Module Descriptions

Undergraduate Program in Civil Engineering

Materials for ASIIN Accreditation

Civil Engineering

Kunming University
May 2026

Contents

General Compulsory Courses

Ideological, Moral and Rule of Law

Module designation	*Ideological, Moral and Rule of Law*
Semester(s) in which the module is taught	*Semester 1*
Person responsible for the module	*MIAO Wenwu*
Language	*Chinese*
Relation to curriculum	*General education compulsory course*
Teaching methods	*Lecture, discussion, online learning, social practice, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 75 hours* *Contact hours: 48* *Self-study hours: 27*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*None*
Module objectives/intended learning outcomes	*1. Knowledge: students understand the historical position of China in the new era and grasp the basic contents of outlook on life, ideals and beliefs, Chinese spirit, socialist core values, socialist morality, socialist rule of law, and the constitutional and legal system.* *2. Abilities: students can analyse, judge and express practical issues related to personal growth, social life, moral practice and rule-of-law construction by using course theories, and form sound value choices, moral judgment and rule-of-law thinking.* *3. Competences: students strengthen ideals, beliefs and confidence in the development path, enhance patriotism, social responsibility, moral cultivation and legal awareness, practise socialist core values, respect, study, observe and use the law, and exercise rights and fulfil obligations according to law.*
Content	*1. Becoming a new generation capable of undertaking national rejuvenation, understanding the historical responsibility and value requirements of young people in the new era. (Weight: 0.083, requirement level: understanding + mastery)* *2. Basic issues of the outlook on life, including the relationship among worldview, outlook on life and values, as well as life purpose, attitude and value. (Weight: 0.083, requirement level: understanding + mastery)* *3. Creating a meaningful life, understanding the unity of personal value and social value, and forming a positive attitude toward life. (Weight: 0.083, requirement level: understanding + application)* *4. Strengthening ideals and beliefs, understanding their meaning and role, and the relationship between personal ideals and social ideals. (Weight: 0.083, requirement level: understanding + mastery)* *5. Special topic on religious issues, understanding China's religious policies and relevant legal provisions. (Weight: 0.042, requirement level: awareness + understanding)*

	6. Chinese spirit and its contemporary significance, including national spirit, spirit of the times and their role in youth development. (Weight: 0.083, requirement level: understanding + mastery) *7. Being loyal patriots in the new era, understanding the basic requirements and new-era meaning of patriotism. (Weight: 0.083, requirement level: understanding + application)* *8. Practising socialist core values, mastering their basic contents, features and practical requirements. (Weight: 0.083, requirement level: mastery + application)* *9. Cultivating good moral qualities in practice, understanding socialist morality, its core, principles and civic moral norms. (Weight: 0.083, requirement level: understanding + application)* *10. Cultivating rule-of-law thinking and following the rule-of-law path, including law-based governance, constitutional authority, legal operation, rights, obligations and legal thinking. (Weight: 0.125, requirement level: mastery + application)* *11. Practical teaching, including online learning, learning notes, social practice, case discussion or seminars on ideological, moral and legal topics. (Weight: 0.169, requirement level: application)*
Examination forms	*Learning notes, online learning, practical teaching, regular performance, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 60% + summative assessment score × 40%.* *3. Formative assessment accounts for 60%, including learning notes, online learning, practical teaching and regular performance.* *4. Summative assessment accounts for 40%, and the assessment method is closed-book examination, focusing on outlook on life, ideals and beliefs, Chinese spirit, moral development and legal literacy.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. XI Jinping. Selected Works of Xi Jinping, Vols. I-II [M]. Beijing: People's Publishing House, 2023.* *2. XI Jinping. The Governance of China, Vols. I-V [M]. Beijing: Foreign Languages Press.* *3. MARX K., ENGELS F. Selected Works of Marx and Engels, Vols. I-IV [M]. Beijing: People's Publishing House, 2012.* *4. CPC Central Committee. Decision on Comprehensively Advancing Law-Based Governance [Z]. 2014.* *5. Constitution of the People's Republic of China, 2018 Revision [Z].* *6. Teaching Case Collection for Ideological, Moral and Rule of Law [M]. Beijing: Guangming Daily Press, 2024.* *7. Special Teaching Research on Ideological, Moral and Rule of Law [M]. Beijing: Capital University of Economics and Business Press, 2024. etc.*

An Overview of Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era

Module designation	*An Overview of Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era*
Semester(s) in which the module is taught	*Semesters 1-2*
Person responsible for the module	*Chen Zongbo*
Language	*Chinese*
Relation to curriculum	*General Education Compulsory Course*
Teaching methods	*Lecture-based teaching; thematic instruction; case-based teaching*
Workload (incl. contact hours, self-study hours)	*Total workload: 75 hours* *Contact hours: 48* *Self-study hours: 27*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*Ideological and Moral Cultivation and Rule of Law; Introduction to the Chinese National Community*
Module objectives/intended learning outcomes	*1. Knowledge: Understand the historical background, scientific system, core ideas, spiritual substance and practical requirements of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, including its worldview, methodology and basic standpoints.* *2. Abilities: Analyse major issues in Chinese modernization, high-quality development, national governance, rule of law, ecological civilization and national security by linking theory with contemporary practice, professional learning and social observation.* *3. Qualities: Strengthen confidence in the path, theory, system and culture of socialism with Chinese characteristics, cultivate responsibility for national development and regional construction, and participate in discussion, case analysis and practice in a rational and cooperative manner.*
Content	*1. Historical background, scientific system, core ideas, worldview and methodology. Topics include the principal contradiction in Chinese society, the logic of theoretical innovation and the fundamental standpoints, viewpoints and methods of the theory. (Weight: 0.20, level: understanding + mastery)* *2. Overall and strategic layout of socialism with Chinese characteristics. Topics cover economic, political, cultural, social and ecological development, as well as reform, rule of law, Party self-governance and modernization. (Weight: 0.25, level: understanding + mastery)* *3. Chinese modernization, high-quality development and national rejuvenation. The module discusses innovation-driven development, common prosperity, rural revitalization, regional coordination and new quality productive forces. (Weight: 0.25, level: mastery + application)*

	4. National security, defence, diplomacy and overall Party leadership. Topics include the holistic approach to national security, defence modernization, major-country diplomacy, a community with a shared future for mankind and governance modernization. (Weight: 0.20, level: understanding + application) *5. Practice, online learning and thematic discussion. Students conduct case study, current-affairs analysis, social observation, thematic presentation and online learning to strengthen analytical and written expression skills. (Weight: 0.10, level: application)*
Examination forms	*Class performance, online learning, thematic discussion, flipped-classroom presentation, social-practice output, thematic essay or course paper, and final examination.*
Study and examination requirements	*1. The course uses a 100-point grading system; 60 or above is a pass.* *2. Final grade = formative assessment 50% + final assessment 50%. Formative assessment includes attendance, class performance, online learning, thematic discussion, case analysis, practice tasks and presentations; the final assessment may be an examination or course paper.* *3. Students are required to complete assigned readings, online learning and practice tasks, and to support their arguments with appropriate materials in class discussion.* *4. All components are graded on a 100-point scale, with emphasis on theoretical understanding, material analysis, connection with practice, value judgement and written expression.* *5. Students should connect textbook reading, class discussion and observation of real issues, and produce structured analysis on topics such as Chinese modernization, national governance, regional development and youth responsibility.* *6. Practice tasks should show problem awareness, use of materials and personal reflection, and may connect theoretical learning with professional study, social service and campus practice.*
Reading list	*1. Xi Jinping, The Governance of China, Vols. 1-5, Foreign Languages Press, 2014-2025.* *2. Xi Jinping, Selected Works of Xi Jinping, Vols. 1-2, People's Publishing House, 2023.* *3. An Overview of Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, Higher Education Press, 2023.* *4. Publicity Department of the CPC Central Committee, Study Outline of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, Study Press and People's Publishing House, 2023.*

Introduction to the Community of the Chinese Nation

Module designation	*Introduction to the Community of the Chinese Nation*
Semester(s) in which the module is taught	*The 2nd Semester*
Person responsible for the module	*Zhang Chunmei*
Language	*Chinese*
Relation to curriculum	*General Compulsory Course*
Teaching methods	*Lectures, seminars, and independent study*
Workload (incl. contact hours, self-study hours)	*Total workload: 50 hours* *Contact hours: 32* *Self-study hours: 18*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Ideological and Moral Cultivation and Rule of Law; An Overview of Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Understand the core concepts, historical evolution, theoretical basis and new-era requirements of the community of the Chinese nation.* *2. Abilities: Analyse ethnic exchanges, the development of a unified multi-ethnic state, and related policies and laws; identify incorrect historical views and one-sided interpretations.* *3. Qualities: Strengthen the five identifications, national community consciousness, ethnic unity, and responsibility for national rejuvenation.*
Content	*1. Basic theories of the community of the Chinese nation (Weight: 0.10, level: mastery + familiarity + understanding)* *2. Correct historical view of the Chinese nation (Weight: 0.10, level: mastery + familiarity + application)* *3. Origins of Chinese civilisation and the Chinese nation (Weight: 0.05, level: familiarity + understanding)* *4. Huaxia community and unified order (Weight: 0.05, level: mastery + familiarity + understanding)* *5. Great unity and early formation of the Chinese nation (Weight: 0.05, level: mastery + familiarity + understanding)* *6. Ethnic exchanges and integration in history (Weight: 0.05, level: familiarity + understanding)* *7. Unified multi-ethnic state (Weight: 0.05, level: mastery + understanding)* *8. Modern national crisis and awakening (Weight: 0.05, level: familiarity + understanding)* *9. The Chinese nation in revolution, construction and reform (Weight: 0.05, level: understanding + application)*

	10. Community building in the new era (Weight: 0.05, level: mastery + application) *11. Common spiritual homeland (Weight: 0.05, level: understanding + application)* *12. Exchanges, communication and integration among ethnic groups (Weight: 0.05, level: familiarity + application)* *13. Ethnic policies, laws and regulations (Weight: 0.05, level: familiarity + understanding)* *14. Practical paths for forging community consciousness (Weight: 0.05, level: understanding + application)* *15. Case discussion and thematic learning (Weight: 0.10, level: application)* *16. Practice and self-study extension (Weight: 0.10, level: application)*
Examination forms	*Class participation (questioning), assignments, seminars, practical activities, and computer-based examination*
Study and examination requirements	*1. The course uses a 100-point grading system; 60 or above is a pass.* *2. Final grade = formative assessment 50% + final assessment 50%. Formative assessment includes class performance, online learning, paper writing, thematic presentation and video task; the final assessment is computer-based.* *3. All components are graded on a 100-point scale.*
Reading list	*1. Xi Jinping: The Governance of China, Vols. 1-5, Foreign Languages Press, 2014-2025.* *2. National Ethnic Affairs Commission (ed.), Study Guide on Forging a Strong Sense of the Chinese National Community, Ethnic Publishing House, 2021.* *3. United Front Work Department of the CPC Central Committee and National Ethnic Affairs Commission (eds.), Study Guide to the Spirit of the Central Conference on Ethnic Affairs, Ethnic Publishing House, 2022.* *4. Fei Xiaotong, Pluralistic Unity Structure of the Chinese Nation, Minzu University of China Press, 2018.*

National Security Education

Module designation	*National Security Education*
Semester(s) in which the module is taught	*Semester 1*
Person responsible for the module	*Gao Li*
Language	*Chinese*
Relation to curriculum	*General Compulsory Course*
Teaching methods	*e.g. Lectures, seminars, visits, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 25 hours* *Contact hours: 16* *Self-study hours: 9*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*None*
Module objectives/intended learning outcomes	*Course Objective 1: Strengthen political literacy. Actively practice the core socialist values, deepen comprehensive recognition of socialism with Chinese characteristics in terms of ideology, politics, theory, and emotion, and contribute to realizing the Chinese Dream of national rejuvenation with firm political stance and theoretical confidence.* *Course Objective 2: Cultivate a global perspective. Gain in-depth understanding of international strategic situations and strategic patterns, firmly establish national security awareness, and demonstrate a high sense of responsibility and mission to actively contribute to safeguarding national sovereignty, security, and development interests, as well as building a community with a shared future for mankind.*
Content	*1. Basic ideas of national security* *(Weight: 0.125, requirement level: understanding + mastery)* *2. National security in major fields* *(Weight: 0.25, requirement level: familiarity + mastery)* *3. National security in other fields* *(Weight: 0.125, requirement level: understanding + familiarity)* *4. Practicing the holistic view of national security* *(Weight: 0.50, requirement level: mastery + application)*
Examination forms	*Questions, assignments, and course essays.*
Study and examination requirements	*1. This course adopts a percentage grading system. Students who achieve a score of 60 points or above will be deemed qualified and awarded the corresponding course credits.* *2. Course grade = Process assessment score × 50% + Final assessment score × 50%.*

	3. Process assessment accounts for 50% of the total score, comprising 20% from quizzes and 30% from assignments. *4. The final assessment accounts for 50% of the total score, and the evaluation method is an open-book examination.* *5. Both the components of formative assessment and summative assessment adopt a 100-point grading system.*
Reading list	*1. Ma Ruiying. General Theory of National Security Education in Universities in the New Era [M]. Beijing: Higher Education Press, 2022.* *2. Zheng Shan. China Modern Border Defense History [M]. Chongqing: Southwest Normal University Press, 1990.* *3. Zheng Shan. China Border Defense History [M]. Beijing: Social Sciences Academic Press, 1995.* *4. Zhang Wei. National Security Intelligence Research [M]. Beijing: Jincheng Publishing House, 2020.* *5. Wang Guoliang. Immigration and Exit Frontier Inspection Studies [M]. Beijing: China People's Public Security University Press, 2011.*

Fundamentals of Information Science and Artificial Intelligence

Module designation	*Fundamentals of Information Science and Artificial Intelligence*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*ZHOU Xi*
Language	*Chinese*
Relation to curriculum	*General Compulsory Course*
Teaching methods	*Lectures, case analysis, computer-based experiments, software demonstrations, group discussion and small comprehensive tasks, with emphasis on computational thinking, data awareness, tool practice and ethical norms.*
Workload (incl. contact hours, self-study hours)	*Total workload: 78 hours* *Contact hours: 48* *Self-study hours: 30*
Credit points	*Chinese credits: 2; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*None. Basic high-school mathematics, information technology, and computer operation skills are recommended.*
Module objectives/intended learning outcomes	*1. Knowledge: understand information, data, algorithms, models and intelligent systems, as well as basic computer systems, networks, data processing and AI application boundaries.* *2. Ability: use computational thinking to analyze simple problems, complete basic data acquisition, visualization and interpretation, and carry out introductory AI tool experiments.* *3. Application: identify scenarios in civil engineering, urban construction and daily learning where information technology or AI may be used, and judge tool outputs, limitations and applicable conditions.* *4. Quality: develop data literacy, scientific spirit, engineering ethics, privacy awareness, academic integrity and responsible human-AI collaboration.*
Content	*1. Information science and computing systems (weight: 0.15, requirement: comprehension + mastery): information, data, knowledge and intelligence; coding, data representation, computer hardware, software, networks, cloud platforms and social applications.* *2. Computational thinking and algorithm basics (weight: 0.20, requirement: mastery + application): abstraction, decomposition, pattern recognition, flowcharts, pseudocode, program structures, modular design and result verification.* *3. Data acquisition, processing and visualization (weight: 0.15, requirement: mastery + application): data types and quality, tabular processing, descriptive statistics, charts and interpretation with common software or programming tools.*

	4. AI principles and methods (weight: 0.20, requirement: comprehension + mastery): AI development, knowledge representation, search, machine learning workflow, supervised/unsupervised learning, neural networks, NLP, computer vision and generative AI. *5. AI tools and engineering applications (weight: 0.15, requirement: application + analysis): model training and prediction, intelligent Q&A, text generation, image recognition, data analysis, and civil-engineering cases such as monitoring, inspection, construction management, BIM and disaster warning.* *6. Security, AI ethics and responsible use (weight: 0.15, requirement: comprehension + evaluation): privacy, cybersecurity, bias, hallucination, copyright, academic integrity, engineering safety and human-AI collaboration norms.*
Examination forms	*Assessment. A combination of process assessment and comprehensive task assessment is recommended. Process assessment accounts for 60%, including attendance and participation (10%), computer-based experiments and data processing exercises (25%), regular assignments (15%), and case discussion or staged small tasks (10%). Comprehensive task assessment accounts for 40% and may take the form of a course report, comprehensive computer-based experiment, open-book test, or small application scheme presentation.*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. Students should attend classes and computer-based experiments, complete data processing, visualization, model experience and case-analysis tasks independently, and keep reliable experimental records.* *3. AI-generated outputs must be checked rather than used directly as conclusions; references, data sources and AI tools should be stated when used.* *4. Assessment focuses on basic concepts, computational thinking, data processing, tool practice, engineering transfer ability, information security and AI ethics.* *5. Students should follow computer-room rules, cybersecurity, data privacy, academic integrity and intellectual-property requirements.*
Reading list	*1. Zhou Zhihua. Machine Learning. Tsinghua University Press.* *2. Li Hang. Statistical Learning Methods. Tsinghua University Press.* *3. Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach. Posts and Telecom Press.* *4. Eric Matthes. Python Crash Course. Posts and Telecom Press.*

Outline of Modern Chinese History

Module designation	*Outline of Modern Chinese History*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*Jiang Bingqing*
Language	*Chinese*
Relation to curriculum	*General Education Required Course*
Teaching methods	*Lectures; seminar-based interactive discussions; question-and-answer sessions*
Workload (incl. contact hours, self-study hours)	*Total workload: 75 hours* *Contact hours: 48* *Self-study hours: 27*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*Ideological and Moral Cultivation and Rule of Law*
Module objectives/intended learning outcomes	*1. Knowledge: Understand the basic timeline, major events and historical conclusions of modern Chinese history, especially the changing social contradictions and historical tasks since 1840.* *2. Abilities: Analyse historical issues with the Marxist standpoint, viewpoint and method, and explain the historical logic of China's choice of Marxism, the CPC and socialism.* *3. Qualities: Strengthen historical confidence, theoretical confidence and patriotism, and connect personal development with national rejuvenation.*
Content	*1. Beginning of modern Chinese history and changes in the main social contradictions after the Opium War. (Weight: 0.10, level: familiarity + understanding)* *2. Early explorations for national salvation, including the Taiping Heavenly Kingdom, Westernization Movement and Reform Movement of 1898. (Weight: 0.10, level: familiarity + analysis)* *3. The Revolution of 1911 and the bourgeois-republic plan, including its significance and limitations. (Weight: 0.10, level: understanding + analysis)* *4. The New Culture Movement, the May Fourth Movement and the founding of the Communist Party of China. (Weight: 0.12, level: mastery + understanding)* *5. The new-democratic revolution, including the national revolution, agrarian revolution, War of Resistance against Japanese Aggression and War of Liberation. (Weight: 0.18, level: mastery + analysis)* *6. Founding of the PRC, socialist transformation and early socialist construction. (Weight: 0.14, level: mastery + understanding)*

	7. Reform and opening up, socialism with Chinese characteristics and historic achievements in the new era. (Weight: 0.16, level: mastery + analysis) *8. Main historical themes, conclusions and contemporary implications of modern Chinese history. (Weight: 0.10, level: understanding + application)*
Examination forms	*Formative Assessment (50%): including learning notes, mid-term test, classroom performance, and online learning* *Summative Assessment (50%): final examination*
Study and examination requirements	*A minimum overall score of 60% is required to pass the course.*
Reading list	*1. Outline of Modern Chinese History, Higher Education Press, 9th edition, 2023.* *2. Hu Sheng, From the Opium War to the May Fourth Movement, People's Publishing House, 1980.* *3. Xi Jinping: The Governance of China, Vols. 1-5, Foreign Languages Press, 2014-2025.* *4. Resolution of the CPC Central Committee on the Major Achievements and Historical Experience of the Party over the Past Century, People's Publishing House, 2021.* *5. Xi Jinping, Speech at the Symposium Marking the 80th Anniversary of the Victory of the Chinese People's War of Resistance Against Japanese Aggression and the World Anti-Fascist War, People's Publishing House, 2025.*

Basic Principles of Marxism

Module designation	*Basic Principles of Marxism*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*Liu Xiyun*
Language	*Chinese*
Relation to curriculum	*General Compulsory Course*
Teaching methods	*Lectures, seminars, and discussions*
Workload (incl. contact hours, self-study hours)	*Total workload: 75 hours* *Contact hours: 48* *Self-study hours: 27*
Credit points	*Chinese Credits: 3* *ECTS Credits: 3*
Required and recommended prerequisites for joining the module	*Ideological and Moral Cultivation and Rule of Law; Outline of Modern Chinese History*
Module objectives/intended learning outcomes	*Objective 1:* *To develop a comprehensive understanding of Marxism as a whole, fostering recognition and endorsement of its guiding role in socialist modernization. Students are expected to build confidence in Marxist theory and socialist culture. The course aims to facilitate mastery of the fundamental principles of dialectical materialism and historical materialism, thereby enabling students to gradually form a scientific worldview and methodology. Students will be trained to apply materialist dialectics in analyzing and addressing real-world social issues, continuously enhancing their critical thinking, reflective learning abilities, and intellectual capacity. Furthermore, the course seeks to strengthen students' competence and awareness in applying historical materialism to correctly interpret history, social reality, and the laws governing social development.* *Objective 2:* *To cultivate the ability to employ Marxist positions, viewpoints, and methods in enhancing theoretical thinking and analytical capacity. Students will be able to apply the fundamental principles of Marxism to analyze major theoretical and practical issues arising in social development. The course emphasizes an accurate understanding of the inherent contradictions of the capitalist mode of production, a profound comprehension of the essence of the capitalist economic system, and a clear recognition of capitalism's historical position as well as the historical inevitability of its replacement by socialism. It aims to strengthen students' conviction in the ultimate demise of capitalism and the eventual triumph of socialism, while equipping them with the ability to consciously identify and resist erroneous social ideologies. In addition, students will grasp the dialectical relationship between the lofty ideal of communism and the common ideal of socialism with*

	Chinese characteristics, integrate personal aspirations with the cause of socialism with Chinese characteristics, and consciously undertake the mission of national rejuvenation, national prosperity, and people's well-being by actively contributing to the development of socialism with Chinese characteristics in the new era.
Content	*1. Thematic course content (weight: 1.00, requirement level: comprehension + mastery)* *Topic 1: Introduction to Marxism - 6 hours* *Topic 2: Worldview of Dialectical Materialism - 10 hours* *Topic 3: Epistemology of Dialectical Materialism - 6 hours* *Topic 4: Human Society and Its Laws of Development - 6 hours* *Topic 5: Marxist Theory of Capitalism - 8 hours* *Topic 6: Scientific Socialism - 4 hours* *Practical Teaching Component - 8 hours*
Examination forms	*Continuous assessment (coursework) and closed-book examination*
Study and examination requirements	*1. The course adopts a percentage-based grading system. A score of 60 or above is considered a pass, upon which course credits will be awarded.* *2. Final grade = Continuous assessment × 60% + Final examination × 40%.* *3. Continuous assessment (60%) includes learning notes, online learning activities, and practical components.* *4. Final assessment (40%) is conducted in the form of a closed-book examination.* *5. All components of both continuous and final assessments are graded on a percentage scale.*
Reading list	*1. Selected Works of Marx and Engels, Vols. 1-4, People's Publishing House, 2012.* *2. Karl Marx & Friedrich Engels, The Communist Manifesto.* *3. Karl Marx, Critique of the Gotha Programme.* *4. Friedrich Engels, Socialism: From Utopia to Science.* *5. V. I. Lenin, State and Revolution.* *6. Mao Zedong, On Contradiction; On Practice.* *7. Deng Xiaoping, We Can Only Unite Through Ideals and Discipline.* *8. Jiang Zemin, Speech at the Celebration of the 80th Anniversary of the Founding of the Communist Party of China.*

Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics

Module designation	*Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics*
Semester(s) in which the module is taught	*The 4th Semester*
Person responsible for the module	*Zhang Chunmei*
Language	*Chinese*
Relation to curriculum	*General Compulsory Course*
Teaching methods	*Lectures, seminars, and independent study*
Workload (incl. contact hours, self-study hours)	*Total workload: 75 hours* *Contact hours: 48* *Self-study hours: 27*
Credit points	*Chinese Credit System: 3* *ECTS Credits: 3*
Required and recommended prerequisites for joining the module	*Ideological and Moral Cultivation and Rule of Law; An Overview of Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era; Outline of Modern Chinese History; Introduction to the Chinese National Community; Basic Principles of Marxism, etc.*
Module objectives/intended learning outcomes	*1. Knowledge* *Students will accurately grasp the theoretical achievements formed in the process of adapting Marxism to the Chinese context and the needs of the times. Students will develop a profound understanding of the historical process, transformations, and achievements of the Chinese people under the leadership of the Communist Party of China in revolution, construction, and reform.* *2. Competence* *Students will gain a deeper understanding of why the Communist Party of China is capable, why Marxism works, and why socialism with Chinese characteristics is effective. Students will enhance their ability to apply the Marxist standpoint, viewpoint, and methodology to identify, analyze, and resolve problems.* *3. Quality* *Students will establish a shared ideal of building socialism with Chinese characteristics, strengthen their consciousness and commitment to implementing the Party's basic line and program, improve their ideological and political quality as well as theoretical level, and actively devote themselves to the great practice of socialist modernization.*
Content	*1. Mao Zedong Thought (Weight: 0.40; Requirement Level: Mastery, Familiarity, Understanding, Application)* *2. Deng Xiaoping Theory (Weight: 0.30; Requirement Level: Mastery, Familiarity, Understanding, Application)*

	3. The Important Thought of the Three Represents (Weight: 0.15; Requirement Level: Mastery, Familiarity, Understanding, Application) *4. The Scientific Outlook on Development (Weight: 0.15; Requirement Level: Mastery, Familiarity, Understanding, Application)*
Examination forms	*Class participation (questioning), assignments, seminars, practical activities, and computer-based examination*
Study and examination requirements	*1. This course adopts a percentage grading system. A score of 60 or above is considered a pass, upon which students will be awarded the corresponding credits.* *2. Final grade = Continuous Assessment (50%) + Final Assessment (50%).* *3. Continuous Assessment (50%) includes:* *Class performance: 10%* *Online learning: 10%* *Written assignments: 10%* *Close reading of classics: 10%* *Current affairs presentations and discussions: 10%* *4. Final Assessment (50%) is conducted in the form of a computer-based examination.* *5. All components of both continuous and final assessment are graded on a percentage scale.*
Reading list	*1. Selected Works of Mao Zedong, Vols. 1-4, People's Publishing House, 1991.* *2. Selected Works of Deng Xiaoping, Vols. 1-3, People's Publishing House, 1994 & 1993.* *3. Selected Works of Jiang Zemin, Vols. 1-3, People's Publishing House, 2006.* *4. Selected Works of Hu Jintao, Vols. 1-3, People's Publishing House, 2016.* *5. Xi Jinping: The Governance of China, Vols. 1-5, Foreign Languages Press, 2014, 2017, 2020, 2022, 2025.* *6. Jiang Zemin, Hold High the Great Banner of Deng Xiaoping Theory and Advance the Cause of Building Socialism with Chinese Characteristics into the 21st Century - Report to the 15th National Congress of the Communist Party of China, People's Publishing House, 1997.* *7. Jiang Zemin, Speech at the Celebration of the 80th Anniversary of the Founding of the Communist Party of China, in Selected Works of Jiang Zemin, Vol. 3, People's Publishing House, 2006.* *8. Publicity Department of the CPC Central Committee, Study Outline of the Important Thought of the Three Represents, Learning Press, 2003.*

Current Affairs and Policies

Module designation	*Current Affairs and Policies*
Semester(s) in which the module is taught	*Semesters 1 to 8*
Person responsible for the module	*Li Shoulei*
Language	*Chinese*
Relation to curriculum	*General Education Compulsory Course*
Teaching methods	*Lecture-based instruction; discussion; multimedia (video-assisted teaching)*
Workload (incl. contact hours, self-study hours)	*Total Workload: 100 hours* *Teaching Hours: 64 hours* *Independent Study: 36 hours*
Credit points	*Chinese Credit System: 2 credits;* *European Credit Transfer System (ECTS): 4 credits*
Required and recommended prerequisites for joining the module	*None*
Module objectives/intended learning outcomes	*Through this course, students are expected to apply the fundamental positions, viewpoints, and methods of Marxism to study major policies of the Party and the state, analyze domestic and international developments, and understand the broader trends of China and the world. Students will develop a sound worldview, outlook on life and values, moral and legal awareness, political judgment, theoretical understanding, and social responsibility.* *Objective 1: Policy and theory cognition. Students understand the latest theoretical innovations of the CPC, China's basic national conditions, and major current issues, and can explain important events and policy developments in connection with social realities.* *Objective 2: Responsibility and mission. Students recognize the responsibilities of young people in the new era, integrate personal aspirations with the Chinese Dream of national rejuvenation, strengthen ideals and convictions, and form a sense of responsibility for serving the country, society, and their professional development.* *Objective 3: Practice and expression. Students collect materials, participate in discussion, and write course papers on current-affairs themes with clear viewpoints, appropriate evidence, coherent logic, and independent thinking.*
Content	*The course uses Current Affairs Report (College Student Edition) as the main textbook. Teaching topics in all semesters are selected from the latest editions and updated according to current domestic and international developments. The course covers theoretical innovations of the CPC, major national strategies, economic and social development, international relations and China's diplomacy, ethnic unity and social governance, and the responsibilities of young people. It emphasizes the connection between theory and practice and combines*

	classroom learning, observation of current affairs, discussion, and paper writing.
Examination forms	*Examination (attendance, classroom participation, and final paper)*
Study and examination requirements	*1. The course is graded on a percentage scale. The final grade consists of continuous assessment (40%) and the final paper (60%).* *2. Continuous assessment is based on attendance, classroom participation, learning attitude, and completion of required thematic learning. Students shall attend the required teaching sessions and participate in class activities. Unexcused absence for one session or more may lead to loss of examination eligibility; approved leave must follow university procedures and the missed topic should be made up.* *3. Classroom participation includes answering questions, joining discussions, and analyzing current affairs. Learning attitude includes classroom discipline, preparation of materials, learning engagement, and the quality of assigned tasks.* *4. The final assessment is a group paper on a topic related to the semester's major themes. The paper should include a title, abstract, keywords, and main text, connect theory with practice, reflect students' responsibilities and mission, and show clear arguments, complete structure, standard formatting, and a certain degree of originality.* *5. Evaluation focuses on topic relevance, completeness of content, conceptual accuracy, case use, language quality, format, logical organization, and independent thinking.*
Reading list	*A Brief History of the Communist Party of China, People's Publishing House and CPC History Press, 2021.* *Xi Jinping, On the History of the Communist Party of China, Central Party Literature Press, 2021.* *Excerpts from Mao Zedong, Deng Xiaoping, Jiang Zemin and Hu Jintao on the History of the CPC, Central Party Literature Press, 2021.* *Questions and Answers on Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, Xuexi Publishing House and People's Publishing House, 2021.* *Xi Jinping, The Governance of China, Vol. IV, Foreign Languages Press, 2022.* *Xi Jinping, The Governance of China, Vol. V, Foreign Languages Press, 2025.*

College English

Module designation	*College English*
Semester(s) in which the module is taught	*Semester 1-3*
Person responsible for the module	*Li Hengsuyi, Duan Lirui*
Language	*English*
Relation to curriculum	*Compulsory General Education Course*
Teaching methods	*Lecture, discussion, classroom presentation, task-based teaching, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 300 hours* *Teaching hours: 192* *Self-study hours: 108*
Credit points	*Chinese credits: 12; ECTS credits: 12*
Required and recommended prerequisites for joining the module	*Primary School English, Junior High School English, Senior High School English, etc.*
Module objectives/intended learning outcomes	*Course Objective 1: Master the basic knowledge of the language and develop listening, speaking, reading, writing and translation skills. On the premise of laying a solid foundation in English language skills and mastering basic English knowledge, broaden students' linguistic knowledge and apply it to daily life and communication.* *Course Objective 2: Learn to analyze and synthesize, abstract and generalize, reflect and innovate; Learn autonomous learning; Cultivate critical thinking ability, innovation ability and teamwork ability; Understand the similarities and differences between Chinese and Western languages, cultures, ethics, etc. through language learning, and lay a foundation for subsequent courses and students' humanistic quality.*
Content	*1. Listening-Speaking Module. Mastery of phonetic skills including liaison, weak forms, plosive elision, stress, rhythm and intonation; training in gist extraction, detail identification and logical organization with materials covering campus dialogues, classroom instructions, academic lecture clips, news briefs and interviews, and cultivation of oral expressive competencies in introducing, advising, refuting, explaining and summarizing through scenarios such as daily communication, situational expression, opinion presentation, discussion and interaction, and short speeches. Dialogue practice, group discussion, theme presentation and role-play are integrated in the process. (weight: 0.3, requirement level: mastery + familiarity + application)* *2. Reading Module. Delivery of reading strategies including skimming, scanning and intensive reading, and explanation of textual structures and paragraph logic, as well as analysis of long and difficult sentences and core vocabulary based on genres such as expository writing, popular science essays, news reports and humanistic materials. Intensive reading, task-based reading and layered reading are*

	integrated in the process. (weight: 0.4, requirement level: mastery + familiarity + application) *3. Writing Module. Consolidation of the basics of sentence standardization, paragraph organization and textual construction; training in writing practical documents, argumentative essays, chart-based compositions, book reviews and academic short essays, as well as cultivation of logical thinking and written expression abilities. Imitation writing, expansion writing and rewriting are integrated in the process. (weight: 0.15, requirement level: mastery + familiarity + application)* *4. Translation Module. Explanation of basic translation methods and skills at the lexical, syntactic and textual levels; overcoming of translation difficulties including word order differences, passive voice, clause structures and culture-loaded words; implementation of translation training on sentences, paragraphs and texts. Contrastive translation, sentence pattern transformation and context-based translation are integrated in the process. (weight: 0.15, requirement level: mastery + familiarity + application)*
Examination forms	*Attendance, classroom performance, self-study, assignment, periodic learning test, final examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 40% + Summative Assessment Score × 60%.* *3. Formative assessment accounts for 40%, including attendance 4%, classroom performance 4%, self-study 4%, assignment12%, and periodic learning test 16%.* *4. Summative assessment accounts for 60%, based on the unified examination set by the college.* *5. All components of formative assessment and the summative assessment adopt the percentage grading system.*
Reading list	*1.Compiled by Cao Yufang. College English Writing. Jilin University Press, 2019.* *2. Compiled by He Qixin. New Concept English. Foreign Language Teaching and Research Press, 2020.* *3. Compiled by Bo Bing. A Comprehensive English Grammar. Foreign Language Teaching and Research Press, 2021.* *4. Compiled by Wang Qiang. English Teaching Methodology. Foreign Language Teaching and Research Press, 2020.* *5. Zheng Xiaotang. English Learning Strategies. Foreign Language Teaching and Research Press, 2019.* *6. New Oriental. CET-6 Mock Test Collection (with MP3) (Latest Edition). Qunyan Press, 2023.* *etc.*

College Sports

Module designation	*College Sports*
Semester(s) in which the module is taught	*Semesters 1-6*
Person responsible for the module	*Shen Yu, Wang Yuhong, Yang Yurong*
Language	*Chinese*
Relation to curriculum	*General Education Compulsory Course*
Teaching methods	*Lectures, specialised skill training, group practice, competition practice and guidance for extracurricular exercise*
Workload (incl. contact hours, self-study hours)	*Total workload: 128 hours* *Contact hours: 128* *Self-study hours: 0*
Credit points	*Chinese credits: 4; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*None*
Module objectives/intended learning outcomes	*1. Knowledge: Understand basic theories of physical education and health, including rules, technical structures, training methods, injury prevention and physical-fitness evaluation.* *2. Abilities: Perform basic skills, combined skills and simple tactical cooperation in selected sports; formulate personal exercise plans according to fitness-test results and improve physical fitness through class and extracurricular practice.* *3. Qualities: Develop teamwork, rule awareness, competitive spirit, perseverance, healthy lifestyle habits, lifelong exercise awareness and self-management ability.* *4. Development: Understand how different sports contribute to cardiopulmonary endurance, strength, speed, agility, flexibility and coordination, and gradually form a long-term exercise plan suited to personal physical conditions.*
Content	*1. Overview of sports activities. Students learn the development, health value, characteristics, venues and equipment, safety requirements and fitness-test requirements of selected sports. (Weight: 0.25, required level: mastery + understanding)* *2. Sports techniques. Training covers basic posture, movement, core techniques, combined movements and correction of common errors, with emphasis on movement accuracy and body control. (Weight: 0.25, required level: mastery + understanding)* *3. Sports tactics. Students learn individual and team cooperation, offensive and defensive transition, match organisation, on-site judgement and simple tactical application through group competition. (Weight: 0.25, required level: mastery + understanding)* *4. Rules and health management. Topics include competition rules, basic refereeing, sports etiquette, workload monitoring, warm-up and*

	cool-down, injury prevention and extracurricular exercise records. (Weight: 0.25, required level: mastery + understanding)
Examination forms	*Basic skills, physical fitness, class performance, extracurricular exercise records, physical-fitness tests, theoretical learning or online tests.*
Study and examination requirements	*1. Basic technical assessment accounts for 50%, with examination content selected from prescribed items and emphasis on movement quality and stability.* *2. Physical-fitness assessment accounts for 30%, based on semester-specific fitness items, scoring criteria and physical-fitness test results.* *3. Regular performance accounts for 20%, including attendance, participation, practice attitude, teamwork, theoretical learning and competition performance.* *4. Running-app or extracurricular exercise records are mandatory. Students must complete the required exercise load each semester, and the online theoretical test must be completed and passed.* *5. Students must follow safety rules, complete warm-up, specialised practice, cool-down and workload records as required, and report injuries or physical abnormalities in time.* *6. The course emphasises process performance and continuous improvement. Students are encouraged to select suitable sports in different semesters and improve skills and physical fitness through staged goals.* *7. Teachers organise differentiated training according to students' physical basis, sport characteristics and safety needs. Students should complete skill retests, physical-fitness tests and class competitions within the required period. Assessment considers not only final scores but also technical improvement, training effort, rule compliance and healthy behaviour.*
Reading list	*1. Zhou Ming (Ed.), College Students' Physical Education and Health, Shanghai Jiao Tong University Press, 2017.* *2. Zhou Ming, Wang Yuhong, Zhao Yunpeng. Editor-in-Chief of "Three-Dimensional Tutorial on College Students' Physical Education and Health", Beijing Sport University Press, 2019.* *3. Wang Chongxi (Ed.), Ball Games: Football, Higher Education Press, 2005.* *4. Wang Jiahong (Ed.), Ball Sports: Basketball, Higher Education Press. July 2005.* *5. Sun Zhenwu (Ed.). Volleyball. Beijing Sport University Press, 2017.*

Mental Health Education for College Students

Module designation	*Mental Health Education for College Students*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*LUO Cheng*
Language	*Chinese*
Relation to curriculum	*General Compulsory Course*
Teaching methods	*Lectures, case analysis, psychological assessment, experiential activities, group discussion, scenario training and reflection records, combining knowledge learning with self-experience and help-seeking practice.*
Workload (incl. contact hours, self-study hours)	*Total workload: 50 hours* *Contact hours: 32* *Self-study hours: 18*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*None.*
Module objectives/intended learning outcomes	*1. Knowledge: understand mental health concepts, evaluation criteria, influencing factors, university developmental tasks, common adaptation problems and the campus counseling service system.* *2. Ability: identify stress sources in study, life, relationships, emotions and personal planning, and conduct basic emotional awareness, stress assessment, communication and problem solving.* *3. Application: complete assessment interpretation, growth reflection, stress management planning, communication training and life-meaning exploration in connection with university life.* *4. Quality: respect life and diversity, care for self and others, and develop a positive, open and inclusive attitude with teamwork and continuous self-growth.*
Content	*1. Mental health and university adaptation (weight: 0.15, requirement: comprehension + mastery): meaning, standards and factors of mental health; student development characteristics, adaptation tasks, campus resources and help-seeking channels.* *2. Self-awareness and emotion management (weight: 0.20, requirement: mastery + application): self-understanding, self-acceptance, confidence, personality traits, emotion recognition, expression and regulation, and coping with anxiety, depression and anger.* *3. Learning psychology and stress coping (weight: 0.20, requirement: mastery + application): motivation, time management, attention, procrastination, exam anxiety, academic and career pressure, relaxation, cognitive adjustment, goal decomposition and resilience.*

	4. Interpersonal, intimate and online relationships (weight: 0.15, requirement: mastery + analysis): dormitory and peer relationships, teacher-student communication, romantic relationships, boundaries, conflict resolution and responsible online communication. *5. Life education, crisis identification and support (weight: 0.20, requirement: comprehension + application): life meaning, crisis signals, serious distress, safety principles, peer-support boundaries, referral awareness, counseling, hotline, counselor and medical resources.* *6. Growth reflection and mental health practice (weight: 0.10, requirement: analysis + evaluation): case discussion, scenario training and growth reports to review personal resources, support systems, coping strategies and self-care plans.*
Examination forms	*Assessment. A combination of process assessment and final course assessment is recommended. Process assessment accounts for 60%, including attendance and participation (10%), psychological assessment or experiential activity records (15%), assignments and growth reflection (15%), and group discussion or case analysis (20%). Final assessment accounts for 40% and may take the form of a course paper, growth report, thematic presentation, or open-book comprehensive test.*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. Students should attend lectures, experiential activities and discussions, respect classroom rules and privacy, and avoid labeling or stigmatizing others.* *3. Students should complete assessment interpretation, growth reflection, case analysis and stress-management tasks, connecting them with university life without plagiarism or fabrication.* *4. Assessment focuses on mental health knowledge, self-awareness, problem analysis, application of adjustment methods and help-seeking resources, and respect for life.* *5. In serious crisis or clear-risk situations, students should follow timely help-seeking, reporting, professional referral and safety-first principles.*
Reading list	*1. Department of Ideological and Political Work, Ministry of Education. Guiding Outline for Mental Health Education for College Students.* *2. Editorial Group. Mental Health Education for College Students. Higher Education Press.* *3. Richard J. Gerrig and Philip G. Zimbardo. Psychology and Life. Posts and Telecom Press.* *4. Lin Chongde. Developmental Psychology. People's Education Press.*

Career Development and Employment & Entrepreneurship Guidance

Module designation	*Career Development and Employment & Entrepreneurship Guidance*
Semester(s) in which the module is taught	*Semesters 2-7*
Person responsible for the module	*LUO Dayou*
Language	*Chinese*
Relation to curriculum	*General Compulsory Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 70 hours* *Contact hours: 32* *Self-study hours: 38*
Credit points	*Chinese credits: 2.5; ECTS credits: 2.5*
Required and recommended prerequisites for joining the module	*None*
Module objectives/intended learning outcomes	*1. Knowledge: Master basic knowledge of innovative thinking, opportunity identification, business-model design, career planning, employment policies, regulations and job-search procedures, and understand job types and competency requirements in civil engineering and related industries.* *2. Abilities: Conduct self-assessment and career-interest analysis, set staged career goals, and complete practical tasks such as market research, innovation project design, business-model analysis, business plan writing, resume preparation and interview practice.* *3. Qualities: Develop initiative, integrity in employment, innovation and entrepreneurship awareness, lifelong learning habits, teamwork, communication, risk awareness, resource integration ability and professional responsibility.*
Content	*1. Career planning. Topics include self-understanding, interest and ability assessment, industry and position analysis, career-goal setting, study planning, professional ethics and career-path design in relation to civil engineering training requirements. (Weight: 0.35, requirement level: mastery + familiarity + application)* *2. Innovation and entrepreneurship. Topics include innovative thinking, problem discovery, user-needs analysis, opportunity identification, market research, business-model canvas, team building, risk control, project pitching and business plan writing. (Weight: 0.35, requirement level: mastery + familiarity + application)* *3. Employment guidance. Topics include employment situation and policies, protection of employment rights, job-information search, resume and cover-letter writing, interview etiquette and expression, written-test preparation, workplace adaptation and employment-*

	document standards. (Weight: 0.30, requirement level: mastery + familiarity + application)
Examination forms	*Online theory score, offline class tasks, career plan, business plan, resume and interview practice, disciplinary competition or innovation and entrepreneurship practice.*
Study and examination requirements	*1. The course uses a 100-point grading system; 60 or above is a pass.* *2. Final grade = theory score 80% + competition or practice score 20%. The theory score consists of online learning and offline class tasks.* *3. Students must complete career assessment, career planning report, innovation and entrepreneurship project analysis, resume preparation and mock interview tasks.* *4. Competition or practice scores may be based on participation in innovation and entrepreneurship training, career-planning contests, resume competitions or project pitching activities.* *5. Career-planning tasks should include self-understanding, industry research, target-position competency requirements, learning plans and staged actions rather than general statements.* *6. Innovation and entrepreneurship tasks should present problem sources, user needs, solutions, resources, team roles and risk analysis; employment-guidance tasks should demonstrate resume improvement, interview expression and document standards.* *7. Students are encouraged to select real positions, real projects or real competitions related to their professional background as analysis objects, and to form actionable learning plans, resource plans and staged outcomes. Discussion, case analysis and group presentation should show clear roles, sufficient evidence and standard expression.*
Reading list	*1. Qu Xiuqin, Nie Ailin and Liu Qiaozhi, Career Development and Employment & Entrepreneurship Guidance, Higher Education Press, 2023.* *2. Jiang Chengyong, Career Development Planning and Employment & Entrepreneurship Guidance for College Students, Higher Education Press, 2015.* *3. Zhao Chixuan and Yang Pin, Career Development and Employment & Entrepreneurship Guidance, People's Posts and Telecommunications Press, 2022.* *4. Li Jiahua, Zhang Xiaohui and Lei Yumei, Career Development and Employment & Entrepreneurship Guidance, Science Press, 2020.*

Military Theory

Module designation	*Military Theory*
Semester(s) in which the module is taught	*Semester 1*
Person responsible for the module	*LI Hao*
Language	*Chinese*
Relation to curriculum	*General education compulsory courses*
Teaching methods	*Lecture, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 52 hours* *Contact hours: 36* *Self-study hours: 16*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*None*
Module objectives/intended learning outcomes	*1. Knowledge: Understand basic concepts, development and significance of national defence, national security, military thought, modern warfare and informationized equipment, and master the core content of national-defence education for university students.* *2. Abilities: Analyse the international strategic environment, neighbouring security situation, forms of modern warfare and trends in informationized equipment by using basic knowledge of national defence and security.* *3. Qualities: Strengthen national consciousness, defence awareness, risk awareness, discipline, patriotism, collectivism, responsibility and teamwork.*
Content	*1. China's national defence. Topics include the meaning of national defence, defence laws and regulations, achievements in defence construction, mobilization, armed forces and students' defence obligations. (Weight: 0.20, requirement level: familiarity + understanding + mastery)* *2. National security. Topics include the holistic approach to national security, political, territorial, military, economic, technological, cyber and border security, with emphasis on risk awareness. (Weight: 0.20, requirement level: familiarity + understanding + mastery)* *3. Military thought. Topics include ancient Chinese military thought, modern military thought, people's war thought and the thought on strengthening the military in the new era. (Weight: 0.20, requirement level: familiarity + understanding + mastery)* *4. Modern warfare. Topics include the evolution of warfare, informationized and intelligent warfare, joint operations, non-traditional security challenges and typical cases. (Weight: 0.20, requirement level: familiarity + understanding)*

	5. Informationized equipment. Topics include reconnaissance and early warning, command and control, precision strike, unmanned systems, cyberspace and new-domain equipment. (Weight: 0.20, requirement level: familiarity + understanding)
Examination forms	*Class learning, online learning, thematic assignments, case analysis, course reflection or final assessment.*
Study and examination requirements	*1. The course adopts a 100-point grading system; students who achieve 60 or above pass the course.* *2. Course score = formative assessment score x 60% + summative assessment score x 40%.* *3. Formative assessment includes attendance, class participation, online learning, thematic assignments and case analysis; summative assessment may be a course reflection, essay or comprehensive assessment.* *4. Students are required to complete learning tasks on time and express views on national-defence and security issues in a structured manner.* *5. Thematic assignments and course reflections should focus on national defence, national security, modern warfare or informationized equipment, with clear arguments, reliable materials and logical analysis.* *6. Class learning encourages discussion of international situations, neighbouring security environments and technological cases, so that students develop law-abiding awareness and responsibility for national security.* *7. Learning should go beyond memorising concepts. Students should explain the importance of national-defence construction by connecting historical cases, current security events and technological trends. Final assessment or course reflection should link course topics and analyse issues from national, social and individual responsibility perspectives.*
Reading list	*1. Chen Runliang, Teaching Methods of Military Theory, Higher Education Press, 2016.* *2. Ma Guofang, University Military Theory Course, Higher Education Press, 2012.* *3. Shou Wenhua, Wang Huaijian and Jin Xiaoliang, Military Theory Course, Higher Education Press, 2011.* *4. Cheng Xigang, Common Knowledge of University Military Theory, Tsinghua University Press, 2006.*

Military Skills (Training)

Module designation	*Military Skills (Training)*
Semester(s) in which the module is taught	*Semester 1*
Person responsible for the module	*LI Hao*
Language	*Chinese*
Relation to curriculum	*General education compulsory courses*
Teaching methods	*Lecture, training, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 168 hours* *Contact hours: 168* *Self-study hours: 0*
Credit points	*Chinese credits: 2; ECTS credits: 6*
Required and recommended prerequisites for joining the module	*None*
Module objectives/intended learning outcomes	*1. Knowledge: Understand common regulations, formation training, basic knowledge of light weapons, tactical basics, protection and first aid, and combat-readiness basics, and understand the link between military training, discipline and national-defence education.* *2. Abilities: Complete formation movements, basic tactical movements, protection and first-aid actions, combat-readiness training and collective presentation tasks, and act according to instructions with cooperation and self-management.* *3. Qualities: Strengthen national-defence awareness, discipline, collective honour, perseverance, teamwork, good conduct and safe training habits.* *4. Development: Adapt to collective life and intensive training, balance personal goals with collective tasks, and improve time management, stress adjustment and safety-protection abilities.*
Content	*1. Common regulations education and training. Students learn daily routines, internal order, discipline requirements, formation movements, assembly and dismissal, marching and collective formation training. (Weight: 0.26, required level: understanding + mastery + application)* *2. Shooting and tactics training. Topics include basic knowledge of light weapons, shooting safety, aiming and firing principles, basic tactical movements, terrain use, concealment, camouflage and squad cooperation. (Weight: 0.20, required level: understanding + mastery + application)* *3. Defensive skills and wartime protection training. Topics include emergency avoidance, protective actions, first aid, casualty carrying, psychological adjustment and emergency response, with emphasis on self-protection and mutual aid. (Weight: 0.20, required level: understanding + mastery + application)*

	4. Basics of combat readiness and applied training. Topics include readiness awareness, mobilization knowledge, comprehensive field training, internal-order inspection, team cooperation, training summary and military-training presentation. (Weight: 0.34, required level: understanding + mastery + application)
Examination forms	*Attendance and daily performance, formation movements, training participation, internal discipline, implementation of safety rules, and military-training achievement presentation.*
Study and examination requirements	*1. The course adopts a 100-point grading system; students who achieve 60 or above pass the course.* *2. Course score = formative assessment score x 60% + summative assessment score x 40%.* *3. Formative assessment includes attendance and daily performance 40%, and formation movements and squad training 20%, with emphasis on discipline, attitude, movement accuracy and teamwork.* *4. Summative assessment accounts for 40% and is mainly based on military-training achievement presentation, comprehensive demonstration or training summary.* *5. Students must strictly follow training discipline and safety rules, attend training, assembly, internal-order activities and achievement presentations on time, and must not leave the team without permission.* *6. Evaluation emphasises the whole training process, including movement quality, obedience to command, teamwork, perseverance, internal-order standards and safety awareness.* *7. Students who need adjusted training because of physical conditions should follow school procedures for leave or registration and complete equivalent learning or observation records.* *8. Military skills training adopts centralised management and process records. Students should complete training logs, internal-order inspection, formation review and safety education. The final presentation focuses on formation quality, morale, collective coordination, training discipline and implementation of safety standards.*
Reading list	*1. Xu Xiuli, Military Training Course for College Students, Economic Science Press, 2010.* *2. Editorial Committee, Military Training Course, Higher Education Press, 2002.* *3. Xiao Zuohong, Military Training Course for College Students, China Renmin University Press, 2013.*

General Elective Courses

College Chinese

Module designation	*College Chinese*
Semester(s) in which the module is taught	*Semesters 1-6*
Person responsible for the module	*Sun Bolin, Chen Yusi, Wu Xiaomei, etc.*
Language	*Chinese*
Relation to curriculum	*General Education Elective Course*
Teaching methods	*Lecture, project-based learning, seminar, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 50 hours* *Teaching hours: 32 hours* *Self-study hours: 18 hours*
Credit points	*Chinese Credits: 2; ECTS Credits: 2*
Required and recommended prerequisites for joining the module	*None*
Module objectives/intended learning outcomes	*Centered on students' all-round development, this course focuses on cultivating students' literary literacy, basic Chinese language skills, cross-cultural communication competence and Chinese language knowledge, so as to improve students' comprehensive quality and humanistic cultivation. Through studying classic literary works, this course improves students' language expression ability, reading comprehension ability and writing ability, enhances students' cultural literacy and humanistic spirit, and cultivates students' literary appreciation ability, aesthetic taste, critical thinking and innovation ability. Meanwhile, through the edification of literary works, this course carries forward China's fine traditional culture, and cultivates students' humanistic feelings and social responsibility.*
Content	*1. Benevolence and Loving Others* *(Weight: 0.08, Requirement Level: Familiarity + Understanding)* *2. Harmony without Uniformity* *(Weight: 0.06, Requirement Level: Familiarity + Understanding)* *3. Learning from History* *(Weight: 0.08, Requirement Level: Familiarity + Understanding)* *4. Bearing the Public in Mind* *(Weight: 0.08, Requirement Level: Familiarity + Understanding)* *5. Affection for Homeland* *(Weight: 0.08, Requirement Level: Familiarity + Understanding)* *6. Praise for Love* *(Weight: 0.06, Requirement Level: Familiarity + Understanding)* *7. Gaining Insight into the World* *(Weight: 0.08, Requirement Level: Familiarity + Understanding)*

	8. Harmony with Nature *(Weight: 0.08, Requirement Level: Familiarity + Understanding)* *9. Caring for Life* *(Weight: 0.08, Requirement Level: Familiarity + Understanding)* *10. Noble Uprightness* *(Weight: 0.08, Requirement Level: Familiarity + Understanding)* *11. Noble Integrity* *(Weight: 0.06, Requirement Level: Familiarity + Understanding)* *12. Poetic Life* *(Weight: 0.08, Requirement Level: Familiarity + Understanding)* *13. Ancient Poetry Recitation Training* *(Weight: 0.05, Requirement Level: Mastery + Familiarity + Application)* *14. Argumentative Writing Training* *(Weight: 0.05, Requirement Level: Mastery + Familiarity + Application)*
Examination forms	*Preview, in-class questioning, assignments, seminar participation, in-class assessment, etc.*
Study and examination requirements	*1. This course adopts the percentage-point grading system. Students with a score of 60 or above are qualified and can get the course credits.* *2. Final course score = Process assessment score × 50% + Terminal assessment score × 50%* *3. Process assessment accounts for 50% of the total score, decomposed as: 5% for preview, 5% for in-class questioning, 15% for notes and assignments, 10% for ancient poetry recitation, 15% for argumentative writing.* *4. Terminal assessment accounts for 50% of the total score, consisting of 25% for in-class assessment and 25% for research survey.* *5. All components of process assessment and terminal assessment adopt the percentage-point grading system.*
Reading list	*(1) Xia Zhongyi (Ed.). University Humanities Reader. Guangxi Normal University Press, 2005.* *(2) Liu Wenxiao (Ed.). Essential Readings of University Humanities. Yunnan People's Publishing House, 2011.* *(3) Ge Zhaoguang. Lectures on Ancient Chinese Culture. Fudan University Press, 2006.* *(4) Ge Zhaoguang. Ten Chinese Classics. The Commercial Press, 2022.* *(5) Ye Jiaying. Lectures on Ancient Chinese Poetry. SDX Joint Publishing Company, 2018.*

Disciplinary Basic Courses

Advanced Mathematics B (1)

Module designation	*Advanced Mathematics B (1)*
Semester(s) in which the module is taught	*Semester1*
Person responsible for the module	*SU zhifang, Li Yaqin*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Lecture, discussion, Problem-driven, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 180 hours* *Contact hours: 96* *Self-study hours: 84*
Credit points	*Chinese credits: 6; ECTS credits: 6*
Required and recommended prerequisites for joining the module	*Elementary Mathematics*
Module objectives/intended learning outcomes	*Students are initially equipped with the ability to observe, analyze and describe complex practical problems using the abstract thinking of advanced mathematics. They basically master the skills of applying single-variable calculus to solve complex problems related to their major. They can develop the basic literacy of establishing relevant mathematical models for innovative research in their disciplines by using the basic knowledge and logical thinking of advanced mathematics, possess the mathematical knowledge and skills required for scientific research, and have a certain ability of interdisciplinary integration.*
Content	*1. Chapter 1 Limits and Continuity of Single-Variable Functions* *(Weight: 0.1, Required level: mastery + familiarity)* *2. Chapters 2 & 3 Differential Calculus of Single-Variable Functions and Its Applications* *(Weight: 0.4, Required level: mastery + comprehension + Familiarity + application)* *3. Chapters 4, 5 & 6 Integral Calculus of Single-Variable Functions and Its Applications* *(Weight: 0.4, Required level: mastery + comprehension +familiarity +application)* *4. Chapter 7 Differential Equations* *(Weight: 0.1, Required level: mastery + familiarity +application)*
Examination forms	*homework, In-class assessments, class attendance & participation, closed-book examination*
Study and examination requirements	*1. This course adopts a 100-point grading system. A score of 60 or above is considered a pass, and students who pass will earn the credits for this course.*

	2. Course Score = Formative Assessment Score × 50% + Summative Assessment Score × 50%. *3. Formative assessment accounts for 50% of the total score, including regular homework (10%), attendance (10%), class performance (20%), and quizzes (10%).* *4. Summative assessment accounts for 50% of the total score, based on the written score of the students' closed-book examination.*
Reading list	*1. Yang Huiqing. Economic Mathematics - Calculus [M]. People's Posts and Telecommunications Press, 2017.* *2. Zhao Shuyuan. Calculus (Fundamentals of Economic Applied Mathematics I) (3rd Edition) [M]. China Renmin University Press, 2007.* *3. Qian Changben. Analysis and Research on the Problem-Solving Process of Advanced Mathematics [M]. Science Press, 1994.* *4. Wang Xianjie. Typical Application Examples and Models of Advanced Mathematics [M]. Science Press, 2005.* *5.Mathematics Subcommittee, Teaching Guidance Committee for Engineering Mathematics Courses of Institutions of Higher Education. Questions and Answers on Advanced Mathematics [M]. Higher Education Press, 1992.* *6. Xue Jiaqing. Compilation of Advanced Mathematics Question Banks. Science and Engineering: Review, Training, Improvement [M]. Northeastern University Press, 2000.* *7.Wang Jingke. Methods and Skills for Solving Advanced Mathematics Problems [M]. China Forestry Publishing House, 1992.*

Introduction to Civil Engineering

Module designation	*Introduction to Civil Engineering*
Semester(s) in which the module is taught	*Semester 1*
Person responsible for the module	*Wei ping*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Lectures, engineering case discussions, and online learning*
Workload (incl. contact hours, self-study hours)	*Total workload: 30 hours* *Contact hours: 16* *Self-study hours: 14*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*/*
Module objectives/intended learning outcomes	*Knowledge Objectives: Students will master the concepts and historical evolution of civil engineering, develop a sound understanding of the basic content and fundamental knowledge of various civil engineering projects, and be able to relate theoretical knowledge to real-world civil engineering practices. Ability Objectives: Students will be able to preliminarily organize the knowledge framework of the course and analyze the basic competencies and qualities required of civil engineers. They will develop basic skills in literature search and academic writing, and be able to conduct simple analysis, discussion, and reasoning on civil engineering cases. In addition, students will gain a clear understanding of future development trends in civil engineering, form a study plan for subsequent professional courses, and establish preliminary career planning for future professional practice.* *Ethical & Educational Objectives :Through blended online and offline learning, students will build professional confidence in civil engineering, foster an enthusiastic learning attitude and a strong sense of teamwork. They will develop sound engineering ethics, craftsmanship spirit, and safety awareness, and initially acquire the professional competence and sense of responsibility to support the green development of Yunnan Province.*
Content	*1. Introduction (Weight: 0.05, requirement level: mastery + understanding)* *2. Foundation and underground engineering (Weight: 0.10, requirement level: mastery + familiarity + application)* *3. Building engineering (Weight: 0.15, requirement level: mastery + familiarity + application)* *4. Transportation civil engineering (Weight: 0.15, requirement level: mastery + familiarity + application)*

	5. Bridge engineering (Weight: 0.15, requirement level: mastery + understanding) *6. Civil engineering construction and project management (Weight: 0.10, requirement level: mastery + understanding)* *7. Seismic prevention and disaster mitigation (Weight: 0.10, requirement level: mastery + understanding)* *8. Digital technology in civil engineering (Weight: 0.10, requirement level: mastery + understanding)* *9. Smart cities and civil engineering (Weight: 0.10, requirement level: mastery + understanding)*
Examination forms	*MOOC learning online, in-class discussions, assignments, papers*
Study and examination requirements	*The overall course score = 40% of process assessment + 60% of final assessment.* *The process assessment emphasizes a reasonable and fair evaluation of students' learning and development, including: assignments 8%; thematic discussions 8%; in-class discussions 8%; online learning performance 8%; and case analysis 8%.* *The final assessment provides a comprehensive evaluation of students' performance in analyzing practical engineering cases, their understanding of civil engineering, study plans, career planning, and skills in writing and editing professional papers.* *This course uses a 100-point grading scale. A score of 60 or above is considered a passing grade, upon which students will earn the credits for this course.*
Reading list	*1. Introduction to Civil Engineering (5th Edition), Ye Zhiming, Higher Education Press* *2. Great Civil Engineering, Cui Jinghao, China Water Resources and Hydropower Press* *3. History of Ancient Chinese Architectural Technology, Institute for the History of Natural Sciences, Chinese Academy of Sciences, Science Press* *4. Introduction to Civil Engineering, M.S. Palanichamy* *5. Structural Concepts and Systems, Tung-Yen Lin, Robert Stotesbery, China Architecture & Building Press* *6. A History of Western Architecture, David Watkin, Jilin People's Publishing House* *7. History of Chinese Architecture, Pan Guxi, China Architecture & Building Press* *8. History of Ancient Chinese Architecture, Liu Dunzhen, China Architecture & Building Press*

Inorganic and Analytical Chemistry

Module designation	*Inorganic and Analytical Chemistry*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*Fang, Yun-Shan; Zhang, Hong-Jiao; Wen, Qiu-Lin, et al.*
Language	*Chinese*
Relation to curriculum	*Disciplinary Foundation Courses*
Teaching methods	*lecture, lab works.*
Workload (incl. contact hours, self-study hours)	*Total workload: 90* *Contact hours : 48* *Private study hours: 42*
Credit points	*China credits: 3; European Credit System credits: 3*
Required and recommended prerequisites for joining the module	*Middle School Mathematics, Middle School Physics, Middle School Chemistry*
Module objectives/intended learning outcomes	*Through this course, students will gain a solid understanding of fundamental chemical theories and knowledge related to the four major equilibrium types. With a focus on volumetric analysis, they will master essential concepts and principles of titration methods. Students will learn to accurately analyze shifts in chemical equilibrium and transitions between equilibrium states, as well as apply quantitative analysis techniques to determine substance quantities. These skills will enable them to solve practical problems in production and scientific research, while laying a robust chemical foundation for studying other specialized courses.*
Content	*1. Main course content (weight: 1.00, requirement level: comprehension + mastery)* *Main Course Content:* *Chapter 1: Gases, Solutions, and Colloids* *1.1Dispersions* *1.2 Gases* *1.3 Methods for Representing Solution Concentration* *1.4 General Properties of Dilute Solutions* *Chapter 2: Fundamental Principles of Chemical Reactions* *2.3 Limits of Chemical Reactions - Chemical Equilibrium* *Chapter 3: Acid-Base Equilibrium* *3.1 Acid-Base Theory* *3.2 Ionization Equilibrium of Acids/Bases* *3.3 Distribution of Species in Weak Acid/Base Solutions* *3.4 Acid/Base Degree Calculation*

	3.5 Buffer Solutions *Chapter 4: Precipitation-Dissolution Equilibrium* *4.1 Solubility Product Principle* *4.2 Factors Affecting Precipitate Dissolution and Stepwise Precipitation 4.3 Precipitate Dissolution and Transformation* *Chapter 5: Redox Equilibrium* *5.1 Basic Concepts of Redox Reactions* *5.2 Balancing Redox Reaction Equations* *5.3 Electrode Potential* *5.4 Applications of Electrode Potential* *Chapter 6: Coordination Compounds and Coordination Equilibrium* *6.1 Coordination Compounds* *6.2 Coordination Equilibrium* *Chapter 7: Introduction to Analytical Chemistry* *7.1 Tasks and Classification of Analytical Chemistry* *7.3 Errors in Quantitative Analysis* *7.4 Data Processing for Analytical Results* *7.5 Significant Figures and Calculation Rules* *Chapter 8: Titration Analysis Methods* *8.1 Overview of Titration Analysis Methods* *8.2 Acid-Base Titration Method* *8.3 Precipitate Titration Method* *8.4 Redox Titration Method* *8.5 Coordination Titration Method*
Examination forms	*Formative assessment includes: classroom performance, homework assignments, chapter quizzes, and midterm examinations.* *Terminal assessment includes: final examination*
Study and examination requirements	*The comprehensive grade (100 points) = formative assessment score (40 points) + summative assessment score (60 points). A comprehensive grade of 60 points or above is required to earn the course credit.*
Reading list	*1. Inorganic and Analytical Chemistry, edited by Jia Peiyun, China Agricultural University Press, Beijing, 3rd edition, 2023.* *2. Inorganic and Analytical Chemistry, edited by Wuhan University Press, Wuhan, 3rd edition, February 2008.* *3. Inorganic and Analytical Chemistry, edited by Jiangnan University, Chemical Industry Press, Beijing, 2nd edition, January 2010.* *4. Inorganic Chemistry (Volume I), edited by Wuhan University, Higher Education Press, Beijing, 2nd edition, February 1983.* *5. College Chemistry, edited by Fu Xiancai, Higher Education Press, Beijing, 1st edition, September 1999.* *6. Inorganic Chemistry (Volume I), edited by Beijing Normal University et al., Higher Education Press, Beijing, 3rd edition, May 1992.* *7. Analytical Chemistry, Volume I, edited by Wuhan University, Higher Education Press, Beijing, 6th edition, September 2018.*

Advanced Mathematics B (2)

Module designation	*Advanced Mathematics B (2)*
Semester(s) in which the module is taught	*Semester2*
Person responsible for the module	*SU zhifang, Li Yaqin*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Lecture, discussion, Problem-driven, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 120hours* *Contact hours:64* *Self-study hours:56*
Credit points	*Chinese credits: 4; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*Elementary Mathematics, Advanced Mathematics B(1)*
Module objectives/intended learning outcomes	*Understand the concepts of vectors and spatial analytic geometry, master vector operations as well as the derivation and applications of equations for spatial planes, curved surfaces and straight lines; master the methods for finding limits and continuity of binary functions; master differential calculus of multivariate functions and its applications; be able to proficiently calculate double integrals and curvilinear integrals; understand the concept of infinite series, master the criteria for convergence and divergence of infinite series, and learn about simple applications of series. Through the study of multivariate calculus, students will master the basic knowledge and theories and acquire essential skills.*
Content	*1. Chapter 8 Vector Algebra and Spatial Analytic Geometry* *(Weight: 0.15, required level: mastery + familiarity)* *2. Chapters 9 and 10 Multivariate Calculus and Its Applications* *(Weight: 0.60, required level: mastery + comprehension + familiarity + application)* *3. Chapter 11 Curve Integrals and Surface Integrals* *(Weight: 0.15, required level: mastery + comprehension + familiarity + application)* *4. Chapter 12 Infinite Series* *(Weight: 0.10, required level: mastery + familiarity + application)*
Examination forms	*homework, In-class assessments, class attendance & participation, closed-book examination*
Study and examination requirements	*1. This course adopts a 100-point grading system. A score of 60 or above is considered a pass, and students who pass will earn the credits for this course.*

	2. Course Score = Formative Assessment Score × 50% + Summative Assessment Score × 50%. *3. Formative assessment accounts for 50% of the total score, including regular homework (10%), attendance (10%), class performance (20%), and quizzes (10%).* *4. Summative assessment accounts for 50% of the total score, based on the written score of the students' closed-book examination.*
Reading list	*1. Yang Huiqing. Economic Mathematics - Calculus [M]. People's Posts and Telecommunications Press, 2017.* *2. Zhao Shuyuan. Calculus (Fundamentals of Economic Applied Mathematics I) (3rd Edition) [M]. China Renmin University Press, 2007.* *3. Qian Changben. Analysis and Research on the Problem-Solving Process of Advanced Mathematics [M]. Science Press, 1994.* *4. Wang Xianjie. Typical Application Examples and Models of Advanced Mathematics [M]. Science Press, 2005.* *5.Mathematics Subcommittee, Teaching Guidance Committee for Engineering Mathematics Courses of Institutions of Higher Education. Questions and Answers on Advanced Mathematics [M]. Higher Education Press, 1992.* *6. Xue Jiaqing. Compilation of Advanced Mathematics Question Banks. Science and Engineering: Review, Training, Improvement [M]. Northeastern University Press, 2000.* *7.Wang Jingke. Methods and Skills for Solving Advanced Mathematics Problems [M]. China Forestry Publishing House, 1992.*

College Physics (Mechanics + Thermodynamics)

Module designation	*College Physics (Mechanics + Thermodynamics)*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*Zou Mei and Deng Shuping*
Language	*Chinese*
Relation to curriculum	*Subject Foundation Course*
Teaching methods	*Lecture, discussion, case analysis, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 120hours* *Contact hours:64* *Self-study hours:56*
Credit points	*Chinese credit points: 4; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*Calculus (I)*
Module objectives/intended learning outcomes	*Through this module, students will systematically master the basic knowledge and fundamental theories of mechanics and thermology. It aims to cultivate students' physical thinking ability, familiarize them with research methods in physics, and enable them to flexibly apply this knowledge, thereby laying a solid physical foundation for subsequent specialized courses. The specific learning outcomes are as follows:* *1.Knowledge: Students will systematically grasp the basic concepts, fundamental principles, and laws of mechanics and thermology, and understand the basic research methods in physics.* *2.Skills: Students will be able to flexibly apply the basic principles and laws of mechanics and thermology to solve relevant practical problems. They will develop the ability to comprehensively use physical and mathematical knowledge to solve practical problems, and enhance their capabilities in identifying, analyzing, and solving problems.* *3.Competences: Students will establish a scientific materialist worldview, methodology, and epistemology. They will develop the ability to independently analyze and handle related issues, and possess strong self-learning skills and the capacity to absorb new knowledge.*
Content	*This module primarily covers particle kinematics and dynamics, conservation laws in mechanics, rigid body mechanics, vibrations and waves, kinetic theory of gases, and fundamental thermodynamics. The content and weighting are as follows:* *1.Vector Basics, Particle Kinematics and Dynamics(Weight: 0.25)* *- Vector operations; Description of particle motion (displacement, velocity, acceleration); Circular motion; Newton's laws and their applications. (Level: Mastery/Application)* *2.Conservation Laws and Rigid Body Mechanics(Weight: 0.22)* *- Momentum theorem and conservation law; Kinetic energy theorem, work-energy principle, and conservation law of mechanical energy;*

	Rotation law of rigid body, conservation law of angular momentum, and kinetic energy theorem for rotation. (Level: Mastery/Application) *3.Vibrations and Waves(Weight: 0.25)* *- Description of simple harmonic motion (SHM), rotating vector method, superposition of SHM; Generation and propagation of mechanical waves, wave function of plane harmonic waves, Huygens' principle, interference of waves. (Level: Mastery/Application)* *4.Kinetic Theory of Gases(Weight: 0.12)* *- Equation of state for ideal gases, pressure formula, and statistical interpretation of temperature; Equipartition theorem, internal energy formula for ideal gases; Maxwell speed distribution law. (Level: Mastery/Understanding)* *5.Thermodynamics(Weight: 0.16)* *- First law of thermodynamics and its application in isochoric, isobaric, isothermal, and adiabatic processes; Cyclic processes and the Carnot cycle; Second law of thermodynamics. (Level: Mastery/Application)*
Examination forms	*Closed-book examination, mid-term examination, homework assignments, post-class summaries, classroom performance, attendance*
Study and examination requirements	*Students are required to attend classes punctually, actively participate in classroom discussions, and diligently complete homework assignments. The final grade is composed of continuous assessment (attendance, classroom performance, homework, post-class summaries, mid-term examination) and a final examination. Successful completion of the module and attainment of credits requires a final overall score of 60 or above.*
Reading list	*1. Ma Wenwei. Physics Tutorial. Volume 1. Higher Education Press. 2023 (4th Edition). ISBN: 9787040436747.* *2. Zhang Sanhui. University Physics. Tsinghua University Press. 2009 (3rd Edition). ISBN: 9787302193449, 9787302193432.* *3. Douglas C. Giancoli. Physics for Scientists and Engineers with Modern Physics (3rd Edition). Higher Education Press. 2005. ISBN: 9787040165630.* *4. Cheng Shouzhu. General Physics. Higher Education Press. 2006 (6th Edition, Volume 1). ISBN: 9787040200591.* *5. Richard P. Feynman. The Feynman Lectures on Physics: The New Millennium Edition, Volume 1. Shanghai Scientific & Technical Publishers. 2020. ISBN: 9787547847176.* *6. Charles Kittel. Berkeley Physics Course (SI Version), Volume 1, Mechanics. China Machine Press. ISBN: 9787111464570.*

Linear Algebra B

Module designation	*Linear Algebra B*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*LI Jie, ZHAO Yongguang*
Language	*Chinese*
Relation to curriculum	*Discipline-based foundation course*
Teaching methods	*Lecture, discussion, self-study, exercise training, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Elementary Mathematics, Advanced Mathematics B (1), etc.*
Module objectives/intended learning outcomes	*1. Knowledge: students systematically master the basic concepts, theories, methods and calculation skills of determinants, matrices, systems of linear equations, linear dependence of vector groups, similar matrices, quadratic forms, linear spaces and linear transformations, and establish links between algebraic and geometric ideas.* *2. Abilities: students can use matrix methods, elementary transformations, vector group theory and eigenvalue theory to express, analyse and solve linear algebra problems. They can conduct logical reasoning, rigorous proof and standard calculation with mathematical language and symbols, and apply linear algebra ideas to data analysis, systems of equations and simple modelling.* *3. Competences: through classroom discussion, self-study, exercise training and extended assignments, students develop abstract thinking, logical reasoning, a rigorous scientific attitude, teamwork awareness and lifelong learning ability for subsequent professional foundation courses and engineering problem analysis.*
Content	*1. Determinants, including permutations, definitions of n-order determinants, properties, expansion by rows or columns, Cramer's rule and applications in solving systems of equations. (Weight: 0.18, requirement level: understanding + mastery + application)* *2. Matrices and matrix operations, including matrix concepts, addition, multiplication, inverse matrices, block matrices, matrix expression and basic operation rules. (Weight: 0.22, requirement level: understanding + mastery + application)* *3. Elementary transformations of matrices and systems of linear equations, including matrix rank, elementary matrices, solution determination, general solutions and calculation methods. (Weight: 0.13, requirement level: familiarity + mastery + application)*

	4. Linear dependence of vector groups, including equivalence of vector groups, maximal linearly independent groups, vector spaces, fundamental solution systems and linear combinations. (Weight: 0.12, requirement level: understanding + mastery) *5. Similar matrices and quadratic forms, including eigenvalues, eigenvectors, similarity, diagonalisation of real symmetric matrices, standardisation of quadratic forms and positive definiteness. (Weight: 0.20, requirement level: understanding + mastery + application)* *6. Linear spaces and linear transformations, including linear spaces, bases and dimensions, coordinates, linear transformations and matrix representations, supported by integrated exercises. (Weight: 0.15, requirement level: familiarity + understanding + application)*
Examination forms	*Class performance, assignments, periodic tests, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 50% + summative assessment score × 50%.* *3. Formative assessment accounts for 50%, including class performance 20%, assignments 10%, and periodic tests 20%.* *4. Summative assessment accounts for 50%, and the assessment method is closed-book examination, focusing on basic concepts, theories, matrix calculation, systems of linear equations, vector groups, eigenvalues and quadratic forms.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. ZHAO Shuyuan. Linear Algebra (4th ed.) [M]. Beijing: China Renmin University Press, 2008.* *2. WU Ganchang. Linear Algebra for Science and Engineering (3rd ed.) [M]. Beijing: China Renmin University Press, 2009.* *3. ZHANG Herui. Advanced Algebra (5th ed.) [M]. Beijing: Higher Education Press, 2007.* *4. HUANG Huiqing, LIANG Zhian. Linear Algebra [M]. Beijing: Higher Education Press, 2006.* *5. Department of Mathematics, Tongji University. Linear Algebra (6th ed.) [M]. Beijing: Higher Education Press, 2014.* *6. School of Mathematical Sciences, Tongji University. Linear Algebra Supplement: Study Guide and Full Solutions [M]. Beijing: Higher Education Press, 2023. etc.*

Descriptive Geometry

Module designation	*Descriptive Geometry*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*LUO Dayou*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering*
Module objectives/intended learning outcomes	*1. Knowledge: Master the fundamental principles of projection methods; be familiar with the projection characteristics and drawing techniques of points, lines, planes, and basic solids; understand the formation rules and drawing skills of intersection lines and interpenetration lines; acquire basic knowledge of axonometric projection and perspective projection, and be able to read and draw engineering drawings of medium complexity.* *2. Abilities: Develop the ability to solve spatial geometry problems using projection theory, and be able to skillfully draw and interpret multi-view orthographic projections; accurately create axonometric drawings to aid spatial visualization based on engineering requirements; perform form analysis and projection representation of simple engineering structures, laying a practical foundation for subsequent professional courses.* *3. Competences: Cultivate rigorous and meticulous drawing habits, and establish a strong sense of standardization; enhance spatial imagination and logical reasoning skills, and develop the professional ability to accurately express engineering concepts using graphical language.*
Content	*1. Introduction; Basic Knowledge and Basic Skills of Drawing (weight: 0.10, requirement level: mastery + familiarity)* *2. Basic Knowledge of Projection Methods; Projections of Points, Lines, and Planes (weight: 0.30, requirement level: mastery + familiarity + application)* *3. Projections of Solids and Composite Solids (weight: 0.40, requirement level: mastery + familiarity + application)* *4. Axonometric Projection (weight: 0.10, requirement level: familiarity + understanding)*

	5. Methods of Expressing Architectural Structures (weight: 0.10, requirement level: mastery + understanding)
Examination forms	*Attendance & Attitude, Class Participation, In-Class Exercises, Homework, Stage Tests, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including Attendance & Attitude 5%, Class Participation 5%, In-Class Exercises 10%, Homework 10%, and Stage Tests 10%.* *4. Summative assessment accounts for 60%, and the assessment method is closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Unified Standard for Architectural Drawing GB/T 50001-2010.* *2. Standard for Architectural Drawing GB/T 50104-2010.* *3. Mo Zhangjin, Ma Zhongjun. Descriptive Geometry and Architectural Drawing (3rd Edition). Tongji University Press, 2022.* *4. Huang Shuisheng, Huang Li, Teng Haoqun. Descriptive Geometry and Architectural Perspective Shadow. Tsinghua University Press, 2023.* *5. Wang Qiang. Architectural Engineering Drawing and Reading. China Machine Press, 2017.* *6. Lu Chuanxian. Civil Engineering Drawing. China Architecture & Building Press, 2017.* *7.Department of Architectural Drawing, Tongji University. Descriptive Geometry (5th Edition). Tongji University Press, 2025.* *8. Zhu Yuwan. Descriptive Geometry and Civil Engineering Drawing (5th Edition). Higher Education Press, 2015.* *9.Tian Xijie, Liu Shaoguo. Fundamentals of Graphics and Civil Engineering Drawing (2nd Edition). China Machine Press, 2011.* *10. He Mingxin, Li Huaijian. Descriptive Geometry and Civil Engineering Drawing (3rd Edition). Wuhan University of Technology Press, 2009.*

Theoretical Mechanics

Module designation	*Theoretical Mechanics*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*LI Xia ,ZHANG Xue,LI Chen chen.*
Language	*Chinese*
Relation to curriculum	*Basic disciplinary courses*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 120 hours* *Contact hours: 64* *Self-study hours: 56*
Credit points	*Chinese credits: 4; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*Advanced Mathematics B (1)*
Module objectives/intended learning outcomes	*1. Knowledge: Master the basic concepts, principles and methods of statics, kinematics and dynamics, so as to establish a knowledge reserve for solving complex engineering problems.* *2. Ability: Be able to apply the fundamental theories and methods of theoretical mechanics to identify, formulate and solve civil engineering problems and obtain effective conclusions.* *3. Quality: Apply the methods and principles of theoretical mechanics to evaluate engineering systems and structures, propose design schemes with reasonable force distribution that meet production practice, cultivate a rigorous professional attitude, and develop a professional spirit of seeking truth, being pragmatic, pioneering and innovative.*
Content	*1. Axioms of statics and force analysis of rigid bodies* *(weight: 0.09, requirement: mastery + familiarity)* *2.Planar force systems* *(weight:0.19, requirement: mastery + familiarity)* *3.Spatial force systems* *(weight:0.12, requirement: mastery + familiarity)* *4. Friction* *(weight: 0.06, requirement: mastery)* *5. Kinematics of a particle* *(weight: 0.06, requirement: mastery)* *6.Simple motion of rigid bodies* *(weight: 0.06, requirement: mastery)* *7.Composite motion of a particle* *(weight: 0.06, requirement: mastery)*

	8. Planar motion of rigid bodies *(weight: 0.09, requirement: mastery)* *9.Fundamental equations of particle dynamics* *(weight: 0.06, requirement: mastery)* *10.Theorem of momentum* *(weight: 0.06, requirement: comprehension)* *11.Theorem of angular momentum* *(weight: 0.03, requirement: comprehension)* *12.Theorem of kinetic energy* *(weight: 0.03, requirement: comprehension)* *13.d'Alembert's principle* *(weight: 0.06, requirement: mastery)* *14.Principle of virtual displacements* *(weight: 0.03, requirement: understanding)*
Examination forms	*Study attitude, group cooperation, classroom questioning, after-class assignments, periodic tests,closed-book examination*
Study and examination requirements	*1.The course adopts a 100-point grading system. A score of 60 or above is considered passing, and students who pass will earn the credits for this course.* *2.Final course grade = formative assessment × 40% + summative assessment × 60%.* *3. Formative assessment accounts for 40%, includingtudy attitude5%,* *group cooperation5%,classroom questioning/participation5%,after-class assignments15%,periodic tests 10%.* *4. Summative assessment accounts for 60%, and the assessment method is closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1.Theoretical Mechanics Teaching and Research Section, Harbin Institute of Technology. Theoretical Mechanics (9th ed.) [M]. Higher Education Press, 2023.* *2. Sun Yi, Cheng Yanping, Zhang Li, Zeng Fanlin. Complete Solutions to Exercises in Theoretical Mechanics [M]. Higher Education Press, 2023.* *3.Hao Tongsheng. Theoretical Mechanics (4th ed.) [M]. Higher Education Press, 2017.* *4.Li Junfeng, Zhang Xiong (eds.). Theoretical Mechanics (2nd ed.) [M]. Tsinghua University Press, 2010.* *5.Wu Qingxi. Theoretical Mechanics (3rd ed.) [M]. Higher Education Press, 2016.* *6.Dai Jingjun. Theoretical Mechanics [M]. Harbin Engineering University Press, 2018.*

Probability Theory and Mathematical Statistics C

Module designation	*Probability Theory and Mathematical Statistics C*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*ZHAO Yuanying, Wang Qin*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Lecture, discussion etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Calculus, Linear Algebra etc.*
Module objectives/intended learning outcomes	*Course Objective 1: Systematically master random events and probability, one-dimensional and multi-dimensional random variables and their distributions, laws of large numbers and the central limit theorem, statistics and their distributions, and the basic concepts, fundamental theories, basic methods, and computational skills of parameter estimation. Enhance students' mathematical knowledge and competence, cultivate their ability for abstract thinking, logical reasoning and judgment, proficiency in mathematical language and symbolic expression, and the ability to apply probability and statistical methods to solve practical problems.* *Course Objective 2: Grasp the fundamental theories and basic modes of thinking within the system of probability and statistics knowledge. Enable students to develop preliminary abilities to analyze and solve practical problems using stochastic and statistical thinking and related theories, as well as the capability for mathematical modeling. Understand the connections between important content in probability and statistics and other related disciplines as well as social practice. Know the origins and a brief history of the development of probability and statistics. Learn about the stories of relevant mathematicians. Appreciate the unique educational value of probability and statistics in shaping worldviews, life philosophies, and theories of knowledge, as well as its role in advancing natural sciences and human civilization. Enhance students' humanistic literacy, mathematical aesthetic ability, and sense of social responsibility.* *Course Objective 3: Learn to explore, solve, and independently study concepts, methods, and problems in probability and statistics through literature research and active group collaboration, while forming and expressing one's own viewpoints, thereby cultivating a scientific spirit of questioning, criticism, and reflection. Deepen the understanding of the connections between probability and statistics and courses such as Calculus, Linear Algebra, and relevant major-specific courses. Develop*

	the ability to approach problems with a developmental perspective, fostering a concept of lifelong learning and an awareness of professional development.
Content	*1. Main course content* *(weight: 1.00, requirement level: comprehension + mastery)* *Random Events and Probability* *2. One-dimensional and Two-dimensional Random Variables and Their Distributions* *3. Numerical Characteristics of Random Variables* *4. Statistics and Sampling Distributions* *5. Parameter Estimation*
Examination forms	*Attendance and Class Performance, Assignments, Process-Based Assessments, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 50% + summative assessment score × 50%.* *3. Formative assessment accounts for 50%, including attendance and class performance 10%, Assignments 20%, process-based assessments 20%.* *4. Summative assessment accounts for 50%, and the assessment method is closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Wei Zongshu, et al. A Course in Probability Theory and Mathematical Statistics (2nd ed.). Beijing: Higher Education Press, 2008.* *2. Chen Xiru. Probability Theory and Mathematical Statistics. Beijing: Science Press, 2009.* *3. Wang Songgui, et al. Probability Theory and Mathematical Statistics (3rd ed.). Beijing: Science Press, 2015.* *4. ILi Xianping, et al. Probability Theory and Mathematical Statistics. Shanghai: Fudan University Press, 2003.* *5. Sheng Zhou. Probability Theory and Mathematical Statistics (5th ed.). Beijing: Higher Education Press, 2020.* *6. Department of Mathematics, Tongji University. A Concise Course in Probability and Statistics: Study Guide and Solutions to Exercises (2nd ed.). Beijing: Higher Education Press, 2012.* *7. Zhao Xuanmin, et al. Analysis and Solutions of Typical Problems in Probability Theory and Mathematical Statistics (2nd ed.). Xi'an: Northwestern Polytechnical University Press, 2003.* *8. Yao Mengchen. Probability Theory and Mathematical Statistics. Beijing: China Renmin University Press, 2011.*

Civil Engineering Drawing

Module designation	*Civil Engineering Drawing*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*LUO Dayou*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Descriptive Geometry, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Master projection theories such as orthographic projection; be familiar with national drawing standards; understand the basic methods of axonometric projection and topographic projection; master the graphical representation methods of composite solids and engineering structures; be able to read and draw professional drawings such as architectural drawings, structural drawings, and road and bridge engineering drawings.* *2. Abilities: Be able to apply projection theory to spatial geometric analysis and graphical solutions; skillfully use drawing tools and AutoCAD software to create engineering drawings that comply with standards; possess bidirectional thinking ability to visualize three-dimensional forms from two-dimensional drawings and to transform three-dimensional forms into two-dimensional representations; be able to independently read and draw professional drawings of medium complexity.* *3. Competences: Develop a rigorous, meticulous, and conscientious work style; establish a strong awareness of strictly adhering to national standards; cultivate a sense of engineering responsibility and craftsmanship spirit; enhance spatial logical thinking and innovative thinking abilities.*
Content	*1. Architectural Construction Drawings* *(weight: 0.35, requirement level: mastery + familiarity + application)* *2. Structural Construction Drawings* *(weight: 0.35, requirement level: mastery + familiarity + application)* *3. Road and Bridge Engineering Drawings* *(weight: 0.30, requirement level: mastery + familiarity)*
Examination forms	*Attendance & Attitude, Class Participation, In-Class Exercises, Homework, Stage Tests, closed-book examination*

Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 50% + summative assessment score × 50%.* *3. Formative assessment accounts for 50%, including Attendance & Attitude 5%, Class Participation 5%, In-Class Exercises 10%, Homework 15%, and Stage Tests 15%.* *4. Summative assessment accounts for 50%, and the assessment method is open-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Yuan Fang. Foundations of Descriptive Geometry and Engineering Drawing. Tianjin University Press, 2025.* *2. Pu Xiaoqiong. Descriptive Geometry and Civil Engineering Drawing (3rd ed.). Sichuan University Press, 2025.* *3. Ding Yuming, Huang Shuisheng. Civil Engineering Drawing (4th ed.). Higher Education Press, 2021.* *4. Tang Renwei. Descriptive Geometry and Civil Engineering Drawing (4th ed.). Southeast University Press, 2018.* *5. Wang Qiang. Architectural Engineering Drawing and Reading. China Machine Press, 2017.* *6. Lu Chuanxian. Civil Engineering Drawing. China Architecture & Building Press, 2017.* *7. Department of Architectural Drawing, Tongji University. Descriptive Geometry (5th ed.). Tongji University Press, 2025.* *8. Zhu Yuwan. Descriptive Geometry and Civil Engineering Drawing (5th ed.). Higher Education Press, 2015.*

Engineering Materials

Module designation	*Engineering Materials*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*Sun Laite, Wang Panpan, Wu Kechuan, Lan Xiang*
Language	*Chinese*
Relation to curriculum	*Disciplinary Fundamental Course*
Teaching methods	*Lectures, discussions, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Teaching hours: 32* *Self-study hours: 28*
Credit points	*Chinese Credits: 2; ECTS Credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Advanced Mathematics, University Physics, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students can correctly use professional terminology related to civil engineering materials, master the basic composition, performance characteristics, technical requirements, testing methods and application principles of civil engineering materials, become familiar with the properties and applicable conditions of commonly used building materials (cement, concrete, steel, asphalt materials, wall materials and functional materials, etc.), and correctly apply relevant knowledge to the selection, performance analysis, quality control and solution of practical engineering problems.* *2. Skills: Students are able, based on consulting domestic and international literature and relevant technical materials and analyzing complex engineering problems of civil engineering materials, to comprehensively consider factors such as material composition, structure, properties, construction technology, service environment and durability, reasonably analyze the engineering applicability of materials, and reach valid conclusions. They can apply basic theories of civil engineering materials, test methods, professional technical tools and relevant technical standards to conduct performance testing, quality evaluation, material selection analysis and optimization for common engineering materials, and propose material application schemes that are technically feasible, economically reasonable, safe, reliable and environmentally friendly for different engineering conditions.* *3. Competence/Attitude: Students become familiar with technical standards, specifications, national policies, laws and regulations related to civil engineering materials, establish quality awareness, standard awareness, environmental awareness and safety awareness, continuously enhance scientific spirit, engineering ethics and*

	professional responsibility, laying a solid foundation for future work in civil engineering design, construction, inspection and management.
Content	*1. Basic properties and engineering application of civil engineering materials (weight: 0.10, requirement: mastery + understanding)* *2. Stone and aggregates (weight: 0.14, requirement: mastery + familiarity + application)* *3. Asphalt binders (weight: 0.14, requirement: mastery + familiarity + application)* *4. Asphalt mixtures (weight: 0.16, requirement: mastery + familiarity + application)* *5. Inorganic cementitious materials (weight: 0.09, requirement: familiarity + understanding)* *6. Mortar (weight: 0.10, requirement: mastery + familiarity)* *7. Cement concrete (weight: 0.11, requirement: familiarity + understanding)* *8. Inorganic binder stabilized materials (weight: 0.12, requirement: mastery + familiarity)* *9. Construction steel (weight: 0.04, requirement: familiarity + understanding)*
Examination forms	*Pre-class preparation, questioning, assignments, discussion, closed-book examination*
Study and examination requirements	*1.This course uses a 100-point grading system. A score of 60 or above is passing, and students will receive the course credit..* *2. Course grade = Process assessment 60% + Final assessment 40%.* *3. Process assessment (40%) includes: pre-class preparation 10% + in-class questioning 5% + after-class review 10% + homework 10% + attendance 5%.* *4. Final assessment (60%): closed-book examination.* *5. All components use a 100-point scale.*
Reading list	*[1] Hunan University et al., Civil Engineering Materials (2nd ed.), China Architecture & Building Press, 2011.* *[2] Chen Depeng, Yan Li, et al., Civil Engineering Materials (2nd ed.), Tsinghua University Press, 2020.* *[3] Wu Keru, Zhang Xiong, Civil Engineering Materials, Tongji University Press, 2003.* *[4] Chen Jianfeng, Yang Hongyu, Ecological Building Materials, Peking University Press, 2011.* *[5] Specification for Mix Proportion Design of Masonry Mortar (JGJ/T 98-2010), China Architecture & Building Press, 2010.* *[6] Fired Perforated Bricks and Blocks (GB 13544-2011), Standards Press of China, 2011.* *[7] Gypsum plasterboard (GB/T 9775-2008), China Architecture & Building Press, 2008.*

Mechanics of Materials

Module designation	*Mechanics of Materials*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*LI Xia ,YU Wen zheng.*
Language	*Chinese*
Relation to curriculum	*Basic disciplinary courses*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 120hours* *Contact hours: 64* *Self-study hours: 56*
Credit points	*Chinese credits: 4; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*Theoretical Mechanics*
Module objectives/intended learning outcomes	*1. Knowledge: Master the basic concepts and calculations of internal forces, stresses, and deformations for members under four fundamental types of deformation; master the concepts and calculations of strength, stiffness, and stability of members; master the concept and application of strength theories; master the application conditions of Hooke's Law, so as to lay a knowledge foundation for solving complex engineering problems.* *2. Ability: Apply the methods and principles of mechanics of materials to conduct force analysis of members and systems in engineering; be able to identify and analyze the strength, stiffness, and stability of members under basic deformations; be able to apply strength theories to analyze the failure laws of members under combined deformations and perform strength design.* *3. Research and Design Solutions: Carry out innovative research in combination with engineering characteristics, and design component and system schemes that comply with codes and standards and meet engineering mechanics requirements.*
Content	*1.Tension and Compression* *(weight:0.22,requirement level: mastery+ familiarity)* *2.Tension and Compression* *(weight: 0.15, requirement level: mastery+ familiarity)* *3. Bending Strength and Deformation* *(weight:0.33,requirement level: mastery+ familiarity)* *4.Analysis of Stress and Strain States and Combined Deformation* *(weight:0.21,requirementlevel: mastery)* *5. Stability of Compression Bars* *(weight:0.09,requirementlevel: mastery)*

Examination forms	*Study attitude, group cooperation, classroom questioning, after-class assignments, periodic tests,closed-book examination*
Study and examination requirements	*1.The course adopts a 100-point grading system. A score of 60 or above is considered passing, and students who pass will earn the credits for this course.* *2.Final course grade = formative assessment × 40% + summative assessment × 60%.* *3. Formative assessment accounts for 40%, includingtudy attitude5%,* *group cooperation5%,classroom questioning/participation5%,after-class assignments15%,periodic tests 10%.* *4. Summative assessment accounts for 60%, and the assessment method is closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Sun Xun fang, Fang, Xiao shu, Guan Lai tai. Mechanics of Materials (I) (6th ed.)[M]. Higher Education Press, 2019.* *2. Liu Ran hui, Guo Xin zhu, Huang Yu guo. Mechanics of Materials[M]. Chemical Industry Press, 2017.* *3.Fan Qin shan,Yin Ya jun, Tang Jing lin.Mechanics of Materials[M]. Tsinghua University Press, 2020.* *4.Zhang Ju Wei, Wang Wei.Mechanics of Materials[M]. Chemical Industry Press, 2020.* *5.Zhang Shu fen. Mechanics of Materials[M]. China Architecture & Building Press, 2021.* *6.Yuan Hai qing.Mechanics of Materials (4th ed.)[M]. Wuhan University of Technology Press, 2020.*

Engineering Surveying

Module designation	*Engineering Surveying*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*YANG Xu, LUO Dayou*
Language	*Chinese*
Relation to curriculum	*Disciplinary Basic Course*
Teaching methods	*Lectures, instrument demonstrations, experiments, classroom discussion, software practice, and assignment-based learning.*
Workload (incl. contact hours, self-study hours)	*Total workload: 90 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 and Civil Engineering Drawing.*
Module objectives/intended learning outcomes	*1. Knowledge objective: Students understand the basic concepts of surveying, the tasks of engineering surveying, and its role in engineering construction; they master the foundations of coordinate and elevation systems, basic working principles of surveying, and gain awareness of new surveying instruments, technologies, and methods used in engineering practice.* *2. Skill objective: Students master the principles of leveling, angle measurement, and distance measurement; become familiar with the structure, operation, and basic calibration of common instruments; and grasp data processing, error analysis, line orientation, coordinate computation, traverse survey, and elevation control methods.* *3. Application objective: Students master topographic map fundamentals, large-scale digital mapping, total-station mapping, RTK methods, CASS-based map application, and construction setting-out; they can apply engineering surveying knowledge to general construction tasks, route survey, and building deformation observation.* *4. Quality objective: Students develop the ability to analyze and solve ordinary surveying problems, maintain continuous-learning awareness, communication and teamwork ability, and build rigorous professional qualities featuring accuracy, truth-seeking, quality awareness, and safety awareness.*
Content	*1. Introduction, coordinate systems, and elevation systems (weight: 0.10, requirement: comprehension + mastery): basic surveying concepts, tasks of engineering surveying, coordinate and elevation datums, and basic working principles.* *2. Leveling, angle measurement, distance measurement, and operation of common instruments (weight: 0.30, requirement: mastery +*

	application): structure, field observation, recording, basic calibration, and computation with levels, theodolites, and total stations. *3. Surveying errors and control survey (weight: 0.20, requirement: mastery + application): basic error theory, permissible errors, error propagation, line orientation, coordinate computation, traverse survey, and elevation control survey.* *4. GPS/RTK surveying, topographic survey, and digital mapping (weight: 0.15, requirement: comprehension + application): fundamentals of GNSS, field data collection, and digital mapping workflow.* *5. Map interpretation, map application, and basic construction surveying methods (weight: 0.10, requirement: mastery + application): terrain-feature representation, electronic map application, and setting-out of plan positions and elevations.* *6. Building construction survey, route survey, and deformation observation (weight: 0.15, requirement: comprehension + application): surveying for civil and industrial buildings, basic route-survey concepts, preliminary bridge and tunnel surveying awareness, and deformation measurement.*
Examination forms	*Assignments, process assessment, experiment reports (experiment performance), and final examination.*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. The final grade is composed of process assessment and final assessment. A recommended structure is process assessment 40% plus final assessment 60%.* *3. Process assessment mainly examines the mastery of basic concepts, surveying principles, observation methods, and data processing. It may include assignments 15%, classroom performance and attendance 10%, and experiment or software-practice outcomes 15%.* *4. The final assessment is a closed-book examination covering coordinate and elevation systems, error theory, basic surveying methods, control survey, map application, and construction surveying.* *5. The instructor may adjust the details of continuous assessment according to teaching needs, while keeping consistency between learning outcomes, assessment tasks, and grading structure.*
Reading list	*1. YANG Jian and Guo Jingjun, Civil Engineering Surveying (5th ed.) [M]. Wuhan: Wuhan University of Technology Press, 2022.* *2. YANG Zhengyao, Surveying (2nd ed.) [M]. Beijing: Chemical Industry Press, 2019.* *3. GU Xiaolie, Bao Feng, and Cheng Xiaojun, Surveying (2nd ed.) [M]. Shanghai: Tongji University Press, 1999.* *4. GB 50026-2020 Standard for Engineering Surveying[S].* *5. JGJ 8-2016 Technical Specification for Deformation Measurement of Buildings [S].* *6. Teaching materials for CASS digital mapping and instrument manuals.*

Soil Mechanics

Module designation	*Soil Mechanics*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*FENG Guojian, LI Chenchen*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Advanced Mathematics ,Mechanics of Materials*
Module objectives/intended learning outcomes	*1. Knowledge: Master the basic theories of soil mechanics, including soil composition, engineering classification, groundwater movement, physical indices, stress distribution, permeability, compressibility, shear strength, bearing capacity, earth pressure and slope stability; understand the applicable assumptions of major calculation methods and the relevant engineering standards.* *2. Abilities: Calculate three-phase indices, base contact pressure, additional stress, settlement, consolidation, permeability, earth pressure and slope stability; apply Rankine and Coulomb earth pressure theories and basic soil mechanics principles to analyze geotechnical problems and propose feasible engineering solutions.* *3. Qualities: Develop rigorous engineering judgement, awareness of codes and standards, teamwork and communication skills, and a professional attitude toward safety, quality and social responsibility in geotechnical engineering.*
Content	*1.Basic theory of soil mechanics (weight: 0.02, requirement level: mastery + understanding)* *2.Physical properties and engineering classification of soils (weight: 0.26, requirement level: mastery + familiarity + application)* *3.Stress calculation in soil mass (weight: 0.21, requirement level: mastery + familiarity + application)* *4.Permeability characteristics of soils (weight: 0.09, requirement level: mastery + familiarity + application)* *5.Deformation characteristics of soils (weight: 0.11, requirement level: mastery + familiarity + application)* *6.Strength characteristics of soils (weight: 0.13, requirement level: mastery + familiarity + application)*

	7.Specific applications of soil properties (weight: 0.18, requirement level: familiarity + understanding)
Examination forms	*assignments, learning attitude, discussions, summaries, in-class tests, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%,including assignments 10%, learning attitude 5%, discussions 5%, summaries 5%, and in-class tests 15%.* *4. Summative assessment accounts for 60%, and the assessment method is closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. SHU Zhile, LIU Baoxian. Soil Mechanics (2nd ed.)[M]. Chongqing: Chongqing University Press, 2023.* *2. Southeast University, Zhejiang University, Hunan University, Soochow University. Soil Mechanics (4th ed.)[M]. Beijing: China Architecture & Building Press, 2016.* *3. ZHAO Chenggang, BAI Bing. Principles of Soil Mechanics (2nd ed.)[M]. Beijing: Tsinghua University Press & Beijing Jiaotong University Press, 2017.* *4. LIAO Hongjian, LI Rongjian, Liu Enlong. Soil Mechanics (3rd ed.)[M]. Beijing: Higher Education Press, 2018.* *5. LI Guangxin. Informal Discussion on Soil Mechanics[M]. Beijing: People's Communications Publishing Co., Ltd., 2019.* *6. Compiling Group of "Soil Mechanics" Textbook of Hohai University. Soil Mechanics (3rd ed.)[M]. Beijing: Higher Education Press, 2019.* *7. SU Dong. Soil Mechanics (2nd ed.)[M]. Beijing: Tsinghua University Press, 2019.* *8. SHEN Yang. Ten Records of Principles of Soil Mechanics (2nd ed.)[M]. Beijing: China Architecture & Building Press, 2021.*

Structural Mechanics A

Module designation	*Structural Mechanics A*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*YU Wenzheng.*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Lecture, class discussion, exercise class, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 120 hours* *Contact hours: 64* *Self-study hours: 56*
Credit points	*Chinese credits: 4; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*Advanced Mathematics, Theoretical Mechanics, Mechanics of Materials*
Module objectives/intended learning outcomes	*1. Knowledge: Students can understand and master the basic knowledge of structural mechanics, including the basic concepts and theories of geometric construction analysis of systems, internal force and displacement calculation of statically determinate structures, force method, displacement method, approximate calculation methods of statically indeterminate structures, and influence lines. Cultivate applied talents who adapt to the needs of socialist modernization, develop comprehensively in morality, intelligence, and physique, possess a solid foundation in structural mechanics, and have systematic and in-depth professional knowledge.* *2. Abilities: Students can apply the basic concepts of structural mechanics to classify civil engineering structures, apply the basic principles of mathematics, natural sciences and engineering sciences to identify, express, and analyze complex civil engineering problems through literature research, and comprehensively apply the learned theories of structural mechanics to obtain effective conclusions independently.* *3. Competences: By using relevant knowledge and analysis methods of structural mechanics, students can design (develop) systems, structures, components (joints) or construction schemes that meet specific needs of civil engineering, comprehensively considering social, health, safety, legal, cultural and environmental factors in the design process. Become applied and innovative professionals who master the basic calculation methods of structural mechanics and certain experimental skills, and are capable of engaging in design, construction, and testing in mechanics and related fields.*
Content	*1. Introduction (weight: 0.03, requirement level: understanding)* *2. Geometric construction analysis of planar bar systems (weight: 0.08, requirement level: mastery + application)*

	3. Force analysis of statically determinate structures (weight: 0.20, requirement level: mastery + application) - including internal force calculation and internal force diagram drawing of beams, rigid frames, trusses, composite structures, and arches. *4. Displacement calculation of statically determinate structures (weight: 0.10, requirement level: mastery + application) - principle of virtual work, unit load method, and graph multiplication method.* *5. Force method (weight: 0.20, requirement level: mastery + application) - force method analysis and calculation of statically indeterminate structures.* *6. Displacement method (weight: 0.20, requirement level: mastery + application) - displacement method analysis and calculation of statically indeterminate structures.* *7. Successive approximation method (weight: 0.09, requirement level: familiarity + application) - moment distribution method.* *8. Influence lines and their applications (weight: 0.10, requirement level: mastery + application) - drawing influence lines by static method and kinematic method, and applications of influence lines.*
Examination forms	*Assignments, unit tests, course summary, class discussion, questioning, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%. Within the formative assessment, class discussion accounts for 5%, questioning accounts for 5%, course summary accounts for 10%, assignments account for 40%, and unit tests account for 40%.* *4. Summative assessment accounts for 60%, and the assessment method is a closed-book examination (total score 100 points, duration 120 minutes).* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. LI Liankun. Structural Mechanics (Vol. 1) (7th ed.) [M]. Beijing: Higher Education Press, 2022.* *2. LONG Yuqiu, BAO Shihua, YUAN Si. Structural Mechanics I - Basic Course (4th ed.) [M]. Beijing: Higher Education Press, 2018.* *3. ZHU Cimian, ZHANG Weiping. Structural Mechanics (3rd ed.) [M]. Beijing: Higher Education Press, 2016.* *4. BAO Shihua, XIN Kegui. Structural Mechanics (2nd ed.) [M]. Wuhan: Wuhan University of Technology Press, 2012.* *5. ZHAO Gengxin. Structural Mechanics Tutoring - Concepts, Methods, and Solutions [M]. Beijing: China Building Materials Press, 2019.* *6. Structural Mechanics Teaching and Research Office of Hunan University. Structural Mechanics Calculation Handbook (2nd ed.) [M]. Beijing: Higher Education Press, 2016.* *7. LEI Zhonghe, JIANG Aichuan, HAO Jingming. Structural Mechanics Problem Solving (2nd ed.) [M]. Beijing: Tsinghua University Press, 2013.*

Building Architecture

Module designation	*Building Architecture*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*SU Xin*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Teaching is organized through lectures, case analysis, reading of architectural drawings, explanation of construction details, classroom discussion, assignments, and staged drawing exercises.*
Workload (incl. contact hours, self-study hours)	*Total workload: 90 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, Descriptive Geometry, Civil Engineering Drawing, and Engineering Drawing.*
Module objectives/intended learning outcomes	*1. Knowledge objective: Students understand the role of Building Construction in studying architectural space organization, construction theory, and basic building design methods. They master the composition of civil buildings, the principles of plan, elevation, and section design, and the basic principles and common practices of walls, floors, roofs, stairs, doors, and windows.* *2. Ability objective: Students are able to analyze common design problems of small and medium-sized civil buildings from the perspectives of function, structural safety, comfort, economy, and code requirements. They can read and express architectural construction drawings, interpret construction details, compare construction schemes, and consult design references.* *3. Application objective: Students can integrate building design principles, construction knowledge, and drawing expression methods to propose reasonable solutions for spatial organization, circulation, enclosure construction, vertical design, and drawing expression of ordinary civil buildings, laying a foundation for the subsequent course design, concrete structure design, and graduation project.* *4. Quality objective: Students develop awareness of engineering codes, spatial scale, building safety and applicability, green and low-carbon design, and human settlement quality, together with rigorous engineering expression habits and lifelong learning ability.*
Content	*1. Fundamentals of building design and building composition (weight: 0.15, requirement: comprehension + mastery): course tasks, classification of civil buildings, building modules, design basis, and the relationship among architecture, structure, equipment, and environment.*

	2. Plan design and spatial organization (weight: 0.20, requirement: mastery + application): use rooms, auxiliary rooms, circulation spaces, functional zoning, circulation organization, plan composition methods, and analysis of small and medium-sized civil building layouts. *3. Section, elevation, and vertical circulation design (weight: 0.15, requirement: mastery): storey height and clear height, section organization, building massing and elevation treatment, stairs, ramps, and dimensional control of vertical circulation.* *4. Major building construction systems (weight: 0.25, requirement: mastery + application): foundations and walls, floors, roofs, waterproofing and thermal insulation, doors and windows, deformation joints, stairs, construction principles, common practices, and detail expression.* *5. Reading architectural construction drawings and expressing details (weight: 0.15, requirement: application): site plans, plans, elevations, sections, details, dimensions, materials, and architectural construction notes.* *6. Reference consultation and integrated application (weight: 0.10, requirement: analysis + evaluation): consultation of codes, standard drawings, and design references through typical civil building cases, and evaluation of scheme rationality, construction feasibility, and drawing quality.*
Examination forms	*Assignments, classroom discussion, drawing reading and construction-detail exercises, staged deliverable inspection, and final assessment or comprehensive coursework.*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. The final grade is composed of process assessment and final assessment; a recommended structure is 40% process assessment and 60% final assessment.* *3. Process assessment focuses on classroom participation, assignments, literature or data consultation, drawing expression, and case analysis. It may include attendance and classroom performance (10%), regular assignments (15%), and staged results or case discussion (15%).* *4. The final assessment may take the form of a written test, open-book assessment, course report, or comprehensive deliverable, depending on the course nature. It focuses on basic concepts, engineering methods, code application, and comprehensive analysis ability.* *5. Students are required to complete assignments and staged deliverables on time, work independently, and observe academic integrity and engineering professional ethics.*
Reading list	*1. DONG Hairong and ZHAO Yongdong, Building Construction (2nd ed.) [M]. Beijing: China Architecture & Building Press, 2022.* *2. YAN Hongliang, Building Construction Details [M]. Shanghai: Tongji University Press.* *3. Editorial Committee, Architectural Design Data Collection (2nd ed.) [M]. Beijing: China Architecture & Building Press.* *4. GB 50352-2019 Unified Standard for Design of Civil Buildings [S].* *5. GB 50016-2014 Code for Fire Protection Design of Buildings (2018 edition) [S].*

Fluid Mechanics

Module designation	*Fluid Mechanics*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*SUN Laite, HAN Zhang*
Language	*Chinese*
Relation to curriculum	*Basic Discipline Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Advanced Mathematics B, Theoretical Mechanics, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: students can accurately use professional terms related to fluid mechanics, master the basic theoretical knowledge of mathematics, natural science and engineering, thoroughly grasp the core principles of fluid statics and liquid kinematics, clarify the basic analytical logic of fluid mechanics problems in the field of civil engineering, be familiar with the basic theories of relevant literature research methods, computer simulation prediction and programming calculation, master the ideas for identifying and analyzing fluid mechanics problems in architecture, road and bridge engineering and hydraulic engineering, and proficiently grasp the basic solving methods and core technical points of various fluid mechanics engineering problems and other professional basic theories.* *2. Abilities: when faced with specific projects or cases related to fluid mechanics in civil engineering, students can correctly apply the learned professional knowledge to accurately identify and analyze engineering problems, carry out simulation calculations with the help of information technology, design feasible solutions and conduct comparative optimization, and put forward scientific and reasonable technical schemes for project implementation and optimization.* *3. Competences: students can comprehensively consider the impacts of multiple factors such as safety, economy and environment in civil engineering practice, correctly apply the professional knowledge of fluid mechanics to scientifically evaluate engineering schemes, cultivate the professional quality of being rigorous and realistic, standardized and law-abiding, establish the awareness of quality and safety and social responsibility, and fulfill the social responsibility of civil engineering practitioners to maintain the stable development of society.*
Content	*1. Introduction* *(weight: 0.06, requirement level: mastery + comprehension)*

	2. Fluid Statics *(weight: 0.18, requirement level: mastery + application)* *3. Fluid Kinematics* *(weight: 0.10, requirement level: mastery + comprehension)* *4. Fundamentals of Fluid Dynamics* *(weight: 0.25, requirement level: mastery + application)* *5. Flow Resistance and Head Loss* *(weight: 0.25, requirement level: comprehension + application)* *6. Orifice and Nozzle Flow, and Pressurized Pipe Flow* *(weight: 0.16, requirement level: mastery + comprehension)*
Examination forms	*Preview, Questioning, Assignments, Seminar, In-class Tests, Open-book Examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including preview (2.5%), questioning (11%), assignments (14%), seminar (10%), and in-class tests (2.5%).* *4. Summative assessment accounts for 60%, conducted as a Open-book Examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. LIU Henian, LIU Jing. Fluid Mechanics[M]. Beijing: China Architecture & Building Press, 2016.* *2. WU Chigong. Hydraulics (5th Edition)[M]. Beijing: Higher Education Press, 2016.* *3. ZHAO Mingdeng. Study Guide and Exercise Solutions for Hydraulics[M]. Beijing: China Water & Power Press, 2009.* *4. WEN Desun. Engineering Fluid Mechanics (Hydraulics) (4th Edition)[M]. Beijing: Higher Education Press, 2020.* *5. HUANG Ruqin. Hydraulics (4th Edition)[M]. Chengdu: Southwest Jiaotong University Press, 2013.* *6. CAI Zengji. Study Guidance and Detailed Exercise Solutions for Fluid Mechanics[M]. Beijing: China Architecture & Building Press, 2007.* *etc.*

Professional Compulsory Courses

Principles of Concrete Structure Design

Module designation	*Principles of Concrete Structure Design*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*Wei Ping, Wang Panpan, Wu Kechuan*
Language	*Chinese*
Relation to curriculum	*Core Major Course (Compulsory)*
Teaching methods	*Lectures, discussions, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total: 90 hours (Teaching: 48, Self-study: 42)*
Credit points	*Chinese Credits: 3; ECTS Credits: 3*
Required and recommended prerequisites for joining the module	*Mechanics of Materials, Civil Engineering Materials, Theoretical Mechanics, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students can correctly use terminology related to concrete structure design, master the basic theories, methods and detailing requirements of concrete structure design, be familiar with the mechanical behavior, failure mechanism, bearing capacity calculation principles, serviceability limit state verification methods and structural detailing requirements of reinforced concrete members, understand the technical standards, specification requirements and design concepts, and correctly apply relevant knowledge to analysis, design calculations and solution of practical engineering problems of concrete structural members.* *2. Skills: Students are able to consult technical standards, specifications and domestic/international literature, analyze complex concrete structure engineering problems, comprehensively consider load effects, material properties, structural mechanical characteristics, detailing measures, durability requirements and service conditions, reasonably analyze the mechanical behavior and design schemes of basic reinforced concrete members (flexural, compressive, tensile, torsional), and obtain valid conclusions. They can apply basic theories, professional calculation methods, engineering charts and relevant technical standards to complete design calculations, detailing analysis and scheme optimization of common concrete structural members, forming structural design results that are safe, reliable, technically feasible, economical, meeting functional and durability requirements.* *3. Attitude: Students become familiar with technical standards, specifications, national policies and regulations related to concrete structure design, establish safety awareness, quality awareness, specification awareness and responsibility awareness, continuously improve rigorous scientific spirit, engineering ethics and professional responsibility.*

Content	*1. Basic concepts and fundamental knowledge of concrete structures* *(weight:0.18, requirement: mastery + familiarity)* *2. Ultimate limit state design method for concrete structures* *(weight:0.32, requirement: mastery + familiarity + application)* *3. Serviceability limit state design method for concrete structures* *(weight:0.22, requirement: mastery + familiarity + application)* *4. Durability design of concrete structures* *(weight:0.10, requirement: familiarity + understanding)* *5. Detailing requirements for concrete structures* *(weight:0.18, requirement: mastery + familiarity + application)*
Examination forms	*Pre-class preparation, questioning, assignments, discussion, closed-book examination*
Study and examination requirements	*Process assessment (40%) = pre-class preparation 10% + questioning 5% + after-class review 10% + homework 10% + attendance 5%; Final (60%) = closed-book exam; overall grade 60% to pass.*
Reading list	*[1] Southeast University et al., Concrete Structures: Volume I (6th ed.), China Architecture & Building Press, 2016.* *[2] Southeast University et al., Concrete Structures: Volume II (6th ed.), China Architecture & Building Press, 2016.* *[3] Code for design of concrete structures: GB 50010-2010, China Architecture & Building Press, 2010.* *[4] Liang Xingwen et al., Principles of Concrete Structure Design, China Architecture & Building Press, 2025.* *[5] Lin Dezhong et al., Principles of Concrete Structure Design, Shanghai Jiao Tong University Press, 2017.* *[6] Li Qiaosheng et al., Principles of Concrete Structure Design (3rd ed.), China Railway Press, 2013.* *[7] Cao Qikun et al., Principles of Concrete Structure Design, China Building Materials Press, 2016.* *[8] Yang Xialin et al., Principles of Concrete Structure Design, China Communications Press, 2014.*

Principles of Steel Structure Design

Module designation	*Principles of Steel Structure Design*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*Song Gaoli, Sun Laite*
Language	*Chinese*
Relation to curriculum	*Specialisation compulsory*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 90 hours* *Contact hours: 48* *Self-study hours: 42*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*Theoretical Mechanics, Mechanics of Materials*
Module objectives/intended learning outcomes	*Knowledge: Students will be able to understand the concept, characteristics and application scope of steel structures, master the classification, performance requirements, key performance indicators and corresponding testing methods of steel materials, master the content, design ideas and specific calculation methods of cross-section design for steel members, and master the connection methods and specific calculation methods of steel structures.* *2. Abilities:Students will be able to rationally select steel materials by combining the actual characteristics of engineering projects. They can comprehensively apply knowledge from prerequisite courses such as Theoretical Mechanics to simplify calculation models, reasonably choose cross-section forms of members, complete the cross-section design of steel members, and possess the ability to optimize and adjust cross-sections. Considering practical engineering factors including fabrication and construction, students can reasonably select joint connection forms of steel members, proficiently master the design theories and methods of various weld and bolt connections, and have the ability to judge the rationality of design results.* *3. Competences: Students will be familiar with the relevant technical standards, specifications, codes, national policies, laws and regulations for steel structure design, and enhance their awareness of codes and professional ethics.*
Content	*1.Concept, Characteristics and Application of Steel Structures (Weight: 0.05, requirement Level: mastery + understanding)* *2.Steel Materials (Weight: 0.12, requirement Level: mastery + familiarity + application)* *3.Axially Loaded Members (Weight: 0.22, requirement Level: mastery + familiarity + application)*

	4.Flexural Members (Weight: 0.22, requirement Level: mastery + familiarity + application) *5.Members under Combined Axial Force and Bending (Weight: 0.12, requirement Level: mastery + familiarity + application)* *6.Connections of Steel Structures (Weight: 0.27, requirement Level: mastery + familiarity + application)*
Examination forms	*Self-directed learning,Homework,In-class exercises,Chapter tests* *,Closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including Self-directed learning 10%, Homework10%,In-class exercises 10%,Chapter tests 10%.* *4. Summative assessment accounts for 60%, and the assessment method is closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1.Song Gaoli. Principles of Steel Structure Design [M]. Beijing: China Architecture & Building Press, 2019.* *2.National Standard of the People's Republic of China. Standard for Design of Steel Structures GB 50017-2017 [S]. Beijing: China Architecture & Building Press, 2018.* *3.National Standard of the People's Republic of China. High-Strength Low-Alloy Structural Steels GB/T 1591-2018 [S]. Beijing: Standards Press of China, 2018.* *4.National Standard of the People's Republic of China. General Code for Steel Structures GB 55006-2021 [S]. Beijing: China Architecture & Building Press, 2021.* *5.Shen Zuyan, Chen Yiyi. Basic Principles of Steel Structures (3rd ed.) [M]. Beijing: China Architecture & Building Press, 2018.* *6.Chen Yiyi, Zhao Xianzhong. Principles and Examples of Steel Structure Design [M]. Beijing: China Architecture & Building Press, 2024.* *7.Editorial Board of Steel Structure Design Handbook. Steel Structure Design Handbook (3rd ed.) [M]. Beijing: China Architecture & Building Press, 2009.* *etc.*

Concrete Structure Design

Module designation	*Concrete Structure Design*
Semester(s) in which the module is taught	*Semester five*
Person responsible for the module	*Wei ping, Wu kechuang*
Language	*Chinese*
Relation to curriculum	*Required Major Course*
Teaching methods	*Lectures, Discussions, Online Learning*
Workload (incl. contact hours, self-study hours)	*Total workload: 90 hours* *Contact hours: 48* *Self-study hours: 42*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*Principles of Concrete Structure Design* *Building Architecture* *Structural Mechanics*
Module objectives/intended learning outcomes	*Knowledge Objectives: Master basic concepts and principles: Students shall fully understand the fundamental principles, concepts and development history of concrete structure design, including basic knowledge of prestressed concrete, single-story factory bent structures, multi-story frame structures, etc. They shall comprehend the physical and mechanical properties of concrete materials, such as strength and deformation characteristics, as well as the mechanism of combined behavior of steel bars and concrete.Gain in-depth understanding of design theories and methods: Conduct in-depth study on the design theories of prestressed concrete members, single-story factory bent structures and multi-story frame structures, and master their design calculation methods and detailing requirements. Understand and grasp the basic principles and methods of structural analysis, such as internal force calculation, displacement calculation, load combinations, etc.* *Be familiar with codes and standards: Be acquainted with national and industrial codes, standards and drawings related to concrete structure design, and understand their guiding and restrictive roles in the design process.* *Ability Objectives: Structural design ability: Cultivate students' preliminary concrete structure design ability, enabling them to carry out structural type selection, layout and member design according to actual engineering conditions. Master the ability to use computer software for structural analysis and design to improve design efficiency and accuracy.Problem-solving ability: Develop students' ability to apply acquired knowledge to solve practical engineering problems, including the handling of complex issues such as structural stress analysis, internal force calculation and member design. Guide students to pay attention to new technologies, new materials and new methods in engineering practice, and enhance their ability to adapt to industrial development.Communication and collaboration ability: Foster students' teamwork spirit and communication and coordination skills, so that*

	they can cooperate effectively with team members during the design process. *Educational Objectives: Engineering ethics and sense of responsibility: Emphasize the importance of engineering ethics, and cultivate students' sense of responsibility and professional ethics. Require students to strictly abide by relevant codes and standards in the design process to ensure the safety and economy of structures.Independent learning and innovative spirit: Cultivate students' independent learning ability and encourage them to actively explore new knowledge, technologies and methods. Meanwhile, inspire students' innovative spirit and encourage them to make bold attempts and innovations in design.Rigorous and realistic work attitude: Guide students to form a rigorous and realistic work attitude, pay attention to details and precision, and ensure the accuracy and reliability of design results.Environmental awareness and sustainable development concept: Cultivate students' environmental awareness and concern for the environmental impact of concrete structure design. Guide them to establish a sustainable design concept, focusing on the energy conservation, environmental protection and recyclability of structures.*
Content	*Introduction (Weight: 0.05, Required level: Master + Comprehend)* *Design of Beam and Slab Structures (Weight: 0.35, Required level: Master + Familiarize + Apply)* *Structural Design of Single-Storey Industrial Buildings (Weight: 0.30, Required level: Master + Familiarize + Apply)* *Design of Multi-Storey and High-Rise Frame Structures (Weight: 0.30, Required level: Master + Familiarize + Apply)*
Examination forms	*Online preview, questioning, assignments, seminars, design calculations, and design drawings*
Study and examination requirements	*1.Process assessment accounts for 40%, including assignments 8%; discussion of structural design proposals 8%; discussion of structural design procedures 8%; discussion of curriculum ideological and political cases 8%; and design of cast-in-place integral cantilever canopies 8%.* *2.Final assessment accounts for 60%, requiring submission of the design calculation report and drawings for a two-way slab ribbed floor system.* *The course adopts a 100-point grading system. A score of 60 or above is considered a pass, upon which students will earn the credits for this course.*
Reading list	*1.Shen Pusheng, Liang Xingwen (eds.). Concrete Structure Design (6th ed.). Higher Education Press, 2025.* *2.General Code for Concrete Structures GB 55008-2021* *3.Principles of Concrete Structure Design (6th ed.). Co-edited by Southeast University, Tongji University, Tianjin University. China Architecture & Building Press.* *4. Concrete Structure Design Handbook by Jack C. Brown* *5.Handbook of Concrete Engineering Structural Design by R. Dodge Woodson et al.* *6. Concrete Technology Manual by A. M. Neville et al.* *7.Design and Construction Technology of Concrete Structures by George Winter et al.*

Steel Structure Design

Module designation	*Steel Structure Design*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*Song Gaoli*
Language	*Chinese*
Relation to curriculum	*Specialisation compulsory*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 90 hours* *Contact hours: 48* *Self-study hours: 42*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*Structural Mechanics, Principles of Steel Structure Design, Loads and Structural Design Methods, etc.*
Module objectives/intended learning outcomes	*Knowledge: Students shall master the commonly used structural systems of steel structures, including the design contents, basic procedures and specific methods of typical steel structure systems such as single-storey industrial buildings with ordinary steel roof trusses, portal frames and steel frames, as well as the key points of drawing and reading construction drawings for steel structures.* *2. Abilities:Students can reasonably select the structural system according to project characteristics, and comprehensively apply the basic theories of steel structure design, professional technical tools and relevant technical standards to complete the structural layout and design calculation of conventional steel structure engineering. They also possess certain abilities in scheme optimization and engineering data processing and application.* *3. Competences:Students shall be familiar with the technical standards, codes, regulations, national policies, laws and regulations related to steel structure design, so as to enhance their code awareness and professional literacy.*
Content	*1.Main structural systems of steel structures (Weight: 0.1, requirement Level: mastery + understanding)* *2.Single-storey industrial buildings with ordinary steel roof trusses (Weight: 0.3, requirement Level: mastery + familiarity + application)* *3.Light-weight building structures with gabled frames (Weight: 0.35, requirement Level: mastery + familiarity + application)* *4.Multi-storey steel frame structures (Weight: 0.25, requirement Level: mastery + familiarity + application)*
Examination forms	*Self-directed learning, Homework, In-class exercises, Chapter tests* *,Closed-book examination*

Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%,including Self-directed learning 10%, Homework10%,In-class exercises 10%,Chapter tests 10%.* *4. Summative assessment accounts for 60%, and the assessment method is closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1.Song Gaoli. Steel Structure Design (2nd ed.) [M]. Beijing: China Architecture & Building Press, 2025.* *2.Song Gaoli. Principles of Steel Structure Design [M]. Beijing: China Architecture & Building Press, 2019.* *3.National Standard of the People's Republic of China. Standard for Design of Steel Structures: GB 50017-2017 [S]. Beijing: China Architecture & Building Press, 2018.* *4.National Standard of the People's Republic of China. Technical Code for Steel Structures of light-weight building with gabled Frames : GB 51022-2015 [S]. Beijing: China Architecture & Building Press, 2015.* *5.National Standard of the People's Republic of China. Technical Standard for Cold-Formed Steel Structures: GB/T 50018-2025 [S]. Beijing: China Planning Press, 2025.* *6.National Standard of the People's Republic of China. General Code for Steel Structures: GB 55006-2021 [S]. Beijing: China Architecture & Building Press, 2021.* *7.Editorial Board of Steel Structure Design Handbook. Steel Structure Design Handbook (3rd ed.) [M]. Beijing: China Architecture & Building Press, 2009.* *8.Li Guoqiang, Wang Lei, Sun Feifei. Design of Light Steel Structures for Portal Frame Buildings [M]. Beijing: China Architecture & Building Press, 2023.* *etc.*

Seismic Design of Building Structures and Smart Disaster Prevention (EEE)

Module designation	*Seismic Design of Building Structures and Smart Disaster Prevention (EEE)*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*ZHANG-Longfei*
Language	*Chinese*
Relation to curriculum	*Specialisation compulsory*
Teaching methods	*Lectures, discussions, exercises, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 90 hours* *Contact hours: 48* *Self-study hours: 42*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*Theoretical Mechanics, Mechanics of Materials, Structural Mechanics, Civil Engineering Materials, Principles of Concrete Structure Design, Principles of Steel Structure Design, etc.*
Module objectives/intended learning outcomes	*1. Skills: Understand China's seismic fortification objectives of "no damage under minor earthquakes, repairable under moderate earthquakes, and no collapse under major earthquakes" (three-level fortification) and the "two-stage" seismic design method; master the judgment of site classification, understand the hazards of foundation soil liquefaction, and conduct seismic checking of foundations; apply knowledge of advanced mathematics and structural dynamics to solve equations of motion, grasp the meaning and function of response spectra, calculate horizontal and vertical seismic actions, and perform seismic checking of structures; understand seismic damage characteristics of masonry structures, reinforced concrete structures, and steel structures, and learn that structural design should be carried out from three levels: conceptual design, seismic calculation, and detailing measures.* *2. Abilities: Comprehend the importance of seismic design of building structures from the three levels of conceptual design, seismic calculation, and detailing measures; recognize energy dissipation as an emerging seismic technology, understand the basic principles and procedures of seismic isolation and energy dissipation design, maintain a developmental perspective on seismic technologies, and track the development trends of civil engineering seismic disciplines.* *3. Qualities: Correctly interpret provisions related to seismic calculation and detailing measures in professional codes such as Code for Seismic Design of Buildings, Code for Design of Masonry Structures, Code for Design of Concrete Structures, and Standard for Design of Steel Structures; comply with relevant requirements and reflect the professional ethics of structural engineers in the practice of seismic design of building structures.*

Content	*1. Basic knowledge of engineering seismic fortification. (weight: 0.15, requirement level: mastery + Familiarize)* *2. Seismic checking of construction sites and foundations. (weight: 0.10, requirement level: familiarity + understanding)* *3. Structural seismic response analysis and seismic calculation. (weight: 0.45, requirement level: mastery + familiarity + application)* *5. Structural seismic design. (weight: 0.20, requirement level: mastery + familiarity + application)* *6. Seismic isolation, energy dissipation and structural control. (weight: 0.10, requirement level: Familiarize + understanding)*
Examination forms	*Preview, questioning, assignments, seminars, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = formative assessment score × 50% + summative Assessment Score × 50%.* *3. Formative assessment score accounts for 50%: Preview 5%, questioning 5%, seminars 20%, assignments 20%.* *4. Summative assessment accounts for 50%, and the assessment method is closed-book examination.* *Both process assessment components and summative assessment use a 100-point system.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Zhu Yingjie. Seismic Design of Structures[M]. Beijing: Peking University Press, 2013.* *2. Shang Shouping, Zhou Fulin. Seismic Design of Structures[M]. Beijing: Higher Education Press, 2015.* *3. GB 50011-2010, Code for Seismic Design of Buildings[S]. Beijing: China Architecture & Building Press, 2016.* *4. JGJ 3-2010, Technical Specification for Concrete Structures of Tall Buildings[S]. Beijing: China Architecture & Building Press, 2010.* *5. GB 50003-2011, Code for Design of Masonry Structures[S]. Beijing: China Architecture & Building Press, 2010.* *6. GB 50017-2003, Code for Design of Steel Structures[S]. Beijing: China Planning Press, 2003.* *7. GB 50007-2011, Code for Design of Building Foundations[S]. Beijing: China Architecture & Building Press, 2012.* *8. GB 50010-2010, Code for Design of Concrete Structures[S]. Beijing: China Architecture & Building Press, 2010.*

High-rise Building Structure Design

Module designation	*High-rise Building Structure Design*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*LAN Xiang, ZHANG Longfei, YU Wenzheng, WU Kechuan*
Language	*Chinese*
Relation to curriculum	*Professional Compulsory Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Theoretical Mechanics, Mechanics of Materials, Structural Mechanics, Civil Engineering Materials, Design Principles of Concrete Structures, Design Principles of Steel Structures, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students can correctly use professional terminology related to high-rise building structural design. They will master the mechanical characteristics, component layout principles, lateral displacement curves, and seismic performance of common structural systems, including frame, shear wall, frame-shear wall, tube, and frame-core tube structures. Students will master the calculation of global and local wind loads, as well as the calculation of horizontal and vertical seismic actions based on the design response spectrum. They will master various structural design requirements (regularity, minimum seismic shear coefficient, deformation verification, energy dissipation, and ductility). Furthermore, students will understand the approximate calculation methods and seismic design principles for frame, shear wall, and frame-shear wall structures, and comprehend fundamental professional theories such as the types, basic principles, and design procedures of energy dissipation and seismic reduction structures.* *2. Ability: When facing specific high-rise building design projects, students will be able to reasonably select structural systems based on conditions such as building functions, structural height, and seismic fortification zones. They will be capable of accurately completing the calculation of wind and seismic loads, and conducting structural scheme design in compliance with national codes and industry standards, ensuring the proposed scheme possesses excellent economic efficiency and seismic performance.* *3. Quality: Students will correctly understand relevant provisions in professional codes such as the Standard for Seismic Design of Buildings, Standard for Design of Concrete Structures, and Technical Specification for Concrete Structures of Tall Building. In the practice of high-rise building structural design, they will be able to modify and refine their designs by integrating industry scheme reviews and special seismic reviews. Guided by economic efficiency and seismic performance,*

	students will consciously abide by relevant legal and regulatory requirements as well as the professional ethics of structural engineers.
Content	*1. Structural Systems (weight: 0.30, requirement level: mastery + comprehension)* *2. Loads on High-rise Building Structures (weight: 0.15, requirement level: mastery + application)* *3. Structural Design Requirements (weight: 0.30, requirement level: mastery + comprehension + application)* *4. Approximate Calculation Methods and Structural Design (weight: 0.15, requirement level: mastery + comprehension)* *5. Design of Energy Dissipation and Seismic Reduction Structures (weight: 0.10, requirement level: mastery + comprehension)*
Examination forms	*Pre-class preparation, in-class discussion, chapter quizzes, regular assignments, short essay, and closed-book exam*
Study and examination requirements	*1. The final grade for this course is evaluated on a 100-point scale. Students who achieve a score of 60 or above will pass the course and obtain the corresponding credits.* *2. Final Course Grade = Formative Assessment Score × 50% + Summative Assessment Score × 50%.* *3. The formative assessment accounts for 50% of the final grade, which consists of pre-class preparation (6%), in-class discussion (9%), chapter quizzes (11%), regular assignments (9%), and a short essay (15%).* *4. The summative assessment accounts for 50% of the final grade, which takes the form of a closed-book exam.* *5. Both the summative assessment and each individual component of the formative assessment are graded on a 100-point scale.*
Reading list	*1. Zhang Congjun, Zong Lan. High-rise Building Structural Design. Southeast University Press, 2014. (in Chinese)* *2. Lu Xilin. High-rise Building Structures (3rd Edition). Wuhan University of Technology Press, 2011. (in Chinese)* *3. Shi Qingxuan, Liang Wenxing. High-rise Building Structural Design (2nd Edition). Science Press, 2012. (in Chinese)* *4. GB 50011-2010 (2024 Edition). Code for Seismic Design of Buildings. Beijing: China Architecture & Building Press, 2024. (in Chinese)* *5. GB 50009-2012. Load Code for the Design of Building Structures. Beijing: China Architecture & Building Press, 2012. (in Chinese)* *6. JGJ 3-2010. Technical Specification for Concrete Structures of Tall Building. Beijing: China Architecture & Building Press, 2010. (in Chinese)* *7. GB 50010-2010 (2015 Edition). Code for Design of Concrete Structures. Beijing: China Architecture & Building Press, 2015. (in Chinese)* *8. JGJ 297-2013. Technical Specification for Seismic Energy Dissipation of Buildings. Beijing: China Architecture & Building Press, 2013. (in Chinese)*

Civil Engineering Construction Technology and Organization

Module designation	*Civil Engineering Construction Technology and Organization*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*FAN Zhen*
Language	*Chinese*
Relation to curriculum	*Professional Compulsory Course*
Teaching methods	*Teaching is organized through lectures, engineering case analysis, interpretation of construction organization documents, network planning exercises, classroom discussion, assignments, and open-book comprehensive assessment.*
Workload (incl. contact hours, self-study hours)	*Total workload: 120 hours* *Contact hours: 64* *Self-study hours: 56*
Credit points	*Chinese credits: 4; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*Civil Engineering Construction Technology, Building Construction, Engineering Economics, and Engineering Project Management.*
Module objectives/intended learning outcomes	*1. Knowledge objective: Students master the general principles and methods of construction organization and site management, and understand the role of construction preparation, flow construction, network planning, unit-project construction organization design, and construction site layout in the whole construction process.* *2. Method objective: Students master the basic methods of determining flow-construction parameters, dividing construction sections, organizing construction processes, drawing activity-on-arrow and activity-on-node networks, calculating time parameters, identifying critical paths, and optimizing schedules.* *3. Application objective: Students can prepare a unit-project construction organization design according to drawings, construction conditions, resource conditions, and technical-economic requirements, and propose construction sequence, schedule, resource allocation, site layout, and quality and safety management measures.* *4. Quality objective: Students develop engineering management awareness that integrates quality, schedule, cost, safety, environment, and civilized construction requirements, and form the ability to solve construction organization and site management problems by scientific methods.*
Content	*1. Introduction to construction organization and management (weight: 0.10, requirement: comprehension): course tasks, types of construction organization design, basic contents of construction project management, and the role of organization documents in project implementation.*

	2. Construction preparation and flow construction organization (weight: 0.20, requirement: mastery + application): construction preparation, division of construction sections, organization of construction processes, flow parameters, organization methods, and applicable conditions. *3. Network planning techniques (weight: 0.25, requirement: mastery + application): activity-on-arrow and activity-on-node networks, time-parameter calculation, critical path, schedule optimization, and application of network plans in schedule control.* *4. Unit-project construction organization design (weight: 0.25, requirement: application + analysis): project overview analysis, construction scheme selection, construction sequence arrangement, schedule preparation, resource demand planning, and main technical and organizational measures.* *5. Construction site layout and resource management (weight: 0.10, requirement: application): temporary facilities, material storage yards, equipment layout, transportation roads, temporary water and electricity, and civilized construction requirements.* *6. Quality, safety, cost, and environmental management (weight: 0.10, requirement: analysis + evaluation): analysis of quality control, safety risks, green construction, and technical-economic evaluation in construction organization schemes through engineering cases.*
Examination forms	*Assignments, classroom discussion, network planning and construction organization exercises, process assessment, and final open-book assessment or comprehensive coursework.*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. The final grade is composed of process assessment and final assessment; a recommended structure is 40% process assessment and 60% final assessment.* *3. Process assessment focuses on classroom participation, assignments, literature or data consultation, drawing expression, and case analysis. It may include attendance and classroom performance (10%), regular assignments (15%), and staged results or case discussion (15%).* *4. The final assessment may take the form of a written test, open-book assessment, course report, or comprehensive deliverable, depending on the course nature. It focuses on basic concepts, engineering methods, code application, and comprehensive analysis ability.* *5. Students are required to complete assignments and staged deliverables on time, work independently, and observe academic integrity and engineering professional ethics.*
Reading list	*1. WANG Jian, Building Construction Organization and Management [M]. Harbin: Harbin Institute of Technology Press, 2023.* *2. Chongqing University, Tongji University, and Harbin Institute of Technology, Civil Engineering Construction (4th ed.) [M]. Beijing: China Architecture & Building Press, 2018.* *3. GUO Jianying and ZONG Xiang, Civil Engineering Construction Technology [M]. Wuhan: Wuhan University Press, 2016.*

Road Survey and Design

Module designation	*Road Survey and Design*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*MAO Dejun, WANG Panpan, ZHU Weiwei*
Language	*Chinese*
Relation to curriculum	*Specialisation compulsory*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 90 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 Drawing, Engineering Ethics, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: students can correctly use professional terms related to highway and urban road survey and design, master the basic principles and methods of road survey and design, as well as the technical requirements and design concepts of highway and urban road design, and correctly apply them to engineering practice related to road survey and design and solve practical engineering problems.* *2. Abilities: students can analyse complex road engineering problems based on domestic and international literature, comprehensively consider the technical requirements and design concepts of the horizontal alignment, vertical profile and cross-section of highways and urban roads, reasonably analyse road geometric design schemes, and draw effective conclusions. Students can apply the basic theories of road survey and design, professional technical tools and relevant technical standards to complete the selection, analysis and optimization of road alignment schemes under specific terrain and environmental conditions, and form technically feasible, safe, reliable, economically reasonable and environmentally friendly design schemes.* *3. Competences: Students can become familiar with the relevant technical standards, specifications, procedures, national policies, laws and regulations for road survey and design, so as to enhance their awareness of regulations and professional ethics.*
Content	*1. Basic theory of road survey and design (weight: 0.08, requirement level: mastery + understanding)* *2. Horizontal alignment design (weight: 0.15, requirement level: mastery + familiarity + application)* *3. Vertical profile design (weight: 0.15, requirement level: mastery + familiarity + application)* *4. Cross-section and roadside design (weight: 0.16, requirement level: mastery + familiarity + application)*

	5. Overall design (weight: 0.06, requirement level: familiarity + understanding) *6. Route selection and location (weight: 0.13, requirement level: mastery + familiarity)* *7. Road at-grade intersection design (weight: 0.08, requirement level: familiarity + understanding)* *8. Road grade separation design (weight: 0.13, requirement level: mastery + familiarity)* *9. Road environmental protection and landscape design (weight: 0.06, requirement level: familiarity + understanding)*
Examination forms	*Preview, questioning, assignments, seminar, course paper, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 55% + summative assessment score × 45%.* *3. Formative assessment accounts for 55%, including preview 5%, questioning 5%, assignments 10%, seminar 20%, and course paper 15%.* *4. Summative assessment accounts for 45%, and the assessment method is closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. ZHANG Chi, PAN Binghong, YANG Hongzhi. Road Survey and Design (6th ed.) [M]. Beijing: China Communications Press, 2024.* *2. Industry Standard of the People's Republic of China. Technical Standard of Highway Engineering: JTG B01-2014 [S]. Beijing: China Communications Press, 2014.* *3. Industry Standard of the People's Republic of China. Design Specifications for Highway Alignment: JTG D20-2017 [S]. Beijing: China Communications Press, 2017.* *4. Industry Standard of the People's Republic of China. Design Specifications of Highways Environmental Protection: JTG B04-2010 [S]. Beijing: China Communications Press, 2010.* *5. Industry Standard of the People's Republic of China. Specifications for Highway Safety Audit: JTG B05-2015 [S]. Beijing: China Communications Press, 2015.* *6. Industry Standard of the People's Republic of China. Code for Design of Urban Road Engineering: CJJ 37-2012 [S]. Beijing: China Architecture & Building Press, 2012.* *7. ZHANG Zhiqing. Road Survey and Design [M]. Beijing: Science Press, 2022.* *etc.*

Roadbed and Pavement Engineering

Module designation	*Roadbed and Pavement Engineering*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*MAO Dejun, WANG Panpan, ZHU Weiwei*
Language	*Chinese*
Relation to curriculum	*Specialisation compulsory*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 90 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 Drawing, Engineering Material, Road Survey and Design, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: students can correctly use professional terminology related to subgrade and pavement engineering. They master the basic theories and methods of general subgrade design, the fundamental approaches for stability analysis of special subgrades, the structural requirements and design methods of subgrade protection and retaining structures, the characteristics and influencing factors of various pavement bases, the design methods and procedures of asphalt concrete pavement, the design methods and structural requirements of cement concrete pavement, as well as the construction methods and technical requirements for subgrade, asphalt pavement and cement concrete pavement.* *2. Abilities: when facing specific road engineering projects or cases, students can properly apply the professional knowledge they have learned to put forward scientific and reasonable technical schemes for the design and construction of subgrade and pavement engineering.* *3. Competences: students can comprehensively consider the impacts of road engineering practices on the natural environment and social sustainable development, and correctly apply their professional knowledge to scientifically and reasonably evaluate the technical schemes for the design and construction of subgrade and pavement engineering projects.*
Content	*1. Basic theories of highway subgrade and pavement engineering (weight: 0.10, requirement level: mastery + comprehension)* *2. Characteristics and design parameters of subgrade soils (weight: 0.08, requirement level: mastery + comprehension)* *3. Subgrade design (weight: 0.18, requirement level: mastery + application)* *4. Design of subgrade protection and retaining structures (weight: 0.08, requirement level: mastery + application)*

	5. Subgrade construction (weight: 0.07, requirement level: comprehension + application) *6. Traffic loads and pavement design parameters (weight: 0.04, requirement level: comprehension)* *7. Pavement base courses (weight: 0.08, requirement level: mastery + comprehension)* *8. Asphalt pavement design (weight: 0.12, requirement level: mastery + application)* *9. Cement concrete pavement design (weight: 0.04, requirement level: mastery + application)* *10. Subgrade and pavement drainage design (weight: 0.07, requirement level: mastery + application)* *11. Pavement construction (weight: 0.07, requirement level: comprehension + application)* *12. Maintenance and management of subgrade and pavement (weight: 0.07, requirement level: comprehension + application)*
Examination forms	*Preview, questioning, assignments, seminar, course paper, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 60% + summative assessment score × 40%.* *3. Formative assessment accounts for 60%, including preview (6%), questioning (8%), assignments (10%), seminars (20%), and course paper (16%).* *4. Summative assessment accounts for 40%, conducted as a closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. HUANG Xiaoming. Subgrade and Pavement Engineering[M]. Beijing: China Communications Press, 2025.* *2. Industry Standard of the People's Republic of China. Specifications for Design of Highway Subgrades: JTG D30-2015[S]. Beijing: China Communications Press, 2015.* *3. Recommended Industry Standard of the People's Republic of China. Technical Specifications for Construction of Highway Subgrades: JTG/T 3610-2019[S]. Beijing: China Communications Press, 2019.* *4. Industry Standard of the People's Republic of China. Specifications for Design of Highway Asphalt Pavement: JTG D50-2017[S]. Beijing: China Communications Press Co., Ltd., 2017.* *5. Industry Standard of the People's Republic of China. Technical Specifications for Construction of Highway Asphalt Pavements: JTG F40-2004[S]. Beijing: China Communications Press, 2004.* *6. Industry Standard of the People's Republic of China. Specifications for Design of Highway Cement Concrete Pavement: JTG D40-2011[S]. Beijing: China Communications Press, 2011.* *etc.*

Tunnel Engineering

Module designation	*Tunnel Engineering*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*SUN Laite, MAO Dejun, WAN Panpan*
Language	*Chinese*
Relation to curriculum	*Compulsory*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 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 Drawing, Theoretical Mechanics, Mechanics of Materials, Engineering Geology and Hydrogeology, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: students can accurately use professional terms related to tunnel engineering, master tunnel classification criteria, main geological survey methods and surrounding rock classification methods, proficiently grasp the theories and methods of tunnel site selection, alignment, cross-section and structural design, be familiar with the mechanical principles of shotcrete and bolt support, master common tunnel construction technologies, quality inspection methods and standards, have a thorough understanding of the design requirements for ventilation and lighting as well as prevention and control measures for common diseases, and meanwhile understand the core literacy theories related to engineering ethics and craftsmanship spirit and other professional basic theories.* *2. Abilities: when faced with specific tunnel engineering projects or cases, students can correctly apply the learned professional knowledge, standardly apply industry codes and standards in the whole process of tunnel survey, design, construction and maintenance, and complete all professional technical work.* *3. Competences: students can abide by the relevant laws and regulations, professional codes and professional ethics of tunnel engineering, establish a scientific spirit and engineering ethics awareness combined with curriculum ideological and political education, cultivate the rigorous craftsmanship spirit of striving for perfection, foster a profound patriotism of serving the country through science and technology, and fulfill the professional mission and social responsibility of civil engineers.*
Content	*1. Introduction (weight: 0.08, requirement level: mastery + comprehension)* *2. Tunnel Geological Survey (weight: 0.15, requirement level: mastery + comprehension)*

	3. Tunnel Design (weight: 0.12, requirement level: mastery + application) *4. Mechanical Principles of Tunnel Shotcrete and Bolt Support (weight: 0.12, requirement level: mastery + application)* *5. Tunnel Ventilation and Lighting (weight: 0.10, requirement level: comprehension + application)* *6. Tunnel Construction Methods (weight: 0.14, requirement level: comprehension)* *7. Tunnel Engineering Quality Inspection (weight: 0.15, requirement level: mastery + comprehension)* *8. Common Diseases and Prevention of Tunnels (weight: 0.14, requirement level: mastery + application)*
Examination forms	*Preview, Questioning, Assignments, Seminar, Review, Closed-book Examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including preview (10%), questioning (5%), assignments (10%), seminar (10%), and review (5%).* *4. Summative assessment accounts for 60%, conducted as a Open-book Examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. WANG Cheng. Tunnel Engineering[M]. Beijing: China Communications Press, 2019.* *2. Ministry of Transport of the People's Republic of China. Code for Design of Highway Tunnels - Volume 1: Civil Engineering (JTG 3370.1-2018)[S]. Beijing: China Communications Press Co., Ltd., 2019.* *3. Ministry of Transport of the People's Republic of China. Technical Code for Construction of Highway Tunnels (JTG F60-2009)[S]. Beijing: China Communications Press Co., Ltd., 2009.* *4. Ministry of Transport of the People's Republic of China. Detailed Rules for Design of Highway Tunnel Lighting (JTG/T D70/2-01-2014)[S]. Beijing: China Communications Press Co., Ltd., 2014.* *5. Ministry of Transport of the People's Republic of China. Technical Code for Maintenance of Highway Tunnels (JTG H12-2015)[S]. Beijing: China Communications Press Co., Ltd., 2015.* *6. ZHU Yongquan, SONG Yuxiang. Tunnel Engineering (4th Edition)[M]. Beijing: China Railway Publishing House Co., Ltd., 2021.* *7. PENG Limin, SHI Chenghua. Tunnel Engineering (2nd Edition)[M]. Changsha: Central South University Press, 2017.* *8. GAO Wei. Tunnel Engineering[M]. Beijing: Science Press, 2022.*

Bridge Engineering

Module designation	*Bridge Engineering*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*WANG Chunhua, WANG Panpan*
Language	*Chinese*
Relation to curriculum	*Specialisation compulsory*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 120 hours* *Contact hours: 64* *Self-study hours: 56*
Credit points	*Chinese credits: 4; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*Advanced Mathematics, Structural Mechanics, Materials Mechanics, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students can comprehensively master the mechanics, construction, and construction characteristics of various types of bridges, especially the construction, design, calculation methods, and construction points of small and medium-sized reinforced concrete and prestressed concrete bridges, arch bridges, cable-stayed bridges, and suspension bridges.* *2. Ability: Students are able to apply the basic principles of bridge engineering, combined with consulting specifications, standards, atlases, and literature to deconstruct and systematically analyze bridge engineering problems, and obtain effective conclusions; To cultivate students' ability to independently analyze and solve practical problems, as well as their application ability to comprehensively consider design, construction, management, and other aspects. Students use design specifications, manuals, and standard drawings to carry out structural design and stress calculations for small and medium-sized bridges, and reasonably select bridge construction methods to prepare construction special plans. Through comprehensive curriculum design, students' abilities to query effective information, correctly apply design standards, and independently design bridge engineering are enhanced.* *3. Quality: Students can be familiar with technical standards, specifications, regulations, national policies, and laws and regulations related to bridge engineering, and enhance their awareness of norms and professional ethics.*
Content	*1. Introduction (Weight: 0.08, Requirement Level: Mastery+Understanding)* *2. Simply supported beam bridge (weight: 0.12, requirement level: mastery+familiarity+application)* *3. Continuous beam bridges and continuous rigid frame bridges (weight: 0.12, requirement level: mastery+familiarity+application)*

	4. Arch Bridge (Weight: 0.12, Requirement Level: Mastery+Familiarity+Application) *5. Suspension Bridge (Weight: 0.10, Requirement Level: Familiar+Understood)* *6. Cable stayed bridge (weight: 0.10, requirement level: mastery+familiarity)* *7. Bridge deck system, supports and ancillary facilities (weight: 0.12, requirement level: familiar+understood)* *8. Bridge piers and abutments (weight: 0.12, requirement level: mastery+familiarity)* *9. Bridge Design (Weight: 0.06, Requirement Level: Familiar+Understood)* *10. Bridge construction and maintenance (weight: 0.06, requirement level: familiar+knowledgeable)*
Examination forms	*Pre class preparation, classroom questioning, homework, case study, post class review, closed book exam*
Study and examination requirements	*1. The grades of this course are based on a percentage system, and students who score 60 or above are considered qualified to receive credits for this course.* *2. Course score=Process assessment score x 40%+Final assessment score x 60%.* *3. The process assessment score accounts for 40%, including 5% pre class preparation, 10% classroom questioning, 10% homework, 10% case study, and 10% post class review.* *4. The final assessment accounts for 60%, and the assessment method is closed book examination.* *5. The various components of the process assessment and the final assessment are both based on a percentage system.*
Reading list	*1. Chen Baochun Bridge Engineering (4th Edition) [M]. Beijing: People's Communications Press Co., Ltd., 2022.* *2. Industry standards of the People's Republic of China JTG B01-2014 Technical Standard for Highway Engineering [S]. Beijing: People's Communications Press Co., Ltd., 2014.* *3. Industry standards of the People's Republic of China JTG D60-2015 General Specification for Design of Highway Bridges and Culverts [S]. Beijing: People's Communications Press Co., Ltd., 2015.* *4. Industry Recommended Standards of the People's Republic of China JTG/T F50-2011 Technical Specification for Construction of Highway Bridges and Culverts [S]. Beijing: People's Communications Press, 2011.* *5. Industry standards of the People's Republic of China JTG 3362-2018 Design Specification for Highway Reinforced Concrete and Prestressed Concrete Bridges and Culverts [S]. Beijing: People's Communications Press Co., Ltd., 2018.* *6. Yao Lingsen Bridge Engineering (Third Edition) [M]. Beijing: People's Communications Press, 2021.* *7. Fan Lichu Bridge Engineering (Third Edition - Volume 1) [M]. Beijing: People's Communications Press, 2017.* *8. Gu Anbang Bridge Engineering (Third Edition - Volume 2) [M]. Beijing: People's Communications Press, 2017.*

Extended Elective Courses

Computer Programming

Module designation	*Computer Programming*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*YU Wenzheng.*
Language	*Chinese*
Relation to curriculum	*Extension Elective*
Teaching methods	*Lecture, computer-based practice, case-based teaching, flipped classroom, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Fundamentals of Information Science and Artificial Intelligence*
Module objectives/intended learning outcomes	*1. Knowledge objectives: Through the study of this course, students can quickly get started with Python programming, master the basic methods and skills of programming, gain a preliminary understanding of the working principles of computers, and enjoy the high-level pleasure brought by programming problem-solving and scientific and technological innovation.* *2. Ability objectives: Students will possess certain programming and computational thinking abilities, learn to use computers to analyze and solve scientific computing problems, and lay a solid foundation of computer application for subsequent learning and practice.* *3. Competence objectives: Through learning, students will grasp the laws of development of things, understand principles, enrich their knowledge, broaden their horizons, shape their character, possess the spirit of craftsmanship of a great nation striving for perfection, and strive to become socialist builders and successors with all-round moral, intellectual, physical, aesthetic, and labor development.*
Content	*1. Programming and Python language (weight: 0.05, requirement level: understanding)* *2. Python basics (weight: 0.15, requirement level: mastery + application)* *3. Sequences (weight: 0.06, requirement level: mastery + application)* *4. Dictionaries and sets (weight: 0.06, requirement level: mastery + application)* *5. Program control structures (weight: 0.15, requirement level: mastery + application)* *6. Functions (weight: 0.12, requirement level: mastery + application)* *7. Files (weight: 0.05, requirement level: mastery + application)*

	8. Object-oriented programming (weight: 0.08, requirement level: understanding) *9. Exceptions (weight: 0.05, requirement level: mastery + application)* *10. Fundamentals of Python scientific computing and data analysis development (weight: 0.08, requirement level: mastery + application)* *11. Introduction to web crawlers (weight: 0.10, requirement level: familiarity + application)* *12. Introduction to text based on the Natural Language Toolkit (NLTK) (weight: 0.05, requirement level: familiarity + application).*
Examination forms	*Assessment. Specifically, it combines formative assessment (assignments, unit tests, course summary, class discussion, questioning) and summative assessment (final open-book examination)..*
Study and examination requirements	*1. Course score = formative assessment score × 40% + summative assessment score × 60%.* *2. Summative assessment accounts for 60% of the total score (the final exam paper has a total score of 100 points, the duration is 120 minutes, and the format is an open-book examination).* *3. Formative assessment accounts for 40% of the total score (based on a 100-point scale), and the specific proportions are: active class discussion (5%), class questioning (5%), course summary (10%), assignments (40%), and unit tests (40%).*
Reading list	*1. ZHANG Li. Python Programming [M]. Beijing: Higher Education Press, 2022.* *2. Eric Matthes. Python Crash Course (3rd ed.) [M]. Beijing: Posts & Telecom Press, 2023.* *3. SONG Tian, HUANG Tianyu, LI Xin. Fundamentals of Python Language Programming (2nd ed.) [M]. Beijing: Higher Education Press, 2017.* *4. Wes McKinney. Python for Data Analysis (3rd ed.) [M]. Beijing: China Machine Press, 2023.* *5. YE Zhiming, ZHANG Hongbo. Computer Methods and Applications in Civil Engineering [M]. Beijing: China Architecture & Building Press, 2018.* *6. ZHANG Ying, WANG Peng. Application of Python in Civil Engineering [M]. Beijing: Tsinghua University Press, 2024.* *7. LI Gang. Crazy Python Notes (2nd ed.) [M]. Beijing: Publishing House of Electronics Industry, 2022..*

Engineering Geology and Hydrogeology

Module designation	*Engineering Geology and Hydrogeology*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*LI Chenchen, XIA Lei, YANG Xu*
Language	*Chinese*
Relation to curriculum	*Specialisation elective*
Teaching methods	*Lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*None.*
Module objectives/intended learning outcomes	*1.Knowledge: Master the fundamental knowledge of the Earth; recognize and distinguish the three main types of rocks; understand the basic principles of tectonic movements and their manifestations, as well as methods of identification; and grasp the basic principles and methods of engineering geological analysis.* *2.Abilities: Possess the ability to read geological data, analyze engineering geological conditions, and preliminarily solve engineering geological problems; as well as the comprehensive ability to identify geological hazards and analyze and address such hazards.* *3.Qualities: Be able to comprehensively consider the impacts of engineering, society, law, safety, and the environment when evaluating the engineering geological conditions of projects; possess the professional competence to analyze and solve general engineering geological problems in an integrated manner, and be able to communicate and present findings effectively.*
Content	*1.Basic Knowledge of the Earth* *(Weight: 0.1; Required Level: Mastery + Understanding)* *2.Engineering Geological Conditions* *(Weight: 0.4; Required Level: Mastery + Familiarity + Application)* *3.Engineering Geological Problems* *(Weight: 0.4; Required Level: Mastery + Familiarity + Application)* *4.Engineering Geological Investigation* *(Weight: 0.1; Required Level: Mastery + Familiarity + Application)*
Examination forms	*Homework Assignments, In-class Quizzes, Discussions, Classroom Performance, Pre-class Preparation, Open-book Examination*

Study and examination requirements	*1.The course adopts a 100-point grading system. A score of 60 or above is considered a pass, and students who pass will earn the course credits.* *2.Final course grade = Continuous Assessment Score × 40% + Final Assessment Score × 60%.* *3.Continuous assessment accounts for 40% of the total grade, including: homework assignments (10%), in-class quizzes (10%), discussions (5%), classroom performance (5%), and pre-class preparation (10%).* *4.The final assessment accounts for 60% of the total grade and is conducted in the form of an open-book examination.* *5.All components of the continuous assessment and the final assessment are graded on a 100-point scale.*
Reading list	*Hu Houtian, Bai Zhiyong. Civil Engineering Geology (4th Edition) [M]. Beijing: Higher Education Press, 2022.* *2. Shi Zhenming, Huang Yu . Engineering Geology (3rd Edition) [M]. Beijing: China Architecture & Building Press, 2018.* *3. Chen Nanxiang. Engineering Geology and Hydrogeology (5th Edition) [M]. Beijing: China Water & Power Press, 2016.* *4.National Standard of the People's Republic of China. Code for Investigation of Geotechnical Engineering: GB50021-2024 [S]. Beijing: China Communications Press, 2024.* *5.Editorial Committee of Engineering Geology Handbook. Engineering Geology Handbook (5th Edition) [M]. Beijing: China Architecture & Building Press, 2018.* *6.China Geological Survey. Hydrogeology Handbook (2nd Edition) [M]. Beijing: Geological Publishing House, 2012.* *etc.*

Engineering Ethics

Module designation	*Engineering Ethics*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*SUN Laite, YANG Xu*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 30 hours* *Contact hours: 16* *Self-study hours: 14*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: students can accurately use professional terms related to engineering ethics, master the basic theories of engineering professional ethics and ethical norms, understand the moral obligations and responsibility boundaries of engineers in professional activities, clarify the ethical requirements such as privacy protection and environmental and resource maintenance in engineering practice, grasp the ethical judgment principle of prioritizing public safety and public interests, understand the differences and values of engineering ethics under different cultural backgrounds, and be familiar with the basic ideas for handling engineering-related legal norms and ethical conflicts.* *2. Abilities: when faced with specific engineering practice projects or ethical cases, students can correctly apply the learned ethical knowledge to identify and analyze engineering ethical issues, and make reasonable judgments and decisions in line with professional norms and public interests.* *3. Competences: students can comprehensively consider the impact of engineering practice on public safety, ecological environment and social public interests, correctly apply engineering ethics knowledge, consciously abide by professional norms, and responsibly evaluate and regulate technical behaviors such as engineering design and construction.*
Content	*1. Understanding "Engineering" (weight: 0.04, requirement level: mastery + comprehension)* *2. Engineering Ethics (weight: 0.10, requirement level: mastery + application)* *3. How to Conduct "Good Engineering"? (weight: 0.06, requirement level: mastery + comprehension)* *4. How to Become an Outstanding Engineer? (weight: 0.10, requirement level: mastery + comprehension)*

	5. Responsible Engineering Creation (weight: 0.10, requirement level: comprehension + application) *6. Engineering, Environment and Sustainable Development (weight: 0.20, requirement level: mastery + application)* *7. Engineering, Safety and Sustainable Development (weight: 0.20, requirement level: mastery + application)* *8. Engineering, Health and Sustainable Development (weight: 0.20, requirement level: mastery + application)*
Examination forms	*Class Performance, In-class Assignments, After-class Assignments, Thematic Discussions, Course Thesis*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including class performance (10%), in-class assignments (10%), after-class assignments (10%), thematic discussions (20%), and course paper (10%).* *4. Summative assessment accounts for 60%, conducted as a course thesis.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. LI Zhengfeng. Engineering Ethics[M]. Beijing: Higher Education Press, 2023.* *2. CHEN Changshu. An Introduction to the Philosophy of Technology[M]. Beijing: Science Press, 1999.* *3. WU Qidi. A History of Chinese Engineers[M]. Beijing: Science Press, 2017.* *4. GAO Zhaoming. Existence and Freedom: An Introduction to Ethics[M]. Shanghai: Tongji University Press, 2017.* *5. Vesilin Gunn. Engineering, Ethics and the Environment[M]. Beijing: Tsinghua University Press, 2003.* *6. XING Ji. The Whole Story of the Three Severe Nuclear Accidents in the World[M]. Beijing: Science Press, 2019.* *7. Charles Perrow. Normal Accidents: Living with High-Risk Technologies[M]. Beijing: Scientific and Technical Documents Publishing House, 1988.* *etc.*

Engineering Environmental Science

Module designation	*Engineering Environmental Science*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*ZHAO Xuan*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course*
Teaching methods	*Lecture, seminar, case study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 30 hours* *Contact hours: 16* *Self-study hours: 14*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*College Physics (Mechanics + Thermodynamics), Inorganic and Analytical Chemistry, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students will be able to use environmental science terminology accurately, and master fundamental knowledge of environmental engineering, including ecological environment, resources and energy, cleaner production, various types of pollution control and environmental assessment. They will be able to identify and understand the impacts of civil engineering projects on the environment and sustainable social development, and possess the ability to analyse and evaluate such impacts.* *2. Abilities: Students will be able to apply environmental engineering knowledge properly, establish environmental awareness for sustainable development, and prioritise environmental impacts in engineering and economic activities. They will be competent to analyse and evaluate the social, health, safety, legal and cultural impacts of civil engineering projects, and understand the professional responsibilities of civil engineers.* *3. Competence: Students will be able to comprehensively take into account social, economic, legal, regulatory and environmental safety factors in engineering design.*
Content	*1. Overview of Environmental Issues, Theory and Practice of Sustainable Development. (Weight: 0.08, Requirements: Knowledge + Comprehension)* *2. Energy and Environmental Issues. (Weight: 0.10, Requirements: Familiarity + Comprehension)* *3. Air Pollution and Its Prevention & Control. (Weight: 0.14, Requirements: Mastery + Comprehension)* *4. Water Pollution and Its Prevention & Control. (Weight: 0.14, Requirements: Mastery + Comprehension)* *5. Soil Pollution and Its Prevention & Control. (Weight: 0.14, Requirements: Mastery + Comprehension)*

	6. Solid Waste Pollution and Its Prevention & Control. (Weight: 0.15, Requirements: Mastery + Comprehension) *7. Other Types of Pollution and Their Prevention & Control. (Weight: 0.08, Requirements: Knowledge + Comprehension)* *8. Environmental Assessment, Planning and Management. (Weight: 0.17, Requirements: Mastery + Application)*
Examination forms	*Pre-class review, class performance, assignments, class discussions, in-class exercises, and open-book examination.*
Study and examination requirements	*1. This module is graded on a 100-point scale. A score of 60 or above is considered a pass, and students who pass will be awarded the credits for this module.* *2. Final Module Score = Formative Assessment × 40% + Summative Assessment × 60%.* *3. Formative assessment accounts for 40%, consisting of pre-class review (5%), class performance (5%), assignments (10%), class discussion (10%), and in-class exercises (10%).* *4. Summative assessment accounts for 60%, conducted in the form of an open-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Hu, X., Wang, K., Yuan, X., et al. Introduction to Environmental Science [M]. Wuhan: Huazhong University of Science and Technology Press, 2020.* *2. Yang, Z., Liu, J. Introduction to Environmental Science (2nd ed.) [M]. Beijing: Higher Education Press, 2010.* *3. Chen, H., Zhu, Y., Dong, Y., et al. Environmental Soil Science (3rd ed.) [M]. Beijing: Science Press, 2018.* *4. Wu, C., Wang, Y. Introduction to Environmental Protection [M]. Beijing: Metallurgical Industry Press, 2017.* *5. Ju, M., Shao, C., Li, Z. Fundamentals of Environmental Science (2nd ed.) [M]. Beijing: Chemical Industry Press, 2010.* *6. Li, S., Meng, X. Environmental Impact Assessment [M]. Beijing: Chemical Industry Press, 2018.* *7. Tang, X., Shen, B. Solid Waste Treatment and Disposal (2nd ed.) [M]. Beijing: Chemical Industry Press, 2018.* *8. Shen, B., Ju, M. Air Pollution Control Engineering [M]. Beijing: Chemical Industry Press, 2007.* *9. Gao, T., Gu, G., Zhou, Q. Water Pollution Control Engineering (4th ed.) [M]. Beijing: Higher Education Press, 2014.*

Engineering Economics

Module designation	*Engineering Economics*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*LI Chenchen*
Language	*Chinese*
Relation to curriculum	*Specialisation elective*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 30 hours* *Contact hours: 16* *Self-study hours: 14*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Probability and Statistics C, Engineering materials*
Module objectives/intended learning outcomes	*1. Knowledge:Students should be able to understand the characteristics, scope of application, and development overview of engineering economics; grasp the basic concepts of engineering economics; understand the fundamental principles and methods of engineering economic analysis; become familiar with professional terminology and evaluation indicators in engineering economics; be proficient in engineering economic evaluation methods; understand the economic feasibility analysis of projects; and be aware of the principles and applications of value engineering.* *2. Ability:Students should be able to recognize the importance of engineering project management and apply economic analysis and decision-making methods of engineering projects to civil engineering practice.* *3. Competences:Students should possess the ability to conduct techno-economic analysis of engineering projects and make sound economic decisions.*
Content	*Cash Flow and Time Value of Money (Weight: 0.35; Required Level: Mastery + Familiarity + Understanding)* *Investment, Costs, Revenue, Taxes, and Profit (Weight: 0.25; Required Level: Mastery + Understanding)* *Economic Evaluation of Engineering Projects (Weight: 0.30; Required Level: Mastery + Familiarity + Understanding)* *Feasibility Study of Engineering Projects (Weight: 0.05; Required Level: Mastery + Familiarity + Understanding)* *Value Engineering (Weight: 0.05; Required Level: Mastery + Understanding)*

Examination forms	*The course adopts a 100-point grading system. Students who achieve a score of 60 or above are considered to have passed and will earn the course credits.*
Study and examination requirements	*Final course grade = Continuous assessment score × 40% + Final assessment score × 60%.* *The continuous assessment accounts for 40%, including: regular assignments (10%), learning attitude (5%), in-class quizzes (15%), discussions (5%), and classroom performance (5%).* *The final assessment accounts for 60% and is conducted in the form of an open-book examination.* *Both the components of the continuous assessment and the final assessment are graded on a 100-point scale.*
Reading list	*Zhang Yanchun. Engineering Economics and Project Management [M]. Beijing: China Architecture & Building Press, 2018.* *Lu Juchun, Xu Li. Engineering Economics [M]. Beijing: Tsinghua University Press, 2017.* *Li Zhongfu, Yang Xiaodong. Engineering Economics (2nd Edition) [M]. Beijing: Science Press, 2017.* *Tan Dalu. Engineering Economics [M]. Beijing: China Architecture & Building Press, 2021.* *Xiang Yong, Xu Jiaojiao, Lu Liyu. Engineering Economics (3rd Edition) [M]. Beijing: China Machine Press, 2018.* *Wang Enmao. Engineering Economics (Revised Edition) [M]. Beijing: Science Press, 2020.* *Liu Guiwen, Wang Xueqing, Tian Qiong, et al.. Engineering Economics [M]. Chongqing: Chongqing University Press, 2023.*

Foundation Engineering

Module designation	*Foundation Engineering*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*SUN Laite, LI Chenchen*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Soil Mechanics, Principles of Reinforced Concrete Structure Design, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: students can accurately use professional terms related to foundation engineering, master the basic concepts and principles of foundation engineering, be familiar with the types and mechanical characteristics of shallow foundations and pile foundations, grasp the design contents and procedures of shallow foundations and pile group foundations, understand ground treatment methods, and master the design calculation and basic methods of replacement method, consolidation method and dynamic compaction method and other professional basic theories.* *2. Abilities: when faced with specific foundation engineering projects or cases, students can correctly apply the learned professional knowledge to complete the construction drawing design and calculation document compilation of general foundation engineering, and put forward scientific and reasonable design and technical schemes.* *3. Competences: students can comprehensively consider the impacts of engineering practice on safety, environment, society, law and other aspects, abide by the relevant specification requirements, evaluate foundation engineering design schemes scientifically and reasonably, and practice the professional ethics of engineers.*
Content	*1. Introduction (weight: 0.02, requirement level: comprehension)* *2. Design of Shallow Foundations on Natural Ground (weight: 0.47, requirement level: mastery + application)* *3. Pile Foundation Design (weight: 0.37, requirement level: mastery + application)* *4. Treatment of Soft Ground (weight: 0.14, requirement level: mastery + comprehension)*
Examination forms	*Learning Attitude, Assignments, Discussions, Course Summary, In-class Tests, Open-book Examination*

Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including learning attitude (5%), assignments (10%), discussions (5%), course summary (5%), and in-class tests (15%).* *4. Summative assessment accounts for 60%, conducted as a Open-book Examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. ZHANG Lijuan. Foundation Engineering[M]. Beijing: Peking University Press, 2023.* *2. ZHOU Jingxing, LI Guangxin, ZHANG Jianhong, YU Shimin, WANG Hongjin. Foundation Engineering (3rd Edition)[M]. Beijing: Tsinghua University Press, 2015.* *3. ZHAO Minghua, XU Xueyan, ZOU Xinjun. Foundation Engineering (3rd Edition)[M]. Beijing: Higher Education Press, 2017.* *4. ZHANG Mingyi, SHI Wei, ZHANG Wei, LIU Junwei. Foundation Engineering[M]. Beijing: Science Press, 2017.* *5. South China University of Technology, Zhejiang University, Hunan University. Foundation Engineering (4th Edition)[M]. Beijing: China Architecture & Building Press, 2019.* *6. MA Xiaochun, WANG Guihe, ZHANG Bin. Foundation Engineering[M]. Beijing: Tsinghua University Press, 2020.* *7. JU Yuwen, ZENG Guohong, LIU Yanzhong, SHAO Li, YANG Jing, HE Bin, LI Lijun. Foundation Engineering[M]. Beijing: Tsinghua University Press, 2020.* *8. Professional Standard of the People's Republic of China. Code for Design of Building Foundation: GB 50007-2011[S]. Beijing: China Architecture & Building Press, 2011.*

Structural Mechanics B

Module designation	*Structural Mechanics B*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*YU Wenzheng.*
Language	*Chinese*
Relation to curriculum	*Extension Elective*
Teaching methods	*Lecture, class discussion, case analysis, self-study, etc..*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Structural Mechanics A*
Module objectives/intended learning outcomes	*1. Knowledge: Students can master the basic principles and methods of structural matrix analysis, understand the basic concepts of structural dynamic characteristics, stability, and plasticity analysis, and become familiar with the advanced application of structural mechanics in engineering practice.* *2. Abilities: Students can use the matrix displacement method for computer analysis of framed structures and understand the engineering significance of the calculation results; they can conduct dynamic characteristic analysis for simple structures; they can initially identify and judge structural stability problems; they can apply the acquired knowledge to analyze and solve engineering structural mechanics problems with a certain degree of complexity.* *3. Competences: Through the study of this course, students will cultivate their ability to use computers for structural analysis, improve their engineering literacy to think about structural problems from an overall and dynamic perspective, and strengthen their awareness of combining mechanical theories with modern computational tools to solve complex engineering problems.*
Content	*1. Matrix displacement method (weight: 0.30, requirement level: mastery + application) - Element stiffness matrix, coordinate transformation, assembly and solution of the global stiffness matrix.* *2. Fundamentals of structural dynamics calculation (weight: 0.25, requirement level: mastery + familiarity) - Free vibration and forced vibration of single-degree-of-freedom systems, free vibration of multi-degree-of-freedom systems (natural frequency, mode shape).* *3. Structural stability calculation (weight: 0.20, requirement level: familiarity + understanding) - Basic concepts of stability problems, calculation methods of critical load.*

	4. Ultimate load of structures (weight: 0.15, requirement level: familiarity + understanding) - Concept of ultimate load, basic methods of plastic analysis. *5. Special topics in structural mechanics (weight: 0.10, requirement level: understanding) - Introduction to nonlinear analysis of structures, basics of structural seismic analysis, etc..*
Examination forms	*Preview, questioning, assignments, seminar, closed-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including preview 5%, questioning 5%, assignments 15%, and seminar 15%.* *4. Summative assessment accounts for 60%, and the assessment method is a closed-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. LI Liankun. Structural Mechanics (Vol. 2) (7th ed.) [M]. Beijing: Higher Education Press, 2017.* *2. LONG Yuqiu, BAO Shihua, YUAN Si. Structural Mechanics II - Special Topics Course (4th ed.) [M]. Beijing: Higher Education Press, 2018.* *3. ZHU Cimian, ZHANG Weiping. Structural Mechanics (3rd ed.) [M]. Beijing: Higher Education Press, 2016.* *4. ZHAO Gengxin. Structural Mechanics Tutoring - Concepts, Methods, and Solutions [M]. Beijing: China Building Materials Press, 2019.* *5. Structural Mechanics Teaching and Research Office of Hunan University. Structural Mechanics Calculation Handbook (2nd ed.) [M]. Beijing: Higher Education Press, 2016.* *6. ZHANG Jinsheng, WANG Zhong. Structural Matrix Analysis and Programming [M]. Beijing: China Electric Power Press, 2011.*

Engineering Load and Structural Design Methods

Module designation	*Engineering Load and Structural Design Methods*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*LAN Xiang, ZHANG Longfei, YU Wenzheng, WU Kechuan*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Theoretical Mechanics, Mechanics of Materials, Civil Engineering Materials, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students should be able to correctly use technical terminology related to engineering loads and structural design methods. They are expected to master fundamental professional theories, which include: the definitions, classifications, and probabilistic analysis models of loads and actions; the determination methods for representative values of loads and the principles of load effect combinations; the statistical analysis methods and probability distribution types of structural member resistance; the basic concepts and principles of structural reliability design; and the practical methods and practical design expressions of reliability analysis. Furthermore, students will master the characteristics and determination methods of gravity loads in engineering structures (including structural self-weight, soil self-weight, floor and roof live loads, snow loads, vehicle loads, pedestrian loads, and crane loads in industrial buildings), as well as the valuation principles and calculation methods for other actions such as wind loads, seismic actions, thermal actions, deformation actions, blast loads, frost heave actions, and impact loads.* *2. Abilities: When confronted with specific engineering structural projects or cases, students will be able to correctly identify various types of loads and their action characteristics, reasonably determine the representative values of loads, and execute load effect combinations. They will be capable of applying structural reliability design methods to conduct structural analysis and evaluation. Furthermore, based on actual conditions, they can simplify structural models and determine load values, utilize common structural design software (e.g., PKPM, YJK) to complete load layout and structural internal force analysis, and ultimately propose scientific and rational technical solutions.* *3. Qualities: Students will be able to comprehensively consider the impacts of engineering structural practices on the natural environment and sustainable social development. They will be able to appropriately apply their acquired professional knowledge to scientifically and*

	rationally evaluate the load safety and structural reliability levels of engineering structures throughout their design, service, and other life-cycle phases.
Content	*1. Statistical Analysis of Loads and Structural Resistance (weight: 0.30, requirement level: mastery + comprehension)* *2. Structural Reliability Analysis and Its Design Methods (weight: 0.45, requirement level: mastery + comprehension + application)* *3. Common Loads and Actions (weight: 0.25, requirement level: mastery + application)*
Examination forms	*Pre-class preparation, in-class questioning, discussion, chapter quizzes, regular assignments, open-book examination*
Study and examination requirements	*1. The course is graded on a 100-point scale. A score of 60 or above is considered a passing grade, upon which students will earn the credits for this course.* *2. Final Course Grade = Formative Assessment Score × 40% + Summative Assessment Score × 60%.* *3. The formative assessment accounts for 40% of the total grade, comprising pre-class preparation (10%), in-class questioning (5%), discussion (5%), chapter quizzes (5%), and regular assignments (15%).* *4. The summative assessment accounts for 60% of the total grade and is conducted in the form of an open-book examination.* *5. Both the individual components of the formative assessment and the summative assessment are evaluated on a 100-point scale.*
Reading list	*1. Bai, Xiaohong. Loads and Structural Design Methods [M]. Beijing: China Building Materials Press, 2017. (in Chinese)* *2. Bai, Guoliang. Loads and Structural Design Methods (3rd ed.) [M]. Beijing: Higher Education Press, 2024. (in Chinese)* *3. Li, Guoqiang, Huang, Hongwei, Wu, Xun, et al. Principles of Engineering Structural Loads and Reliability Design (5th ed.) [M]. Beijing: China Architecture & Building Press, 2022. (in Chinese)* *4. Load Code for the Design of Building Structures (GB 50009-2012) [S]. Beijing: China Architecture & Building Press, 2012. (in Chinese)* *5. Unified Standard for Reliability Design of Building Structures (GB 50068-2018) [S]. Beijing: China Architecture & Building Press, 2018. (in Chinese)* *etc.*

Foundation Pit Support

Module designation	*Foundation Pit Support*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*CHEN Xu, LUO Dayou*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course (Building Engineering)*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Civil Engineering Drawing, Engineering Material, Soil Mechanics, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students can correctly use professional terminology related to foundation pit support, master various commonly used support structure types and design methods, including gravity retaining walls, slab support, pile anchor support, etc., and have the ability to design support structures. Understand the construction methods and techniques of foundation pit support engineering, including preparation work before construction, earthwork excavation, dewatering treatment, construction monitoring, etc., and be familiar with relevant construction specifications and operating procedures. Understand the quality and safety management skills of foundation pit support engineering, including quality control, safety prevention, environmental protection, etc. during the construction process, and master relevant regulations and standards to ensure the smooth implementation of the project.* *2. Abilities: When facing specific foundation pit engineering projects or cases, students can correctly apply their professional knowledge and propose scientific and reasonable professional technical solutions for foundation pit support design, construction, etc.* *3. Competences: Students can comprehensively consider the impact of practical activities in foundation pit support engineering on the natural environment and sustainable social development, correctly apply their professional knowledge, and scientifically and reasonably evaluate professional technical solutions such as design and construction of foundation pit support engineering projects.*
Content	*1. Basic theories of foundation pit engineering (Weight: 0.10, requirement level: mastery + understanding)* *2. Internal force of retaining structures (Weight: 0.10, requirement level: mastery + understanding)*

	3. Stability and deformation of retained foundation pits (Weight: 0.12, requirement level: mastery + application) *4. Sheet-type retaining structures (Weight: 0.12, requirement level: mastery + application)* *5. Internal bracing systems and anchor technology (Weight: 0.12, requirement level: understanding + application)* *6. Gravity cement-soil walls (Weight: 0.12, requirement level: understanding)* *7. Soil nailing walls (Weight: 0.12, requirement level: mastery + understanding)* *8. Groundwater control for foundation pits (Weight: 0.10, requirement level: mastery + application)* *9. Foundation pit monitoring (Weight: 0.10, requirement level: mastery + application)*
Examination forms	*Preview, questioning, assignments, seminar, course paper, achievement report*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including pre class preview 10%, classroom questioning 10%, group discussion 10%, and homework after class 10%.* *4. Summative assessment accounts for 60%, conducted as an achievement report.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. JGJ120-2012. Technical Specification for Building Foundation Pit Support [S]. Beijing: China Architecture&Building Press, 2012.* *2. MA Hailong. Excavation Engineering [M]. Beijing: Tsinghua University Press, 2018.* *3. WANG Xiulan, WANG Wei, HAN Jiabao. Foundation and Foundation (Third Edition) [M]. Beijing: People's Communications Press, 2020.* *4. MU Linlong, ZHAO Cheng. Excavation Engineering [M]. Beijing: Machinery Industry Press, 2021.* *5. HU Yu. Research and Exploration on Foundation Pit Support Engineering [M]. Beijing: Beijing Institute of Technology Press, 2016.* *6. HU Qi, LI Zheng, JIANG Yexiang, HU Huan. Technical Manual for Construction of Foundation Pit Support Structure [M]. Beijing: China Architecture&Building Press, 2024.* *7. KONG Desen. Excavation Support Engineering [M]. Beijing: Metallurgical Industry Press, 2012.* *8. HUANG Mei. Design and Construction Example Diagram of Foundation Pit Support Engineering [M]. Beijing: Chemical Industry Press, 2015.*

Building Engineering Measurement and Valuation

Module designation	*Building Engineering Measurement and Valuation*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*Li ding*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course*
Teaching methods	*lesson, lecture, project, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload:60 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 Drawing, Engineering Materials, Building Architecture, Civil Engineering Construction Technology and Organization, Engineering Economics, etc.*
Module objectives/intended learning outcomes	*1. Abilities: students can understand the composition of construction investment costs, and are familiar with the methods about building engineering measurement and valuation.* *2. Competences: students possess a good team spirit,ability to take on roles as individuals, team members, and leaders in multidisciplinary teams when addressing complex civil engineering problems.*
Content	*1. Reading and understanding the main contents and key information of Building engineering valuation, including the principles , the methods and steps,The classification of civil engineering projects, etc. Exercises, discussions and questioning are integrated in the process. (Weight: 0.20, requirement level: familiarity + understanding)* *2. Reading and understanding the main contents and key information of Building engineering price, including the concepts, the composition, the basis for Building engineering valuation,the standards and methods based on bills of quantities pricing works. Exercises, discussions and questioning are integrated in the process. (Weight: 0.40, requirement level: familiarity + understanding)* *3. . Reading and understanding the main contents and key information of rules for quantities calculation, including construction area, earthwork, masonry works, foundation treatment & tiling works, sasonry works, concrete & reinforcement works, measure items,etc. Exercises, discussions and questioning are integrated in the process. (Weight: 0.40, requirement level: familiarity + understanding)*
Examination forms	*Preview, after-class excercise, in-class excercise, In-class questioning, self-study, investigation, open-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.*

	2. Course Score = Formative Assessment Score × 40% + Summative Assessment Score × 60%. *3. Formative assessment accounts for 40%, including preview 5%, after-class excercise 10%, classroom excercise+ questioning 10%, discussion +investigation +seminar 15%.* *4. Summative assessment accounts for 60%, based on the score students' submitted on The final examination .* *5. All components of formative assessment and the summative assessment adopt the percentage grading system.*
Reading list	*1. 《Building Engineering Measurement and Valuation 》, ISBN 978-7-111-71979-3.China Machine Press,2024* *2. Industry Standard of the People's Republic of China: 《Notice of the Ministry of Housing and Urban-Rural Development and the Ministry of Finance on Issuing the Composition of Costs for Construction and Installation Projects》 (Jian Biao [2013] No.44).Ministry of Housing and Urban-Rural Development of the People's Republic of China, Ministry of Finance, 2013.* *3. Industry Standard of the People's Republic of China: 《Standard for Bills of Quantities and Valuation for Construction Works》 (GB/T 50500-2024). China Planning Press, 2024.* *4. Local Industry Standard of Yunnan Province: 《Yunnan Province construction project cost valuation rules and quota of machine, instrument and meter shift costs (DBJ 53/T-58-2020). Yunnan Publishing Group Corporation, Yunnan Science and Technology Press, Department of Housing and Urban-Rural Development of Yunnan Province,2021.* *5. Local Industry Standard of Yunnan Province:《Yunnan Province Construction Project Cost Valuation Standard (2020 Edition) (DBJ 53/T-60-2020)》. Yunnan Publishing Group Corporation, Yunnan Science and Technology Press.Department of Housing and Urban-Rural Development of Yunnan Province, 2021.* *6. Local Industry Standard of Yunnan Province:《Yunnan Province Construction Project Cost Valuation Standard (2020 Edition) (DBJ 53/T-61-2020)》. Yunnan Publishing Group Corporation, Yunnan Science and Technology Press.Department of Housing and Urban-Rural Development of Yunnan Province, 2021.* *etc.*

Prefabricated Building Construction Technology

Module designation	*Prefabricated Building Construction Technology*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*WU Kechuan, WANG Panpan*
Language	*Chinese*
Relation to curriculum	*Expand electives*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 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 materials, principles of concrete structure design, civil engineering construction techniques, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students are able to correctly use professional terminology related to prefabricated buildings, master the basic design principles and detailed design methods of prefabricated concrete structures (frames, shear walls, slabs, columns, etc.), the structural requirements and connection node design methods of prefabricated components (wall panels, composite panels, stairs, balconies, etc.) (sleeve grouting, grout anchor overlap, bolt connection, welding, etc.), the technical requirements for the productio.* *2. Ability: When facing specific prefabricated construction projects or cases, students can correctly apply their professional knowledge, propose scientific and reasonable prefabricated structure disassembly plans, prefabricated component production and transportation organization plans, on-site construction and installation technical plans, as well as quality control and safety management measures and other professional technical plans.* *3. Quality: Students are able to comprehensively consider the positive impact of prefabricated construction activities on the natural environment (saving materials, energy, reducing wet operations, reducing noise and dust) and social sustainable development, correctly apply their professional knowledge, scientifically and reasonably evaluate the technical solutions, green construction level, and resource utilization efficiency of prefabricated construction projects in design and disassembly, prefabrication producti.*
Content	*1. Basic theory and terminology of prefabricated buildings (weight: 0.10, requirement level: mastery+understanding)* *2. Prefabricated component materials and design parameters (weight: 0.08, requirement level: mastery+understanding)* *3. Structural splitting and deepening design (weight: 0.18, requirement level: mastery+application)*

	4. Construction and design of connection nodes (weight: 0.08, requirement level: mastery+application) *5. Production and quality control of prefabricated components (weight: 0.07, requirement level: understanding+application)* *6. Component transportation and on-site stacking (weight: 0.04, requirement level: understanding)* *7. Prefabricated construction and installation process (weight: 0.12, requirement level: mastery+application)* *8. Prefabricated construction organization and schedule management (weight: 0.04, requirement level: mastery+application)* *9. Quality acceptance standards and inspection methods (weight: 0.07, requirement level: mastery+application)* *10. Safe construction and green construction (weight: 0.07, requirement level: mastery+application)* *11. Case analysis of prefabricated structure construction (weight: 0.07, requirement level: understanding+application)* *12. Information construction management of prefabricated buildings (weight: 0.08, requirement level: understanding+application)*
Examination forms	*Pre class preparation, classroom questioning, homework, case study, post class review, open book exam*
Study and examination requirements	*1. The grades of this course are based on a percentage system, and students who score 60 or above are considered qualified to receive credits for this course.* *2. Course score=Process assessment score x 40%+Final assessment score x 60%.* *3. The process assessment score accounts for 40%, including 5% pre class preparation, 10% classroom questioning, 10% homework, 10% case study, and 10% post class review.* *4. The final assessment accounts for 60%, and the assessment method is open book examination.* *5. The various components of the process assessment and the final assessment are both based on a percentage system.*
Reading list	*1. Wang Yu Bracelet, Zheng Zhaodian, etc. Prefabricated Construction Technology [M]. Beijing: China Architecture&Building Press, 2022.* *2. Ministry of Housing and Urban Rural Development of the People's Republic of China Technical Standard for Prefabricated Concrete Buildings: GB/T 51231-2016 [S]. Beijing: China Architecture&Building Press, 2017.* *3. Ministry of Housing and Urban Rural Development of the People's Republic of China Technical Specification for Prefabricated Concrete Structures: JGJ 1-2014 [S]. Beijing: China Architecture&Building Press, 2014.* *4. Ministry of Housing and Urban Rural Development of the People's Republic of China Code for Acceptance of Construction Quality of Concrete Structures: GB 50204-2015 [S]. Beijing: China Architecture&Building Press, 2015.*

Engineering Structure Testing

Module designation	*Engineering Structure Testing*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*Wu Kechuan, Lan Xiang*
Language	*Chinese*
Relation to curriculum	*Elective Extension Course*
Teaching methods	*Lectures, discussions, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total: 60 hours (Teaching: 32, Self-study: 28)*
Credit points	*Chinese Credits: 2; ECTS Credits: 2*
Required and recommended prerequisites for joining the module	*Principles of Concrete Structure Design, Principles of Steel Structure Design, Structural Mechanics, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students can correctly use professional terms related to engineering structure testing, master the basic principles, methods and measurement techniques of structural testing, be familiar with static testing, dynamic testing and common measurement techniques, understand the basic requirements of test scheme design, loading control, data acquisition, result analysis and error processing, master experimental research methods for structural mechanical behavior, deformation characteristics, crack development, failure modes and bearing capacity, and correctly apply relevant knowledge to engineering structure test design, implementation and practical problem analysis.* *2. Skills: Students can, based on consulting technical standards, specifications and literature, analyze complex structural problems, comprehensively consider structural form, mechanical characteristics, material properties, boundary conditions, loading methods, test contents and environmental factors, reasonably formulate structural test plans, analyze structural mechanical performance, deformation patterns, crack development and failure mechanisms, and obtain valid conclusions. They can apply basic theories, testing equipment, measuring instruments, data processing methods and relevant standards to complete test specimen design, loading, measurement, data collation and evaluation, forming technically feasible, reliable data, reasonable analysis and clearly concluded test results to provide basis for structural design verification, performance evaluation and engineering optimization.* *3. Attitude: Students become familiar with technical standards, specifications and laboratory safety management, establish rigorous scientific spirit, standardized operation awareness, quality awareness,*

	safety awareness and teamwork, continuously improve experimental literacy, engineering practice ability and professional responsibility.
Content	*1. Principles of structural test design (weight: 0.25, requirement: mastery)* *2. Static load test of structures (weight: 0.30, requirement: mastery + application)* *3. Dynamic load test of structures (weight: 0.20, requirement: comprehension + understanding)* *4. Processing and analysis of test data (weight: 0.25, requirement: mastery + application)*
Examination forms	*Pre-class preparation, questioning, assignments, discussion, closed-book examination*
Study and examination requirements	*Course grade = Process assessment (40%) includes pre-class preparation 10% + questioning 5% + review 10% + homework 10% + attendance 5%; Final (60%): closed-book exam. Minimum passing 60/100.*
Reading list	*[1] Southeast University et al., Concrete Structures (6th ed.), China Architecture & Building Press, 2021.* *[2] Liu Jie et al., Building Structure Testing, China Machine Press, 2021.* *[3] Cao Pengcheng, Experimental Course on Construction Engineering Structural Testing Technology, China Electric Power Press, 2017.* *[4] Xu Guoshan et al., Modern Structural Experiment Technology, Harbin Institute of Technology Press, 2023.* *[5] Xu Fenqiang et al., Building Structure Test and Inspection (2nd ed.), China Architecture & Building Press, 2023.* *[6] Wu Xiaofeng et al., Building Structure Test and Inspection, Chemical Industry Press, 2020.* *[7] Zhu Eryu et al., Advanced Course on Civil Engineering Structure Testing, China Science and Technology Press, 2009.* *[8] Zhou Ying, Shaking Table Model Test Method and Technology for Building Structures (2nd ed.), Science Press, 2016.*

Smart Construction (EEE)

Module designation	*Smart Construction (EEE)*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*LUO Dayou*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Construction Technology and Organization of Civil Engineering, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students will be able to correctly use professional terminology related to highway and urban road survey and design, master the fundamental principles and methods of road survey and design, as well as the technical requirements and design concepts for highway and urban road design, and correctly apply these to engineering practices and solve practical engineering problems in road survey and design.* *2. Abilities: Based on consulting domestic and international literature to analyze complex road engineering problems, students will be able to comprehensively consider technical requirements and design concepts such as the horizontal alignment, vertical alignment, and cross-section of highways and urban roads, reasonably analyze road geometric design solutions, and draw effective conclusions. By applying the basic theories of road survey and design, professional technical tools, and relevant technical standards, students will be able to complete the design, selection, analysis, and optimization of road route schemes under specific terrain and environmental conditions, resulting in design outcomes that are technically feasible, safe and reliable, economically reasonable, and environmentally friendly.* *3. Competences: Students will be able to familiarize themselves with the technical standards, specifications, regulations, national policies, and laws related to road survey and design, thereby enhancing their awareness of standardization and professional competence.*
Content	*1. Overview and Emerging Trends (weight: 0.12, requirement level: mastery + familiarity)* *2. Smart Design (weight: 0.12, requirement level: mastery + understanding)* *3.Smart Production (weight: 0.18, requirement level: mastery + familiarity + application)*

	4. Smart Construction (weight: 0.18, requirement level: mastery + familiarity + application) *5. Smart Operation and Maintenance (weight: 0.20, requirement level: mastery + familiarity + application)* *6. Smart Construction Practice (weight: 0.20, requirement level: mastery + understanding)*
Examination forms	*Attendance & Attitude, Group Discussion, Homework, Class Participation, Group Presentation, open-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 45% + summative assessment score × 55%.* *3. Formative assessment accounts for 55%, including Attendance & Attitude 5%, Group Discussion 5%, Homework 10%, Class Participation 10%, and Group Presentation 15%.* *4. Summative assessment accounts for 55%, and the assessment method is open-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Wang Yuhang, Luo Xiaorong. Introduction to Smart Construction. China Machine Press, 2021.* *2. Li Jiulin. Theory and Practice of Smart Construction. China Architecture & Building Press, 2015.* *3. Zhang Yaling, Sun Jian. Smart Building Operation and Maintenance Technology and Application. China Architecture & Building Press, 2019.* *4. Smart Building Design Standard T/ASC 19-2021. China Architecture & Building Press, 2021.* *5. Smart Building Evaluation Standard (T/CREA 002-2020 / T/CBIMU 14-2020) / China Real Estate Association Standard. China Architecture & Building Press, 2021.* *6. Du Mingfang. Smart Building: The Path to Transformation and Development of the Construction Industry in the Intelligent+ Era. China Machine Press, 2020.* *7. Wang Yong. Smart Building. Tsinghua University Press, 2012.* *8. Wu Yinbo. Smart Building Integration Technology. Chengdu Southwest Jiaotong University Press, 2019.* *9. Sun Cheng. Introduction to Smart Building and Construction. China Architecture & Building Press, 2024.* *10.Lu Xiaofeng, Cui Yumei. Smart Building Operation and Maintenance. China Architecture & Building Press, 2025.*

Advanced Comprehensive Knowledge of Civil and Hydraulic Engineering

Module designation	*Advanced Comprehensive Knowledge of Civil and Hydraulic Engineering*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*YU Wenzheng*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course*
Teaching methods	*Lecture, seminar, case-based teaching, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Principles of Concrete Structure Design, Principles of Steel Structure Design, Soil Mechanics, Foundation Engineering, Civil Engineering Construction Technology and Organization*
Module objectives/intended learning outcomes	*1. Knowledge: Students can systematically integrate and deepen the main professional knowledge in the field of civil and hydraulic engineering, master the analysis ideas and solution methods for complex engineering problems, understand the frontier technologies and development trends of the industry, and form a complete professional knowledge system.* *2. Abilities: Students can apply the acquired professional knowledge to comprehensively analyze, judge, and evaluate complex engineering problems in the fields of building engineering, road and bridge engineering, geotechnical engineering, and hydraulic engineering; they can consult domestic and international literature to compare and optimize multiple schemes; and they initially possess the ability to solve complex engineering problems and conduct preliminary research.* *3. Competences: Through the study of this course, students will cultivate their awareness and ability to comprehensively apply professional knowledge, improve their engineering thinking level and professional literacy, strengthen their overall understanding of the relationship between engineering practice and society, environment, economy, and ethics, and lay a solid foundation for their graduation project (thesis) and future career development.*
Content	*1. Integration of professional knowledge systems (Weight: 0.12, requirement level: mastery + application): systematic review and correlation of structural design, geotechnical engineering, construction technology and project management.* *2. Analysis methods for complex engineering problems (Weight: 0.12, requirement level: mastery + application): problem identification, multidisciplinary factor analysis, technical route selection and optimization.*

	3. Comprehensive case analysis of building engineering (Weight: 0.12, requirement level: application + analysis): high-rise structural design, deep foundation pit engineering and construction organization. *4. Comprehensive case analysis of road and bridge engineering (Weight: 0.12, requirement level: application + analysis): route design under complex terrain, long-span bridge construction and tunnel engineering.* *5. Comprehensive case analysis of geotechnical and foundation engineering (Weight: 0.10, requirement level: application + analysis): soft ground treatment, slope stability and underground engineering.* *6. Special topics in hydraulic engineering (Weight: 0.10, requirement level: familiarity + understanding): hydraulic structures, water control project layout and comprehensive utilization of water resources.* *7. Frontier technologies and emerging engineering education (Weight: 0.10, requirement level: understanding + familiarity): smart construction, BIM, prefabricated buildings and smart operation and maintenance.* *8. Engineering ethics and sustainable development (Weight: 0.08, requirement level: familiarity + application): ethical issues, environmental impact assessment and green construction.* *9. Literature review and thematic seminar (Weight: 0.14, requirement level: application + synthesis): seminars and presentations on hot topics in civil and hydraulic engineering based on domestic and foreign literature.*
Examination forms	*Preview, questioning, assignments, seminar, final assessment*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including preview 5%, questioning 5%, assignments 15%, and seminar 15%.* *4. Summative assessment accounts for 60%, and the assessment method is a final assessment (comprehensive research report).* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Southeast University, Tianjin University, Tongji University. Concrete Structures (Vol. 1, Vol. 2) (7th ed.) [M]. Beijing: China Architecture & Building Press, 2020.* *2. CHEN Shaofan, GU Qiang. Steel Structures (Vol. 1, Vol. 2) (4th ed.) [M]. Beijing: China Architecture & Building Press, 2018.* *3. South China University of Technology, Zhejiang University, Hunan University. Foundation Engineering (4th ed.) [M]. Beijing: China Architecture & Building Press, 2019.* *4. YAO Lingsen. Bridge Engineering (3rd ed.) [M]. Beijing: China Communications Press, 2020.* *5. DENG Xuejun. Roadbed and Pavement Engineering (5th ed.) [M]. Beijing: China Communications Press, 2017.*

Smart Detection of Engineering Structures

Module designation	*Smart Detection of Engineering Structures*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*YANG Xu*
Language	*Chinese*
Relation to curriculum	*Elective Extension Course*
Teaching methods	*Teaching is organized through lectures, case analysis, experimental demonstrations, literature reading, group seminars, and course reports.*
Workload (incl. contact hours, self-study hours)	*Total workload: 30 hours Contact hours: 16 Self-study hours: 14*
Credit points	*Chinese credits: 1* *ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Engineering Structure Testing, Structural Mechanics, Principles of Concrete Structure Design, Principles of Steel Structure Design, etc.*
Module objectives/intended learning outcomes	*1. Knowledge objective: Students understand the basic concepts, system composition, objects of study, major development trends, and typical applications of smart detection and structural health monitoring for buildings and bridges, and grasp the basic ideas of monitoring-system design, implementation, and maintenance.* *2. Skill objective: Students master the basic principles, selection criteria, and layout methods of common sensors and data-acquisition systems, and understand the technical routes of load and environmental monitoring, structural-response monitoring, deformation monitoring, durability monitoring, and synchronized data acquisition with preprocessing.* *3. Analytical objective: Students understand the basic methods of modal identification, physical-parameter identification, finite-element model updating, damage identification, structural condition evaluation, and safety warning, and can complete a simple monitoring plan, data collation and analysis, and a technical report for a given engineering scenario.* *4. Quality objective: Students develop awareness of service safety, smart operation and maintenance, and life-cycle management of infrastructure, together with data authenticity, engineering ethics, teamwork, and sound judgment for real engineering problems.*
Content	*1. Introduction and system composition (weight: 0.10, requirement: comprehension): concepts, objects of study, system composition, classifications, and typical application scenarios of smart detection and structural health monitoring.* *2. Monitoring-system design, implementation, maintenance, and sensor layout (weight: 0.20, requirement: mastery + application): determination of monitoring objectives, selection of monitoring indices,*

	sensor selection principles, optimized layout, and maintenance requirements. *3. Load and environmental monitoring together with structural-response, deformation, and durability monitoring (weight: 0.20, requirement: mastery + application): wind, earthquake, vehicle-load, and environmental actions as well as strain, displacement, vibration, and durability indicators.* *4. Synchronized data acquisition, transmission, storage, preprocessing, and statistical analysis (weight: 0.15, requirement: comprehension + application): multi-source data acquisition, transmission, storage, outlier detection, preprocessing, and basic statistical analysis.* *5. Modal identification, model updating, and damage identification (weight: 0.20, requirement: comprehension + application): data-based and model-updating-based approaches to damage identification and their applicability.* *6. Condition evaluation, safety warning, and engineering case analysis (weight: 0.15, requirement: comprehension + application): condition-evaluation concepts, warning indicators, typical building and bridge cases, course report writing, and technical expression.*
Examination forms	*Questioning, literature reading, case assignments, group seminars, and a course report or case-analysis report.*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. In line with the nature of the course and similar offerings, a recommended grading structure is process assessment 50% plus final assessment 50%.* *3. Process assessment may include pre-class reading and information search 10%, classroom discussion and questioning 10%, case assignments 15%, and group presentation 15%, focusing on students' understanding of monitoring systems, sensing techniques, data processing, and engineering cases.* *4. The final assessment is recommended to be a course report or case-analysis report that evaluates the integrated ability to design a monitoring scheme, analyze data, perform condition evaluation, propose warning ideas, and present technical conclusions.* *5. Assessment should pay attention not only to knowledge and methods, but also to students' awareness of engineering application scenarios, technical limitations, data reliability, and engineering ethics.*
Reading list	*1. Tutorial on Structural Health Monitoring [M]. Beijing: Higher Education Press, 2021.* *2. LI Hui, Structural Health Monitoring: Data Science and Engineering [M]. Science Press, 2019.* *3. GUO Jian, Large Bridge Health Monitoring Systems and Damage Identification Theory [M]. Beijing: China Communications Press, 2013.* *4. LIU Jie et al., Building Structure Testing [M]. Beijing: China Machine Press, 2021.* *5. GB/T 50344-2019 Technical Standard for Inspection of Building Structures [S].* *6. GB 55001-2021 General Code for Engineering Structures [S].*

Engineering Project Management

Module designation	*Engineering Project Management*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*LUO Dayou*
Language	*Chinese*
Relation to curriculum	*Specialisation elective*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Construction Technology and Organization of Civil Engineering, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Master the core theories, processes, and tools of the engineering project life cycle management. Become familiar with the critical aspects of quality, cost, and schedule control, as well as relevant regulatory standards and codes.* *2. Abilities: Ability to independently develop comprehensive project plans. Proficient in applying management tools to solve practical problems. Possess strong cross-departmental communication abilities and capabilities for risk assessment and mitigation.* *3. Competences: Establish a rigorous and responsible professional attitude. Cultivate teamwork spirit and innovative thinking. Uphold engineering ethics and comply with industry norms.*
Content	*1. Introduction (weight: 0.05, requirement level: mastery + understanding)* *2. Engineering Project Planning (weight: 0.10, requirement level: mastery + familiarity)* *3. Engineering Project Organization (weight: 0.10, requirement level: mastery + familiarity)* *4. Contract Management (weight: 0.05, requirement level: familiarity)* *5. Procurement Management (weight: 0.10, requirement level: familiarity + understanding)* *6. Quality Management (weight: 0.12, requirement level: mastery + familiarity + application)* *7. Schedule Management (weight: 0.12, requirement level: mastery + familiarity + application)* *8. Cost Management (weight: 0.12, requirement level: mastery + familiarity + application)*

	9. Risk Management (weight: 0.08, requirement level: mastery + familiarity) *10. Occupational Health, Safety, and Environment (weight: 0.04, understanding)* *11. Project Close-out Management (weight: 0.04, understanding)* *12. Informatization of Project Management (weight: 0.04, understanding)* *13.Sustainable Construction (weight: 0.04, understanding)*
Examination forms	*Attendance & Attitude, Group Discussion, Homework, Class Participation, Stage Tests, Open-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 45% + summative assessment score × 55%.* *3. Formative assessment accounts for 45%, including Attendance & Attitude 5%, Group Discussion 5%, Homework 10%, Class Participation 10%, and Stage Tests 15%.* *4. Summative assessment accounts for 55%, and the assessment method is open-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Ding, S., et al. Engineering project management. China Architecture & Building Press, 2014.* *2. Ying, P., & Yao, T. Engineering project management. Shanghai Jiao Tong University Press, 2016.* *3. Xu, C., et al. Engineering project management. Wuhan University of Technology Press, 2021.* *4. Wei, D. Engineering project management. Wuhan University of Technology Press, 2022.* *5. Fan, C., et al. Engineering project management. Southeast University Press, 2023.* *6. Yang, X., & Shen, A. Engineering project management(4th ed.). Huazhong University of Science & Technology Press, 2024.*

Engineering Supervision Theory

Module designation	*Engineering Supervision Theory*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*LUO Dayou*
Language	*Chinese*
Relation to curriculum	*Specialisation elective*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Construction Technology and Organization of Civil Engineering, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Systematically master the core theoretical framework of engineering supervision, relevant industry laws, regulations, codes, and standards. Demonstrate a deep understanding of the professional essentials regarding the four key controls: quality, schedule, cost, and safety. Become familiar with the critical nodes and technical requirements throughout the entire supervision workflow.* *2. Abilities: Be able to independently develop supervision plans and detailed implementation rules. Proficiently conduct on-site inspections, quality acceptance, and tracking of corrective actions. Possess practical capabilities to coordinate conflicts among participating parties and handle unexpected engineering incidents.* *3. Competences: Establish a rigorous, impartial, and responsible professional attitude; strictly adhere to the code of ethics for engineering supervision. Cultivate keen risk awareness and the spirit of teamwork.*
Content	*1. Basics of Construction Supervision (weight: 0.08, requirement level: mastery + familiarity)* *2. Supervisors & Firms (Weight: 0.06, requirement level: familiarity + understanding)* *3. Supervision Planning Documents (Weight: 0.10, requirement level: mastery + familiarity)* *4. Organizational Coordination (Weight: 0.10, requirement level: mastery + familiarity)* *5. Quality Control (Weight: 0.15, requirement level: mastery + familiarity + application)* *6. Cost Control (Weight: 0.15,requirement level: mastery + familiarity + application)*

	7. Schedule Control (Weight: 0.15, requirement level: mastery + familiarity + application) *8. Safety Management (Weight: 0.08, requirement level: mastery + familiarity)* *9. Contract Management (Weight: 0.08, requirement level: mastery + familiarity)* *10.Information & Documentation Management (Weight: 0.05, requirement level: familiarity)*
Examination forms	*Attendance & Attitude, Group Discussion, Homework, Class Participation, Stage Tests, Open-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 45% + summative assessment score × 55%.* *3. Formative assessment accounts for 45%, including Attendance & Attitude 5%, Group Discussion 5%, Homework 10%, Class Participation 10%, and Stage Tests 15%.* *4. Summative assessment accounts for 55%, and the assessment method is open-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Gong, T., & Zhang, Z. Introduction to construction project supervision(4th ed.). Peking University Press, 2018.* *2. Chen, J. Introduction to construction project supervision. Southeast University Press, 2021.* *3. Zhou, G. Introduction to engineering supervision. Chemical Industry Press, 2018.* *4. Feng, H. Introduction to construction project supervision. Chemical Industry Press, 2018.* *5. Hu, H., & Wang, Y. Introduction to construction project supervision. Yellow River Water Conservancy Press, 2023.* *6. China Association of Construction Supervision. Introduction to construction project supervision. China Architecture & Building Press, 2025.* *7. Liu, Y. Introduction to construction project supervision. China Water & Power Press, 2016.*

Construction Regulations

Module designation	*Construction Regulations*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*LI Chenchen*
Language	*Chinese*
Relation to curriculum	*Specialisation elective*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Engineering Ethics*
Module objectives/intended learning outcomes	*1. Knowledge: Students will be able to grasp the fundamental concepts related to construction laws and regulations, understand the composition of the construction regulatory system and the basic knowledge of legal relationships, become familiar with commonly used laws and regulations in construction projects, and master the laws and regulations governing the key stages of engineering construction. This includes regulations on building permits, professional qualifications, contracting and subcontracting of construction projects, bidding and tendering, construction project supervision, safety production management, quality management, contract management, engineering insurance and guarantees, completion acceptance, construction project quality warranties, and the resolution of construction project disputes.* *2.Competence: Students will be able to comprehend and adhere to laws, regulations, professional standards, technical specifications, and ethical guidelines relevant to civil engineering practice. They will be capable of correctly applying their acquired knowledge to analyze and address legal issues in the key stages of engineering construction.* *3.Qualities: Students will possess a sense of responsibility and accountability, along with the ability to organize, manage, and lead engineering projects.*
Content	*1. Overview of Construction Engineering Regulations (Weight: 0.05, Required Proficiency Level: Familiarity + Awareness)* *2. Project Initiation (Weight: 0.3, Required Proficiency Level: Mastery + Familiarity + Awareness)* *3. Engineering Management (Weight: 0.45, Required Proficiency Level: Familiarity + Awareness)* *4. Completion Acceptance (Weight: 0.2, Required Proficiency Level: Mastery + Familiarity + Awareness)*

Examination forms	*Regular assignments, learning attitude, in-class quizzes, discussions, classroom performance, open-book exams*
Study and examination requirements	*1. The grading system for this course adopts a percentage scale. Students who achieve a score of 60 or above are considered qualified and will earn the corresponding course credits.* *2. Course grade = Process-based assessment score × 40% + Summative assessment score × 60%.* *3. The process-based assessment accounts for 40% of the total grade, including regular assignments (10%), learning attitude (5%), in-class quizzes (15%), discussions (5%), and classroom performance (5%).* *4. The summative assessment accounts for 60% of the total grade and is conducted through an open-book exam.* *5. Both the components of process-based assessment and the summative assessment are graded on a percentage scale.*
Reading list	*1. Lu Zheng, Li Tinghui. Construction Engineering Regulations (2nd Edition) [M]. Beijing: China Machine Press, 2023.* *2. Sun Jian. Construction Regulations [M]. Beijing: China Architecture & Building Press, 2023.* *3. Ma Fengling, Liu Xiaohong, Wang Dedong. Construction Regulations (3rd Edition) [M]. Beijing: China Architecture & Building Press, 2023.* *4. Li Yongfu, Sun Xiaobing. Construction Engineering Regulations (3rd Edition) [M]. Beijing: China Architecture & Building Press, 2022.* *5. Zhou Zhonghao. Construction Engineering Regulations [M]. Beijing: China Architecture & Building Press, 2023.* *6. Construction Law of the People's Republic of China, Standing Committee of the National People's Congress, 2019 (Second Revision in accordance with the Decision on Amending Eight Laws including the Construction Law of the People's Republic of China adopted at the Tenth Session of the Standing Committee of the 13th National People's Congress on April 23, 2019).* *7. Civil Code of the People's Republic of China, National People's Congress, 2020 (Presidential Decree No. 45).* *etc.*

Green Building and Sustainable Development

Module designation	*Green Building and Sustainable Development*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*YU Wenzheng*
Language	*Chinese*
Relation to curriculum	*Extension Elective*
Teaching methods	*Lecture, case analysis, seminar, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 30 hours* *Contact hours: 16* *Self-study hours: 14*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Engineering Materials*
Module objectives/intended learning outcomes	*1. Knowledge: Students can master the basic concepts, design principles, evaluation standards, and technical systems of green buildings, understand the impact of the whole life cycle of buildings on the environment and resources, and become familiar with the frontier trends, policies, and regulations of green building and sustainable development at home and abroad.* *2. Abilities: Students can apply the basic principles and methods of green buildings to conduct greening analysis of civil engineering projects, and initially possess the ability to apply green technologies and sustainable development concepts in the engineering design, construction, and operation and maintenance stages. Students can analyse and evaluate the impact of civil engineering practices on the environment, society, and sustainable development.* *3. Competences: Through the study of this course, students will be cultivated to establish engineering values of green, low-carbon, and environmental protection, enhance their sense of social responsibility and awareness of sustainable development, and be able to consciously practice the green concept in future engineering practices, undertaking the responsibility of protecting the environment and promoting social sustainable development.*
Content	*1. Overview of green building and sustainable development (weight: 0.10, requirement level: understanding + familiarity) - Concept of sustainable development, definition and development history of green building, domestic and international green building policies and trends.* *2. Green building evaluation standards (weight: 0.12, requirement level: mastery + application) - Assessment standard for green building of China (GB/T 50378), LEED, WELL, and other evaluation systems.*

	3. Green building site selection and site design (weight: 0.08, requirement level: familiarity + understanding) - Site selection, land use, ecological protection, sponge city design, etc. *4. Energy saving and energy utilization (weight: 0.15, requirement level: mastery + application) - Energy saving of building envelope, utilization of renewable energy, high-efficiency energy systems.* *5. Water saving and water resources utilization (weight: 0.08, requirement level: familiarity + understanding) - Water-saving technologies, rainwater harvesting and utilization, reclaimed water reuse systems.* *6. Material saving and material resources utilization (weight: 0.12, requirement level: mastery + familiarity) - Selection of green building materials, utilization of recyclable materials, reduction and resource utilization of construction waste.* *7. Indoor environmental quality (weight: 0.08, requirement level: familiarity + understanding) - Indoor air quality, acoustic environment, luminous environment, thermal comfort.* *8. Whole life cycle assessment of buildings (weight: 0.12, requirement level: mastery + application) - LCA method, carbon emission calculation, environmental impact assessment.* *9. Green construction and smart operation and maintenance (weight: 0.08, requirement level: familiarity + understanding) - Green construction technology, smart building operation and maintenance management.* *10. Case analysis of green buildings (weight: 0.07, requirement level: application + analysis) - Analysis of typical green building cases at home and abroad.*
Examination forms	*Preview, questioning, assignments, seminar, open-book examination.*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including preview 5%, questioning 5%, assignments 15%, and seminar 15%.* *4. Summative assessment accounts for 60%, and the assessment method is an open-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. China Academy of Building Research. Assessment Standard for Green Building: GB/T 50378-2019 [S]. Beijing: China Architecture & Building Press, 2019.* *2. YANG Weiju. Green Building Design and Technology (2nd ed.) [M]. Nanjing: Southeast University Press, 2023.* *3. Building Energy Research Center of Tsinghua University. Annual Report on China Building Energy Efficiency [M]. Beijing: China Architecture & Building Press, 2024.* *4. WANG Youwei, WANG Qingqin. Green Building and Sustainable Development [M]. Beijing: China Architecture & Building Press, 2020.*

Professional English for Civil Engineering

Module designation	*Professional English for Civil Engineering*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*XIA Lei*
Language	*English*
Relation to curriculum	*Extension Elective Course*
Teaching methods	*Lectures, discussions, tutorials, presentations, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Principles of Reinforced Concrete Design, Foundation Engineering, Engineering Loads and Structural Design Methods, etc.*
Module objectives/intended learning outcomes	*1. Abilities: students are able to analyze complex civil engineering problems by referring to domestic and international literature, apply knowledge of mathematics, natural sciences and engineering sciences to conduct analysis, reasoning and verification, and draw effective conclusions. Students can accurately identify their roles in a multidisciplinary team, fulfill their responsibilities, and take the initiative to cooperate with other members.* *2. Competences: students have good command of professional English in civil engineering, understand the international development of civil engineering, and can communicate effectively in cross-cultural contexts.*
Content	*1. Structural Engineering: English terminology, reading and expression for concrete structures, prestressed concrete, steel structures, seismic design and foundation engineering; students learn to understand structural forms, design principles, mechanical analysis and technical documents. (Weight: 0.25, requirement level: familiarity + understanding)* *2. Bridge and Underground Engineering: English expressions for bridge types, underground structures, seismic analysis and structural performance evaluation; students improve their ability to read international engineering cases and technical literature. (Weight: 0.25, requirement level: familiarity + understanding)* *3. New Technologies and Project Management: English concepts and descriptions related to industrialized construction, 3D printing, BIM and project management processes; students summarize digital construction and management materials in English. (Weight: 0.15, requirement level: familiarity + understanding)* *4. Scientific English Writing and Academic Expression: Writing standards, abstracts, technical descriptions and presentations in civil engineering; students move from reading specialized English to*

	communicating professionally in English. (Weight: 0.35, requirement level: familiarity + understanding)
Examination forms	*Preview, in-class questioning, self-study, discussion, presentation, after-class assignments*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 40% + Summative Assessment Score × 60%.* *3. Formative assessment accounts for 40%, including preview 5%, in-class questioning 5%, self-study 5%, discussion 5%, presentation 10%, and after-class assignments 10%.* *4. Summative assessment accounts for 60%, based on the final examination score.* *5. All components of formative assessment and the summative assessment adopt the percentage grading system.*
Reading list	*1. Guo Xiangrong, Chen Zhengqing. Specialized English for Civil Engineering[M]. China Railway Publishing House, 2001.* *2. Jia Yanmin. Specialized English for Civil Engineering[M]. Science Press, 2005.* *3. Wang Zhufang. Specialized English for Engineering Management[M]. Peking University Press, 2009.* *4. Zhang Liangping, He Xiaoming. Specialized English for Civil Engineering[M]. Chemical Industry Press, 2010.* *5. Wang Dingtang. Specialized English for Civil Engineering[M]. Hefei University of Technology Press, 2011.* *6. Su Xiaocu. Specialized English for Civil Engineering (Volume 1)[M]. Tongji University Press, 2011.* *7. Song Yunlian, Cui Yanan. Specialized English for Highway, Bridge and Traffic Engineering[M]. China Water Conservancy and Hydropower Press, 2012.* *8. Jia Yanmin. Specialized English for Civil Engineering[M]. Harbin Institute of Technology Press, 2014.*

Hydrology of Bridge and Culvert

Module designation	*Hydrology of Bridge and Culvert*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*MAO Dejun*
Language	*Chinese*
Relation to curriculum	*Specialisation elective*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Probability and Statistics C, Engineering Geology and Hydrogeology, Fluid Mechanics, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: students can correctly use professional terms of hydrology for bridges and culverts, and apply the basic knowledge and principles of hydrology, hydraulics and sediment transport to conduct hydrological analysis and calculation of structural facilities in bridge engineering, such as bridge site, bridge aperture, bridge piers and abutments, diversion and protection works.* *2. Abilities: students can apply the basic theory of bridge and culvert hydrology, consider the interaction between bridges and natural environments such as rivers, seas and mountainous areas, scientifically select bridge sites, determine bridge length, arrange bridge types, design apertures, calculate deck elevation and scour depth of piers and abutments, and thus put forward scientific and reasonable preliminary design schemes for bridges.* *3. Competences: in the process of bridge engineering design, students can correctly apply relevant design codes that take into account the hydrological impacts of rivers and marine environments.*
Content	*1. Bridge environment (weight: 0.07, requirement level: understanding)* *2. Rivers (weight: 0.07, requirement level: mastery + understanding)* *3. Principles of hydrological statistics (weight: 0.07, requirement level: familiarity + understanding)* *4. design flood flow (weight: 0.12, requirement level: mastery + familiarity + understanding)* *5. Aperture calculation of medium and large bridges (weight: 0.12, requirement level: mastery + understanding)* *6. Scour of bridge piers and abutments (weight: 0.12, requirement level: mastery + familiarity)* *7. Regulation structures (weight: 0.07, requirement level: familiarity)*

	8. Marine environment of cross-sea bridges (weight: 0.12, requirement level: mastery + familiarity + understanding) *9. Bridge site survey and selection (weight: 0.12, requirement level: mastery + familiarity)* *10. Aperture calculation of small bridges and culverts (weight: 0.12, requirement level: mastery + familiarity)*
Examination forms	*Preview, questioning, assignments, seminar, self-study, open-book examination*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 45% + summative assessment score × 55%.* *3. Formative assessment accounts for 45%, including preview 5%, questioning 8.5%, assignments 10%, seminar 16%, and self-study 5.5%.* *4. Summative assessment accounts for 55%, and the assessment method is open-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. GAO Dongguang, WANG Yaling. Hydrology for Bridges and Culverts [M]. Beijing: China Communications Press, 2022.* *2. GAO Dongguang. Hydrology and Anti-Corrosion for Cross-Sea Bridges and Coastal Highways [M]. Beijing: China Communications Press, 2012.* *3. XIONG Wen. Bridge Hydraulic Resistance: Analysis of Bridge Scour and Water Damage [M]. Beijing: Science Press, 2025.* *4. GUO Jian. Analysis of Local Bridge Scour and Safety Protection [M]. Beijing: Science Press, 2020.* *5. YANG Hongxia, ZHAO Zhengrong, MA Guangshu, et al. Hydraulics and Hydrology for Bridges and Culverts [M]. Beijing: China Machine Press, 2018.* *6. LI Yanfeng. Hydrology for Bridges and Culverts [M]. Beijing: China Water & Power Press, 2020.* *7. HUANG Xin, JIN Juliang, LI Fan. Hydrology for Bridges and Culverts [M]. Beijing: China Communications Press, 2017.* *etc.*

Highway Engineering Measurement and Valuation

Module designation	*Highway Engineering Measurement and Valuation*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*CHEN Xu*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course (Road and Bridge Engineering)*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 60 hours* *Contact hours: 32* *Self-study hours: 28*
Credit points	*Chinese credits: 2; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Civil Engineering Drawing, Engineering Material, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students can accurately use professional terminology related to highway engineering measurement and pricing, master the fundamental theories of highway engineering measurement and pricing along with current bill of quantities and quota specifications, become familiar with the measurement rules and cost composition for subgrade, pavement, bridges, culverts, and other projects, grasp the calculation methods for construction and installation costs, comprehensive unit prices in the bill of quantities, and other aspects, understand the budget preparation process, and clearly distinguish the differences between bill of quantities and quota pricing.* *2. Abilities: Capable of independently completing itemized engineering quantity calculation, bill of quantities preparation, quota-based pricing, comprehensive unit price, and the preparation of construction and installation costs as well as project costs. Able to compare and analyze cost schemes, with practical job skills and basic cost optimization capabilities.* *3. Competences: Students can abide by the regulations and professional standards of the cost industry, establish a work style of integrity, compliance, rigor, and refinement, uphold the craftsman spirit of seeking truth from facts and striving for excellence, actively follow up on new pricing regulations and information technology, and cultivate professional qualities of self-learning and adapting to industry development.*
Content	*1. Basic theory of highway engineering cost, including cost composition, pricing basis and valuation procedures. (Weight: 0.10, requirement level: mastery + understanding)* *2. Highway engineering quotas and direct costs, including labor, materials, machinery and direct engineering cost calculation. (Weight: 0.20, requirement level: mastery + application)*

	3. Budgetary estimate and budget cost calculation for highway engineering. (Weight: 0.20, requirement level: mastery + application) *4. Bill of quantities pricing for highway engineering. (Weight: 0.20, requirement level: mastery + application)* *5. Measurement rules for highway engineering bills of quantities. (Weight: 0.10, requirement level: understanding + application)* *6. Application of valuation software and case practice. (Weight: 0.20, requirement level: mastery + application)*
Examination forms	*Preview, questioning, assignments, seminar, course paper, achievement report*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including pre class preview 10%, classroom questioning 10%, group discussion 10%, and homework after class 10%.* *4. Summative assessment accounts for 60%, conducted as an achievement report.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Chen Xu and Zhang Shengping, Measurement and Valuation of Highway Engineering, Central South University Press, 2024.* *2. Luo Xingchun and Li Ning, Highway Engineering Budgeting and Measurement Pricing, China Communications Press, 2020.* *3. Guo Jian, Budget Estimate of Highway Bridge Engineering, China Communications Press, 2020.* *4. Hao Wei, Highway Engineering Budgeting and Bill of Quantities Pricing, China Architecture & Building Press, 2019.* *5. Pu Cuihong and Lai Yingliang, Highway Engineering Measurement and Valuation, Southwest Jiaotong University Press, 2017.* *6. Ministry of Transport, Highway Engineering Budget Quota (JTG/T 3832-2018), China Communications Press, 2019.* *7. Ministry of Transport, Preparation Method for Budgetary Estimate and Budget of Highway Construction Projects (JTG 3830-2018), China Communications Press, 2019.* *8. Ministry of Transport, Machinery Shift Cost Quota for Highway Engineering (JTG/T 3833-2018), China Communications Press, 2019.* *9. Ministry of Transport, Standard Construction Bidding Documents for Highway Engineering (2018 edition), China Communications Press, 2018.*

Seismic and Wind Resistance of Bridges

Module designation	*Seismic and Wind Resistance of Bridges*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*ZHANG-Longfei*
Language	*Chinese*
Relation to curriculum	*Specialisation elective*
Teaching methods	*Lectures, discussions, exercises, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 90 hours* *Contact hours: 48* *Self-study hours: 42*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*Theoretical Mechanics, Mechanics of Materials, Structural Mechanics, Civil Engineering Materials, Principles of Concrete Structure Design, Principles of Steel Structure Design,*
Module objectives/intended learning outcomes	*1. Skills: Master the operation and application of common design and analysis software for highway and bridge engineering, and properly apply computer-aided design methods to bridge structure design in practical projects.* *2. Abilities: Correctly use relevant codes and standards in seismic and wind-resistant design of bridge engineering.* *3. Qualities: Understand and abide by the laws, regulations, professional codes, technical specifications and ethical standards for engineers related to bridge seismic and wind-resistant design.*
Content	*1. Bridge seismic damage and seismic fortification. (Weight: 0.1; Requirement level: understanding + Familiarize)* *Site and foundation. (Weight: 0.1; requirement level: understanding + familiarity)* *2. Seismic response analysis and seismic action calculation. (Weight: 0.2; requirement level: understanding + familiarity)* *3. Ductile seismic design of bridges. (Weight: 0.19; requirement level: mastery + familiarity + application)* *4. Midas/Civil response spectrum analysis. (Weight: 0.1; requirement level: mastery + familiarity + application)* *5. Seismic isolation and energy dissipation design of bridges. (Weight: 0.1; requirement level: mastery + familiarity + application)* *6. Wind-resistant design of bridges. (Weight: 0.21; requirement level: mastery + familiarity + application)*
Examination forms	*Preview, questioning, assignments, seminars, open-book examination*
Study and examination requirements	*1. The course uses a 100-point scale. A score of 60 or above is a pass, granting course credits.*

	2. Course Score = formative assessment score × 50% + summative Assessment Score × 50%. *3. Formative assessment score accounts for 50%: Preview 5%, questioning 5%, seminars 20%, assignments 20%.* *4. Summative assessment accounts for 50%, and the assessment method is open-book examination.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Ministry of Transport of the People's Republic of China. Technical Standards of Highway Engineering: JTG B01-2014 [S]. Beijing: China Communications Press Co., Ltd., 2014.* *2. Ministry of Transport of the People's Republic of China. General Code for Design of Highway Bridges and Culverts: JTG D60-2015 [S]. Beijing: China Communications Press Co., Ltd., 2015.* *3. Ministry of Transport of the People's Republic of China. Technical Specifications for Construction of Highway Bridges and Culverts: JTG/T F50-2011 [S]. Beijing: China Communications Press Co., Ltd., 2011.* *4. Ministry of Transport of the People's Republic of China. Code for Seismic Design of Highway Bridges: JTG/T 2231-01-2020 [S]. Beijing: China Communications Press Co., Ltd., 2020.* *5. Ye Aijun, Guan Zhongguo. Bridge Seismic Design (3rd Edition)[M]. Beijing: China Communications Press Co., Ltd., 2017.* *6. Ministry of Housing and Urban-Rural Development of the People's Republic of China. Code for Design of Urban Bridges: CJJ 11-2011 [S]. Beijing: China Architecture & Building Press, 2011.* *7. Ministry of Transport of the People's Republic of China. Code for Seismic Design of Highway Bridges: JTG/T 2231-01-2020 [S]. Beijing: China Communications Press Co., Ltd., 2020.* *8. Ministry of Transport of the People's Republic of China. Code for Wind-Resistant Design of Highway Bridges: JTG/T 3360-01-2018 [S]. Beijing: China Communications Press Co., Ltd., 2018.* *9. Wang Kehai. Research on Bridge Seismic Design[M]. Beijing: China Railway Publishing House, 2007.* *10. Chen Zhengqing. Bridge Wind Engineering[M]. Beijing: China Communications Press, 2005.*

Smart Bridges (EEE)

Module designation	*Smart Bridges (EEE)*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*WANG Chunhua, WANG Panpan*
Language	*Chinese*
Relation to curriculum	*Expand elective courses*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 30 hours* *Contact hours: 16* *Self-study hours: 14*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Bridge engineering, structural mechanics, material mechanics, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students are able to correctly use professional terminology related to smart bridges, master the basic theory of bridge structures (mechanical properties, material performance, construction requirements), intelligent sensing and monitoring technology (various sensor principles, deployment methods, data acquisition and transmission), design of bridge health monitoring systems (monitoring parameter selection, measurement point optimization, data collection frequency), BIM based bridge lifecycle information management methods, application of big data analysis and artificial intelligence in bridge condition assessment (anomaly detection, damage identification, trend prediction), intelligent maintenance decision-making system for bridges (technical condition assessment, maintenance priority sorting, maintenance and reinforcement plan optimization), as well as professional basic theories such as intelligent construction monitoring and operation and maintenance management for bridges.* *2. Ability: When facing specific new bridge construction projects or smart renovation cases of existing bridges, students can correctly apply their professional knowledge to propose scientific and reasonable bridge intelligent monitoring schemes, data analysis and status evaluation schemes, BIM based information integration management schemes, as well as professional technical schemes such as bridge intelligent operation and maintenance decision-making schemes.* *3. Quality: Students are able to comprehensively consider the impact of bridge engineering practice activities on the natural environment and social sustainable development (such as extending the service life of bridges through intelligent monitoring, reducing resource consumption and environmental interference caused by major repairs), correctly apply their professional knowledge, scientifically and reasonably evaluate the technical solutions of bridges in intelligent design, construction monitoring, health monitoring, and operation and*

	maintenance management stages, and be able to reflect innovative consciousness and green development concepts in smart bridge construction.
Content	*1. Basic Theory and Technical System of Smart Bridges (Weight: 0.10, Requirement Level: Mastery+Understanding)* *2. Mechanical characteristics and design parameters of bridge structures (weight: 0.08, requirement level: mastery+understanding)* *3. Bridge intelligent sensing and data acquisition technology (weight: 0.12, requirement level: mastery+application)* *4. Design and optimization of bridge health monitoring system (weight: 0.10, requirement level: mastery+application)* *5. Bridge BIM model and information integration management (weight: 0.08, requirement level: mastery+application)* *6. Bridge big data analysis and status assessment (weight: 0.10, requirement level: mastery+application)* *7. Bridge damage identification and safety warning (weight: 0.08, requirement level: mastery+application)* *8. Bridge intelligent construction monitoring technology (weight: 0.06, requirement level: understanding+application)* *9. Intelligent maintenance and operation decision-making for bridges (weight: 0.10, requirement level: mastery+application)* *10. Bridge Internet of Things and edge computing technology (weight: 0.06, requirement level: understanding)* *11. Bridge digital twin and visualization technology (weight: 0.06, requirement level: understanding+application)* *12. Case analysis and development trend of smart bridge engineering (weight: 0.06, requirement level: understanding+application)*
Examination forms	*Pre class preparation, classroom questioning, homework, case study, post class review, open-book exam*
Study and examination requirements	*1. The grades of this course are based on a percentage system, and students who score 60 or above are considered qualified to receive credits for this course.* *2. Course score=Process assessment score x 40%+Final assessment score x 60%.* *3. The process assessment score accounts for 40%, including 5% pre class preparation, 10% classroom questioning, 10% homework, 10% case study, and 10% post class review.* *4. The final assessment accounts for 60%, and the assessment method is open book examination.* *5. The various components of the process assessment and the final assessment are both based on a percentage system.*
Reading list	*1. Dong Zejiao, Ma Xianyong Introduction to Intelligent Transportation Infrastructure [M]. Beijing: People's Transportation Press, 2025.* *2. Li Xiaoli Digital Design, Analysis, and Construction of Bridge Engineering [M]. Dalian: Dalian Maritime University Press, 2025.* *3. Zhang Yufeng, Xu Yichao, Cheng Yu Bridge Lightweight Monitoring [M]. Beijing: People's Communications Press, 2025.*

New Concepts in Highway Survey and Design

Module designation	*New Concepts in Highway Survey and Design*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*MAO Dejun, WANG Panpan, ZHU Weiwei*
Language	*Chinese*
Relation to curriculum	*Extension Elective Course (Road and Bridge Engineering)*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 30 hours* *Contact hours: 16* *Self-study hours: 14*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Civil Engineering Drawing, Road Survey and Design, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Master new concepts in highway survey and design, including route selection, green and low-carbon design, safety resilience and life-cycle design.* *2. Abilities: Apply BIM, 3D collaboration and digital methods to analyse design schemes and evaluate engineering cases.* *3. Qualities: Develop engineering awareness of resource conservation, environmental friendliness, safety, reliability and landscape coordination.*
Content	*1. Basic theory of new concepts in highway survey and design* *(Weight: 0.10, level: mastery + understanding)* *2. People-oriented highway design concepts and methods* *(Weight: 0.12, level: mastery + application)* *3. Safety and resilient highway design concepts and methods* *(Weight: 0.12, level: mastery + application)* *4. Green and low-carbon highway design concepts and methods* *(Weight: 0.10, level: mastery + application)* *5. Life-cycle cost and benefit analysis* *(Weight: 0.08, level: mastery + application)* *6. Resource-saving and environmentally friendly design* *(Weight: 0.08, level: mastery + application)* *7. Highway-landscape integration and coordination design* *(Weight: 0.06, level: understanding + application)* *8. BIM and 3D collaborative survey and design* *(Weight: 0.10, level: mastery + application)* *9. Route selection and geological route selection concepts*

	(Weight: 0.06, level: mastery + application) *10. Intelligent design and digital construction concepts* *(Weight: 0.06, level: understanding + application)* *11. Disaster prevention and mitigation design concepts* *(Weight: 0.06, level: understanding + application)* *12. Case studies of new-concept highway projects* *(Weight: 0.06, level: understanding + application)*
Examination forms	*Pre class preparation, classroom questioning, homework, case study, post class review, open book exam*
Study and examination requirements	*1. The grades of this course are based on a percentage system, and students who score 60 or above are considered qualified to receive credits for this course.* *2. Course score=Process assessment score x 40%+Final assessment score x 60%.* *3. The process assessment score accounts for 40%, including 5% pre class preparation, 10% classroom questioning, 10% homework, 10% case study, and 10% post class review.* *4. The final assessment accounts for 60%, and the assessment method is open book examination.* *5. The various components of the process assessment and the final assessment are both based on a percentage system.*
Reading list	*1. Yang Shaowei, Road Survey and Design, 5th ed., China Communications Press, 2020.* *2. Ministry of Transport, Design Specification for Highway Alignment (JTG D20-2017), China Communications Press, 2017.* *3. Ministry of Transport, Technical Standard of Highway Engineering (JTG B01-2014), China Communications Press, 2015.* *4. Ministry of Transport, Specifications for Environmental Protection Design of Highway (JTG B04-2010), China Communications Press, 2010.*

Practical Education

Labor

Module designation	*Labor*
Semester(s) in which the module is taught	*Semester 1-4*
Person responsible for the module	*LI Chenchen， LUO Dayou*
Language	*Chinese*
Relation to curriculum	*General Education Practice*
Teaching methods	*Lectures, labor activities, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 28 hours* *Contact hours: 28* *Self-study hours: 0*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*None.*
Module objectives/intended learning outcomes	*1. Knowledge: Help students gain an understanding of laws, regulations, professional ethics, practical skills, hands-on experience, and work ethic closely related to the engineering industry while studying specialized courses. By integrating labor education into academic curricula, both academic courses and labor education can mutually reinforce and benefit each other.* *2. Abilities: Cultivate students' Marxist work ethic, establish correct attitudes toward labor, and foster good work habits. Through labor, students can hone their willpower and enhance their skills in fields such as construction engineering and hydraulic engineering. By combining labor education with practical professional production and social service activities, students will develop the practical labor skills required for engineering-related jobs, strong innovative and entrepreneurial capabilities, as well as the ability to identify and solve new problems in labor practice, laying a solid foundation for their future careers.* *3. Qualities: Instill strong professional ethics, cultivate students' professional awareness and a sense of dedication to their work. Strengthen their sense of responsibility and identification with engineering disciplines, and establish correct labor values. Through labor education, students will develop morally, intellectually, physically, and aesthetically, ultimately promoting their all-around development and enabling them to meet the social development needs of college students in the new era.*
Content	*1. Marxist labor perspective and labor spirit* *(Weight: 0.4, Required proficiency level: Understanding)* *2. Daily on-campus labor* *(Weight: 0.3, Required proficiency level: Familiarity + Mastery + Understanding)* *3. Engineering professional labor services*

	(Weight: 0.3, Required proficiency level: Familiarity + Understanding)
Examination forms	*Labor summary, labor performance*
Study and examination requirements	*1. The final grade for this course adopts a five-tier grading system. Students who achieve a passing grade or higher are deemed qualified and will earn credits for this course.* *2. The course grade = process-based assessment score × 75% + summative assessment score × 25%.* *3. The process-based assessment accounts for 75% of the total grade, primarily based on labor performance.* *4. The summative assessment accounts for 25% of the total grade, and the assessment method is through a labor summary.* *5. Both the components of the process-based assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Zhao Xinquan and Zhang Yong, Labor Education for College Students in the New Era, China Machine Press, 2021.* *2. Huang Haijun, Labor Education for College Students, Xinhua Publishing House, 2022.* *3. Shi Zhongfeng, Dong Aiqin and Zhang Yanxia, Labor Education for College Students in the New Era, Tsinghua University Press, 2022.* *4. Xie Yan, Labor Education for College Students, China Renmin University Press, 2022.*

Thematic Practice of Core Socialist Values

Module designation	*Thematic Practice of Core Socialist Values*
Semester(s) in which the module is taught	*Semester 1-6*
Person responsible for the module	*YU Wenzheng, GAO Li, LI Chenchen.*
Language	*Chinese*
Relation to curriculum	*General Education Practice*
Teaching methods	*Theme class meetings, theme Party (Communist Youth League) day education, group discussion, case analysis, debate, social investigation, volunteer service, public welfare activities.*
Workload (incl. contact hours, self-study hours)	*Total workload: 28 hours* *Contact hours: 16* *Self-study hours: 12*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*None*
Module objectives/intended learning outcomes	*1. Knowledge: Deepen theoretical cognition and value internalization. Master the scientific connotation and theoretical logic of the core socialist values, and profoundly understand their contemporary value and practical significance. Guide students to maintain a firm political stance and distinguish right from wrong in a multicultural background, form a stable professional ethical judgment, and strengthen engineers' professional ethics and social responsibility.* *2. Abilities: Strengthen practice and teamwork capabilities. Cultivate students' ability to translate core socialist values into daily codes of conduct, and enhance their active practice awareness in professional scenarios through case analysis, project practice, and other forms. Focus on value guidance in teamwork, enabling students to demonstrate a spirit of responsibility in cross-role cooperation.* *3. Competences: Promote lifelong development and strategic mission responsibility. Stimulate students' endogenous motivation for continuous learning, and guide them to combine personal career planning with national strategic needs. Shape students to become disseminators and practitioners of core values, and cultivate sustainable development capabilities to adapt to industry changes.*
Content	*1. Thematic practice content (weight: 1.00, requirement level: comprehension + mastery)* *1. Course I: Comprehensive practice of prosperity and democracy* *2. Course II: Comprehensive practice of civility and harmony* *3. Course III: Freedom, equality, and justice* *4. Course IV: Comprehensive practice of the rule of law and patriotism* *5. Course V: Dedication, integrity, and friendship*

	6. Course VI: Achievement presentation
Examination forms	*Assessment (Attendance, comprehensive practice performance, achievement presentation, learning reflection, student learning activity handbook).*
Study and examination requirements	*1. The course adopts a five-level grading system: Excellent (90 and above), Good (80-89), Medium (70-79), Pass (60-69), and Fail (below 60). Students who fail cannot obtain credits.* *2. Formative assessment accounts for 60%, with weights allocated flexibly according to the characteristics of courses in different semesters. For example:* *- Courses I, II, IV: attendance 10%, comprehensive practice performance 10%, completion of the "Student Learning Activity Handbook" 40%;* *- Courses III, V: attendance 15%, comprehensive practice performance 15%, completion of the "Student Learning Activity Handbook" 30%;* *- Course VI (achievement presentation): attendance 10%, personal comprehensive performance 10%, achievement presentation 40%.* *3. Summative assessment accounts for 40%. Students are required to write and submit a learning reflection on this course combining their major and career planning, and complete the corresponding stage records in the "Student Learning Activity Handbook" as required.*
Reading list	*GUO Hua. Education Reader on Core Socialist Values for College Students [M]. Beijing: China Forestry Publishing House, 2020. (ISBN: 978-7-5219-0676-9)* *Institute of Party History and Literature of the CPC Central Committee. Excerpts from Xi Jinping's Discourses on Core Socialist Values [M]. Beijing: Central Party Literature Press, 2014.* *Publicity Department of the CPC Central Committee. Learning Reader on Core Socialist Values [M]. Beijing: Xuexi Publishing House, 2015.* *HAN Zhen. Interpretation of Core Socialist Values [M]. Beijing: People's Publishing House, 2014.* *YUWEN Li. Research on College Students' Identification and Practice of Core Socialist Values [M]. Beijing: Peking University Press, 2018.* *6. LUO Yuting, et al. Theory and Practice of Ideological and Political Education in the New Era [M]. Beijing: Higher Education Press, 2020.*

Inorganic and Analytical Chemistry Laboratory

Module designation	*Inorganic and Analytical Chemistry Laboratory*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*Fang, Yun-Shan; Zhang, Hong-Jiao; Wen, Qiu-Lin, et al.*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*lecture, lab works.*
Workload (incl. contact hours, self-study hours)	*Total workload: 42* *Contact hours : 24* *Private study hours: 18*
Credit points	*China credits: 1.5; European Credit System credits: 1.5*
Required and recommended prerequisites for joining the module	*Middle School Mathematics, Middle School Physics, Middle School Chemistry*
Module objectives/intended learning outcomes	*Through this course, students will deepen their understanding of theoretical knowledge, develop the ability to reasonably interpret experimental phenomena, accurately comprehend the principles and methods involved in analytical testing, master fundamental operational skills in inorganic and analytical chemistry experiments, and enhance their capacity to independently apply theoretical and experimental knowledge to solve practical problems. This course lays a solid chemical foundation for studying other specialized courses.*
Content	*1. Main experimental content (weight: 1.00, requirement level: comprehension + mastery)* *Main Course Content:* *Experiment 1: Preparation of General Solutions;* *Experiment 2: Preparation and Properties of Buffer Solutions; Experiment 3: Acid-Base Equilibrium and Precipitation Equilibrium;* *Experiment 4: Formation and Properties of Complexes; Experiment 5: Preparation and Calibration of Sodium Hydroxide/Hydrochloric Acid Solutions;* *Experiment 6: Analysis of Mixed Bases;* *Experiment 7: Preparation and Calibration of EDTA Standard Solutions;* *Experiment 8: Determination of Vitamin C Content*
Examination forms	*check*
Study and examination requirements	*The comprehensive score (100 points) = Basic operational experiment score (50 points) + Quantitative analysis experiment score (30 points) + Comprehensive experiment score (20 points). A comprehensive score of 60 points or above is required to earn the course credit.*

Reading list	*1.《Inorganic and Analytical Chemistry Experiments》, 2nd Edition, edited by Deng Xiujun et al. Kunming: Yunnan University Press, 2024.* *2.《Inorganic Chemistry Experiments》, edited by Li Shengying et al., Beijing: Chemical Industry Press, 2007.* *3.《Inorganic Chemistry Experiments》(2nd Edition), edited by the Inorganic Chemistry Teaching and Research Section of Beijing Normal University et al. Beijing: Higher Education Press, 1991.* *4.《Inorganic and Analytical Chemistry Experiments》, compiled by the University Chemistry Experimental Teaching Group of Nanjing University. Beijing: Higher Education Press, 1996.* *5.《Inorganic Chemistry》(Volumes I & II), 4th Edition, edited by Beijing Normal University et al. Beijing: Higher Education Press, 2002.* *6.《Inorganic Chemistry Experiments》(2nd Edition), compiled by the Inorganic Chemistry Teaching and Research Section of Dalian University of Technology. Beijing: Higher Education Press, 1990.* *7.《Analytical Chemistry Experiments》(3rd Edition), edited by Huazhong Normal University. Beijing: Higher Education Press, 2007.*

Structural Model Making

Module designation	*Structural Model Making*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*Wei Ping, Wu Kechuan*
Language	*Chinese (instruction in Chinese, syllabus translated)*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Lectures, discussions, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 28 hours* *Teaching hours: 16* *Self-study hours: 12*
Credit points	*Chinese Credits: 1; ECTS Credits: 1*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Advanced Mathematics, University Physics Experiments, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students can correctly use professional terminology related to structural model fabrication and structural analysis, master the basic principles, fabrication methods and technical requirements of structural model implementation, become familiar with the mechanical characteristics, structural forms, connection methods and model material properties of common structural systems, understand the correspondence between structural models and actual engineering structures and their role in structural analysis, design representation and scheme verification, and correctly apply relevant knowledge to structural model design, fabrication, loading analysis, and expression and solution of practical engineering problems.* *2. Skills: Students are able, on the basis of consulting relevant technical materials and domestic/international literature and analyzing complex problems in structural engineering, to comprehensively consider factors such as structural system, mechanical performance, construction requirements, material properties, connection methods, fabrication processes and experimental conditions, reasonably formulate structural model implementation plans, and analyze the mechanical characteristics, deformation patterns and failure mechanisms of the model to obtain valid conclusions. They can apply basic structural theories, model fabrication techniques, experimental observation methods and relevant technical standards to complete structural model design, material selection, processing, assembly, testing and optimization, producing structural model outcomes that are technically feasible, mechanically reasonable, clearly constructed, standard in fabrication and reflect actual engineering characteristics.* *3. Competence/Attitude: Students become familiar with technical requirements, operating specifications, safety regulations and*

	laboratory management requirements related to structural model implementation, establish a rigorous and realistic scientific attitude, teamwork awareness, innovation awareness, quality awareness and safety awareness, continuously improve engineering practice literacy, hands-on ability and professional responsibility, laying a good foundation for future work in civil engineering structural design, construction, experimental research and engineering management.
Content	*1. Overview of structural models (weight: 0.08, requirement: understanding + familiarity)* *2. Structural model materials (weight: 0.14, requirement: familiarity + application)* *3. Structural concepts (weight: 0.18, requirement: mastery + familiarity + application)* *4. Structural types (weight: 0.18, requirement: mastery + familiarity + application)* *5. Competition item analysis (weight: 0.16, requirement: mastery + familiarity + application)* *6. Competition real problem analysis (weight: 0.18, requirement: mastery + familiarity + application)* *7. Introduction to domestic and international competitions (weight: 0.08, requirement: understanding + familiarity)*
Examination forms	*Pre-class preparation, questioning, discussion, lab report*
Study and examination requirements	*1. The course grade is based on a 100-point system. A score of 60 or above is considered passing, and students will obtain the course credits.* *2. Course grade = Process assessment60% + Final assessment 40%.* *3. Process assessment accounts for 40%, including autonomous learning 10% + in-class questioning 10% + group discussion 10% + design attitude 10%.* *4. Final assessment accounts for 60%, based on submission of a physical fabricated model and loading test score.* *5. Each component of process assessment and the final assessment are evaluated on a 100-point scale.*
Reading list	*[1] Liu Dewen ed. "Eight Lectures on University Student Structural Competition" (1st ed.), Southwest Jiaotong University Press, 2018.* *[2] Xu Xiquan, Conceptual Design of Building Structures, China Machine Press, 2019.*

Engineering Structure Testing Practical Training

Module designation	*Engineering Structure Testing Practical Training*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*Wu Kechuan, Lan Xiang*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Lectures, discussions, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total: 56 hours (Teaching: 32, Self-study: 24)*
Credit points	*Chinese Credits: 1; ECTS Credits: 2*
Required and recommended prerequisites for joining the module	*Principles of Concrete Structure Design, Principles of Steel Structure Design, Structural Mechanics*
Module objectives/intended learning outcomes	*1. Knowledge: Students can correctly use professional terms, master the basic principles, methods, operation procedures and technical requirements of structural testing training, be familiar with loading methods, measurement point layout, equipment usage and data acquisition principles for common structural component tests, understand the test observation and analysis methods of structural mechanical performance, deformation characteristics, crack development, failure modes and bearing capacity, and correctly apply relevant knowledge to scheme formulation, field operation, data collation and practical engineering problem analysis.* *2. Skills: Students can, based on consulting technical standards, specifications and literature, analyze practical problems of structural testing, comprehensively consider structural type, material properties, test purpose, loading system, measurement content, experimental conditions and safety requirements, reasonably formulate training plans, complete specimen installation, instrument debugging, loading control, phenomenon observation and data recording in a standardized manner, and sort out, analyze and evaluate test results, obtaining valid conclusions. They can apply basic theories, testing equipment, measuring instruments, data processing methods and relevant standards to complete experimental operation and result analysis of common structural components, forming training results with standardized process, reliable data, reasonable analysis and clear conclusions, providing basis for structural performance evaluation, design verification and engineering practice.* *3. Attitude: Students become familiar with technical standards, specifications and laboratory safety management, establish rigorous work style, standardized operation awareness, quality awareness,*

	safety awareness and team spirit, continuously improve engineering practice literacy, experimental skills, responsibility and professionalism.
Content	*1. Basic principles, tasks and organization of structural testing training (weight:0.08, requirement: understanding+mastery)* *2. Composition, performance and operation methods of commonly used instruments and equipment (weight:0.12, requirement: mastery)* *3. Specimen installation, support arrangement and loading device setup (weight:0.10, requirement: mastery)* *4. Layout of measuring points, measurement methods and data acquisition technology (weight:0.12, requirement: mastery)* *5. Implementation process and operation requirements of static load tests for common structural components (weight:0.16, requirement: mastery+application)* *6. Observation and recording methods for deformation, cracks, strain and failure phenomena (weight:0.12, requirement: mastery+application)* *7. Data collation, error analysis and result processing (weight:0.12, requirement: mastery+application)* *8. Experimental analysis of mechanical performance, bearing capacity and failure mechanism (weight:0.10, requirement: comprehension+application)* *9. Test report writing, result evaluation and training summary (weight:0.04, requirement: mastery+application)* *10. Safety management, operating norms and teamwork requirements (weight:0.04, requirement: mastery)*
Examination forms	*Pre-class preparation, questioning, discussion, lab report*
Study and examination requirements	*Process assessment (40%) = autonomous learning 10% + questioning 10% + group discussion 10% + design attitude 10%; Final assessment (60%) = submission of training report. Passing >=0/100.*
Reading list	*1. [1] Yi Weijian, Zhang Jianren, Structural Testing, China Communications Press, 2011.* *2. [2] Ye Jianshu, Structural Design Principle Testing, China Communications Press, 2014.* *3. [3] Wang Sheliang, Wu Gang, Civil Engineering Structure Test and Inspection, China Architecture & Building Press, 2016.* *4. [4] Li Hui, Bai Guoliang, Civil Engineering Structure Testing, China Architecture & Building Press, 2012.* *5. [5] Standard for test method of concrete structures: GB/T 50152-2012.* *6. [6] Technical standard for inspection of building structures: GB/T 50344-2019.* *7. [7] General code for engineering structures: GB 55001-2021.* *8. [8] Load code for building structures: GB 50009-2012.*

College Physics Laboratory

Module designation	*College Physics Laboratory*
Semester(s) in which the module is taught	*2024-2025 Academic Year, Semester 2*
Person responsible for the module	*Deng Shuping, Xu Wei*
Language	*Chinese*
Relation to curriculum	*Practical Course for Professional Education*
Teaching methods	*Lectures, seminars, experiments, etc.*
Workload (incl. contact hours, self-study hours)	*Total Workload: 28 hours* *Teaching Hours: 16* *Self-study Hours: 12*
Credit points	*Chinese Credits: 1; ECTS Credits: 1*
Required and recommended prerequisites for joining the module	*Advanced Mathematics, College Physics*
Module objectives/intended learning outcomes	*Course Objectives/Expected Learning Outcomes* *Knowledge Objectives* *Master the principles and performance of commonly used basic physics instruments, and learn to correctly operate, adjust and take readings; master the measurement methods of basic physical quantities and error analysis methods, understand how to determine experimental schemes, select instruments and reduce experimental errors according to experimental requirements; master common experimental data processing methods such as graphing method, successive difference method, extrapolation method and compensation method; explore physical laws, observe and analyze physical phenomena through experiments, deepen the understanding of important physical laws, guide experiments with theoretical and experimental knowledge, and analyze problems in experiments; learn error analysis for experiments, master basic methods of uncertainty evaluation, correctly apply significant figures, and conduct qualitative judgment and quantitative estimation on the reliability of experimental results.* *Ability Objectives* *Improve comprehensive abilities in scientific experiments, including practical operation ability, analytical judgment ability, independent thinking ability, inductive summary ability, oral expression ability, etc.* *Quality Objectives* *Cultivate good experimental habits and rigorous scientific work style, especially treat experimental data seriously, eliminate fraud, establish a realistic scientific attitude, and enhance students' scientific literacy.*
Content	*Module 1: Introduction (Error Theory and Data Processing) - 20%*

	Module 2: Basic Mechanics Experiments (Length measurement, density measurement, simple pendulum, motion of a slider on an inclined air track) - 40% *Module 3: Basic Thermodynamics Experiments (Measurement of specific heat capacity of solids (mixture method), measurement of linear expansion coefficient of metals, measurement of viscosity (falling ball method)) - 40%*
Examination forms	*Regular Experimental Scores* *Course Objective 1* *Master basic knowledge, methods and skills of mechanics and thermodynamics experiments* *Weight A: 30%, Integrity of experimental principles: 20%* *Accuracy of experimental instrument operation: 10% (first 3 experiments)* *Pre-experiment preview report (completed before experiment)* *In-class discussion, original data recording and operation performance (completed during experiment via teacher's questioning, discussion and observation)* *Course Objective 2* *Possess strong practical and innovative abilities* *Weight B: 50%, Rationality of experimental scheme: 15%* *Accuracy of experimental data measurement: 15%* *Accuracy and completeness of data processing: 20% (last 5 experiments)* *Data recording (completed during experiment with teacher's review and guidance)* *Data processing (completed after experiment)* *Course Objective 3* *Possess rigorous, careful scientific attitude and realistic scientific spirit* *Weight C: 20%, Completeness of experimental error analysis: 10%, Depth of problem discussion: 10%* *Final Score: Average of comprehensive scores of all experiments* *Experimental result analysis (completed after experiment)* *Thinking questions (completed after experiment)*
Study and examination requirements	*Basically master basic knowledge, methods and skills of general physics experiments, and possess professional knowledge for physics teaching, physics experiment teaching and related work.* *Design relatively reasonable experimental schemes, measure experimental data accurately, process data accurately and basically completely, and possess certain practical and innovative abilities.* *Conduct basically complete and reasonable experimental error analysis.*
Reading list	*Yang, Shuwu. General Physics Experiment Vol.1 (Mechanics and Thermodynamics) (4th ed.). Higher Education Press, December 2007.* *Zhang, Zhaokui. College Physics Experiment (1st ed.). Higher Education Press, December 2001.* *Zhou, Dianqing. Basic Physics Experiments (1st ed.). Science Press, January 2009.*

Engineering Geology and Hydrogeology Practical Training

Module designation	*Engineering Geology and Hydrogeology Practical Training*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*LI Chenchen, XIA Lei, YANG Xu*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecturing, Guidance, Practical Training, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 28 hours* *Contact hours: 16* *Self-study hours: 12*
Credit points	*Chinese credits: 0.5; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*None.*
Module objectives/intended learning outcomes	*1.Knowledge: Through this practical training course, students are expected to master the basic knowledge and methods of geological investigation; identify and describe the three common types of rocks and geological structures; understand methods for describing and investigating common geological hazards; and learn how to use a compass.* *2.Abilities: Through systematic study of this course, students are expected to develop comprehensive abilities in reading geological data, interpreting geological maps, and drawing geological maps.* *3.Qualities: Through this course, students will develop the ability to identify geological hazards and analyze and solve related problems, cultivate skills in reading and writing geological reports, and enhance their awareness of teamwork and collaboration.*
Content	*1.Basic Knowledge of Geological Investigation and Identification of Minerals and Rocks (Weight: 0.375; Required Level: Mastery + Understanding + Application)* *2.Interpretation of Geological Maps (Weight: 0.25; Required Level: Mastery + Understanding + Application)* *3.Identification of Landslides and Common Prevention and Control Methods (Weight: 0.125; Required Level: Mastery + Understanding + Application)* *4.Off-campus Practical Training (Weight: 0.25; Required Level: Mastery + Understanding + Application)*
Examination forms	*Map Interpretation Assessment, Compass Operation, Discussions, Cross-section Drawing, Classroom Questioning, Practical Training Report.*

Study and examination requirements	*1.The course adopts a 100-point grading system. A score of 60 or above is considered a pass, and students who pass will earn the course credits.* *2.Final course grade = Continuous Assessment Score × 60% + Final Assessment Score × 40%.* *3.Continuous assessment accounts for 60% of the total grade, including: map interpretation assessment (10%), compass operation (10%), discussions (10%), cross-section drawing (20%), and classroom questioning (10%).* *4.The final assessment accounts for 40% of the total grade and is based on the practical training report submitted by students, including fundamental knowledge points and understanding of each module, as well as the off-campus training analysis report.* *5.All components of the continuous assessment and the final assessment are graded on a 100-point scale.*
Reading list	*Hu Houtian, Bai Zhiyong. Civil Engineering Geology (4th Edition) [M]. Beijing: Higher Education Press, 2022.* *2. Shi Zhenming, Huang Yu . Engineering Geology (3rd Edition) [M]. Beijing: China Architecture & Building Press, 2018.* *3. Chen Nanxiang. Engineering Geology and Hydrogeology (5th Edition) [M]. Beijing: China Water & Power Press, 2016.* *4.National Standard of the People's Republic of China. Code for Investigation of Geotechnical Engineering: GB50021-2024 [S]. Beijing: China Communications Press, 2024.* *5.Editorial Committee of Engineering Geology Handbook. Engineering Geology Handbook (5th Edition) [M]. Beijing: China Architecture & Building Press, 2018.* *6.China Geological Survey. Hydrogeology Handbook (2nd Edition) [M]. Beijing: Geological Publishing House, 2012.* *etc.*

Engineering Materials Laboratory

Module designation	*Engineering Materials Laboratory*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*Sun Laite, Wang Panpan, Wu Kechuan, Lan Xiang*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Lectures, discussions, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total: 56 hours (Teaching: 32, Self-study: 24)*
Credit points	*Chinese Credits: 1; ECTS Credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Advanced Mathematics, University Physics Experiments, etc.*
Module objectives/intended learning outcomes	*1. Knowledge: Students can correctly use terminology related to civil engineering material experiments, master the basic properties, test principles, testing methods, technical requirements and evaluation indicators of common civil engineering materials, become familiar with the relationship between material composition, structure and properties, understand the basic process, operating specifications and data processing methods of civil engineering material experiments, and correctly apply relevant knowledge to material performance testing, quality evaluation and analysis of practical engineering problems.* *2. Skills: Students are able to consult relevant technical standards, specifications and domestic/international literature, analyze material performance and engineering applicability issues, comprehensively consider factors such as material types, compositional characteristics, service environment, test conditions and technical requirements, reasonably formulate experimental plans, standardize experimental operations, accurately record and process experimental data, and analyze, judge and evaluate experimental results. They can apply basic theories of civil engineering material experiments, testing equipment, professional tools and relevant technical standards to conduct performance tests, quality inspections and result analysis for common engineering materials, forming scientific, reliable and well-concluded experimental reports to provide basis for material selection, quality control and technical optimization.* *3. Attitude: Students become familiar with technical standards, specifications and safety management requirements for material experiments, establish a rigorous scientific attitude, standardized operation awareness, quality responsibility and safety/environmental awareness, continuously improve experimental literacy, teamwork and professional responsibility.*

Content	*1. Determination of mechanical indexes of steel: yield strength, modulus of elasticity, ultimate strength, elongation, reduction of area, etc. (weight:0.16, requirement: mastery+familiarity+application)* *2. Cold bending test of steel bars (weight:0.08, requirement: familiarity+application)* *3. Concrete mix proportion design (weight:0.15, requirement: mastery+familiarity+application)* *4. Determination and adjustment of workability of fresh concrete (weight:0.13, requirement: mastery+familiarity+application)* *5. Determination of apparent density of fresh concrete (weight:0.08, requirement: familiarity+application)* *6. Determination of cubic compressive strength of concrete (weight:0.16, requirement: mastery+familiarity+application)* *7. Determination of mortar consistency (weight:0.08, requirement: familiarity+application)* *8. Determination of mortar layering degree (weight:0.06, requirement: familiarity+understanding)* *9. Mortar compressive strength test (weight:0.10, requirement: mastery+familiarity+application)*
Examination forms	*Pre-class preparation, questioning, discussion, lab report*
Study and examination requirements	*Same structure: grade = process 60% + final 40%;* *process (40%) = autonomous learning 10% + questioning 10% + group discussion 10% + design attitude 10%;* *final assessment (60%) = submission of lab report.* *All 100-point scale.*
Reading list	*1. [1] Wu Keru, Zhang Xiong, Civil Engineering Materials, Tongji University Press, 2023.* *2. [2] JGJ/T 98-2010 Specification for mix proportion design of masonry mortar.* *3. [3] Bai Xianchen, Civil Engineering Material Experiments, China Architecture & Building Press, 2018.* *4. [4] Luo Xiangjie, Civil Engineering Material Experiments, Beijing Institute of Technology Press, 2012.* *5. [5] Li Meijuan, Civil Engineering Material Experiments, China Petrochemical Press, 2011.* *6. [6] GB/T 228.1-2021 Metallic materials - tensile testing - Part 1: room temperature test method.* *7. [7] JGJ/T 70-2009 Standard for test method of basic properties of building mortar.* *8. [8] GB/T 1345-2005 Test method for fineness of cement.*

Engineering Surveying Practical Training

Module designation	*Engineering Surveying Practical Training*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*Yang Xu, LUO Dayou*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*The training is organized through centralized outdoor practice, on-site supervision, group collaboration, computer-based office processing, result presentation, and reflection.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Higher Mathematics and Engineering Drawing.*
Module objectives/intended learning outcomes	*1. Knowledge objective: Students become proficient in the operation and basic checking of common instruments such as theodolites, levels, and total stations; they master the measurement and setting-out of angles, distances, and elevations, and understand the workflow of large-scale digital topographic mapping and construction setting-out.* *2. Ability objective: Through centralized practice, students gain preliminary field experience and practical skills, and become able to complete field observation, office computation, digital mapping, result finishing, and quality inspection, thereby improving problem-solving and independent working ability.* *3. Quality objective: Through comprehensive training in measuring, recording, computing, and drawing, students develop a rigorous, careful, accurate, efficient, hardworking, and cooperative working style, together with professional responsibility and practical engineering awareness.*
Content	*1. Training orientation, instrument familiarization, centering, leveling, and basic observations (weight: 0.15, requirement: mastery): training organization, safety requirements, instrument checking, and basic operation drills.* *2. Leveling, angle and distance observation, traverse survey, and control survey (weight: 0.25, requirement: mastery + application): survey-line arrangement, field observation, recording, and office computation.* *3. Field data acquisition with total stations or RTK and large-scale digital topographic mapping for a small area (weight: 0.25, requirement: mastery + application): detail-point collection, terrain-element recording, and data collation.*

	4. Computer-based office processing, digital mapping, deliverable finishing, and quality inspection (weight: 0.15, requirement: mastery + application): graphic editing, result checking, error analysis, and document archiving. *5. Building setting-out, elevation transfer, result presentation, and training summary (weight: 0.20, requirement: mastery + application): plan-position setting-out, elevation transfer, presentation of results, and reflective summary.*
Examination forms	*Process assessment (practical drills, questioning, teamwork, working attitude, and reflection) plus final assessment (design deliverables or training outcomes).*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. A recommended grading structure is process assessment 40% and final assessment 60%.* *3. Process assessment focuses on practical operation, classroom questioning, teamwork, working attitude, and reflective summary. A typical structure may be practical drills 10%, questioning 5%, teamwork 5%, working attitude 10%, and reflection 10%.* *4. The final assessment is based on design deliverables, surveying products, or a training report, with emphasis on field observation, office computation, mapping quality, result presentation, and completion quality.* *5. Assessment concerns not only standardized operation and deliverable quality, but also the student's performance in organization, coordination, cooperation, and problem handling during practice.*
Reading list	*1. YANG Jian and Guo Jingjun, Civil Engineering Surveying (5th ed.) [M]. Wuhan: Wuhan University of Technology Press, 2022.* *2. YANG Zhengyao, Surveying (2nd ed.) [M]. Beijing: Chemical Industry Press, 2019.* *3. GU Xiaolie, Bao Feng, and Cheng Xiaojun, Surveying (2nd ed.) [M]. Shanghai: Tongji University Press, 1999.* *4. Engineering Surveying Practical Training handbook and accompanying drawings.* *5. GB 50026-2020 Standard for Engineering Surveying [S].* *6. Manuals for total stations, RTK equipment, and digital mapping software.*

Mechanics of Materials Laboratory

Module designation	*Mechanics of Materials Laboratory*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*LI Xia ,YU Wen zheng.*
Language	*Chinese*
Relation to curriculum	*Professional education practice*
Teaching methods	*Experiments, discussions, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 28hours* *Contact hours: 16* *Self-study hours: 12*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Mechanics of Materials*
Module objectives/intended learning outcomes	*1. Experimental testing ability: Master the electrical measurement principle of strain measurement; master the application of DH3818Y static strain tester and DHMMT multi-functional mechanics test bench; master the characteristic design of different bridge circuits and strain detection methods; master the operation methods of the four basic experiments.* *2. Data analysis ability: Correctly analyze and process experimental data; obtain the strain distribution laws of rods at different positions in the four basic experiments; verify stress calculation formulas; explain the causes of errors between experimental data and theoretical data; draw valid conclusions and apply them to engineering practice.* *3. Teamwork ability: Possess organizational, communication, coordination and teamwork skills; completed experiments collaboratively with team members.*
Content	*1.Equal strength beam experiment (weight:0.25,requirement level: mastery)* *2.Experiment on normal stress distribution in pure bending (weight: 0.25, requirement level: mastery)* *3. Experiment on deformation and stress measurement of beam under combined bending and torsion (weight:0.25,requirement level: mastery)* *4.Eccentric tension experiment (weight:0.25,requirementlevel: mastery)*
Examination forms	*Learning attitude, experimental Operation, teamwork/group cooperation, data Recording, data Processing*
Study and examination requirements	*1.The course adopts a 100-point grading system. A score of 60 or above is considered passing, and students who pass will earn the credits for this course.*

	2.Final course grade = formative assessment × 40% + summative assessment × 60%. *3.Formative assessment accounts for 60%, includingtudy attitude10%,* *Experimental Operation20%,group cooperation10%,* *Data Recording20%* *4.Summative assessment accounts for 40%, the assessment method is data processing.* *5.All components of formative assessment and the* *summative assessment are graded on a 100-point scale.*
Reading list	*1.She Bing. Concise Course of Mechanics of Materials Experiments [M]. Nanjing University Press, 2016.* *2.Liu Hong wen. Lv Rong kun. Experiments in Mechanics of Materials (4th ed.) [M]. Higher Education Press, 2017.* *3.Dong Ji lei. Mechanics of Materials Experiments [M]. University of Science and Technology of China Press, 2019.* *4.Su Fei,Shi Xin hong ,Zhang Min,Mechanics of Materials Experiments [M]. Beihang University Press, 2021.* *5.Gao fang qing,Liu Juan,Basic Experiments and Guidance for Mechanics of Materials [M]. China Machine Press, 2021.* *6.Qian Li juan,Zhang Ji cheng. Experimental Guide for Mechanics of Materials (2nd ed.) [M]. China Water & Power Press, 2021.*

Soil Mechanics Laboratory

Module designation	*Soil Mechanics Laboratory*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*FENG Guojian, LI Chenchen*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Lecture, discussion, self-study, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 28 hours* *Contact hours: 16* *Self-study hours: 12*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Advanced Mathematics ,Mechanics of Materials*
Module objectives/intended learning outcomes	*1. Knowledge: Understand the principles, specifications and safety requirements of common soil mechanics tests, including water content, density, liquid-plastic limit, consolidation and direct shear tests, and become familiar with the functions and applicable scope of the main instruments.* *2. Abilities: Operate laboratory equipment according to standard procedures, complete specimen preparation, data collection and test records, and use tools such as Excel or Origin to process data, draw curves and interpret experimental results with soil mechanics theory.* *3. Qualities: Develop careful experimental habits, accurate record keeping, safety awareness, responsibility and teamwork spirit, and form a rigorous attitude toward engineering testing and data reliability.*
Content	*1.Basic properties of soil experiment (weight: 0.15, requirement level: mastery + application)* *2.Liquid limit and plastic Limit experiment (weight: 0.15, requirement level: mastery + application)* *3.Consolidation experiment (weight: 0.35, requirement level: mastery + familiarity + application)* *4.Direct shear experiment (weight: 0.35, requirement level: mastery + familiarity + application)*
Examination forms	*experimental attitude, discussion, familiarity with laboratory instruments, operation of laboratory instruments, experimental summary, laboratory report*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.*

	2. Course score = formative assessment score × 40% + summative assessment score × 60%. *3. Formative assessment accounts for 40%,including experimental Attitude 5%, discussion 5%, familiarity with laboratory instruments 10%, operation of laboratory instruments 10%, and experimental summary 10%.* *4. Summative assessment accounts for 60%, and the assessment method is laboratory report.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. SHU Zhile, LIU Baoxian. Soil Mechanics (2nd ed.)[M]. Chongqing: Chongqing University Press, 2023.* *2. Southeast University, Zhejiang University, Hunan University, Soochow University. Soil Mechanics (4th ed.)[M]. Beijing: China Architecture & Building Press, 2016.* *3. ZHAO Chenggang, BAI Bing. Principles of Soil Mechanics (2nd ed.)[M]. Beijing: Tsinghua University Press & Beijing Jiaotong University Press, 2017.* *4. LIAO Hongjian, LI Rongjian, Liu Enlong. Soil Mechanics (3rd ed.)[M]. Beijing: Higher Education Press, 2018.* *5. LI Guangxin. Informal Discussion on Soil Mechanics[M]. Beijing: People's Communications Publishing Co., Ltd., 2019.* *6. Compiling Group of "Soil Mechanics" Textbook of Hohai University. Soil Mechanics (3rd ed.)[M]. Beijing: Higher Education Press, 2019.* *7. SU Dong. Soil Mechanics (2nd ed.)[M]. Beijing: Tsinghua University Press, 2019.* *8. SHEN Yang. Ten Records of Principles of Soil Mechanics (2nd ed.)[M]. Beijing: China Architecture & Building Press, 2021.*

Fluid Mechanics Laboratory

Module designation	*Fluid Mechanics Laboratory*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*SUN Laite, HAN Zhang*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, guidance, practical project operation, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 28 hours* *Contact hours: 16* *Self-study hours: 12*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Advanced Mathematics B, Theoretical Mechanics, etc.*
Module objectives/intended learning outcomes	*1. Abilities: students are able to address complex problems in fluid mechanics experiments, complete experimental scheme design and determine the experimental management mode, present results in a standardized way through experimental data and reports, demonstrate the rationality of the experimental design, and reflect innovative awareness in experimental technical solutions.* *2. Skills: students are able to independently select and apply professional experimental software and information technology tools to conduct scheme analysis, data calculation and report sorting for complex problems in fluid mechanics experiments, and effectively solve practical experimental tasks.* *3. Competences: students are able to comprehensively consider the impacts of fluid mechanics experimental practices on the natural environment and social sustainable development, and correctly apply professional knowledge to scientifically and reasonably evaluate technical schemes for the design and implementation of fluid mechanics experimental projects.*
Content	*1. Comprehensive Experiment of Fluid Statics (Weight: 0.15, requirement level: mastery + comprehension + application)* *2. Comprehensive Experiment of Bernoulli's Equation for Steady Total Flow (Weight: 0.20, requirement level: mastery + comprehension + application)* *3. Pitot Tube Velocity Measurement and Correction Factor Calibration Experiment (Weight: 0.20, requirement level: mastery + vomprehension)* *4. Reynolds Experiment (Weight: 0.20, requirement level: mastery + comprehension + application)* *5. Comprehensive Venturi Experiment (Weight: 0.15, requirement level: mastery + comprehension + application)*

	6. Water Hammer Demonstration Experiment and Water Flow Demonstration Experiment (Weight: 0.10, requirement level: mastery + comprehension)
Examination forms	*Independent Learning, In-class Questioning, Group Discussion, Team Collaboration, Experimental Operation, Experimental Report*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including independent learning (3%), in-class questioning (3%), group discussion (9%), team collaboration (10%), experimental operation (15%).* *4. Summative assessment accounts for 60%, based on the experimental report submitted by students.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. SUN Yuxia, ZHU Yongmei, ZHANG Peng. Hydraulics Experiment[M]. Zhengzhou: Yellow River Water Conservancy Press, 2017.* *2. TAN Xianzhong. Fluid Mechanics Experiment Guide[M]. Nanjing: Southeast University Press, 2015.* *3. HE Hui, WANG Hua, CHEN Bo. Hydraulics Experiment Tutorial[M]. Zhengzhou: Yellow River Water Conservancy Press, 2012.* *4. YANG Zhonghua, LI Dan, LI Qiong. Hydraulics Experiment Guide[M]. Beijing: China Water & Power Press, 2019.* *5. TENG Guirong, WU Lirong. Fluid Mechanics Experiment Tutorial[M]. Beijing: China Coal Industry Press, 2019.* *etc.*

Building Architecture Course Design

Module designation	*Building Architecture Course Design*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*SU Xin*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Teaching is organized through a task-book-driven design process, concentrated design training, staged instructor guidance, code and reference consultation, drawing expression exercises, presentation, and revision.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Civil Engineering Drawing, Engineering Materials, and Building Construction.*
Module objectives/intended learning outcomes	*1. Knowledge objective: Students consolidate the basic knowledge of civil building design principles, building construction methods, plans, elevations, sections, and construction drawing expression learned in Building Construction, and understand the role of design task books, codes, and standard drawings in design practice.* *2. Ability objective: Students can complete scheme conception, plan organization, elevation and section design, main construction-detail expression, and architectural construction drawings for small and medium-sized civil buildings according to the task book, forming preliminary building design and drawing expression ability.* *3. Application objective: Students can consult and apply relevant standards and drawings such as unified civil building design standards, fire codes, barrier-free design requirements, stairs, doors, and windows to solve functional organization, dimensional control, circulation organization, and construction expression problems.* *4. Quality objective: Students develop professional habits of independent thinking, code awareness, engineering expression, drawing quality control, and staged design task management.*
Content	*1. Interpretation of design task book and reference consultation (weight: 0.15, requirement: comprehension + mastery): design tasks, site conditions, building scale, functional requirements, code provisions, and standard drawing references.* *2. Scheme conception and plan design (weight: 0.25, requirement: mastery + application): functional zoning, room combination, circulation organization, dimensional control, and preliminary scheme comparison.*

	3. Elevation, section, and vertical circulation design (weight: 0.20, requirement: application): building massing, elevation proportion, storey and clear height, stairs, and vertical spatial organization. *4. Architectural construction drawings and construction-detail expression (weight: 0.25, requirement: application + analysis): plans, elevations, sections, stair details, wall details, roofs, doors, windows, and other main construction details.* *5. Deliverable organization, drawing expression, presentation, and revision (weight: 0.15, requirement: analysis + evaluation): drawing layout, dimensions and annotations, material practices, design notes, presentation, and improvement according to feedback.*
Examination forms	*Process assessment, staged deliverable inspection, drawing quality evaluation, design notes and presentation, and final design deliverable assessment.*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. A recommended grading structure is 40% process assessment and 60% final deliverable assessment.* *3. Process assessment focuses on task understanding, data consultation, design attitude, staged deliverables, consultation and discussion, teamwork, and schedule control. It may include attendance and design attitude (10%), staged inspection (20%), and consultation, discussion, and revision implementation (10%).* *4. Final assessment is based mainly on design deliverables, drawings, calculations or explanatory documents, and presentation. It evaluates scheme rationality, code application, drawing quality, document completeness, and engineering expression ability.* *5. Students must complete the required deliverables independently, follow the design task book, codes, and drawing standards, and submit complete design documents on time.*
Reading list	*1. DONG Hairong and ZHAO Yongdong, Building Construction [M]. Beijing: China Architecture & Building Press.* *2. Editorial Committee, Architectural Design Data Collection (2nd ed.) [M]. Beijing: China Architecture & Building Press.* *3. GB 50352-2019 Unified Standard for Design of Civil Buildings [S].* *4. GB 50016-2014 Code for Fire Protection Design of Buildings (2018 edition) [S].* *5. Course design task book, design guide, and relevant standard drawing references.*

Foundation Engineering Course Design

Module designation	*Foundation Engineering Course Design*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*SUN Laite, LI Chenchen*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Lecture, guidance, practical project operation, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 28 hours* *Contact hours: 16* *Self-study hours: 12*
Credit points	*Chinese credits: 0.5; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Soil Mechanics, Principles of Reinforced Concrete Structure Design, Foundation Engineering, etc.*
Module objectives/intended learning outcomes	*1. Abilities: students are able to address design problems in foundation engineering, complete the full-process scheme design of shallow foundations and pile foundations, sort out the core design content accurately, express design ideas and key parameters in a standardized way with engineering design language, implement all design calculations of ground and foundation completely, and ensure the compliance and rationality of the design content.* *2. Skills: students are able to independently use diverse forms such as drawings, charts and words to express key information including foundation embedment depth, pile parameters and bearing platform dimensions accurately for the practical design tasks of shallow foundations and pile foundations, present design results in a standardized manner, and sort out the complete design context clearly.* *3. Competences: students are able to strictly follow the relevant design codes for building ground foundation and pile foundation, implement various structural requirements accurately, control the design quality of foundation engineering scientifically, and abide by the professional norms of engineering design with a rigorous and meticulous professional attitude.*
Content	*1. Shallow Foundation Design: In accordance with the design requirements specified in the course design assignment, combined with the professional theoretical knowledge of foundation engineering, students shall successively determine the foundation embedment depth, conduct revised calculation of ground bearing capacity, determine the foundation base dimensions and verify the bearing capacity, then carry out the design of foundation height and bottom slab reinforcement, draw the drawings by hand or with CAD, and submit the results in a standardized manner after inspection and revision. (Weight: 0.5, requirement level: mastery + comprehension + application)*

	2. Pile Foundation Design: In accordance with the design requirements specified in the course design assignment, combined with the professional theoretical knowledge of foundation engineering, students shall determine parameters such as pile type, section size and pile length, complete the calculation of vertical bearing capacity of single pile, determine the number and layout of piles and verify the bearing capacity of pile foundation, then carry out the design of bearing platform height and bottom slab reinforcement, draw the drawings by hand or with CAD, and submit the results in a standardized manner after inspection and revision. (Weight: 0.5, requirement level: mastery + comprehension + application)
Examination forms	*Preview, Seminar, Independent Learning, Design Attitude, Summary, Design Calculation Document*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including preview (5%), seminar (5%), independent learning (5%), design attitude (10%), summary (15%).* *4. Summative assessment accounts for 60%, based on the design outcomes submitted by students, including technical documents of construction schemes and slope stability analysis reports.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. ZHANG Lijuan. Foundation Engineering[M]. Beijing: Peking University Press, 2023.* *2. ZHOU Jingxing, LI Guangxin, ZHANG Jianhong, YU Shimin, WANG Hongjin. Foundation Engineering (3rd Edition)[M]. Beijing: Tsinghua University Press, 2015.* *3. ZHAO Minghua, XU Xueyan, ZOU Xinjun. Foundation Engineering (3rd Edition)[M]. Beijing: Higher Education Press, 2017.* *4. ZHANG Mingyi, SHI Wei, ZHANG Wei, LIU Junwei. Foundation Engineering[M]. Beijing: Science Press, 2017.* *5. South China University of Technology, Zhejiang University, Hunan University. Foundation Engineering (4th Edition)[M]. Beijing: China Architecture & Building Press, 2019.* *6. MA Xiaochun, WANG Guihe, ZHANG Bin. Foundation Engineering[M]. Beijing: Tsinghua University Press, 2020.* *7. JU Yuwen, ZENG Guohong, LIU Yanzhong, SHAO Li, YANG Jing, HE Bin, LI Lijun. Foundation Engineering[M]. Beijing: Tsinghua University Press, 2020.* *8. Professional Standard of the People's Republic of China. Code for Design of Building Foundation: GB 50007-2011[S]. Beijing: China Architecture & Building Press, 2011.*

Civil Engineering Construction Technology and Organization Course Design

Module designation	*Civil Engineering Construction Technology and Organization Course Design*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*FAN Zhen*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Teaching is organized through a course-design task book, concentrated design practice, case and reference consultation, staged instructor guidance, network-plan preparation, presentation, and revision.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Civil Engineering Construction Technology and Organization, Building Construction, and Engineering Project Management.*
Module objectives/intended learning outcomes	*1. Knowledge objective: Students understand the role of construction organization design as a technical-economic document and master the main contents of construction schemes, construction sequences, schedules, resource demand plans, construction site layouts, and technical and organizational measures.* *2. Ability objective: Students can prepare the main documents of a unit-project construction organization design according to the course-design task book, drawings, and given data, and can formulate construction schemes and schedules that meet specific project needs.* *3. Evaluation objective: Students can compare the rationality of different construction organization schemes and analyze the coordination among duration, resources, quality, safety, and site layout, forming preliminary engineering scheme evaluation ability.* *4. Quality objective: Students develop rigorous habits in engineering document preparation, reference consultation ability, technical-economic awareness, construction safety awareness, and responsibility for completing design tasks according to schedule.*
Content	*1. Course-design tasks and project data analysis (weight: 0.15, requirement: comprehension + mastery): interpretation of the task book, project overview, construction conditions, drawings, and deliverable requirements.* *2. Construction scheme and construction sequence design (weight: 0.25, requirement: mastery + application): selection of construction methods*

	for major subprojects, division of construction sections, construction workflow arrangement, and technical and organizational measures. *3. Construction schedule and network-plan preparation (weight: 0.25, requirement: application + analysis): estimation of quantities and labor, flow construction organization, bar chart or network plan preparation, critical path analysis, and duration coordination.* *4. Construction resource planning and site layout (weight: 0.20, requirement: application): labor, material, and equipment plans; temporary facilities; construction roads; material yards; vertical transportation; and temporary water and electricity layout.* *5. Design-document organization and deliverable expression (weight: 0.15, requirement: analysis + evaluation): construction organization design report, schedule drawings, site layout drawings, quality, safety and civilized construction measures, presentation, and revision.*
Examination forms	*Process assessment, staged design inspection, construction organization design report, construction schedule, site layout drawing, presentation, and final deliverable assessment.*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. A recommended grading structure is 40% process assessment and 60% final deliverable assessment.* *3. Process assessment focuses on task understanding, data consultation, design attitude, staged deliverables, consultation and discussion, teamwork, and schedule control. It may include attendance and design attitude (10%), staged inspection (20%), and consultation, discussion, and revision implementation (10%).* *4. Final assessment is based mainly on design deliverables, drawings, calculations or explanatory documents, and presentation. It evaluates scheme rationality, code application, drawing quality, document completeness, and engineering expression ability.* *5. Students must complete the required deliverables independently, follow the design task book, codes, and drawing standards, and submit complete design documents on time.*
Reading list	*1. YU Qunzhou et al., Construction Organization and Management of Building Engineering [M]. Beijing: Peking University Press.* *2. WANG Jian, Building Construction Organization and Management [M]. Harbin: Harbin Institute of Technology Press, 2023.* *3. Chongqing University, Tongji University, and Harbin Institute of Technology, Civil Engineering Construction (4th ed.) [M]. Beijing: China Architecture & Building Press, 2018.* *4. GB 50300-2013 Unified Standard for Constructional Quality Acceptance of Building Engineering [S].* *5. Course design task book, design guide, and related engineering drawings.*

Building Engineering Measurement and Valuation Course Design

Module designation	*Building Engineering Measurement and Valuation Course Design*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*Li ding*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, guidance, practical project operation, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Civil Engineering Drawing, Engineering Materials, Building Architecture, Civil Engineering Construction Technology and Organization, Engineering Economics, Building Engineering Measurement and Valuation, etc.*
Module objectives/intended learning outcomes	*1. Abilities: students are able to independently complete the preparation of Building Engineering pricing Achievements based on Building Engineering drawing design documents, and transform basic theories into practical achievements.* *2. Skills: students are able to independently complete the preparation work by using software such as drawing reading, engineering quantity calculation, and bills of quantities pricing.* *3. Competences: students are able to select appropriate construction schemes based on the information of drawing design, correctly apply regional, environmental, climatic, contractual conditions and market material price information, and comprehensively consider the impacts of project management and whole-process cost controlling factors.*
Content	*1. Preparation of the bill of quantities: based on design drawings, specifications for bill of quantities preparation, and engineering quantity calculation rules, students calculate quantities of works, select reasonable construction technology and organization schemes, and prepare complete bills of quantities for construction projects. (Weight: 0.5, requirement level: mastery + comprehension + application)* *2. Preparation of bill of quantities pricing documents: according to the bill requirements, market material prices, tax rates, altitude, construction period and contract management conditions, students prepare complete construction project pricing documents and write preparation notes. (Weight: 0.5, requirement level: mastery + comprehension + application)*
Examination forms	*Preview, seminar, in-class self-study, learning attitude, summary, achievements*

Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 50% + summative assessment score × 50%.* *3. Formative assessment accounts for 50%, including preview 10%, in-class practise+ questioning 20%, discussion + investigation +seminar 20%.* *4. Summative assessment accounts for 50%, based on the design outcomes submitted by students, including pricing documents of construction ,the completeness and reasonableness of the preparation instructions.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. 《Building Engineering Measurement and Valuation 》, ISBN 978-7-111-71979-3.China Machine Press,2024* *2. Industry Standard of the People's Republic of China: 《Notice of the Ministry of Housing and Urban-Rural Development and the Ministry of Finance on Issuing the Composition of Costs for Construction and Installation Projects》 (Jian Biao [2013] No.44), Ministry of Housing and Urban-Rural Development of the People's Republic of China, Ministry of Finance, 2013.* *3. Industry Standard of the People's Republic of China: 《Standard for Bills of Quantities and Valuation for Construction Works》 (GB/T 50500-2024). China Planning Press, 2024.* *4. Industry Standard of the People's Republic of China: 《Standard for Measurement of Building Construction and Fitting Out Works》 (GB/T 50854-2024). China Planning Press, 2024.* *5. Local Industry Standard of Yunnan Province: 《Yunnan Province construction croject cost valuation rules and quota of machine, instrument and meter shift costs (DBJ 53/T-58-2020). Yunnan Publishing Group Corporation, Yunnan Science and Technology Press, Department of Housing and Urban-Rural Development of Yunnan Province. 2021.* *6. Local Industry Standard of Yunnan Province:《Yunnan Province Construction Project Cost Valuation Standard (2020 Edition) (DBJ 53/T-60-2020)》. Yunnan Publishing Group Corporation, Yunnan Science and Technology Press, Department of Housing and Urban-Rural Development of Yunnan Province. 2021.* *7. Local Industry Standard of Yunnan Province:《Yunnan Province Construction Project Cost Valuation Standard (2020 Edition) (DBJ 53/T-61-2020)》. Yunnan Publishing Group Corporation, Yunnan Science and Technology Press, Department of Housing and Urban-Rural Development of Yunnan Province. 2021.*

Construction Drawing Interpretation

Module designation	*Construction Drawing Interpretation*
Semester(s) in which the module is taught	*Semester six*
Person responsible for the module	*Wei ping*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Drawing interpretation discussion, lecture and case analysis*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours:24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Architectural Building Construction*、*Principles of Concrete Structure Design*、*Concrete Structure Design*
Module objectives/intended learning outcomes	*1.Knowledge Objectives To understand the basic knowledge of reinforcing steel bars and the plane overall expression method for reinforced concrete structures; to master the plane method drawing rules and seismic detailing measures for frame columns, beams, slabs and isolated footings; to understand the plane method drawing rules and seismic detailing measures for shear walls and stairs, so as to acquire the ability to apply engineering laws, regulations, codes and standards in solving complex engineering problems.* *2.Ability Objectives To master the basic knowledge of plane method drawing rules and construction details for concrete structure construction drawings, further improve spatial imagination ability and spatial analysis ability in graphic expression and interpretation, cultivate the ability to read professional engineering drawings, develop a rigorous and earnest work attitude as well as a patient, meticulous and meticulous work style, and enhance students' professional quality as engineers. Thus, to understand and abide by the laws and regulations, professional codes, technical regulations and professional ethics for engineers related to civil engineering practice.* *3.Educational Objectives Through learning, to understand the basic knowledge of reinforcing steel bars and plane method, master the plane method drawing rules and seismic detailing measures for frame columns, beams, slabs and isolated footings; to understand the plane method drawing rules and seismic detailing measures for shear walls and stairs, improve spatial imagination and graphic analysis ability, cultivate the ability to apply professional codes and standards, so as to possess the ability to organize, manage and lead engineering projects.*
Content	*Basic Knowledge and Drawing Rules of the Plane-Overall Expression Method (Weight: 0.25, Required Level: Mastery + Familiarity + Application)*

	Standard Details of the Plane-Overall Expression Method (Weight: 0.25, Required Level: Mastery + Familiarity + Application) *Interpretation of Practical Engineering Construction Drawings (Weight: 0.5, Required Level: Mastery + Familiarity + Application)*
Examination forms	*Homework, class discussion, stage test, drawing reading report*
Study and examination requirements	*Process Assessment 50% = Homework 10% + Class Discussion 10% + Stage Tests 10% + Case Discussion 10% + Course Performance 10%* *Final Assessment 50% = Drawing Reading Report 50%* *This course uses a 100-point grading system. A score of 60 or above is a passing grade, upon which students will earn credits for the course.*
Reading list	*22G101-1 Drawing Rules and Construction Details of Plane-Overall Expression Method for Concrete Structure Construction Drawings*, China Planning Press, 2022 2.* *22G101-2 Drawing Rules and Construction Details of Plane-Overall Expression Method for Concrete Structure Construction Drawings*, China Planning Press, 2022 3.* *22G101-3 Drawing Rules and Construction Details of Plane-Overall Expression Method for Concrete Structure Construction Drawings*, China Planning Press, 2022* *You Xiaoming, Wang Jinneng. Plane Method Drawing Interpretation and Steel Bar Quantity Calculation*. Northwestern Polytechnical University Press, 2018* *Chen Dafei. Plane Method Drawing Interpretation and Steel Bar Calculation. China Architecture & Building Press, 2019* *Shangguan Zichang. Plane Method Steel Bar Drawing Interpretation Methods and Examples. Chemical Industry Press, 2020* *Compiled by Shen Pusheng, Liang Xingwen. Concrete Structure Design (6th Edition). Higher Education Press, 2025* *General Code for Concrete Structures GB 55008-2021*

Steel Structure Course Design

Module designation	*Steel Structure Course Design*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*Song Gaoli*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, guidance, practical project operation, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours:24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Principles of Steel Structure Design, Steel Structure Design, Loads and Structural Design Methods, etc.*
Module objectives/intended learning outcomes	*1.Abilities: Students can master the design contents, basic ideas and methods of angle steel trusses, cold-formed thin-walled C-section steel purlins, and single-span gabled frames; grasp the drawing contents and basic methods of steel structure construction drawings; and master the basic operation of structural design software.* *2. Skills: Students can independently select and apply professional design software and information technology tools to address complex engineering problems in steel structure design, complete scheme analysis, calculations and drawing preparation, and effectively solve practical design tasks.* *3. Competences:Students can become familiar with the technical standards, specifications, regulations, national policies, laws and regulations related to steel structure design, and improve their awareness of codes and professional ethics.*
Content	*1.Design of Angle Steel Truss (Weight: 0.4, Requirement Level: Mastery + Application)* *2.Design of Cold-Formed Thin-Walled C-Section Steel Purlin (Weight: 0.25, Requirement Level: Mastery + Application)* *3.Design of Single-Span Gabled Frame (Weight: 0.35, Requirement Level: Mastery + Application)*
Examination forms	*Self-directed learning, software operation, truss design, purlin design, gabled frame design*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 100%*

	3. Formative assessment accounts for 100%,including Self-directed learning 5%, software operation15%,truss design 30%,purlin design20%,gabled frame design30%. *4. All components of formative assessment are graded on a 100-point scale.*
Reading list	*1.Song Gaoli. Steel Structure Design (2nd ed.) [M]. Beijing: China Architecture & Building Press, 2025.* *2.Song Gaoli. Principles of Steel Structure Design [M]. Beijing: China Architecture & Building Press, 2019.* *3.National Standard of the People's Republic of China. Standard for Design of Steel Structures: GB 50017-2017 [S]. Beijing: China Architecture & Building Press, 2018.* *4.National Standard of the People's Republic of China. Technical Code for Steel Structures of light-weight building with gabled Frames : GB 51022-2015 [S]. Beijing: China Architecture & Building Press, 2015.* *5.National Standard of the People's Republic of China. Technical Standard for Cold-Formed Steel Structures: GB/T 50018-2025 [S]. Beijing: China Planning Press, 2025.* *6.National Standard of the People's Republic of China. General Code for Steel Structures: GB 55006-2021 [S]. Beijing: China Architecture & Building Press, 2021.* *7.Editorial Board of Steel Structure Design Handbook. Steel Structure Design Handbook (3rd ed.) [M]. Beijing: China Architecture & Building Press, 2009.* *8.Li Guoqiang, Wang Lei, Sun Feifei. Design of Light Steel Structures for Portal Frame Buildings [M]. Beijing: China Architecture & Building Press, 2023.* *etc.*

Concrete Structure Design Course Design

Module designation	*Concrete Structure Design Course Design*
Semester(s) in which the module is taught	*Semester six*
Person responsible for the module	*Wei ping*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Design discussions, online learning, and design instruction*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours:24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Principles of Concrete Structure Design* *Design of Concrete Structure* *Structural Mechanics*
Module objectives/intended learning outcomes	*1.Knowledge Objectives: Master the fundamental theories of concrete structure design: Students shall gain an in-depth understanding of the basic principles, calculation methods and detailing requirements for concrete structure design, including the basic mechanical properties of concrete structural materials, mechanical characteristics of members, internal force analysis and bearing capacity calculation methods. Understand various structural systems: Be familiar with different structural systems such as beam-slab structures, single-story industrial factory buildings, and multi-story frame structures, including their composition, classification, applications and structural analysis methods. Be familiar with relevant codes and standards: Master current national codes for concrete structure design, the Construction Law and other relevant laws and regulations to ensure that design results comply with regulatory requirements.* *2.Ability Objectives: Design and calculation ability: Students shall be able to apply theoretical knowledge to perform design calculations of concrete structures, including internal force analysis, section design and reinforcement calculation of members. They shall be able to select appropriate structural forms and section dimensions based on practical engineering conditions and conduct reasonable design. Construction drawing ability: Master the drafting methods of concrete structure construction drawings, including layout plans, reinforcement drawings and joint details. Be able to use modern tools (such as CAD software) to draw structural construction drawings accurately and standardly. Problem analysis and solving ability: Be able to analyze and model complex practical engineering problems and propose reasonable solutions using acquired knowledge. Consider the application of new processes, equipment, technologies and materials in design and put forward innovative design ideas.* *3.Educational Objectives Cultivate a rigorous scientific attitude: Through the course design process, foster students' rigorous, earnest*

	scientific attitude and work style to ensure the accuracy and reliability of design outcomes. Emphasize safety awareness and responsibility in structural design, so that students recognize the importance of structural design to engineering quality and safety. Improve engineering practical ability: Enhance students' engineering practice ability through hands-on operation and exercises, enabling them to apply theoretical knowledge to real engineering projects. Cultivate teamwork and communication skills for better collaboration in future work. Strengthen professional ethics and responsibility: Guide students to establish correct professional ethics and social responsibility, and strictly abide by national laws, regulations and industrial standards in design. Cultivate innovative awareness and exploratory spirit, encouraging continuous pursuit of technological progress and innovative development in future careers.
Content	*1. Design of Beam Stairs (Weight: 0.25, Proficiency Level: Mastery + Familiarity + Application)* *2.Design of Slab Stairs (Weight: 0.25, Proficiency Level: Mastery + Familiarity + Application)* *3.Design of One-Way Ribbed Slab Floor System (Weight: 0.5, Proficiency Level: Mastery + Familiarity + Application)*
Examination forms	*Design discussions, design calculation reports, and design drawings*
Study and examination requirements	*Continuous Assessment (50%) = Beam Stair Design (20%) + Slab Stair Design (15%) + Design Drawing and Calculation Skills (5%) + Design Discussion (5%) + Design Presentation (5%)* *Final Assessment (50%) = Design of One-Way Ribbed Slab Floor System* *This course uses a 100-point grading system. A score of 60 or above is a passing grade, upon which students will earn credits for the course.*
Reading list	*1.Shen Pusheng, Liang Xingwen (eds.). Concrete Structure Design (6th ed.). Higher Education Press, 2025.* *2.General Code for Concrete Structures GB 55008-2021* *3.Principles of Concrete Structure Design (6th ed.). Co-edited by Southeast University, Tongji University, Tianjin University. China Architecture & Building Press.* *4. Concrete Structure Design Handbook by Jack C. Brown* *5.Handbook of Concrete Engineering Structural Design by R. Dodge Woodson et al.* *6. Concrete Technology Manual by A. M. Neville et al.* *7.Design and Construction Technology of Concrete Structures by George Winter et al.*

BIM Software Learning

Module designation	*BIM Software Learning*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*SU Xin*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Teaching is organized through lectures, software demonstrations, case-based modeling, computer practice, project deliverable output, classroom consultation, and comprehensive assignments.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours:24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Civil Engineering Drawing, Engineering Drawing, CAD basics, and Building Construction.*
Module objectives/intended learning outcomes	*1. Knowledge objective: Students understand the basic concepts, data characteristics, collaborative design ideas, and life-cycle application value of BIM technology, and become familiar with the functional positioning, data standards, and workflows of mainstream BIM software.* *2. Skill objective: Students master the basic operation logic of BIM modeling software such as Revit and can create projects, set levels and grids, and model and edit basic elements such as walls, columns, beams, floors, roofs, doors, windows, and stairs.* *3. Application objective: Students can extract schedules from BIM models, add dimensions, create sheets, organize views, export deliverables, and preliminarily use models for visualization, clash understanding, and engineering information communication.* *4. Quality objective: Students develop awareness of digital construction, model information management, interdisciplinary collaboration, and continuous learning of new tools, standards, and workflows.*
Content	*1. Introduction to BIM technology and software environment (weight: 0.15, requirement: comprehension): BIM concepts, technical characteristics, data standards, application value, mainstream software systems, Revit interface, and project settings.* *2. Project creation, levels, grids, and basic modeling logic (weight: 0.15, requirement: mastery): project templates, levels, grids, view management, element types, families, types, and instances.* *3. Modeling of basic architectural and structural elements (weight: 0.30, requirement: mastery + application): creation, editing, and parameter setting of walls, columns, beams, foundations, floors, roofs, doors, windows, curtain walls, stairs, and railings.*

	4. Model information management and deliverable output (weight: 0.20, requirement: application): schedule creation, data extraction, dimensioning, view organization, sheet creation, drawing output, and export to common file formats. *5. Visualization and integrated case practice (weight: 0.20, requirement: application + analysis): material setting, rendering, walkthrough, model checking, integrated modeling case, and presentation of deliverables.*
Examination forms	*Computer practice, staged modeling deliverables, classroom consultation and operation checks, comprehensive modeling assignments, and evaluation of model deliverables and drawing outputs.*
Study and examination requirements	*1. The course uses a 100-point grading system, and 60 or above is required to pass.* *2. The final grade is composed of process assessment and final assessment; a recommended structure is 40% process assessment and 60% final assessment.* *3. Process assessment focuses on classroom participation, assignments, literature or data consultation, drawing expression, and case analysis. It may include attendance and classroom performance (10%), regular assignments (15%), and staged results or case discussion (15%).* *4. The final assessment may take the form of a written test, open-book assessment, course report, or comprehensive deliverable, depending on the course nature. It focuses on basic concepts, engineering methods, code application, and comprehensive analysis ability.* *5. Students are required to complete assignments and staged deliverables on time, work independently, and observe academic integrity and engineering professional ethics.*
Reading list	*1. BIM Technology and Application [M]. Relevant textbook.* *2. Textbooks or user manuals on Autodesk Revit architectural design basics and application.* *3. GB/T 51212-2016 Unified Standard for Building Information Modeling Application [S].* *4. GB/T 51301-2018 Standard for Design Delivery of Building Information Modeling [S].* *5. Course computer-practice guide, case model files, and supporting drawings.*

Application of Architectural Structure Design Software

Module designation	*Application of Architectural Structure Design Software*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*CHEN Xu*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, guidance, accompaniment practice, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 112 hours* *Contact hours: 64* *Self-study hours: 48*
Credit points	*Chinese credits: 2; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*Civil Engineering Drawing, Theory Mechanics, Material Mechanics, Structural Mechanics A, Principles of Concrete Structure Design, Concrete Structure Design, High-rise Building Structure Design, etc.*
Module objectives/intended learning outcomes	*1. Skills: Students master the operation and application of common design and analysis software for building structure engineering, and can correctly apply computer-aided design methods to conduct structural design of building structure engineering in practical projects.* *2. Abilities: Students can correctly apply common software for building structure engineering to conduct modelling and analysis, accurately judge the rationality of results, and further solve complex engineering problems related to roads and bridges.* *3. Competences: In the process of using computer-aided design and analysis methods to carry out building structure engineering design, analysis and solving practical engineering problems, students can correctly apply relevant specifications and standards.*
Content	*1. Be familiar with the software and master its functions, including software functions, operation interface, common tools and their usage, modelling skills, result viewing and judgment, etc. (Weight: 0.41, requirement level: mastery + familiarity)* *2. Case demonstration and practice with question and answer. Students follow the teacher to complete modelling and analysis of several engineering project cases using the software, and questions raised by students are answered during the process. (Weight: 0.31, Requirement level: mastery + familiarity + application)* *3. Independent case practice with question and answer. Assign engineering project case tasks for students to conduct independent and group practice, and questions raised by students are answered during the process. (Weight: 0.28, requirement level: proficient application)*
Examination forms	*Pre class preparation, classroom questioning, group discussion, attitude design, achievement report*

Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 40% + Summative Assessment Score × 60%.* *3. Formative assessment accounts for 40%, including pre class preparation10%, classroom questioning10%, group discussion10%, and attitude design 10%.* *4. Summative assessment accounts for 60%, based on the achievement report submitted by students.* *5. All components of formative assessment and the summative assessment adopt the percentage grading system.*
Reading list	*1. GB 55001-2021. General Code for Engineering Structures [S]. Beijing: China Architecture&Building Press, 2021.* *2. GB 55002-2021. General Code for Seismic Design of Buildings and Municipal Engineering [S]. Beijing: China Architecture&Building Press, 2021.* *3. GB 55008-2021. General Code for Concrete Structures [S]. Beijing: China Architecture&Building Press, 2021.* *4. GB 50010-2010. Code for Design of Concrete Structures [S]. Beijing: China Architecture&Building Press, 2010. (2015 edition)* *5. GB 50009-2012. Code for Load of Building Structures [S]. Beijing: China Architecture&Building Press, 2012.* *6. GB 50011-2010. Code for Seismic Design of Buildings [S]. Beijing: China Architecture&Building Press, 2010. (2016 edition)* *7. JGJ 3-2010. Technical Specification for Concrete Structures of Tall Buildings [S]. Beijing: China Architecture&Building Press, 2010.* *8. Beijing Yingjianke Software Co., Ltd. User Manual and Calculation Conditions for YJK-A Structural Calculation Software [M]. 2022.* *9. ZHUANG Wei, KUANG Yachuan. Yingjianke YJK software from beginner to improvement [M]. Beijing: China Architecture&Building Press, 2018.* *10. CHEN Dailin, GAO Hang. Detailed Explanation of Technical Conditions and Common Problems of Structural Software [M]. Beijing: China Architecture&Building Press, 2015.* *11. SHEN Pusheng. Principles of Concrete Structure Design 4th edition [M]. Higher Education Press, 2012.* *12. BAO Shihua, ZHANG Tongsheng. Design and calculation of high-rise building structures 2nd edition [M]. Tsinghua University Press, 2013.* *etc.*

Engineering Drawing

Module designation	*Engineering Drawing*
Semester(s) in which the module is taught	*Semester 3*
Person responsible for the module	*Wei ping*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Lecturing, enterprise platform learning, and CAD software application*
Workload (incl. contact hours, self-study hours)	*Total workload: 28 hours* *Contact hours: 16* *Self-study hours:12*
Credit points	*Chinese credits: 1; ECTS credits: 1*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering*、*Descriptive Geometry*、*Theoretical Mechanics*
Module objectives/intended learning outcomes	*1.Knowledge Objectives: To further become familiar with the graphic contents and methods of major drawings in various specialties, and consolidate the mastery of relevant standards and codes such as Unified Standard for Building Architectural Drawing and Architectural Drawing Standard; to develop the ability to accurately and effectively express complex engineering problems through drawings, charts, texts and other means.* *2.Ability Objectives: To understand the basic knowledge of CAD software for technical drawing, become familiar with the setup of the CAD drawing environment, and master the basic drawing, editing methods and skills of CAD software. To be familiar with the methods and applications of block operations, text annotation, dimensioning, hatching, plotting and output. To understand the methods and procedures of creating engineering drawings using CAD software, and be able to draw house construction drawings with Zhongwang Architectural CAD. Thus, to acquire the ability to rationally apply engineering software for modeling, analyzing and solving complex engineering problems.* *3.Educational Objectives: Through learning from the drawing of basic lines and points, the writing standards for each character, to the requirements for the drawing methods and contents of a complete professional drawing, students will recognize the importance of engineering-related laws, regulations and standards, cultivate a rigorous and meticulous work style, and develop professional ethics consistent with those of an engineer.*
Content	*Relevant provisions of standards and codes including Unified Standard for Building Architectural Drawing and Architectural Drawing Standard* *(Weight: 0.3, Required level: Mastery + Familiarity + Application)* *Application methods and skills of CAD software*

	(Weight: 0.5, Required level: Mastery + Familiarity + Application) *Application of drawing-related standards* *(Weight: 0.2, Required level: Mastery + Familiarity + Application)*
Examination forms	*Daily assignments, classroom questioning, software operation*
Study and examination requirements	*1.Process Assessment 50% = Daily Assignments 10% + Classroom Questioning 10% + Stage Tests 10% + Practical Operation Scores 10% + Training Attitude 10%* *2.Final Assessment 50% = On-site Final Examination 50%* *This course uses a 100-point grading system. A score of 60 or above is a passing grade, upon which students will earn credits for the course.*
Reading list	*1.Zhong wang CAD Educational Technology Platform, https://www.cadexam.com/soft/444.html* *2.Xu Guoyu. AutoCAD Training Course (4th Edition). Tsinghua University Press, 2017* *3.Lushan Culture. AutoCAD 2016 Basic Training Course. Posts & Telecom Press, 2021* *4.Cheng Xuqi, Wang Jianhua, Li Wei. AutoCAD 2020 Standard Course. Electronic Industry Press, 2019* *5.Yuan Chuanjie. Practical Skills of AutoCAD. China Railway Press, 2020* *6.Huang Xiaoyu. AutoCAD 2018 Architectural Design A Complete Guide. Electronic Industry Press, 2018* *7.Yin Yuan. AutoCAD 2016 The Complete Self-study Guide. Electronic Industry Press, 2016*

Familiarization Internship

Module designation	*Familiarization Internship*
Semester(s) in which the module is taught	*Semester 2*
Person responsible for the module	*CHEN Xu; WEI Ping*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, guidance, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, etc.*
Module objectives/intended learning outcomes	*1. Skills: Students master the structural systems, characteristics, and material applications of modern and ethnic historical buildings, industrial plants, and hydraulic structures. They will clarify the key structural forms such as foundations, walls, and roofs of different types of buildings, understand the seismic and durability design of modern and traditional residential buildings, as well as the key points of modern hydropower engineering design, and establish a basic cognitive system for all types of civil engineering buildings.* *2. Abilities: Students have the basic ability to identify different structural forms of buildings on site and analyze the structural stress characteristics. They can independently complete structural research records of traditional residential, industrial, and rural buildings, master the comparative analysis methods of the three types of buildings, and combine on-site research to complete internship reports, enhancing their comprehensive abilities in engineering site observation, structural analysis, and professional report writing.* *3. Competences: Establish professional ethics that respect traditional architectural culture and inherit the spirit of craftsmanship, cultivate a rigorous, pragmatic, and hardworking engineering style, enhance awareness and recognition of the diverse development of the civil engineering industry, cultivate practical awareness of teamwork and on-site research, strengthen safety regulations and engineering responsibility, and stimulate professional learning interest and industry mission.*
Content	*1. Familiar with the types of civil engineering structures, the composition of various structural components, force transmission pathways, understanding of seismic reduction and isolation technologies, as well as building materials, road and bridge materials. (Weight: 0.10, Requirement Level: Understanding+Familiarity)*

	2. Visit modern and ethnic historical architectural structures, as well as industrial factory building structures and hydraulic structures. (Weight: 0.70, Requirement Level: Familiar+Applied) *3. Requirements and Methods for Writing Internship Logs and Reports (Weight: 0.20, Requirement Level: Proficiency+Application)*
Examination forms	*Internship attitude and performance, group cooperation, logs, achievement report*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 50% + Summative Assessment Score × 50%.* *3. Internship attitude and performance20%, group cooperation10%, logs20%.* *4. Summative assessment accounts for 50%, based on the achievement report submitted by students.* *5. All components of formative assessment and the summative assessment adopt the percentage grading system.*
Reading list	*1. SU Qing. Civil Engineering Materials (4th edition) [M]. Wuhan: Wuhan University of Technology Press, 2020.* *2. ZHANG Jianrong. Architectural Structure Selection (Second Edition) [M]. Beijing: China Architecture&Building Press, 2019.* *3. WANG Hongchen. Application Examples of Building Seismic Reduction and Isolation Technology [M]. Beijing: China Architecture&Building Press, 2024.* *4. YE Zhiming. Introduction to Civil Engineering (Fifth Edition) [M]. Beijing: Higher Education Press, 2020.* *5. XU Zhanfa, TONG Lingmei. Introduction to Civil Engineering and Practical Training Guidance [M]. Beijing: People's Communications Press, 2007.* *etc.*

Production Internship

Module designation	*Production Internship*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*MAO Dejun, YU Wenzheng, FENG Guojian, and all other teachers majoring in Civil Engineering.*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Guidance, on-the-job training, task-driven approach, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 112 hours* *Contact hours: 64* *Self-study hours: 48*
Credit points	*Chinese credits: 2; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*All theoretical and practical courses in the undergraduate talent training program for Civil Engineering, excluding the graduation project and graduation internship.*
Module objectives/intended learning outcomes	*1. Competence 1: students can integrate theory with practice and apply knowledge to solve problems. They are familiar with new structures, new technologies, new materials and new processes adopted by the internship organization. They are capable of evaluating construction plans or solutions to complex problems while taking into account social, health, safety, legal, cultural and environmental factors.* *2. Competence 2: students can correctly understand the requirements of engineering laws, professional codes and technical regulations. They are familiar with the current organizational structure, quality assurance system and on-site safety management system of construction enterprises. They can abide by and apply these requirements in the production internship and uphold the code of ethics for engineers.* *3. Competence 3: during the production internship, students assist the internship organization in completing relevant work and achieving work objectives either as team leaders or team members. They possess the ability to cooperate with others and work independently, and are competent for the roles and responsibilities of team members.*
Content	*Students are required to undertake an internship at institutions closely related to Civil Engineering, including survey and design, construction, supervision, inspection, and cost consulting firms. They must complete one of the following internship tasks:* *1. Participate in professional technical work such as survey and design, feasibility study of engineering projects. (Weight: 0.20, requirement level: master + familiarize + understand + apply)* *2. Participate in professional technical work at construction sites, including surveying and setting-out, construction organization and management, quality control, engineering measurement, and data compilation. (Weight: 0.20, requirement level: master + familiarize + understand + apply)*

	3. Participate in relevant professional technical work for engineering project supervision. (Weight: 0.20, requirement level: master + familiarize + understand + apply) *4. Participate in the preparation of engineering budget and estimate. (Weight: 0.20, requirement level: master + familiarize + understand + apply)* *5. Other work related to the Civil Engineering discipline. (Weight: 0.20, requirement level: master + familiarize + understand + apply)* *Note: the internship tasks are normalized according to the module training objectives.*
Examination forms	*Internship attitude and performance, basic evaluation by internship organization, completion of internship logs, quality of internship report*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 60% + Summative Assessment Score × 40%.* *3. Formative assessment accounts for 60%, including: internship attitude and performance (20%), basic evaluation by internship organization (20%), and completion of internship logs (20%).* *4. Summative assessment accounts for 40%, based on the internship report submitted by students.* *5. All components of the formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. National Standard of the People's Republic of China. Code for Design of Concrete Structures: GB 50010-2010[S]. Beijing: China Architecture & Building Press, 2010.* *2. Professional Standard of the People's Republic of China. Technical Specification for Steel Structure of Tall Building: JGJ 99-2015[S]. Beijing: China Architecture & Building Press, 2015.* *3. National Standard of the People's Republic of China. Technical Code of Slipform Engineering: GB/T 50113-2019[S]. Beijing: China Architecture & Building Press, 2019.* *4. Recommended Professional Standard of the People's Republic of China. Technical Specifications for Construction of Highway Subgrades: JTG/T 3610-2019[S]. Beijing: China Communications Press, 2019.* *5. Professional Standard of the People's Republic of China. Technical Specifications for Construction of Highway Asphalt Pavements: JTG F40-2004[S]. Beijing: China Communications Press, 2004.* *6. Professional Standard of the People's Republic of China. Technical Standard of Highway Engineering: JTG B01-2014[S]. Beijing: China Communications Press, 2014.* *etc.* *Note: since the task content may vary for each student during the production Internship, the reading list shall be reasonably selected and determined according to the instructor's advice.*

Graduation Internship

Module designation	*Graduation Internship*
Semester(s) in which the module is taught	*Semester 8*
Person responsible for the module	*MAO Dejun, YU Wenzheng, FENG Guojian, and all other teachers majoring in Civil Engineering.*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Guidance, on-the-job training, task-driven approach, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 112 hours* *Contact hours: 64* *Self-study hours: 48*
Credit points	*Chinese credits: 2; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*All theoretical and practical courses in the undergraduate talent training program for Civil Engineering, excluding the graduation project.*
Module objectives/intended learning outcomes	*1. Competence 1: Students can correctly understand the requirements of relevant provisions such as engineering laws and regulations, professional codes and technical specifications. Under the guidance of technical personnel in enterprises (departments), they can be familiar with the work contents and requirements of civil engineering planning, survey, design, construction, testing, management and other aspects. They can abide by and apply these requirements in graduation practice and reflect the code of ethics for engineers.* *2. Competence 2: During graduation practice, students assist the practice organization in completing relevant work and achieving work objectives either as team leaders or team members. They possess the ability of teamwork and independent work, and can fulfill the roles and responsibilities of team members.* *3. Competence 3: Students can learn about the excellent qualities, job responsibilities and working procedures of technical personnel, and understand the general knowledge of design or on-site production organization and management. They are able to write practice logs and reports, and use engineering charts for effective communication. This helps cultivate students' professional responsibility, enhance their passion for the major, and further establish a correct outlook on labor and life.*
Content	*Students shall complete one of the following internship tasks in a civil-engineering-related organization:* *1. Construction site management: participate in schedule, quality and safety management, learn construction organization and key construction technologies, and assist in on-site supervision. (Weight: 1.0, requirement level: mastery + familiarity + understanding + application)*

	2. Engineering surveying: conduct topographic survey, setting-out and monitoring with total stations, levels and other instruments, organize data and prepare technical reports. (Weight: 1.0, requirement level: mastery + familiarity + understanding + application) *3. Design and drafting: prepare construction and structural drawings using CAD and assist engineers in structural design work. (Weight: 1.0, requirement level: mastery + familiarity + understanding + application)* *4. Project management: participate in schedule tracking, budgeting, cost control and quality inspection. (Weight: 1.0, requirement level: mastery + familiarity + understanding + application)* *5. Material testing: participate in concrete, reinforcement and other material tests, process data and prepare reports. (Weight: 1.0, requirement level: mastery + familiarity + understanding + application)* *6. Structural inspection and evaluation: learn to detect cracks, deformation and other defects, participate in safety evaluation and propose reinforcement suggestions. (Weight: 1.0, requirement level: mastery + familiarity + understanding + application)* *7. Engineering supervision: assist supervising engineers in on-site supervision and organize logs, reports and related documents. (Weight: 1.0, requirement level: mastery + familiarity + understanding + application)*
Examination forms	*Internship attitude and performance, basic evaluation by internship organization, completion of internship logs, quality of internship report*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 60% + Summative Assessment Score × 40%.* *3. Formative assessment accounts for 60%, including: internship attitude and performance (20%), basic evaluation by internship organization (20%), and completion of internship logs (20%).* *4. Summative assessment accounts for 40%, based on the internship report submitted by students.* *5. All components of the formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. National Standard of the People's Republic of China. Code for Design of Concrete Structures: GB 50010-2010[S]. Beijing: China Architecture & Building Press, 2010.* *2. Professional Standard of the People's Republic of China. Technical Specification for Steel Structure of Tall Building: JGJ 99-2015[S]. Beijing: China Architecture & Building Press, 2015.* *3. National Standard of the People's Republic of China. Technical Code of Slipform Engineering: GB/T 50113-2019[S]. Beijing: China Architecture & Building Press, 2019.*

Graduation Project (Thesis)

Module designation	*Graduation Project (Thesis)*
Semester(s) in which the module is taught	*Semester 8*
Person responsible for the module	*MAO Dejun, YU Wenzheng, FENG Guojian, and all other teachers majoring in Civil Engineering.*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Guidance, discussion, task-driven approach, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 392 hours* *Contact hours: 224* *Self-study hours: 168*
Credit points	*Chinese credits: 7; ECTS credits: 14*
Required and recommended prerequisites for joining the module	*All theoretical and practical courses in the undergraduate talent training program for Civil Engineering except this course.*
Module objectives/intended learning outcomes	*1. Competence 1: students can apply the knowledge of mathematics and natural sciences they have mastered to the modelling and analysis of civil engineering projects and single buildings.* *2. Competence 2: aiming at engineering problems in civil engineering such as reinforced concrete structures, steel structures, slope support, bridge design, highways, construction organization, bidding and tendering, and budget estimation, students can proficiently use computer-aided design software such as CAD, PKPM, and Midas to carry out design and drawing, and have the awareness of working with professional software.* *3. Competence 3: students can be familiar with laws, regulations, public policies, codes and standards related to the construction, operation and management of civil engineering, and understand quality management systems, health, safety and environmental management systems related to civil engineering.* *4. Competence 4: students can effectively communicate and express their own opinions with others by writing reports, summaries, graduation projects, making speeches, presentations, defending and other means.*
Content	*Students of this major are mainly required to complete a graduation project.* *The types of graduation project can be diverse, as long as they are related to civil engineering, such as structural design of buildings, bridge design, road design, steel structure design, tunnel design, etc. The specific design field is closely related to the professional background of the supervisor.* *Taking building structural design as an example, the contents of the graduation project are specified in detail as follows:*

	According to the task assignment issued by the supervisor, students conduct literature research on the selected topic, write a proposal report, and clarify the engineering background, design basis and technical route. *They carry out architectural scheme design to determine the plan, elevation, section and functional layout; complete structural type selection, load calculation, internal force analysis, as well as member design and checking.* *By using professional software for modeling and calculation, students draw a certain number of architectural and structural construction drawings, and compile a structural calculation specification, which may include construction organization design or engineering cost analysis.* *Finally, students organize all achievements in accordance with specifications, participate in the defense and submit a complete set of graduation project materials.* *(Weight: 1.0, requirement level: master + familiarize + understand + apply)*
Examination forms	*Supervisor evaluation, reviewer evaluation, graduation project defense*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 70% + Summative Assessment Score × 30%.* *3. Formative assessment accounts for 70%, including: supervisor evaluation (40%) and reviewer evaluation (30%).* *4. Summative assessment accounts for 30%, the assessment basis is the score of the defence expert of the students' graduation design defence.* *5. All components of the formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. National Standard of the People's Republic of China. Code for Design of Concrete Structures: GB 50010-2010[S]. Beijing: China Architecture & Building Press, 2010.* *2. Professional Standard of the People's Republic of China. Technical Specification for Steel Structure of Tall Building: JGJ 99-2015[S]. Beijing: China Architecture & Building Press, 2015.* *3. Industry Standard of the People's Republic of China. Technical Standard of Highway Engineering: JTG B01-2014 [S]. Beijing: China Communications Press, 2014.* *4. Industry Standard of the People's Republic of China. Design Specifications for Highway Alignment: JTG D20-2017 [S]. Beijing: China Communications Press, 2017.* *5. Industry Standard of the People's Republic of China. Code for Design of Urban Road Engineering: CJJ 37-2012 [S]. Beijing: China Architecture & Building Press, 2012.* *6. Industry Standard of the People's Republic of China. Specifications for Design of Highway Subgrades: JTG D30-2015 [S]. Beijing: China Communications Press, 2015.* *7. Industry Standard of the People's Republic of China. General Specifications for Design of Highway Bridges and Culverts: JTG D60-2015 [S]. Beijing: China Communications Press, 2015.*

Road Survey Course Design

Module designation	*Road Survey Course Design*
Semester(s) in which the module is taught	*Semester 4*
Person responsible for the module	*MAO Dejun, WANG Panpan*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, guidance, practical project operation, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Civil Engineering Drawing, Engineering Surveying, Road Survey and Design, etc.*
Module objectives/intended learning outcomes	*1. Skills: students are able to use modern tools and resources to complete road alignment selection and design at various stages for complex problems in road survey and design.* *2. Competence 1: students can proficiently conduct the design and calculation of road horizontal, vertical and cross-sectional elements, draw design drawings correctly and normatively, and calculate the earthwork volume of road engineering.* *3. Competence 2: students can analyze and evaluate the impacts of practical activities on the natural environment and social sustainable development in road survey and design, and systematically assess the compatibility of project implementation with environmental and social sustainable development.* *4. Competence 3: students can correctly prepare calculation documents for road survey and design.*
Content	*Under the guidance of the course instructor, students shall independently carry out the route design of a section of road based on the given topographic data and design standards in the assignment. This includes the design, calculation and analysis of the road's horizontal alignment, vertical profile and cross-section, as well as the preparation of the design and calculation specification and the drawing of design drawings. (Weight: 1.0, requirement level: master + familiarize + understand + apply)*
Examination forms	*Preview, in-class questioning, self-study, investigation, classroom discussion, design outcomes*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.*

	2. Course score = formative assessment score × 50% + summative assessment score × 50%. *3. Formative assessment accounts for 50%, including preview 10%, questioning 10%, self-study 10%, investigation 10%, classroom discussion 10%.* *4. Summative assessment accounts for 50%, based on the design outcomes submitted by students, including design specifications and design drawings.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Professional Standard of the People's Republic of China. Technical Standard of Highway Engineering: JTG B01-2014[S]. Beijing: China Communications Press, 2014.* *2. Professional Standard of the People's Republic of China. Design Specification for Highway Alignment: JTG D20-2017[S]. Beijing: China Communications Press, 2017.* *3. Professional Standard of the People's Republic of China. Code for Design of Urban Road Engineering: CJJ 37-2012[S]. Beijing: China Architecture & Building Press, 2012.* *4. ZHANG Chi, PAN Binghong, YANG Hongzhi. Road Survey and Design (6th Edition) [M]. Beijing: China Communications Press, 2023.* *5. ZHU Feng, DONG Jifu. Road Survey and Design[M]. Beijing: China Communications Press, 2021.* *6. LIN Yu, TAO Mingxia. Road Survey and Design[M]. Wuhan: Wuhan University Press, 2013.* *etc.*

Roadbed and Pavement Engineering Course Design

Module designation	*Roadbed and Pavement Engineering Course Design*
Semester(s) in which the module is taught	*Semester 5*
Person responsible for the module	*MAO Dejun, WANG Panpan*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, guidance, practical project operation, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Civil Engineering Drawing, Soil Mechanics, Road Survey and Design, Subgrade and Pavement Engineering, etc.*
Module objectives/intended learning outcomes	*1. Abilities: students are able to address complex problems in road engineering, complete subgrade and pavement scheme design and determine the management mode, present results in a standardized way through drawings and calculation reports, demonstrate the rationality of the design, and reflect innovative awareness in technical solutions.* *2. Skills: students are able to independently select and apply professional design software and information technology tools to conduct scheme analysis, calculation and drawing for complex problems in subgrade and pavement design, and effectively solve practical design tasks.* *3. Competences: students are able to comprehensively consider the impacts of road engineering practices on the natural environment and social sustainable development, and correctly apply professional knowledge to scientifically and reasonably evaluate technical schemes for the design and construction of subgrade and pavement engineering projects.*
Content	*1. Preparation of highway engineering construction scheme, students shall complete the design and preparation of the construction scheme for the engineering project case and form the technical document of the construction scheme, based on the project case materials and requirements given in the assignment, combined with the professional knowledge learned in the Subgrade and Pavement Engineering theory course, and by consulting relevant literature. (Weight: 0.5, requirement level: mastery + comprehension + application)* *2. Stability analysis of subgrade slope, Students shall first learn and master the operation method of the designated slope stability analysis software, then complete the stability analysis of the given slope and form the analysis report, according to the slope materials provided in the assignment. (Weight: 0.5, requirement level: mastery + application)*

Examination forms	*Preview, seminar, in-class self-study, learning attitude, summary, design outcomes*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course score = formative assessment score × 44% + summative assessment score × 56%.* *3. Formative assessment accounts for 44%, including preview 10%, seminar 10%, in-class self-study 12%, learning attitude 6%, summary 6%.* *4. Summative assessment accounts for 56%, based on the design outcomes submitted by students, including technical documents of construction schemes and slope stability analysis reports.* *5. All components of formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. HUANG Xiaoming. Subgrade and Pavement Engineering[M]. Beijing: China Communications Press, 2025.* *2. Industry Standard of the People's Republic of China. Specifications for Design of Highway Subgrades: JTG D30-2015[S]. Beijing: China Communications Press, 2015.* *3. Recommended Industry Standard of the People's Republic of China. Technical Specifications for Construction of Highway Subgrades: JTG/T 3610-2019[S]. Beijing: China Communications Press, 2019.* *4. Industry Standard of the People's Republic of China. Specifications for Design of Highway Asphalt Pavement: JTG D50-2017[S]. Beijing: China Communications Press Co., Ltd., 2017.* *5. Industry Standard of the People's Republic of China. Technical Specifications for Construction of Highway Asphalt Pavements: JTG F40-2004[S]. Beijing: China Communications Press, 2004.* *6. Industry Standard of the People's Republic of China. Specifications for Design of Highway Cement Concrete Pavement: JTG D40-2011[S]. Beijing: China Communications Press, 2011.* *7. Recommended Industry Standard of the People's Republic of China. Technical Guidelines for Construction of Highway Cement Concrete Pavements: JTG/T F30-2014[S]. Beijing: China Communications Press, 2014.* *8. Recommended Industry Standard of the People's Republic of China. Technical Guidelines for Construction of Highway Roadbases: JTG/T F20-2015[S]. Beijing: China Communications Press, 2015.* *etc.*

Highway Engineering Measurement and Valuation Course Design

Module designation	*Highway Engineering Measurement and Valuation Course Design*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*CHEN Xu*
Language	*Chinese*
Relation to curriculum	*Professional Education Practice*
Teaching methods	*Lecture, guidance, accompaniment practice, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Introduction to Civil Engineering, Civil Engineering Drawing, Engineering Material, etc.*
Module objectives/intended learning outcomes	*1. Skills: Students should master the operational skills and usage methods of commonly used design and analysis software for highway engineering measurement and pricing, and be able to correctly apply computer-aided design methods to carry out highway engineering cost preparation work in practical engineering.* *2. Abilities: Students can correctly apply commonly used software for highway engineering measurement and pricing to model and analyze, and accurately judge the rationality of the results, thereby solving complex engineering problems related to highway engineering cost.* *3. Competences: Students are able to correctly apply relevant standards and quotas in the process of using computer-aided calculation and analysis methods to carry out highway engineering cost compilation, analysis, and solve practical engineering problems.*
Content	*1. Become familiar with highway engineering measurement and valuation software and master its functions, including the operation interface, common tools, quantity takeoff and valuation skills, and result checking. (Weight: 0.41, requirement level: mastery + familiarity)* *2. Case demonstration, practice and Q&A: students follow the instructor to complete quantity calculation, quota application and valuation analysis for several highway engineering cases using the software. (Weight: 0.31, requirement level: mastery + familiarity + application)* *3. Independent case practice and Q&A: students independently or in groups complete valuation documents, result checking and report preparation for assigned highway engineering cases. (Weight: 0.28, requirement level: proficiency + application)*

Examination forms	*Pre class preparation, classroom questioning, group discussion, attitude design, achievement report*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 40% + Summative Assessment Score × 60%.* *3. Formative assessment accounts for 40%, including pre class preparation10%, classroom questioning10%, group discussion10%, and attitude design 10%.* *4. Summative assessment accounts for 60%, based on the achievement report submitted by students.* *5. All components of formative assessment and the summative assessment adopt the percentage grading system.*
Reading list	*1. Chen Xu and Zhang Shengping, Measurement and Valuation of Highway Engineering, Central South University Press, 2024.* *2. Luo Xingchun and Li Ning, Highway Engineering Budgeting and Measurement Pricing, China Communications Press, 2020.* *3. Guo Jian, Budget Estimate of Highway Bridge Engineering, China Communications Press, 2020.* *4. Hao Wei, Highway Engineering Budgeting and Bill of Quantities Pricing, China Architecture & Building Press, 2019.* *5. Pu Cuihong and Lai Yingliang, Highway Engineering Measurement and Valuation, Southwest Jiaotong University Press, 2017.* *6. Ministry of Transport, Highway Engineering Budget Quota (JTG/T 3832-2018), China Communications Press, 2019.* *7. Ministry of Transport, Preparation Method for Budgetary Estimate and Budget of Highway Construction Projects (JTG 3830-2018), China Communications Press, 2019.* *8. Ministry of Transport, Machinery Shift Cost Quota for Highway Engineering (JTG/T 3833-2018), China Communications Press, 2019.* *9. Ministry of Transport, Standard Construction Bidding Documents for Highway Engineering (2018 edition), China Communications Press, 2018.* *10. Yunnan Provincial Department of Transport, Supplementary Provisions on Estimation, Budgetary Estimate and Budget Preparation for Highway Construction Projects in Yunnan Province, 2019.*

Construction Drawing Interpretation

Module designation	*Construction Drawing Interpretation*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*MAO Dejun*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, discussion, guidance, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Civil Engineering Drawing, Road Survey and Design, Subgrade and Pavement Engineering, Tunnel Engineering, Bridge Engineering, etc.*
Module objectives/intended learning outcomes	*1. Abilities: students can accurately grasp their roles in a multidisciplinary team, fulfil their duties, take the initiative to cooperate with other members in work, and improve teamwork ability.* *2. Competences: students are familiar with the technical standards, specifications, intellectual property rights, industrial policies, laws and regulations related to civil engineering. They can understand the social responsibilities of engineers in engineering practice, abide by professional ethics and norms, and fulfil their obligations.*
Content	*1. Reading and understanding the main contents and key information of bridge construction drawings, including design specifications, bill of quantities of main engineering materials, bridge site plan, general layout of bridge structure, standard cross-section of superstructure, general reinforcement details of superstructure, construction flow chart, general layout of main pier, general layout of abutment, etc. Discussions and questioning are integrated in the process. (Weight: 0.35, requirement level: familiarity + understanding)* *2. Reading and understanding the main contents and key information of tunnel construction drawings, including design specifications, bill of quantities, tunnel (geological) plan, tunnel (geological) longitudinal section, tunnel superelevation diagram, clearance and inner contour diagram of tunnel (cross adit), tunnel portal design drawing, support structure diagram of tunnel (cross adit), etc. Discussions and questioning are integrated in the process. (Weight: 0.35, requirement level: familiarity + understanding)* *3. Reading and understanding the main contents and key information of road construction drawings, including design specifications, horizontal alignment drawing, vertical profile drawing, subgrade design table, side ditch (drainage ditch) design table, standard cross-section of subgrade, general subgrade design drawing, subgrade cross-section drawing, superelevation diagram, median strip design drawing,*

	calculation table of subgrade earthwork quantities, etc. Discussions and questioning are integrated in the process. (Weight: 0.30, requirement level: familiarity + understanding)
Examination forms	*Preview, In-class questioning, self-study, investigation, seminar, achievement report*
Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 50% + Summative Assessment Score × 50%.* *3. Formative assessment accounts for 50%, including preview 10%, classroom questioning 10%, self-study 10%, investigation 10%, and seminar 10%.* *4. Summative assessment accounts for 50%, based on the students' submitted report on drawing reading and drafting achievements.* *5. All components of the formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. Industry Standard of the People's Republic of China. Technical Standard of Highway Engineering: JTG B01-2014 [S]. Beijing: China Communications Press, 2014.* *2. Industry Standard of the People's Republic of China. Design Specifications for Highway Alignment: JTG D20-2017 [S]. Beijing: China Communications Press, 2017.* *3. Industry Standard of the People's Republic of China. Code for Design of Urban Road Engineering: CJJ 37-2012 [S]. Beijing: China Architecture & Building Press, 2012.* *4. Industry Standard of the People's Republic of China. Specifications for Design of Highway Subgrades: JTG D30-2015 [S]. Beijing: China Communications Press, 2015.* *5. Industry Standard of the People's Republic of China. General Specifications for Design of Highway Bridges and Culverts: JTG D60-2015 [S]. Beijing: China Communications Press, 2015.* *6. Industry Standard of the People's Republic of China. Specifications for Design of Highway Asphalt Pavement: JTG D50-2017 [S]. Beijing: China Communications Press, 2017.* *7. Industry Standard of the People's Republic of China. Specifications for Design of Highway Tunnels Section I Civil Engineering: JTG 3370.1-2018 [S]. Beijing: China Communications Press, 2018.* *8. Industry Standard of the People's Republic of China. Specifications for Design of Highway Reinforced Concrete and Prestressed Concrete Bridges and Culverts: JTG 3362-2018 [S]. Beijing: China Communications Press, 2018.*

Bridge Engineering Course Design

Module designation	*Bridge Engineering Course Design*
Semester(s) in which the module is taught	*Semester 6*
Person responsible for the module	*WANG Chunhua, WANG Panpan*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, guidance, practical project operation, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 56 hours* *Contact hours: 32* *Self-study hours: 24*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Civil engineering drawings, structural mechanics, material mechanics, bridge engineering, etc.*
Module objectives/intended learning outcomes	*1. Ability: Master the upper structure requirements and internal force calculation methods of commonly used bridges, and have the ability to comprehensively analyze bridge engineering problems using drawings, charts, text, etc.* *2. Skills: Students are able to consult specifications, standard atlases, and literature materials to design and analyze commonly used bridges, cultivating their comprehensive design and application abilities.* *3. Quality: When students are able to comprehensively apply professional knowledge to practical teaching, they can naturally achieve the effect of ideological and political education, while also possessing social and professional responsibilities.*
Content	*1. Internal force calculation and analysis of prefabricated prestressed concrete simply supported T-shaped beam bridge* *Based on the basic parameters of the bridge given in the task book (standard span of 30m, deck clearance, load level, material bulk density, etc.), combined with the professional knowledge learned in the bridge engineering theory course, students complete the internal force calculation of the bridge deck (cantilever slab, one-way slab), main beam internal force calculation (using the "modified rigid transverse beam method" to calculate the lateral distribution coefficient of the mid span load, using the "lever method" to calculate the lateral distribution coefficient of the fulcrum load, calculate the mid span bending moment, fulcrum and mid span shear force, and perform internal force combination), cross beam internal force calculation (using the "rigid transverse beam method"), main beam deflection and pre arch calculation, and form a complete internal force calculation and analysis report.* *(Weight: 0.5, Requirement Level: Mastery+Understanding+Application)*

	2. Design and drawing of prefabricated prestressed concrete simply supported T-shaped beam bridge structure *Based on the calculation results of internal forces and in accordance with current standards such as the "Design Specification for Highway Reinforced Concrete and Prestressed Concrete Bridges and Culverts" (JTG 3362-2018), students complete the estimation and layout of prestressed steel tendons, ordinary steel bar configuration, section strength verification, crack resistance verification, deformation verification, and other structural design contents, and draw A3 drawings: overall layout of the bridge (plan, vertical, and horizontal views), upper structure structure diagram (vertical and horizontal views), and general structure diagram of the main beam, forming structural design calculation sheets and design documents.* *(Weight: 0.5, Requirement Level: Mastery+Application)*
Examination forms	*Self directed learning, classroom questioning, group discussion, design attitude, summary, design results*
Study and examination requirements	*1. The grades of this course are based on a percentage system, and students who score 60 or above are considered qualified to receive credits for this course.* *2. Course score=Process assessment score x 40%+Final assessment score x 60%.* *3. The process assessment score accounts for 40%, including 5% for self-directed learning, 5% for classroom questioning, 10% for group discussion, 10% for design attitude, and 10% for summary.* *4. The final assessment accounts for 60%, and the assessment is based on the design results submitted by students, including design calculation sheets and design documents.* *5. The various components of the process assessment and the final assessment are both based on a percentage system.*
Reading list	*1. Chen Baochun Bridge Engineering (4th Edition) [M]. Beijing: People's Communications Press Co., Ltd., 2022.* *2. Industry standards of the People's Republic of China JTG B01-2014 Technical Standard for Highway Engineering [S]. Beijing: People's Communications Press Co., Ltd., 2014.* *3. Industry standards of the People's Republic of China JTG D60-2015 General Specification for Design of Highway Bridges and Culverts [S]. Beijing: People's Communications Press Co., Ltd., 2015.* *4. Industry Recommended Standards of the People's Republic of China JTG/T F50-2011 Technical Specification for Construction of Highway Bridges and Culverts [S]. Beijing: People's Communications Press, 2011.* *5. Industry standards of the People's Republic of China JTG 3362-2018 Design Specification for Highway Reinforced Concrete and Prestressed Concrete Bridges and Culverts [S]. Beijing: People's Communications Press Co., Ltd., 2018.* *6. Yao Lingsen Bridge Engineering (Second Edition) [M]. Beijing: People's Communications Press, 2008.* *7. Fan Lichu Bridge Engineering (Second Edition - Volume 1) [M]. Beijing: People's Communications Press, 2012.* *8. Gu Anbang Bridge Engineering (Second Edition - Volume 2) [M]. Beijing: People's Communications Press, 2011.*

Application of Road and Bridge Software

Module designation	*Application of Road and Bridge Software*
Semester(s) in which the module is taught	*Semester 7*
Person responsible for the module	*MAO Dejun*
Language	*Chinese*
Relation to curriculum	*Specialisation education practice*
Teaching methods	*Lecture, guidance, accompaniment practice, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 112 hours* *Contact hours: 64* *Self-study hours: 48*
Credit points	*Chinese credits: 2; ECTS credits: 4*
Required and recommended prerequisites for joining the module	*Civil Engineering Drawing, Theory Mechanics, Material Mechanics, Structural Mechanics A, Road Survey and Design, Subgrade and Pavement Engineering, Bridge Engineering, etc.*
Module objectives/intended learning outcomes	*1. Skills: Students master the operation and application of common design and analysis software for road and bridge engineering, and can correctly apply computer-aided design methods to conduct structural design of road and bridge engineering in practical projects.* *2. Abilities: Students can correctly apply common software for road and bridge engineering to conduct modelling and analysis, accurately judge the rationality of results, and further solve complex engineering problems related to roads and bridges.* *3. Competences: In the process of using computer-aided design and analysis methods to carry out road and bridge engineering design, analysis and solving practical engineering problems, students can correctly apply relevant specifications and standards.*
Content	*1. Be familiar with the software and master its functions, including software functions, operation interface, common tools and their usage, modelling skills, result viewing and judgment, etc. (Weight: 0.41, requirement level: mastery + familiarity)* *2. Case demonstration and practice with question and answer. Students follow the teacher to complete modelling and analysis of several engineering project cases using the software, and questions raised by students are answered during the process. (Weight: 0.31, Requirement level: mastery + familiarity + application)* *3. Independent case practice with question and answer. Assign engineering project case tasks for students to conduct independent and group practice, and questions raised by students are answered during the process. (Weight: 0.28, requirement level: proficient application)*
Examination forms	*In-class questioning, regular practice, group practice, after-class practice, learning attitude, achievement report*

Study and examination requirements	*1. The course adopts a 100-point grading system. Students who achieve a score of 60 or above pass the course and obtain the corresponding credits.* *2. Course Score = Formative Assessment Score × 50% + Summative Assessment Score × 50%.* *3. Formative assessment accounts for 50%, including regular practice 15%, group practice 10%, in-class questioning 5%, learning attitude 10%, and after-class practice 10%.* *4. Summative assessment accounts for 50%, based on the achievement report submitted by students.* *5. All components of the formative assessment and the summative assessment are graded on a 100-point scale.*
Reading list	*1. GUO Tengfeng. 3D Integrated CAD Technology for Highways: A Tutorial forHinted 3D Road CAD Software Series[M]. Beijing: China Communications Press, 2006.* *2. FANG Feifei. CAD for Municipal, Road and Bridge Engineering[M]. Wuhan: Huazhong University of Science and Technology Press, 2019.* *3. XU Liying, CHU Yunpeng. Computer-Aided Design of Bridge Engineering[M]. Chongqing: Chongqing University Press, 2019.* *4. XU Da, WANG Dingwen. Midas/Civil Bridge Structure Analysis Skills and Examples[M]. Beijing: China Architecture & Building Press, 2015.* *5. ZHOU Shuixing, WANG Xiaosong, TIAN Weifeng. Computer Computation for Bridge Structures - Finite Element Method and Its Application in MIDAS/Civil (2nd Edition) [M]. Beijing: China Communications Press, 2020.* *6. GE Junying. A Guide to midas Civil for Bridge Engineering Software[M]. Beijing: China Communications Press, 2013.* *7. Industry Standard of the People's Republic of China. Technical Standards for Highway Engineering: JTG B01-2014[S]. Beijing: China Communications Press, 2014.* *etc.*