Zhao Minghua, Soil Mechanics and Basic Engineering (4th edition), Wuhan University of Technology Press, 2014.7; Ba Lingzhen, South China University of Technology Press, 2016;		

Foundation Engineering Curriculum Design Module Handbook

Module designation	Foundation Engineering Curriculum Design		
Semester(s) in which the module is taught	Semester 7		
Person responsible for the module	Zhou Wei		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, class projects, seminars, etc		
Workload (incl. contact hours, self-study hours)	Contact hours: 32, self-study hours: 20		
Credit points	Chinese credits: 1, ECTS Credits: 1		
Required and recommended prerequisites for joining the module	Civil engineering materials, structural mechanics, material mechanics, soil mechanics, concrete structure design principles, etc		
Module objectives/intended learning outcomes	Course objective 1: master the type of pile and pile foundation and structure, pile foundation vertical bearing capacity, pile foundation level bearing capacity, pile foundation settlement calculation, pile foundation design calculation, pile foundation design knowledge, in solving the problem of civil engineering of civil engineering, can use its service to model construction, solving and comparative analysis. Course objective 2: Be able to compare and select design schemes, prepare basic design calculation books, master the relevant rules of pile foundation drawing recognition and drawing of piles, and master the expression requirements of pile foundation construction drawings. Familiar with the professional and industry standards, policies, laws and regulations related to civil engineering.		
Content	1. According to the geological conditions, correctly choose the appropriate foundation type. 2. Calculation of vertical bearing capacity of pile foundation and horizo bearing capacity of pile foundation 3. Vertical and horizontal deformation calculation of pile foundation 4. After scheme comparison, select the best design scheme, and check feasibility of the scheme 5. Inindependently complete the calculation and design drawings that meet engineering requirements		
Examination forms	Calculation book and design drawings		
Study and examination requirements	**Assessment Components**	**Weighting**	**Requirements**
	statement of account	55%	Assessment of knowledge mastery
	design drawing	45%	Covering all of the knowledge units

Reading list	Code for Design of Foundation and Foundation of Highway Bridges and Culverts (JTJ024- -2007) Code for Design of Building Foundation Foundation (GB 50007- -2011) Zhao Minghua, Soil Mechanics and Basic Engineering, edited by Zhao Minghua, Wuhan University of Technology Press

Curriculum Design of Budget Estimate Module Handbook

Module designation	Curriculum Design of Budget Estimate
Semester(s) in which the module is taught	The seventh semester
Person responsible for the module	Xie Jin
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Lectures, projects, seminars, etc.
Workload (incl. contact hours, self-study hours)	Contact learning hours: 32, Self-study hours: 28
Credit points	Chinese credits: 1, European credits: 1
Required and recommended prerequisites for joining the module	Budgetary Estimation of Building Engineering Budgetary Estimation of Road and Bridge Engineering Construction Principles and Methods Engineering Project Management Engineering Economics and Architectural Regulations
Module objectives/intended learning outcomes	Course Objective 1: Be familiar with the operation of basic modeling software and be able to extract engineering quantity data from it. Cultivate the operation ability of basic software required for the informatization development of the construction industry, and possess the preliminary ability to construct information models and conduct virtual construction. Course Objective 2: Be familiar with the principles of engineering quotas and correctly consult the quotas. Cultivate professional qualities related to civil engineering and possess relevant knowledge of industry standards, policies, laws and regulations in civil engineering. Course Objective 3: Be familiar with the application of quotas, master the method of analysis of labor and materials, be familiar with the calculation procedures of engineering budgets and the calculation standards of expenses, and summarize the project costs. Be familiar with the content, form and compilation requirements of the design specification, and organize the achievements of the course design. Possess theoretical knowledge of engineering economics, master economic decision-making methods, be able to make a reasonable economic analysis of civil engineering projects, and have basic decision-making ability.
Content	Build models using basic software, extract engineering quantity data from them, and accurately calculate the engineering quantities. According to the content of the sub-projects, correctly look up the quota values. Arrange in the order of labor, materials and machinery, and calculate the budget unit price of materials according to the types of materials and relevant conditions. Calculate the budget unit price of mechanical shift according to the types of machinery. Calculate the unit price of labor days according to the regional category and relevant materials. By calculating the direct costs, indirect costs, profits and taxes, calculate the construction and installation project costs in total. According to the engineering budget sheet, calculate various technical indicators and

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<tr><td></td><td colspan="3">conduct cost analysis. After the budget preparation is completed, a preparation description should be written and the result documents should be sorted out.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Project model, Project calculation document</td></tr>
<tr><td rowspan="3">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Calculation of Engineering Quantities</td><td>30%</td><td>Evaluate according to the required standards of the completion status.</td></tr>
<tr><td>Budget Document</td><td>70%</td><td>Evaluate according to the required standards of the completion status.</td></tr>
<tr><td>Reading list</td><td colspan="3">1. In the direction of construction engineering: Consumption standards for building construction and decoration engineering, Code for Valuation with Bill Quantity of Construction Works
2. In the directions of road and bridge engineering and urban rail transit engineering: "Method for Compiling Estimated (Budgeted) Documents of Highway Capital Construction", "Budget Quota for Highway Engineering", "Estimated Quota for Highway Engineering"</td></tr>
</table>

Load and Reliability Theory of Engineering Structures Module Handbook

Module designation	Load and Reliability Theory of Engineering Structures
Semester(s) in which the module is taught	Semester 4
Person responsible for the module	Wang Yukuai
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Course
Workload (incl. contact hours, self-study hours)	Contact Hours: 24, Self-study Hours: 21
Credit points	Chinese Credits: 1.5, European Credits: 1.5
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Structural Mechanics, Material Mechanics, Soil Mechanics, Principles of Concrete Structure Design, etc.
Module objectives/intended learning outcomes	Course Objective 1: Master the principles and methods of load calculation, be able to analyze various load combinations, and correctly apply different load combinations for structural load-bearing capacity calculations. Understand the impact of uncertainties on structural resistance, and have the ability to build simple models using mathematical statistics to accurately analyze structural resistance. Master the probabilistic reliability design method for structures, and be able to accurately select partial safety factors in actual engineering design to guide structural scheme design. Course Objective 2: Master the methods for consulting load codes, and have the ability to correctly select various calculated load values, importance coefficients for engineering projects, partial safety factors for loads and resistances, and combination factors. Be able to correctly choose the calculation formulas for load combination effects and apply them in actual engineering projects to obtain accurate solutions.
Content	Concepts and calculations of structural self-weight, soil self-weight stress, snow load, vehicular load, floor live load, and crowd load; concepts and calculations of earth pressure, water pressure, wave load, frost heave force, ice pressure, and impact force; basic knowledge of wind, concept and calculation of wind pressure; concept and calculation of mean wind effect in the direction of the wind; concepts of along-wind fluctuating wind effect and total along-wind effect; concepts and calculations of cross-wind structural wind effects; concepts and calculations of temperature effects, deformation effects, explosion effects, buoyancy effects, braking and traction impacts, centrifugal force, and prestress; probabilistic models of loads, various representative values of loads, load effects, and load combinations; uncertainties of structural resistance, statistical characteristics of structural resistance; structural reliability, practical methods for structural reliability analysis; system reliability of structures, design objectives of structures, direct design method of structural reliability; practical expressions for probabilistic reliability design of

<table>
<tr><td></td><td colspan="3">structures.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Examination</td></tr>
<tr><td rowspan="4">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Homework</td><td>30%</td><td>At least once for each knowledge unit (1-8), to be completed independently by individuals</td></tr>
<tr><td>Tests</td><td>30%</td><td>Each knowledge unit (1-8) will be assessed at least once, with units 2, 3, and 4 being assessed at least twice. The focus will be on evaluating students' mastery of core knowledge points, primarily using objective questions.</td></tr>
<tr><td>Final Exam</td><td>40%</td><td>Primarily using subjective questions without standard answers, focusing on assessing students' comprehensive analytical abilities.</td></tr>
<tr><td>Reading list</td><td colspan="3">Load and Reliability Theory of Engineering Structures [M]. Li Guoqiang. Beijing: China Architecture & Building Press, 2016; Code for Load of Building Structures (GB50009-2012); Unified Standard for Reliability Design of Engineering Structures (GB50153-2008); Unified Standard for Reliability Design of Building Structures (GB50068-2018).</td></tr>
</table>

Design of tall building structures Module Handbook

Module designation	Design of tall building structures
Semester(s) in which the module is taught	The sixth semester
Person responsible for the module	Liu Yihong
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Lectures, courses, seminars, etc.
Workload (incl. contact hours, self-study hours)	Contact learning hours: 32, Self-study hours: 28
Credit points	Chinese credits: 2, European credits: 2
Required and recommended prerequisites for joining the module	Structural Mechanics, Mechanics of Materials, Principles of Concrete Structure Design, Principles of Steel Structure Design, Concrete Structure Design, Steel Structure Design, etc.
Module objectives/intended learning outcomes	Course Objectives: 1. Understand the general development of high-rise building structures, master the characteristics of high-rise building structure design, and be familiar with various structural systems of high-rise buildings and their applicable scopes. On the basis of mastering these professional knowledge, be able to use professional language to communicate in writing or orally with the outside world about the basic aspects of high-rise building structure design. 2. Comprehend the design requirements of high-rise building structures. Be able to flexibly apply the design requirements in engineering practice to serve the model construction, calculation analysis and scheme comparison of conventional high-rise buildings. 3. Be familiar with the approximate calculation methods of frame structures, shear wall structures, and frame-shear wall structures, and possess the ability to apply the learned mechanical knowledge to the estimation of structural internal forces and deformations. 4. Master the application of PKPM or YJK (choose one) software and the structural construction requirements of high-rise buildings. Be able to use the learned knowledge to complete the structural modeling, calculation, construction drawing preparation and virtual construction model of a high-rise residential building with a shear wall structural system, and demonstrate innovative thinking during the design and construction process.
Content	This course is a core professional course for the Civil Engineering major (in the direction of Architectural Engineering). Through the study of this course, students will understand the structural systems of high-rise building structures, as well as the characteristics and application scopes of various systems; comprehend the design principles and methods of high-rise reinforced concrete structures; master the simplified calculation methods for internal forces and displacements of three basic structures, namely frame structures, shear wall structures, and frame-shear wall structures, and understand the characteristics and laws of the internal force distribution and lateral displacement deformation of these three structures; master the reinforcement calculation methods and construction requirements for the frame and shear wall components included in these three systems; initially master the usage methods and characteristics of the mainstream computer-aided design software for multi-story and high-rise building structures in China; and have a preliminary understanding of the

<table>
<tr><td></td><td colspan="3">internal force distribution, calculation characteristics, and structural design of tube structures and steel-concrete composite structures.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Homework, Examinations, Course Participation</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Cooperative Project</td><td>30%</td><td>According to the construction drawings of high-rise residential buildings provided by the teacher, establish a BIM structural model. Import this model into PKPM or YJK software for structural calculation, output the calculation report, and draw the structural construction drawings. The cooperative project is completed collaboratively in groups, with 2-6 people in each group, and the tasks of each group are different. Focus on examining students' ability items.</td></tr>
<tr><td>Course Participation</td><td>15%</td><td>Evaluate the degree of course participation and performance.</td></tr>
<tr><td>In-class Tests</td><td>15%</td><td>Test at least once for each knowledge unit. Use mainly objective questions. Compose test papers from the question bank, and the Cloud Class app automatically grades the papers. Examine students' mastery of knowledge.</td></tr>
<tr><td>Final Examination</td><td>40%</td><td>Use subjective questions with engineering backgrounds for the test, and focus on assessing students' ability to comprehensively analyze and deal with problems by applying the knowledge they have learned.</td></tr>
<tr><td>Reading list</td><td colspan="3">(1) Qian Jiaru, Zhao Zuozhou, Ye Lieping. Structural Design of High-rise Buildings [M]. Beijing: China Architecture & Building Press
(2) Zhu Bingyin. Application and Analysis of the Technical Specification for Concrete Structures of High-rise Buildings [M]. Beijing: China Architecture & Building Press</td></tr>
</table>

Architectural Design Module Handbook

Module designation	Architectural Design
Semester(s) in which the module is taught	Fourth Semester
Person responsible for the module	He Dongliang
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Courses, On-site Training, Seminars, etc. (Adapt based on your course)
Workload (incl. contact hours, self-study hours)	Contact Hours: 40, Self-study Hours: 35
Credit points	Chinese Credits: 2.5, European Credits: 2.5
Required and recommended prerequisites for joining the module	Civil Engineering Drawing (including CAD), Introduction to Civil Engineering, Civil Engineering Materials, etc.
Module objectives/intended learning outcomes	Course Objective 1: Master urban planning, surrounding environment, and site requirements in architectural site design; master the design of primary and auxiliary functional rooms and circulation areas in building plans, and conduct building plan combination design; master the determination of building height, number of floors, and the combination and utilization of building spaces; familiarize with the basic principles of architectural composition; master the research objects and tasks of building construction, as well as the components of buildings; master the factors influencing building construction and design principles; master the selection of column grids and determination of positioning axes in single-story industrial buildings, and the design of multi-story factory building plans, including the determination of floor numbers and heights. Course Objective 2: Master the construction components and design requirements of foundations, walls, floors, stairs and elevators, roofs, and doors/windows; master the conditions and requirements for setting expansion joints, structural treatment at expansion joints, and joint cover construction; master the finishing methods for walls, floors, and ceilings; master the scale design of stairs and the drawing of stair details; master roof drainage design and drawing; master waterproofing construction for basements, floors, walls, and roofs; develop the ability to analyze, reason, and solve engineering problems. Course Objective 3: Familiarize with the types of building insulation, thermal insulation, and soundproofing; master the construction design and requirements for building insulation, thermal insulation, and soundproofing.
Content	Overview of architectural design, fundamentals of building physical environments, building plan design, elevation design, section design, industrial building design, and related content, procedures, requirements,

	and basis of architectural design; components, principles, and methods of civil building construction; building insulation, thermal insulation, and soundproofing, and related architectural technologies. Through various teaching sessions, students will master the content, procedures, requirements, and basis of architectural design; master the components, principles, and methods of civil building construction; master the construction design and requirements for building insulation, thermal insulation, and soundproofing; gain a deeper understanding of architectural design and building construction components and principles; and develop a certain level of architectural design ability and the concept of green, energy-efficient, and environmentally friendly building construction.		
Examination forms	Examinations, Papers, Major Assignments (Adapt based on your course)		
Study and examination requirements	Assessment Item	Proportion	Requirements
	Regular Assignments	Twenty percent	Assess knowledge mastery
	Tests	Ten percent	Cover all knowledge units
	Major Assignment	Ten percent	Architectural design modeling
	Final Exam	Sixty percent	Assess mastery and application of core knowledge
Reading list	Wang Xuesong, et al. Architectural Design [M]. Chongqing: Chongqing University Press, 2018		

Design Of Steel Structure Handbook

<table>
<tr><td>Module designation</td><td colspan="3">Design Of Steel Structure</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td colspan="3">The sixth semester</td></tr>
<tr><td>Person responsible for the module</td><td colspan="3">Mao Guangxiang</td></tr>
<tr><td>Language</td><td colspan="3">Chinese</td></tr>
<tr><td>Relation to curriculum</td><td colspan="3">Professional Application</td></tr>
<tr><td>Teaching methods</td><td colspan="3">Lectures, courses, projects, seminars, etc.</td></tr>
<tr><td>Workload (incl. contact hours, self-study hours)</td><td colspan="3">Contact learning hours: 48, Self-study hours: 42</td></tr>
<tr><td>Credit points</td><td colspan="3">Chinese credits: 3, European credits: 3</td></tr>
<tr><td>Required and recommended prerequisites for joining the module</td><td colspan="3">Civil Engineering Materials, Structural Mechanics, Mechanics of Materials, Principles of Steel Structure Design, etc.</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td colspan="3">Course Objective 1: Master the design knowledge of steel roof structures, steel floor structures, light portal frame structures, steel structures of heavy industrial plants, and steel frame structures. When solving complex engineering problems in civil engineering, be able to apply this knowledge to model construction, solution, and comparative analysis.
Course Objective 2: Be able to conduct a comparison and selection of design schemes, compile structural calculation reports, master the relevant rules for reading and drawing steel structure drawings, and grasp the requirements for expressing structural construction drawings. Be familiar with the standards, policies, and laws and regulations of the professions and industries related to civil engineering.
Course Objective 3: Master the basic knowledge through pre-class preparation, be able to conduct discussions on difficult issues within the study group, communicate effectively with group members and teachers, strengthen the training of comprehensive abilities, and possess the ability for independent learning and the adaptability to meet the development needs of the industry.</td></tr>
<tr><td>Content</td><td colspan="3">Contents such as the design of steel structures for single-story industrial plants of heavy steel, the design of light steel portal frame structures, and the design of multi-story and high-rise steel frame structures.
Cultivate students' ability to use the basic principles and methods of steel structures to carry out the design of steel structure engineering, and enable them to possess the basic qualities and abilities for technical and research work related to steel structure design, laying a necessary foundation for future work such as the design and management of complex steel structure engineering projects.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Projects/Homework, Examinations, Course Participation</td></tr>
<tr><td rowspan="3">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Regular Homework</td><td>30%</td><td>Assess at least once for each knowledge unit. Focus on examining students' mastery of core knowledge points, based on the after-class homework questions.</td></tr>
<tr><td>Major Assignment</td><td>30%</td><td>Complete a handwritten course</td></tr>
</table>

			design calculation report for the steel roof truss unit. Focus on examining students' ability items.
	Final Examination	40%	Mainly consist of subjective questions without standard answers, and focus on assessing students' comprehensive analysis ability.
Reading list	Design of Steel Structures for Building Construction. Chen Shaofan, etc. [M]. Beijing: China Architecture & Building Press, 2023 Steel Structure Design Manual (4th Edition). Dan Zeyi [M]. Beijing: China Architecture & Building Press, 2018 Steel Structure Design. Hu Xibing, Zhang Zaihua [M]. Beijing: Peking University Press, 2013.		

Concrete structure design Module Handbook

Module designation	Concrete structure design		
Semester(s) in which the module is taught	5th Semester		
Person responsible for the module	Chen Liqun		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Courses, Projects, Seminars, etc.		
Workload (incl. contact hours, self-study hours)	Contact Hours: 56, Self-study Hours: 49		
Credit points	Chinese Credits: 3.5, ECTS Credits: 3.5		
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Structural Mechanics, Material Mechanics, Soil Mechanics, Principles of Concrete Structure Design, etc.		
Module objectives/intended learning outcomes	Course Objectives:Apply civil engineering knowledge and other learned skills to analyze, model, and solve complex civil engineering problems, with the ability to compare and synthesize solutions.Utilize modern tools to analyze, calculate, and design solutions for complex civil engineering problems, and evaluate the effectiveness and limitations of the results.Familiarize with standards, policies, laws, and regulations related to civil engineering, and understand the impact of different social and cultural contexts on engineering practices.Develop self-learning abilities, including understanding technical issues, summarizing knowledge, and posing questions, to adapt to new developments in the civil engineering industry.		
Content	Understanding structures, floor structure layout, calculation diagrams for one-way slabs, internal force combinations for one-way slabs, construction drawing of cast-in-place one-way slab floors, design of two-way slabs, layout and load calculation of frame structures, internal force combinations for frame structures, internal force adjustment for frame structures, seismic design of frame structures, construction drawing of frame structures, interpretation of construction drawings for multi-story and high-rise structures, selection and layout of bent structures, load calculation for bent structures, internal force combinations for bent structures, corbel design, seismic design of bent structures, and construction drawing of bent structures.		
Examination forms	Assignments, Tests, Projects, Exams		
Study and examination requirements	Assessment Item	Percentage	Requirements
	Process Control	Ten percent	Evaluation of student participation in learning resources, discussions, and class performance.
	In-class Tests	Twenty percent	Primarily objective questions, conducted via the Lanmo Cloud platform or other online testing

			methods.
	Collaborative Projects	Thirty percent	Completion of computational models for frame structures, design calculations for bent structures, and beam-slab structure design calculations using modern tools.
	Final Exam	Forty percent	Assessment of core knowledge mastery and application.
Reading list	Textbook:Shen Pusheng. Concrete Structure Design [M]. Beijing: Higher Education Press, 2022.References:Shi Qingxuan. Concrete Structure Design [M]. Beijing: China Architecture & Building Press, 2016.Chen Bowang. Concrete Structure Design [M]. Changsha: Hunan University Press, 2016.		

Prefabricated Buildings Module Handbook

Module designation	Prefabricated Buildings		
Semester(s) in which the module is taught	Sixth Semester		
Person responsible for the module	Long Hao		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Courses, On-site Training, Seminars		
Workload (incl. contact hours, self-study hours)	Contact Hours: 24, Self-study Hours: 35		
Credit points	Chinese Credits: 1.5, ECTS Credits: 1.5		
Required and recommended prerequisites for joining the module	Principles of Concrete Structure Design, Concrete Structure Design, Fundamentals of Steel Structures, Steel Structure Design, High-rise Building Structures, etc.		
Module objectives/intended learning outcomes	Course Objective 1: Familiarize with the basic systems, types, design, and construction processes of prefabricated buildings. Master the detailed design methods, be proficient in consulting relevant codes and standards, and possess the ability to evaluate prefabricated buildings. Be able to assist in the virtual design and construction of a project, demonstrating innovative thinking during the design and construction process. Course Objective 2: Familiarize with BIM-based structural modeling, analysis, and design solutions. Master the forward design process and methods based on BIM technology. Develop the ability to solve practical engineering problems using BIM models and enhance teamwork skills. Master the operation of basic software required for the informatization development of the construction industry, and possess the ability to build and apply information models.		
Content	Types, application scopes, design and manufacturing processes, and standard systems of prefabricated buildings; Evaluation of prefabricated buildings; Design of prefabricated concrete frame structures; Design of prefabricated shear wall structures; Design of prefabricated steel structure residences; Vertical division and connection of prefabricated concrete structural components; Horizontal division and connection of prefabricated concrete structural components; Detailed design and construction drawings of prefabricated concrete structures; Key points of BIM technology application at various stages; Detailed design of prefabricated buildings based on BIM technology.		
Examination forms	Thesis, Major Assignments		
Study and examination requirements	Assessment Items	Percentage	Requirements

	In-class Tests	Thirty percent	Conducted at least once per unit, mainly objective questions, automatically graded by the cloud-based platform to assess students' knowledge mastery.)
	Assignment	Twenty percent	(Create short videos on issues related to prefabricated buildings; calculate the prefabrication rate of a project based on given construction drawings and evaluate it. Assess students' ability to apply knowledge to solve practical problems.)
	Group Project	Fifty percent	Based on the structural calculation results and construction drawings completed in the high-rise building structure course, each student selects different areas for detailed design of horizontal and vertical components, and draws detailed design and fabrication drawings. The group members are the same as in the high-rise building structure course.)
Reading list	Self-compiled textbook; Series of standards for prefabricated buildings		

Construction Project Budget Estimate Module Handbook

Module designation	Construction Project Budget Estimate		
Semester(s) in which the module is taught	Semester 5		
Person responsible for the module	Xie Jin		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Courses, programs, seminars, etc		
Workload (incl. contact hours, self-study hours)	Contact hours: 24, Self-study hours: 21		
Credit points	Chinese credits: 1.5, ECTS Credits: 1.5		
Required and recommended prerequisites for joining the module	Civil engineering materials, housing architecture, concrete structure design, construction engineering construction, etc		
Module objectives/intended learning outcomes	Course objective 1: Mainly by self-study, master the operation methods of graphic calculation software and valuation software; can independently construct the graphic calculation model of housing construction and decoration engineering, and complete the calculation of graphic engineering quantity and construction drawing budget. Cultivate students' ability to use modern tools to model and calculate complex engineering problems in civil engineering, and to analyze the effectiveness and limitations of the results. Course objective 2: Be familiar with the basic concepts of quota and bill of quantities, master the procedures and methods of construction drawing budget; familiar with the relationship between the valuation and quota, master the consumption standard of quota and the calculation rules of the quantities; familiar with the composition and calculation of budget price, master the analysis and calculation method of comprehensive unit price, and can analyze the comprehensive unit price of construction engineering independently. Train students to use engineering economy and decision-making methods to make economic analysis of civil engineering projects and have basic decision-making ability.		
Content	Construction engineering quota principle, overview and quota general description, housing construction engineering quota quantity calculation, decoration engineering quota quantity calculation, construction engineering valuation method, housing construction engineering bill of quantities compilation, decoration engineering bill of quantities compilation, measures project list compilation, project valuation and management.		
Examination forms	*Examinations, projects, assignments, (based on your own courses)*		
Study and examination requirements	**Assessment Components**	**Weighting**	**Requirements**
	school assignment	15%	Assessment of knowledge mastery
	test	10%	Covering all of the

			knowledge units
	project	15%	For the specified project, build the graphic calculation model, which is completed by the team
	final	60%	Assess the mastery and application of the core knowledge points
Reading list	Meng Xintian, Cui Yanmei. Civil engineering estimate budget and inventory valuation. Beijing: Higher Education Press, 2015. Long Jingting, Qi Chunling. Budget estimate of construction works. Shanghai: Shanghai Jiao Tong University Press, 2016. (optional)		

Building engineering construction Module Handbook

Module designation	Building engineering construction		
Semester(s) in which the module is taught	The seventh semester		
Person responsible for the module	Tang Jia		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, courses, projects, seminars, etc.		
Workload (incl. contact hours, self-study hours)	Contact learning hours: 32, Self-study hours: 28		
Credit points	Chinese credits: 2, European credits: 2		
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Structural Mechanics, Mechanics of Materials, Principles of Concrete Structure Design, Principles of Steel Structure Design, Foundation Engineering, Principles and Methods of Construction, etc.		
Module objectives/intended learning outcomes	Course Objective 1: Master the construction techniques of brick-concrete structures, cast-in-place concrete structures, the installation of single-story factory building structures, the installation of multi-story prefabricated structures, and the installation of steel structures. Cultivate the ability to formulate construction plans for specific complex engineering problems in civil engineering, and be able to fully consider restrictive factors such as society, health, safety, laws, culture, and the environment during the formulation of the plans. Course Objective 2: Comprehend the application technologies of building energy conservation and environmental protection, understand the basic concepts, principles, and key technical points of green construction, and keep abreast of the new trends in green construction; enhance the awareness of using new energy-saving and environmentally friendly materials and conducting green construction.		
Content	Construction of brick-concrete structures, construction of cast-in-place concrete structures, installation of single-story factory building structures, installation of multi-story prefabricated structures, installation of steel structures, energy conservation, environmental protection and green construction. Cultivate students' ability to prepare engineering construction plans by using the basic knowledge of construction principles and methods, and enable them to possess the basic qualities and abilities for technical and research work related to construction management in building engineering, laying a necessary foundation for future work such as the construction organization design and management of complex engineering projects.		
Examination forms	Projects/Homework, Examinations, Course Participation		
Study and examination requirements	**Assessment Items**	**Proportion**	**Requirements**
	Projects/Homework	30%	Projects: Compile construction plans; Completed collaboratively in groups, with 5-8 people in each group. Focus on examining students' ability to compile construction plans. Homework: Examine the

			application of core knowledge points.
	Course Participation	10%	Evaluate the degree of course participation and performance.
	Final Examination	60%	Mainly consist of subjective questions, and focus on assessing students' ability to comprehensively analyze and deal with problems by applying the knowledge they have learned.
Reading list	Construction of Building Engineering. Hua Jianmin. [M]. Beijing: Chongqing University Press, 2015 Construction Manual of Building Engineering. Yang Bo [M]. Beijing: Chemical Industry Press, 2012 Construction Technology of Modern Civil Engineering. Li Jianfeng [M]. Beijing: China Electric Power Press, 2015 Construction Organization and Management of Building Decoration. Wei Daojun [M]. Beijing: Chemical Industry Press, 2018 Cases of Prefabricated Building Engineering. Broad Homes Co., Ltd. [M]. Beijing: China Architecture & Building Press, 2019		

Hydrology for Bridge Engineering Handbook

Module designation	Hydrology for Bridge Engineering
Semester(s) in which the module is taught	The fifth semester
Person responsible for the module	Zhang Kai
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	course
Workload (incl. contact hours, self-study hours)	Contact hours: 24, Self-study hours: 21
Credit points	Chinese credits: 1.5, European credits: 1.5
Required and recommended prerequisites for joining the module	Advanced Mathematics, Probability Theory, Engineering Surveying, Fluid Mechanics, etc.
Module objectives/intended learning outcomes	Course Objective 1: To master the basic knowledge of river hydrology, the fundamental principles and methods of hydrological statistics, the calculation of design flood discharge, the computation of pier and abutment scour, and the basic knowledge of span calculation for large and medium bridges, small bridges, and culverts. Students will be able to apply this knowledge to model construction, solution, and comparative analysis when solving complex civil engineering problems. Course Objective 2: To acquire basic knowledge through pre-class preview and engage in discussions on difficult issues within study groups. Students will be able to communicate effectively with group members and teachers, enhance their comprehensive ability training, and develop the capacity for self-directed learning and adaptability to the demands of industry development.
Content	Understand the concepts of rivers and basins, and be able to describe the basic characteristics of rivers and basins; understand the main factors influencing river runoff and the methods for studying hydrological patterns: be able to understand the main factors influencing river runoff, comprehend the characteristics of hydrological phenomena, and explain the methods for studying hydrological patterns; understand the basic principles of hydrological statistics: be able to distinguish between probability and frequency, understand the difference between a population and a sample, calculate cumulative frequency and return period, and explain the impact of statistical parameters on the frequency distribution curve; be able to plot empirical frequency curves and use theoretical frequency curves to solve flood discharge problems; understand the calculation methods for bridge span length and the minimum elevation of the bridge deck center, and be able to calculate bridge span length and the minimum elevation of the bridge deck center. Understand the types of pier and abutment scour and the types of channel improvement structures: be able to understand the types of pier and abutment scour and name the types of channel improvement structures; understand the calculation methods for general scour and local scour under bridges and the determination of the minimum embedment depth of pier and abutment foundations; understand the methods for determining the span length of small bridges and culverts, the classification of small bridges and culverts, the design principles of small bridges and

<table>
<tr><td></td><td colspan="3">culverts, and the principles for selecting the location of small bridges and culverts.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Exam</td></tr>
<tr><td rowspan="4">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Homework</td><td>20%</td><td>Assess the level of knowledge mastery</td></tr>
<tr><td>Tests</td><td>20%</td><td>Cover all knowledge units</td></tr>
<tr><td>Final Exam</td><td>60%</td><td>Assess the mastery and application of core knowledge points</td></tr>
<tr><td>Reading list</td><td colspan="3">Course textbook: "Bridge and Culvert Hydrology", edited by Gao Dongguang, People's Traffic Press.
Reference materials: 1. "Hydraulics and Bridge and Culvert Hydrology", edited by Ye Zhenguo, People's Traffic Press; 2. "Hydraulics", edited by Hunan University, China Architecture & Building Press.</td></tr>
</table>

Road Survey and Design Module Handbook

Module designation	Road survey and design
Semester(s) in which the module is taught	Semester 6
Person responsible for the module	Xiao Ming
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Courses, Projects, Seminars, etc.
Workload (incl. contact hours, self-study hours)	Contact Hours: 40, Self-study Hours: 35
Credit points	Chinese Credits: 2.5, ECTS Credits: 2.5
Required and recommended prerequisites for joining the module	高Advanced Mathematics, Civil Engineering Drawing (including CAD), Engineering Geology, Engineering Surveying, etc.
Module objectives/intended learning outcomes	Course Objective 1: Understand the basic situation of national road construction and planning, master the basic concepts of road survey and design, and acquire fundamental knowledge of horizontal, vertical, and cross-sectional design, as well as intersection design. Understand the basic content of overall design, be able to operate basic software required for the informatization development of the construction industry, and possess the ability to build and apply information models. Course Objective 2: Understand the principles, steps, and methods of highway route selection, and learn the content of route comparison and selection at different design stages. Master road route selection in plain, mountainous, and hilly terrains, and understand route selection under special terrain conditions. Master the principles and methods of specific route alignment. Develop the ability to analyze, reason, and solve practical engineering problems. Be able to analyze and evaluate the impact of civil engineering project design and construction, as well as solutions to complex engineering problems, on society, health, safety, law, and culture, and provide support for the content and steps of solution comparison.
Content	《"Road Survey and Design" is an important professional course for the Civil Engineering major (Road and Bridge Engineering direction). It is an applied and practical course that comprehensively applies knowledge of mathematics, mechanics, geometry, surveying, and engineering geology. The main content of this course includes an overview of road survey and design, road horizontal design, road vertical design, road cross-sectional design, overall design, route selection and alignment, and road intersection design. Through the study of various knowledge units and teaching activities, students should understand the basic situation of national transportation construction, master the basic principles and methods of road survey and design, and possess the ability to design road alignments. They should be able to participate in actual road engineering route surveys and

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<tr><td></td><td colspan="3">designs and understand the development and trends of modern survey and design technologies.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Small assignments, quizzes, major (project) assignments, final exam</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>Percentage</td><td>Requirements</td></tr>
<tr><td>Assignments</td><td>Twenty percent</td><td>Assessing knowledge mastery</td></tr>
<tr><td>Quizzes</td><td>Ten percent</td><td>Covering all knowledge units</td></tr>
<tr><td>Project</td><td>Ten percent</td><td>Conduct route selection and horizontal, vertical, and cross-sectional design for a specified project, to be completed collaboratively by a group</td></tr>
<tr><td>Final Exam</td><td>Sixty percent</td><td>Assessing core knowledge mastery and application</td></tr>
<tr><td>Reading list</td><td colspan="3">Textbook:Zhang Chi et al. Road Survey and Design (6th Edition). Beijing: China Communications Press Co., Ltd., 2023.7
Reference Materials:Pei Yulong. Road Survey and Design (2nd Edition). Beijing: China Communications Press Co., Ltd., 2018.8</td></tr>
</table>

Subgrade and Pavement Engineering Module Handbook

Module designation	Subgrade and Pavement Engineering
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	Chen Xiangliang
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Lectures, Courses, Projects, Seminars, etc.
Workload (incl. contact hours, self-study hours)	Contact Hours: 48, Self-study Hours: 42
Credit points	Chinese Credits: 3, ECTS Credits: 3
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Material Mechanics, Soil Science and Soil Mechanics, Road Survey and Design, etc.
Module objectives/intended learning outcomes	Course Objectives:Through learning the types and structures of retaining structures, layout of retaining walls, earth pressure calculations for retaining walls, and design of gravity retaining walls, cultivate the ability to master basic construction processes, collaboratively complete the establishment of a 3D BIM model for retaining walls, and demonstrate innovative thinking during the design and construction process. Through learning vehicle classification, standard axle load conversion methods, types of pavement material design parameters, measurement methods, and value determination methods, master the calculation of cement concrete pavement thickness. Develop familiarity with standards, policies, laws, and regulations related to civil engineering, and understand the impact of different social and cultural contexts on engineering activities. Through learning the classification and engineering properties of subgrade soil, the role of subgrade drainage facilities, and the classification and characteristics of asphalt pavements, master subgrade design, drainage design, and asphalt pavement structural composition and thickness design. Cultivate awareness of using energy-saving and environmentally friendly materials and implementing green construction practices.
Content	Master the types and structures of retaining structures, layout of retaining walls, earth pressure calculations for retaining walls, and design of gravity retaining walls. Develop the ability to master basic construction processes, complete the establishment of a 3D BIM model for retaining walls, and demonstrate innovative thinking during the design and construction process. Master vehicle classification, the concept and parameters of standard axles, the concept and calculation methods of traffic volume, the concept and determination methods of axle load spectra, the concept and value determination of wheel track lateral distribution coefficients, and standard axle load conversion methods. Understand the types, measurement methods, and value determination methods of pavement material design parameters. Learn the structure and

<table>
<tr><td></td><td colspan="3">thickness calculation of cement concrete pavements.
Master the classification and engineering properties of subgrade soil, subgrade moisture conditions, determination of subgrade moisture equilibrium, and division of subgrade natural regions. Understand the mechanical strength characteristics of subgrades and the determination methods of bearing capacity and material parametersMaster the concept and structure of subgrades, subgrade protection engineering, and subgrade slope stability analysis. Understand the occasions, types, structures, and roles of subgrade drainage facilities.Master the concept, strength formation principles, and application scope of gravel base courses. Understand the classification, characteristics, performance, and zoning of asphalt pavements, as well as the structural composition and thickness design of asphalt pavements.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Exams, Thesis, Major Assignments (based on the course requirements).</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Item</td><td>Percentage</td><td>Requirements</td></tr>
<tr><td>Assignments</td><td>Twenty percent</td><td>Assess knowledge mastery.</td></tr>
<tr><td>Tests</td><td>Thirty percent</td><td>Cover all knowledge units.</td></tr>
<tr><td>Major Assignment</td><td>Ten percent</td><td>Complete a specified project, select construction machinery, and collaborate as a group.</td></tr>
<tr><td>Final Exam</td><td>Forty percent</td><td>Assess core knowledge mastery and application.</td></tr>
<tr><td>Reading list</td><td colspan="3">Huang Xiaoming. Subgrade and Pavement Engineering [M]. Beijing: People's Transportation Press, 2023.</td></tr>
</table>

Bridge Engineering (1) Module Handbook

Module designation	Bridge Engineering (1)
Semester(s) in which the module is taught	Semester 5.
Person responsible for the module	Li Miao.
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Courses, lectures, etc.
Workload (incl. contact hours, self-study hours)	Contact hours: 56, self-study hours: 49.
Credit points	Chinese credits: 3.5, European credits: 3.5.
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Mechanics of Materials, Structural Mechanics, Principles of Concrete Structure Design, Foundation Engineering, etc.
Module objectives/intended learning outcomes	Course Objective 1: Understand the types of bridges and the mechanical properties, application scope, and development trends of several basic bridge types; master the principles and methods of bridge planning and design; familiarize with the characteristics of bridge design loads and the combination principles of various load effects; cultivate professional knowledge in civil engineering and comprehensive analysis skills in solving complex engineering problems in civil engineering. Course Objective 2: Master the structural characteristics of simply supported beam bridges; understand the basic principles of practical methods for spatial calculation of bridges and the concept of effective working width of bridge decks; master the structural principles and design calculation methods of reinforced concrete simply supported beam (slab) bridges (focusing on prefabricated bridges); master the structural characteristics of continuous beam bridges; understand the internal force calculation of the main girders of continuous beam bridges; master the structural principles and basic calculation methods of concrete continuous beam (slab) bridges; cultivate comprehensive analysis capabilities that consider social, health, safety, legal, cultural, and environmental factors, as well as the ability to complete system design (development) solutions that meet specific needs in civil engineering. Course Objective 3: Familiarize with the structural types of piers and abutments; master the design and calculation principles of piers and abutments; cultivate the ability to use modern engineering tools related to civil engineering, perform numerical modeling and calculations based on practical engineering needs, and analyze the validity and limitations of prediction and simulation results.
Content	Master the basic components and classification of bridges, the overall planning and design of bridges, the actions on bridges, and the layout and construction of bridge decks; master the classification, construction, and design key points of concrete beam bridges, as well as the calculation of simply supported concrete beam bridges; understand the relevant principles

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<tr><td></td><td colspan="3">and methods for calculating continuous concrete beam bridges; familiarize with the structural characteristics and forms of rigid frame bridges and skew beam bridges; master the types, construction, design requirements, and selection principles of bridge piers and abutments; understand the calculation methods for bridge piers and abutments.
Gain a certain depth of understanding of bridge engineering and initially poss the ability to solve general bridge-related problems.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Exams, assignments.</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items.</td><td>Proportion.</td><td>Requirements</td></tr>
<tr><td>Homework</td><td>20%</td><td>To assess the mastery of core knowledge points.</td></tr>
<tr><td>In-class Tests</td><td>20%</td><td>Cover all knowledge units.</td></tr>
<tr><td>Major project assignments</td><td>20%</td><td>Structural Design Major Assignment, Assessing Students' Competencies</td></tr>
<tr><td>Final Exam</td><td>40%</td><td>Assessing students' mastery of core knowledge points and their comprehensive analysis abilities.</td></tr>
<tr><td>Reading list</td><td colspan="3">Current relevant specifications for highway bridges and culverts
Shao Xudong. Bridge Design and Calculation [M]. People's Communications Press, 2007.
Li Zilin. Bridge Engineering [M]. China Machine Press, 2011.
Wu Ming. Bridge Engineering [M]. Wuhan University Press, 2009.
Yao Lingsen. Bridge Engineering [M]. People's Communications Press, 2021.
Fan Lichu. Bridge Engineering [M]. People's Communications Press, 2012.</td></tr>
</table>

Bridge Engineering(II) Module Handbook

Module designation	Bridge Engineering(II)
Semester(s) in which the module is taught	Semester 6
Person responsible for the module	Yang Rihua
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Courses, programs, seminars, etc. (based on their own course)
Workload (incl. contact hours, self-study hours)	Contact hours: 40, Self-study hours: 35
Credit points	Chinese credits: 2.5, ECTS Credits: 2.5
Required and recommended prerequisites for joining the module	Structural mechanics, material mechanics, concrete structure design principle, bridge engineering (1), etc
Module objectives/intended learning outcomes	Course objective 1: master the design characteristics of arch bridge structure, understand the calculation principle and calculation method of catenary arch bridge design; understand the overall layout characteristics of cable-stayed bridge, cultivate the professional knowledge of civil engineering, and have the ability to use the relevant knowledge in model construction, solution and comparative analysis when solving complex engineering problems in civil engineering. Course objective 2: Understand the overall design characteristics and structural characteristics of steel plate girder bridge, understand the structural characteristics of steel truss girder bridge; cultivate the ability to be familiar with the standards, policies, laws and regulations of occupations and industries related to civil engineering. Course objective 3: Be able to independently complete the layout of the upper concrete arch bridge according to the provided materials, master the internal force calculation method of the upper concrete arch bridge structure, and master the checking method of the strength, stiffness and stability of the arch bridge. Master the basic skills of calculation book writing and drawing drawing, and cultivate the ability to have independent learning and adapt to the needs of industry development.
Content	Structural principle, design calculation and construction method of concrete arch bridge; general layout of concrete cable-stayed bridge; structure and design of steel plate beam bridge and structural design of steel truss bridge. Through the study of each knowledge unit and teaching link, students should master the structural design of concrete arch bridge and the calculation principles and methods of upper arch bridge, understand the calculation characteristics of middle and lower bearing arch bridge, understand the overall design of concrete cable-stayed bridge; master the composition and classification of steel plate beam bridge, the structure and layout; master the composition and classification of steel truss bridge, the structure and layout of steel truss bridge; enable the students to have a deep understanding of bridge engineering and the ability

<table>
<tr><td></td><td colspan="3">to solve general bridge problems.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Exams, papers, big assignments, (according to their own courses)</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Components</td><td>Weighting</td><td>Requirements</td></tr>
<tr><td>school assignment</td><td>15%</td><td>Assessment of knowledge mastery</td></tr>
<tr><td>test</td><td>20%</td><td>Covering all of the knowledge units</td></tr>
<tr><td>project</td><td>10%</td><td>For the designated project, it is completed together by the team together</td></tr>
<tr><td>final</td><td>60%</td><td>Assess the mastery and application of the core knowledge points</td></tr>
<tr><td>Reading list</td><td colspan="3">By Shao Xudong, Bridge Engineering (sixth edition), People's Communications Press, 2023
Giberhai, Steel Bridge (2nd edition), People's Communications Press, 2023</td></tr>
</table>

Construction Technology of Road and Bridge Engineering Handbook

Module designation	Construction Technology of Road and Bridge Engineering
Semester(s) in which the module is taught	Semester 6
Person responsible for the module	Instructor: Feng Haoxiong
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Courses, Internships, Projects, Seminars, etc.
Workload (incl. contact hours, self-study hours)	Contact Hours: 32, Self-study Hours: 28
Credit points	Chinese Credits: 2, ECTS Credits: 2
Required and recommended prerequisites for joining the module	Civil Engineering Materials, Structural Mechanics, Material Mechanics, Soil Mechanics, Principles of Concrete Structure Design, Fundamentals of Steel Structures, Bridge Engineering, Road Survey and Design, Subgrade and Pavement Engineering, Construction Principles and Methods, etc
Module objectives/intended learning outcomes	Objective 1: Understand the role of subgrade, master common ground treatment methods, and learn the construction of soil and rock subgrades. Understand common subgrade construction machinery.Objective 2: Understand the role of pavement, master pavement classification, pavement structural layers, and construction techniques and key points of road base layers. Learn the construction techniques and key points of asphalt concrete and cement concrete pavements. Understand common pavement construction machinery.Objective 3: Understand the role of bridge substructures, learn common construction methods for substructures, and master key control points in substructure construction. Learn to prepare construction organization designs for bridge substructures. Understand common substructure construction equipment.Objective 4: Understand the role and main forms of bridge superstructures, learn common construction methods for superstructures, and master key control points in superstructure construction. Learn to prepare construction organization designs for bridge superstructures. Understand common superstructure construction equipment.
Content	Subgrade Engineering, Pavement Engineering, Bridge Substructure, Bridge Superstructure. Through various teaching activities, students will master the construction methods and techniques for subgrades, pavements, and different bridge types. They will also learn about the application of new materials and technologies in modern road and bridge construction. Additionally, students will be able to apply their knowledge to practical situations, gaining a deeper understanding of road and bridge construction technology and developing the ability to draft construction plans for roads, bridges, and tunnels.

Examination forms	Exams, Quizzes, Assignments		
Study and examination requirements	Assessment Items	Percentage	Requirements
	Assignments	Thirty percent	(Assessing knowledge mastery)
	Quizzes	- Ten percent	(Covering all knowledge units)
	Final Exam	Sixty percent	Assessing core knowledge mastery and application)
Reading list	Yao Gang, Hua Jianmin. Construction Technology and Organization of Civil Engineering [M]. Chongqing: Chongqing University Press, 2017.		

Road and Bridge Engineering Budget Estimate Module Handbook

Module designation	Road and Bridge Engineering Budget Estimate
Semester(s) in which the module is taught	Semester 6
Person responsible for the module	Liu Lingyong
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Courses, programs, and workshops
Workload (incl. contact hours, self-study hours)	Contact hours: 24, self-study hours: 21
Credit points	Chinese credits: 1.5, ECTS Credits: 1.5
Required and recommended prerequisites for joining the module	Construction principles and methods, engineering project management, engineering economy and building regulations
Module objectives/intended learning outcomes	Course objective 1: Master the definition of quota, the characteristics of quota, the role of quota, and understand the occasions of various quota application. Understand the basic composition of quota, master the method of quota number, the correct use of quota, master the direct application of quota and complex quota application. Understand the investment measurement system; understand the role of budget and the composition of budget expenses. Master the calculation methods of construction and installation project costs, land use and demolition compensation costs, other project construction expenses, reserve funds, construction period loan interest and other expenses. Familiar with the engineering economic theory, master the economic decision-making method, to be able to make a reasonable economic analysis of civil engineering projects, and have the ability of basic decision-making. Course objective 2: To use highway engineering cost software to measure and price, to cultivate the ability to use modern tools to model and calculate complex engineering problems in civil engineering, and to analyze the effectiveness and limitations of the results.
Content	Quota overview and classification, application of quota, software modeling and calculation, function and document composition of budget, calculation of budget cost, software valuation, etc. Through the study of each teaching link, students can retell the definition of quota, explain the characteristics of quota, and explain the role of quota. According to the different use of objects, the correct selection of various quotas. Explain the basic composition of quota, confirm the number of quota, correctly use quota, implement the application of quota. Determine the classification of investment according to the construction procedure; understand the role of the budget and determine the composition of the budget cost. Calculate the construction and installation costs, land use and demolition compensation costs, and calculate other construction expenses, reserve funds and loan interest during the construction period. Correct use of the cost software to prepare the project budget. Using the cost software to create a model, the

<table>
<tr><td></td><td colspan="3">implementation of the quantity calculation, the implementation of the final cost calculation.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Examination, usual homework, in-class test, big homework</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Components</td><td>Weighting</td><td>Requirements</td></tr>
<tr><td>Usually homework</td><td>10%</td><td>Assessment of knowledge mastery</td></tr>
<tr><td>In-class test</td><td>15%</td><td>Cover all knowledge units except for software valuation</td></tr>
<tr><td>Big homework</td><td>15%</td><td>For the designated small components, the cost software is selected to compile the construction and installation engineering cost, which is completed by the team.</td></tr>
<tr><td>final</td><td>60%</td><td>Assess the mastery and application of the core knowledge points</td></tr>
<tr><td>Reading list</td><td colspan="3">Course textbook: Wang Shouxu. Highway Construction Organization and Summary Budget (4th edition) [M]. Beijing: People's Communications Press, 2020.07
Reference materials: "highway capital construction outline (pre-calculation) document preparation method", "highway engineering budget quota", "highway engineering budget estimate quota", "highway engineering machinery station class cost quota"</td></tr>
</table>

Network planning and route design for urban rail transit

Module designation	Network planning and route design for urban rail transit		
Semester(s) in which the module is taught	Semester 5		
Person responsible for the module	Tan Dexi and Zhou Yi		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Teaching, discussion and communication, picture parsing, video learning, etc		
Workload (incl. contact hours, self-study hours)	Contact hours: 48, self-study hours: 42		
Credit points	Chinese credits: 3, ECTS Credits: 3		
Required and recommended prerequisites for joining the module	Introduction to civil engineering, civil engineering survey, etc		
Module objectives/intended learning outcomes	Course objective 1: master the urban rail transit system, urban rail transit network planning and design method, urban rail transit line plane design method, line profile design method, line cross section and wiring design method and other professional knowledge, in solving the urban rail transit line planning and design complex engineering problems, can use relevant knowledge in the service of model construction, solving and comparative analysis. Course objective 2: master the evaluation method of urban rail transit network scheme, understand the urban rail transit route routing scheme, line plane location scheme and station distribution scheme than content, to evaluate the urban rail transit network, line design to the social, health, safety, legal and cultural influence, set up the correct engineering concept and engineering consciousness.		
Content	The course mainly includes the foundation of urban rail transit system design, rail transit comprehensive line selection, rail transit network planning, line plane design, line longitudinal section design, cross-section design and distribution line design. Through the study of each teaching link, the students can have a deep understanding of the urban rail transit network planning and line design, and initially have a certain planning and design ability.		
Examination forms	*Small homework, class tests, big homework, final exams*		
Study and examination requirements	**Assessment Components**	**Weighting**	**Requirements**
	Small homework	15%	Assessment of knowledge mastery
	test	15%	Covering all of the knowledge units
	Big homework	10%	Complete the graphic

			design and calculation for the specified projects
	final	60%	Assess the mastery and application of the core knowledge points
Reading list	Mao Baohua. Urban Rail Transit Planning and design [M]. Beijing: People's Communications Press, 2020. Yi Sirong. Planning and design of urban rail transit lines [M]. Beijing: Science Press, 2013.		

Railroad Track Engineering Module Handbook

Module designation	Railroad Track Engineering		
Semester(s) in which the module is taught	Fifth semester.		
Person responsible for the module	Xirong Peng, Dexi Tan		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Lectures, question-guided discussions, seminars, picture presentations, case studies, etc.		
Workload (incl. contact hours, self-study hours)	Contact hours: 48. Self-Study hours: 48.		
Credit points	Chinese Credits: 3.0, European Credits: 3.0		
Required and recommended prerequisites for joining the module	Theoretical Mechanics, Mechanics of Materials, Structural Mechanics, Principles of Concrete Structure Design, etc.		
Module objectives/intended learning outcomes	**Course Objective 1**: Master professional knowledge of ballasted track structure, ballastless track structure, track geometry, turnouts, seamless tracks, and track maintenance, keep abreast of the latest developments in track structure, and be able to apply relevant knowledge to model construction, solution, and comparative analysis when solving complex engineering problems in railroad track engineering. **Course Objective 2**: Be capable of using modern tools such as MATLAB and EXCEL to model and calculate engineering problems in railroad track engineering, including mechanical analysis and strength verification of track structures, geometrical calculation and rail matching of single turnout, and calculation and design of seamless tracks, and be able to analyze the validity and limitations of the results. **Course Objective 3**: While learning railroad track engineering knowledge and its applications, cultivate the ability to self-study and adapt to the development needs of the industry.		
Content	Ballasted track and ballastless track structures, geometric analysis of track structures, mechanical analysis of track structures, structures and geometric dimensions of turnouts, basic principles of seamless tracks, stability calculation and structural design methods, repair and management of track structures, urban rail transit track structures, etc. Through the learning of various teaching links, students master ballasted track and ballastless track structures, understand the geometric analysis of track structures, can apply the principles of mechanical analysis of track structures and seamless tracks, etc., to design track structures, master the structures and dimensions of turnouts, and have the ability to calculate turnout designs, and be able to repair and manage track structures, etc. They have a deep understanding of the relevant knowledge, principles and methods of railroad track engineering, and initially possess certain abilities in the design, construction and management of railroad track engineering.		
Examination forms	Class tests, regular homework, major project assignments, final exam.		
Study and examination requirements	**Assessment Items**	**proportion**	**Requirements**
	Class tests	15%	Assess the mastery of knowledge
	Regular homework	15%	Cover all knowledge units
	Major project assignments	10%	Based on project cases, the internal force calculation and strength check of the track structure were conducted independently

			by the individual.
	Final exam	60%	Assess the mastery and application of core knowledge points.
Reading list	Gao Liang. Track Engineering [M]. Beijing: China Railway Publishing House, 2015. Li Chenghui. Railway Track [M]. Beijing: China Railway Publishing House, 2014.		

Construction Principles and Methods Module Handbook

Module designation	Railway bridge
Semester(s) in which the module is taught	The sixth semester
Person responsible for the module	Li Xingxin
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Lecture, Course
Workload (incl. contact hours, self-study hours)	Contact class hours: 32, Self-study class hours: 28
Credit points	Chinese credits: 2.5, European credits: 2.5
Required and recommended prerequisites for joining the module	Materials of Civil Engineering, Structural Mechanics, Mechanics of Materials, Principles of Concrete Structure Design, etc.
Module objectives/intended learning outcomes	Course Objective 1: Explain the general development situation of railway bridges at home and abroad; Identify the composition, structural system and classification of bridges; Identify common nouns and terms of bridges. Cultivate the ability of written expression, the ability to read and apply industry norms. Course Objective 2: Explain the basic content and principles of bridge design; Identify the requirements for the plane design of bridges, bridge openings and the clearance above the bridge; Explain the procedures for bridge design and construction; Explain the steps and procedures for the comparison and selection of bridge design schemes; Explain the characteristics of railway bridge design. Cultivate the ability to effectively express complex engineering problems in civil engineering through drawings, charts and texts, as well as the ability to read and apply industry norms. Course Objective 3: Identify the classification and composition of bridge design loads; Identify the definitions and calculations of various loads such as dead loads, live loads, additional loads and special loads; Explain railway bridge loads; Identify load combinations and their principles. Cultivate the ability to effectively express complex engineering problems in civil engineering through drawings and charts, as well as the ability to analyze, reason and solve complex engineering problems. Course Objective 4: Understand the deck structures of highway bridges, including deck pavement, anti-drainage systems, bridge expansion devices, continuous deck structures, sidewalks, railings, guardrails, lighting and greening, etc.; Identify the deck structures of railway bridges, such as rails, sleepers, ballast, ballast retaining walls, sidewalks, railings and rail expansion regulators, etc.; Understand the deck structures of high-speed railway bridges. Cultivate the ability to read and apply industry norms and drawings. Course Objective 5: Identify the structural characteristics of concrete simply supported

<table>
<tr><td></td><td colspan="3">beam bridges; Explain the manufacturing processes and common erection methods and equipment of concrete simply supported beam bridges; Master the design and calculation of concrete simply supported beam bridges; Understand the characteristics, technical requirements and construction methods of concrete simply supported beam bridges of high-speed railways. Cultivate the ability to effectively express complex engineering problems in civil engineering through drawings, charts and texts, the ability to analyze, reason and solve complex engineering problems, the ability to read and apply industry norms, the ability of effective communication and teamwork, and the ability of independent learning.
Course Objective 6: Identify the types and structures of railway bridge bearings; Understand the design and calculation of railway bridge bearings. Cultivate the ability to read, calculate and apply industry norms and drawings.
Course Objective 7: Identify the types, structures, designs and calculations of general railway bridge piers and abutments; Explain the types, structures, designs and calculations of bridge piers and abutments. Cultivate the ability to read, calculate and apply industry norms and drawings.</td></tr>
<tr><td>Content</td><td colspan="3">"Railway Bridges" is an important specialized course for the urban rail transit direction of the civil engineering major. It is one of the main branches of the civil engineering discipline and also an applied branch of the structural engineering discipline. The main contents include an overview of bridge engineering and the basic content of design, railway bridge loads, the structures of railway bridge decks and bearings, as well as the design and calculation of concrete simply supported beam bridges, piers and abutments.
Based on the study of each teaching link, students will understand the basic situation bridge engineering and the basic knowledge of design, explain railway bridge loads, bridge d structures and bearings, master the design and calculation of concrete simply supported be bridges, piers and abutments. At the same time, they can apply the knowledge they have lear and connect it with reality. This enables students to have a certain in-depth understanding railway bridges and initially possess the ability to solve general technical problems of railv bridges.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Examination,</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Homework</td><td>15%</td><td>Assess the mastery of knowledge</td></tr>
<tr><td>Test</td><td>15%</td><td>Cover all knowledge units</td></tr>
<tr><td>Major Assignment</td><td>30%</td><td>Select construction machinery for the designated project and complete it through the collaboration of the group.</td></tr>
<tr><td>Final examination</td><td>40%</td><td>Assess the mastery and application of core knowledge points.</td></tr>
<tr><td>Reading list</td><td colspan="3">Xia He. Bridge Engineering [M]. Beijing: Beijing Jiaotong University Press, 2017.</td></tr>
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Urban Rail Transit Station Module Handbook

Module designation	Urban Rail Transit Station
Semester(s) in which the module is taught	Semester 6
Person responsible for the module	Zhou Yi
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Lectures, courses, projects, seminars, etc.
Workload (incl. contact hours, self-study hours)	Contact Hours: 24, Self-Study Hours: 21
Credit points	Chinese Credits: 1.5 | ECTS Credits: 1.5
Required and recommended prerequisites for joining the module	Soil Mechanics, Engineering Geology, Structural Mechanics, Principles of Concrete Structure Design, Theory of Engineering Structure Load and Reliability, Urban Rail Transit Network Planning and Line Design, etc.
Module objectives/intended learning outcomes	Course Objective 1:Understand the planning of underground stations, the principles of determining station scale and layout. Be familiar with the principles and contents of the planar layout and architectural design of underground stations. Master the structural forms and structural design of underground stations. Master the construction characteristics, classification, methods of the cut - and - cover method for underground stations, as well as the construction steps and contents of different construction methods. Understand the characteristics, classification and construction methods of the mining method for underground stations.By searching for occupation - related, industry - related standards, policies, laws and regulations related to urban rail transit, initially possess the ability to use the professional knowledge of urban rail transit station design and construction learned to calculate the stress of simple structures and conduct construction organization design. Course Objective 2:Through self - learning, understand the general development situation and the latest trends of urban rail transit. When learning the knowledge of urban rail transit stations and their applications, cultivate the ability of self - learning and the ability to adapt to the development needs of the industry.
Content	Gain an understanding of the entire process of underground station planning, design, and construction, including the selection and application of planning principles, design, and construction methods in specific projects. Through the study of each teaching link, students will master the basic principles, content, and specific design calculation methods of station planning and design, as well as the classification of station construction and the steps and content of different construction methods. They will have a certain understanding of the design and construction of urban rail underground stations and initially master the ability to design and construct urban rail underground stations.

Examination forms	Exams, In - class Tests, Papers, Major Assignments		
Study and examination requirements	Assessment Components	Weighting	Requirements
	Assignments	20%	Assess the mastery of knowledge.
	Tests	10%	Cover all knowledge units.
	Major Assignments	10%	Given the conditions of a station, select the construction method, analyze the structural stress situation and conduct load - bearing calculations, and correctly draw simple stress diagrams.
	Final Exam	60%	Assess the mastery and application of core knowledge points.
Reading list	Wang Mingnian. Design and Construction of Urban Rail Transit Underground Stations. Beijing: Science Press, 2013. Zhou Shunhua. Structural Design and Construction of Urban Rail Transit (2nd Edition). Beijing: China Communications Press Co., Ltd., 2017 .		

Railroad Bed Module Handbook

Module designation	Railroad Bed
Semester(s) in which the module is taught	Semester 5
Person responsible for the module	Zheng Liangfei
Language	Chinese
Relation to curriculum	Professional Application
Teaching methods	Lectures, courses, laboratory work, projects, seminars, etc.
Workload (incl. contact hours, self-study hours)	Contact Hours: 32, Self-Study Hours: 28
Credit points	Chinese Credits: 2 | ECTS Credits: 2
Required and recommended prerequisites for joining the module	Engineering Geology, Soil Mechanics, Building Materials, Structural Mechanics, Mechanics of Materials, etc.
Module objectives/intended learning outcomes	Course Objective 1:Master general subgrade design, drainage, and protection. Grasp the analysis of subgrade stress, deformation, and slope stability, subgrade design for special soils and special sections, as well as subgrade retaining structures. Master subgrade construction techniques and have an understanding of high - speed railway subgrade design and other professional knowledge.Keep abreast of the latest developments in subgrade engineering. When solving complex engineering problems in track engineering, be able to apply relevant knowledge to model construction, solution, and comparative analysis. Course Objective 2:Through mastering the mechanical analysis and strength checking of subgrade retaining walls, be able to assist in the virtual design and construction of gravity retaining walls, and demonstrate innovative thinking during the design and construction process. Course Objective 3:Understand the application of new materials in subgrade design and new construction techniques in subgrade construction, and have the awareness of using energy - saving and environmentally friendly new materials for green construction.
Content	General subgrade design, subgrade drainage and protection, subgrade stress and deformation, subgrade slope stability, subgrade retaining structure, subgrade construction technology, special soil, subgrade design of special sections and high-speed railway subgrade design. The goal of learning is to master the general subgrade design, drainage, protection, subgrade stress, deformation and slope stability analysis, special soil, special section subgrade design, and be able to use the above knowledge to design subgrade; Master the subgrade support structure, be able to use the principle of retaining wall force analysis, and be able to design the retaining wall; Master the subgrade construction technology and understand the design of the high-speed railway subgrade. At the same time, it lays a good foundation for further study of track engineering, deep foundation engineering, underground engineering and other related professional

	courses.		
Examination forms	Exams, Papers, Major Assignments		
Study and examination requirements	Assessment Components	Weighting	Requirements
	After - class Assignments	30%	assess the mastery of knowledge
	Major Assignments	20%	Assess the mastery and application of core knowledge points
	Final Exam	50%	cover all teaching units
Reading list	Course Textbook: Yang Guangqing, Su Qian. Subgrade Engineering (Third Edition). Beijing: China Railway Publishing House, February 2019. Reference Materials: Code for Design of Concrete Structures, Code for Design of Railway Subgrades, Code for Design of Retaining Structures of Railway Subgrades, etc.		

Urban Rail Transit Engineering Budget Teaching Program Module Handbook

Module designation	Urban Rail Transit Engineering Budget		
Semester(s) in which the module is taught	The seventh semester		
Person responsible for the module	Hong Xinmin		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Course		
Workload (incl. contact hours, self-study hours)	Contact hours: 24, Self-study hours: 21		
Credit points	Chinese credits: 1.5, European credits: 1.5		
Required and recommended prerequisites for joining the module	Construction Organization, Engineering Economics, Principles of Concrete Structure Design, etc.		
Module objectives/intended learning outcomes	Through the teaching of this course, students can firmly master the basic concepts, fundamental theories, and essential skills of the course. They are able to prepare the budgetary estimate for urban rail transit engineering projects and gain an understanding of the current development status and trends of this discipline. This course aims to cultivate students' good professional ethics, a strong sense of dedication to their work, and the basic qualities of being responsible and accountable. By understanding the basic concepts and relevant theories, students can enhance their abilities to identify and solve problems.		
Content	The definition, characteristics, and functions of quotas, the basic composition of quotas, the application of quotas, the investment measurement system, the functions of budgetary estimates and budgets, the composition of budgetary estimate and budget expenses, the costs of construction and installation works, other expenses in project construction, contingency reserves, special expenses, and the calculation of various costs. Through learning in various teaching links, students will become familiar with engineering economic theories, conduct reasonable economic analyses of civil engineering projects, and make decisions. They will master the pricing procedures of quota-based pricing and bill - of - quantities pricing, and learn to compile tender bills of quantities and tender offers. Students will be able to use modern tools to model and calculate complex civil engineering problems and analyze the effectiveness and limitations of the results.		
Examination forms	*Examination, Project, Assignment*		
Study and examination requirements	**Assessment Items**	**Proportion**	**Requirements**
	Homework	15%	Assess the mastery of knowledge
	Test	15%	Cover all knowledge units
	Project	10%	For the designated project, select construction machinery and complete it through the collaboration of

			the group.
	Final Examination	60%	Assess the mastery and application of core knowledge points.
Reading list	Li Minghua. Construction Organization and Budgetary Estimate of Urban Rail Transit Engineering [M]. Beijing: China Railway Publishing House, September 2020. "Budget Quota for Urban Rail Transit Engineering" (Jianbiao [2011] No. 99), "Compilation Rules for the Expense Standards of Construction and Installation Engineering of Urban Rail Transit" (Jianbiao [2011] No. 159), "Compilation Measures for the Design Budgetary Estimate of Urban Rail Transit Engineering" (Jianbiao [2017] No. 89), "Budgetary Estimate Quota for Urban Rail Transit Engineering" (GCG 102-2011)		

Highway and Railway Engineering Construction Technology Module Handbook

Module designation	Highway and Railway Engineering Construction Technology		
Semester(s) in which the module is taught	Semester 6		
Person responsible for the module	Tan de xi		
Language	Chinese		
Relation to curriculum	Professional Application		
Teaching methods	Teaching, discussion and communication, picture parsing, video learning, etc		
Workload (incl. contact hours, self-study hours)	Contact hours: 32, self-study hours: 28		
Credit points	Chinese credits: 2, ECTS Credits: 2		
Required and recommended prerequisites for joining the module	Civil engineering materials, construction principles and methods, civil engineering survey, roadbed engineering, bridge engineering, tunnel engineering, track engineering, etc		
Module objectives/intended learning outcomes	Course objective 1: master subgrade earthwork construction, bridge engineering construction, tunnel engineering construction, rail engineering construction professional knowledge, to specific road and railway engineering complex engineering problems, formulate construction plan, and in the plan to fully consider the social, health, safety, law, culture, and environmental constraints. Course objective 2: In the process of selecting construction methods, construction materials and construction machinery and equipment, cultivate the awareness of using energy-saving and environmental protection new materials and carrying out green construction.		
Content	The course mainly includes subgrade earthwork construction, bridge engineering construction, tunnel engineering construction and track engineering construction. Through the study of each teaching link, make the students master subgrade earthwork engineering construction, bridge engineering construction, tunnel engineering construction, rail engineering construction basic principle, basic method, construction machinery equipment configuration and organization, quality control, etc., have a deep understanding of road and railway engineering construction, preliminary have certain site construction management ability.		
Examination forms	*Small homework, class tests, big homework, final exams*		
Study and examination requirements	**Assessment Components**	**Weighting**	**Requirements**
	Small homework	10%	Assessment of knowledge mastery
	test	10%	Covering all of the knowledge units
	Big homework	20%	Complete the construction design and calculation for the designated projects

	final	60%	Assess the mastery and application of the core knowledge points
Reading list	Li Minghua, Wang Wei. Railway engineering construction technology [M]. Beijing: China Railway Press, 2024. Li Minghua. Construction technology of road and railway engineering [M]. Changsha: Central South University Press, 2012.		

Comprehensive Graduation Training Design Module Handbook

Module designation	Comprehensive Graduation Training
Semester(s) in which the module is taught	The 8 semester
Person responsible for the module	Tang Huang
Language	Chinese
Relation to curriculum	Comprehensive Application
Teaching methods	Course
Workload (incl. contact hours, self-study hours)	Contact Hours：420，Self - study Hours：420
Credit points	Chinese credits: 14, European credits: 28
Required and recommended prerequisites for joining the module	Basic course, professional course and practical teaching link
Module objectives/intended learning outcomes	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.
Content	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

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<tr><td></td><td colspan="3">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.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Building model， Design, Calculation</td></tr>
<tr><td rowspan="7">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>1. Design scheme</td><td>25%</td><td>The scheme design is based on the application</td></tr>
<tr><td>2. Programme evaluation</td><td>10%</td><td>project evaluation</td></tr>
<tr><td>3. Design hand calculation</td><td>20%</td><td>Standard application of hand calculation</td></tr>
<tr><td>4. Design computer</td><td>20%</td><td>Computerized calculation and analysis</td></tr>
<tr><td>5.BIM model</td><td>15%</td><td>BIM modeling</td></tr>
<tr><td>6. Design summary</td><td>5%</td><td>Sustainability assessment</td></tr>
<tr><td></td><td>7. Communication</td><td>5%</td><td>Effective communication</td></tr>
<tr><td>Reading list</td><td colspan="3">Course materials: None
Reference materials: road bridge, construction, urban rail and other direction textbooks, technical specifications of various industries
Teaching website:</td></tr>
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Graduation Internship Module Handbook

Module designation	Graduation Internship
Semester(s) in which the module is taught	The 7 semester
Person responsible for the module	Tang Huang
Language	Chinese
Relation to curriculum	Comprehensive Application
Teaching methods	Internship
Workload (incl. contact hours, self-study hours)	Contact Hours：50，Self - study Hours：70
Credit points	Chinese credits: 2, European credits: 4
Required and recommended prerequisites for joining the module	Production internship, Design of Concrete Structures, Design of Steel Structures, Principles and Methods of Construction
Module objectives/intended learning outcomes	Through the teaching of this course, students will master fundamental knowledge and acquire certain construction management capabilities. The specific course objectives are as follows: Course Objective 1: When formulating engineering design plans and construction plans, students should be able to fully take into account restrictive factors such as society, health, safety, law, culture, and the environment. Course Objective 2: Students should be capable of evaluating the impacts of the design, construction, and operation and maintenance plans of civil engineering projects, as well as solutions to complex engineering problems, on society, health, safety, law, and culture. Course Objective 3: Students should understand the concepts of environmental protection and sustainable development. Course Objective 4: Students should be able to conduct research on complex engineering problems in civil engineering and analyze solution approaches.
Content	The Graduation Internship, a subsequent course to "Production Practice", is a compulsory professional course for civil engineering majors. It is a practical - based course that comprehensively applies professional knowledge like the principles of concrete structure design, steel structure design, and construction principles and methods, along with relevant knowledge from fields such as building engineering, road and bridge engineering, and urban rail transit engineering. The teaching objectives are to cultivate students' capabilities in applying professional knowledge, reading relevant codes, and

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<tr><td></td><td colspan="3">participating in engineering practices to solve complex civil engineering problems. It aims to endow students with the basic qualities and skills necessary for technical and research work related to construction management, thus laying a solid foundation for their future work in construction management of complex engineering projects and structural design.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Logs, Weekly Reports, Internship Report, Internship Defense</td></tr>
<tr><td rowspan="4">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Weekly Reports</td><td>60%</td><td>A total of three reports. The contents are as follows: 1. Modern Tools; 2. Legal and Social Responsibilities; 3. Green Construction. Evaluated by the instructor.</td></tr>
<tr><td>Internship Report</td><td>20%</td><td>Under the guidance of the on - site instructor, participate in the preparation of a special construction plan. Evaluated by the instructor.</td></tr>
<tr><td>Internship Defense</td><td>20%</td><td>Evaluated by the defense teachers.</td></tr>
<tr><td>Reading list</td><td colspan="3">Course Textbook
Reference Materials: code, video et al.
Teaching Website</td></tr>
</table>

Production Internship Module Handbook

Module designation	Production Internship
Semester(s) in which the module is taught	The 7 semester
Person responsible for the module	Tang Huang
Language	Chinese
Relation to curriculum	Comprehensive Application
Teaching methods	Internship
Workload (incl. contact hours, self-study hours)	Contact Hours：120，Self - study Hours：180
Credit points	Chinese credits: 4, European credits: 10
Required and recommended prerequisites for joining the module	Design of Concrete Structures, Design of Steel Structures, Principles and Methods of Construction
Module objectives/intended learning outcomes	Through the teaching of this course, students will master basic knowledge and possess certain construction management capabilities. The specific course objectives are as follows: Course Objective 1: Be familiar with modern tools related to civil engineering, understand their limitations, and have the ability to select appropriate tools. Course Objective 2: Be familiar with the standards, policies, laws, and regulations of occupations and industries related to civil engineering. Course Objective 3: Comprehend the legal and social responsibilities that civil engineers should assume in engineering practices. Course Objective 4: Have the awareness of using energy - saving and environmentally friendly new materials and conducting green construction. Course Objective 5: Master the principles of civil engineering project management, collaborate to complete management plans for common engineering projects in a multi - disciplinary environment, and possess certain organizational, management, and leadership abilities.
Content	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

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<tr><td></td><td colspan="3">civil engineering design and construction, as well as solutions to complex engineering problems, on society, health, safety, law, and culture.</td></tr>
<tr><td>Examination forms</td><td colspan="3">Logs, Weekly Reports, Internship Report, Internship Defense</td></tr>
<tr><td rowspan="5">Study and examination requirements</td><td>Assessment Items</td><td>Proportion</td><td>Requirements</td></tr>
<tr><td>Logs</td><td>15%</td><td>Two logs per week, recording the daily provisions. Evaluated by the instructor</td></tr>
<tr><td>Weekly Reports</td><td>45%</td><td>A total of three reports. The contents are as follows: 1. Modern Tools; 2. Legal and Social Responsibilities; 3. Green Construction. Evaluated by the instructor.</td></tr>
<tr><td>Internship Report</td><td>20%</td><td>Under the guidance of the on - site instructor, participate in the preparation of a special construction plan. Evaluated by the instructor.</td></tr>
<tr><td>Internship Defense</td><td>20%</td><td>Evaluated by the defense teachers.</td></tr>
<tr><td>Reading list</td><td colspan="3">Course Textbook
Reference Materials: code, video et al.
Teaching Website</td></tr>
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