School of Mechanical and Electrical Engineering, Major in Electrical Engineering and Automation. Introduction to undergraduate courses.

Kunming University School of Mechanical and Electrical Engineering
2023 format

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Basic modules of electrical science

Advanced Mathematics B(1)

Course Name	Advanced Mathematics B(1)
Semester in which the course is taught	First Semester
Course Coordinator	Su Zhibang, Li Yaqin
language	Chinese
Nature of the course	Basic courses in the discipline
Teaching methods	Teaching, discussion, problem-driven approach
Workload (including teaching hours and self-study hours)	Total workload: 180 teaching hours. Number of teaching hours: 96 Self-study hours: 84
credit points	Chinese credits: 6; European credit system credits: 6
Prerequisite courses	Elementary mathematics
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Students will initially be able to use the abstract thinking of advanced mathematics to observe, analyze, and describe complex real-world problems. They will also be able to use single-variable calculus to solve complex problems related to their field of study. Students will develop a basic understanding of the fundamental knowledge and logical thinking of advanced mathematics, which will help them create mathematical models for innovative research in their field. They will also possess the necessary knowledge and skills in the mathematical field to conduct scientific research, as well as have the ability to integrate knowledge from different disciplines. Supported graduation requirement indicators: 1.1, 1.3, 2.2.
Content	1. Chapter 1: Limits and Continuity of Functions of One Variable (Weight: 0.1, Requirement Level: Proficient + Familiar) 2. Chapters 2 and 3: Derivatives of Single-Variable Functions and Their Applications (Weight: 0.4; Required level: Proficient + Understandable + Familiar + Capable of application) 3. Chapters 4, 5, and 6: Integrals of single-variable functions and their applications (Weight: 0.4, Requirement Level: Master, Understand, Familiarize, Apply) 4. Chapter 7: Differential Equations (Weight: 0.1, Difficulty Level: Proficient + Familiar + Applied)
Assessment methods	Homework, in-class assessments, attendance in classes, closed-book exams

Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 50% + Final assessment score × 50%. 3. The performance assessment accounts for 50% of the total score. This includes 10% for regular assignments, 10% for attendance, 20% for classroom behavior, and 10% for tests. 4. The final assessment accounts for 50% of the total score. The assessment is based on the student's score in the closed-book exam.

Advanced Mathematics B (2)

Course Name	Advanced Mathematics B(2)
Semester in which the course is taught	Second Semester
Course Coordinator	Su Zhibang, Li Yaqin
language	Chinese
Nature of the course	Basic courses in the discipline
Teaching methods	Teaching, discussion, problem-driven approach
Workload (including teaching hours and self-study hours)	Total workload: 120 teaching hours. Number of teaching hours: 64 Self-study hours: 56
credit points	Chinese credits: 4; European credit system credits: 4
Prerequisite courses	Elementary Mathematics, Advanced Mathematics B(1)
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To understand the concepts related to vectors and spatial analytic geometry. To master vector operations, as well as methods for calculating and applying lines in space, planes, surfaces, and other geometric shapes. To grasp the concepts of limits and continuity for binary functions. To understand the differentiation of multivariate functions and their applications. Students should be able to proficiently calculate double integrals and line integrals. To comprehend the concept of infinite series, and to master methods for determining the convergence or divergence of infinite series. To have an understanding of simple applications of series. Through the study of multivariate calculus, students will acquire basic knowledge, fundamental theories, and essential skills. Supported graduation requirement indicators: 1.1, 1.2, 1.3.
Content	1. Chapter 8: Vector Algebra and Analytic Geometry in Space (Weight: 0.15, Requirement Level: Proficient + Familiar) 2. Chapter 9 and 10: Calculus of Multiple Functions and Its Applications (Weight: 0.6; Required level: Proficient + Understandable + Familiar + Capable) 3. Chapter 11: Integral Over Curves and Surfaces

	(Weight: 0.15; Required level: Proficient + Understandable + Familiar + Capable of application) 4. Chapter Twelve: Infinite Series (Weight: 0.1, Difficulty level: Proficient + Familiar + Applied)
Assessment methods	Homework, in-class assessments, attendance in classes, closed-book exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 50% + Final assessment score × 50%. 3. The performance assessment accounts for 50% of the total score. This includes 10% for regular assignments, 10% for attendance, 20% for classroom behavior, and 10% for tests. 4. The final assessment accounts for 50% of the total score. The assessment is based on the student's score in the closed-book exam.
Read a list of items to be considered	1. Yang Huiqing. Economic Mathematics – Calculus [M]. People's Post and Telecommunications Press, 2017. 2. Zhao Shuyuan. Calculus (Basic Economic Applications in Mathematics I) (Third Edition)[M], Renmin University of China Press, 2007. 3. Qian Changben. Analysis and Research on the Process of Solving Problems in Advanced Mathematics[M]. Scientific Publishers 1994. 4. Wang Xianjie. Typical Applications of Advanced Mathematics and Relevant Models [M]. Science Press, 2005. 5. Teaching Guidance Committee for Mathematics Courses in Engineering Departments of Higher Education Institutions. Solutions to Difficult Problems in Advanced Mathematics [M]. Higher Education Press, 1992. 6. Xue Jiaqing. Compiled Collection of Advanced Mathematics Question Banks. For Science and Engineering Students: Review, Training, Improvement [M]. Northeastern University Press, 2000. 7. Wang Jingke. Methods and Techniques for Solving Advanced Mathematics Problems [M]. China Forestry Publishing House, 1992.
Read a list of items to be considered	1. Yang Huiqing. Economic Mathematics – Calculus [M]. People's Post and Telecommunications Press, 2017. 2. Zhao Shuyuan. Calculus (Basic Economic Applications of Mathematics I) (Third Edition)[M], Renmin University of China Press, 2007. 3. Qian Changben. Analysis and Research on the Process of Solving Problems in Advanced Mathematics[M]. Scientific Publishers 1994.

	4. Wang Xianjie. Typical Applications and Models in Advanced Mathematics [M]. Science Press, 2005. 5. Teaching Guidance Committee for Mathematics Courses in Higher Education Institutions. Solutions to Difficult Problems in Advanced Mathematics [M]. Higher Education Press, 1992. 6. Xue Jiaqing. Compiled Collection of Advanced Mathematics Question Banks. For Science and Engineering Students: Review, Training, Improvement [M]. Northeastern University Press, 2000. 7. Wang Jingke. Methods and Techniques for Solving Advanced Mathematics Problems [M]. China Forestry Publishing House, 1992.

Discrete Mathematics

Course Name	Discrete Mathematics
Semester in which the course is taught	Third Semester
Course Coordinator	Dou Wei
language	Chinese
Nature of the course	Compulsory courses
Teaching methods	Lectures, seminars, etc.
Workload (including teaching hours and self-study hours)	Total workload: 54 class hours Teaching hours: 32 Self-study hours: 22
credit points	Chinese credits: 2; European credit system credits: 2
Prerequisite courses	Advanced Mathematics, Linear Algebra
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To be able to understand propositional logic, relations and sets, as well as knowledge related to graph theory. Additionally, students should be able to solve mathematical problems within these areas through logical reasoning. Supported graduation requirement indicators: 1.1, 1.3. Course Objective 2: To be able to understand common proof methods such as direct proof, proof by contradiction, mathematical induction, and construction methods. Students should develop the ability to use logical reasoning in a symbolic and automated manner. Students should also be able to utilize the core concepts, theories, and methods of discrete mathematics, including propositional logic, relations, and graph theory, to analyze complex engineering problems. Supported graduation requirement indicators: 1.1, 1.3. Course Objective 3: Able to apply the basic concepts and principles of propositional logic, relations and sets, and graph theory to solve discrete mathematics problems; capable of abstracting and expressing practical problems using discrete mathematics symbols, and performing effective reasoning, solving, and verification.; Supported graduation requirement indicators: 1.1, 1.2, 1.3. Course Objective 4: To understand the tasks of discrete mathematics and its historical development. To cultivate a scientific mindset and an innovative spirit. While mastering mathematical tools, it is also important to develop a rigorous and pragmatic attitude, a sense of mission to serve science and technology, and professional ethics of honesty and responsibility. The goal is to become high-quality engineering professionals who are both talented and morally upright. Supported graduation requirement indicators: 1.1.
Content	1. Propositional Logic Main contents: Propositions and connectives, conformative formulas, valuation, equivalent operations, normal forms, logical reasoning theories for propositions, the natural reasoning system P Weight: 0.2 Requirements: Must have a solid understanding of basic

	concepts in propositional logic, knowledge of equivalent reasoning techniques and principal paradigms. Ability to effectively use reasoning theories to perform logical proofs is essential. 2. First-order logic Main contents: individual terms, predicatives, quantifiers, proposition notation, tautological formulas, interpretations, equivalent expressions, normal form, reasoning theories Weight: 0.2 Requirements: Must be familiar with first-order logical notation, equivalent operations, and reasoning rules. Additionally, one must understand how to interpret formulas and construct forward chaining normal forms. 3. Collections and matrices Main contents: Basic concepts of sets, relationships between sets, operations and proofs related to sets; basic concepts of matrices, and basic operations on matrices. Weight: 0.15 Requirements: Must understand the basic concepts and operations of sets and matrices. Also, need to grasp the fundamental ideas and standards for proving statements involving sets. 4. Relations and Functions Main contents: definition and representation of relations, relational operations and power operations, properties of relations, equivalent relations and partial order relations; definition of functions, injection/maps/emersion, composition of functions and inverse operations. Weight: 0.25 Requirements: Must be able to understand relational representations, properties of functions, and methods for determining equivalence/partial orders. Also, must be able to define and understand functions, as well as construct bijections and perform composition operations. 5. Diagram/Image Main contents: Basic concepts of graphs, connectivity, matrix representations of graphs, Euler graphs, Hamiltonian graphs, bipartite graphs, planar graphs. Weight: 0.2 Requirements: Must understand the basic concepts of graphs and methods for determining graph connectivity. Must be able to effectively use matrix representations of graphs and various methods for identifying special types of graphs.
Assessment methods	The course uses a comprehensive evaluation system, which includes attendance, classroom performance, homework assignments, and a final written exam. The total course

	evaluation score (on a scale of 100 points) is calculated as follows: Attendance and classroom performance × 15% + Homework assignments × 15% + Final exam score × 70%. 1. Attendance rate (7.5%) The assessment is conducted through daily check-ins. Attendance without any absences will earn a full score. If a student is late by less than 10 minutes or leaves early by less than 10 minutes, 0.5 points will be deducted each time. If a student misses a day without valid reasons, 2 points will be deducted. If a student misses more than 4 days, their score will be reset to 0. Students who have valid reasons for missing days, such as work or medical reasons, will not have their scores deducted. 2. Classroom performance (7.5%) The system adopts a basic scoring system. Students who attend classes on time, maintain classroom discipline, and do not engage in any behaviors such as playing with phones, sleeping, or making noise will receive a full score for this criterion. Students who actively participate in discussions and complete assigned exercises will receive additional points. If a student engages in disciplinary violations during class, they will be deducted 0.5 points at a time, until the score reaches zero. Students who do not speak up or participate in any presentations will not have their scores deducted. 3. Homework (15%) The process involves completing tasks through an online platform, with each chapter being assessed separately. The average score of all chapters will be taken into consideration, and 15% of this score will be added to the overall course grade. 4. Final written exam (70%) The exam syllabus covers various core topics in propositional logic, first-order logic, sets and matrices, relations and functions, and graph theory. The exam consists of multiple-choice questions, true/false questions, proof-based problems, and analysis/computation questions. The difficulty level is as follows: 50% of the questions are easy, 30% are medium difficulty, and 20% are difficult. The exam aims to assess students' understanding of basic concepts, logical reasoning skills, computational abilities, and their ability to apply discrete mathematics methods to solve problems.
Requirements for learning and assessment	Students must complete the course requirements, including coursework, assessment tasks, and final exams as specified by the regulations. The overall course score is calculated on a 100-point scale. Only those who score 60 points or above, and who

	have no serious disciplinary violations that could affect their course performance, will be considered successfully completed and awarded the corresponding credits.
Read a list of items to be considered	[1] Qiu Xueshao. Discrete Mathematics [M]. Beijing: Mechanical Industry Press, 2017. [2] Qu Wanling, Geng Suyun, Zhang Liang. Discrete Mathematics [M]. Beijing: Higher Education Press, 2019. [3] SHANNON C E. A symbolic analysis of relay and switching circuits[J]. Transactions of the American Institute of Electrical Engineers, 1938, 57(12): 713-723. [4] LEHMAN E, LEIGHTON F T, MEYER A R. Mathematics for Computer Science[M/OL]. Cambridge: MIT OpenCourseWare. https://ocw.mit.edu. [5] Beijing University of Science and Technology. Discrete Mathematics [M/OL]. Beijing: China University MOOC. https://www.icourse163.org. [6] 3Blue1Brown. An Illustrated Explanation of Key Concepts in Discrete Mathematics [EB/OL]. https://www.bilibili.com

Complex functions and integral transforms

Course Name	Complex functions and integral transforms
Semester in which the course is taught	Third Semester
Course Coordinator	Li Yunjuan, Yang Zuyuan, Liu Qingxue, etc.
language	Chinese
Nature of the course	Basic compulsory courses
Teaching methods	Lectures, exercise classes, and classroom discussions, etc.
Workload (including teaching hours and self-study hours)	Total workload: 32 class hours Teaching hours: 28 hours Self-study hours: 4 hours
credit points	Chinese credits: 2; European credit system credits: 6
Prerequisite courses	Advanced Mathematics
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the basic theories of complex numbers and complex-valued functions, and to understand key concepts and properties such as analytic functions, complex integrals, power series, and residues. Supported graduation requirement indicators: 1.1. Course Objective 2: To master the derivative, integral, series expansion, and contour integral methods for complex variables. Students should be able to solve problems related to typical issues in complex analysis. Supported graduation requirement indicators: 1.1, 1.2, 1.3. Course Objective 3: Understand the definitions and properties of Fourier transform and Laplace transform, as well as common transform pairs. Master the calculation of basic transforms and their inverses. Supported graduation requirement indicators: 1.1, 1.2. Course Objective 4: To be able to use integral transformations to solve ordinary differential equations and analyze linear systems. Students should also have the ability to convert real-world engineering problems into mathematical models and solve them. Supported graduation requirement indicators: 1.2, 1.3. Course Objective 5: Develop abstract thinking, logical reasoning skills, and mathematical modeling capabilities. This will provide a solid mathematical foundation for further studies in related professional courses. Supported graduation requirement indicators: 1.2, 1.3.
Content	1. Complex Numbers and Complex Variable Functions (Weight: 0.15): Operations on complex numbers, the complex plane, regions, complex variable functions, limits and continuity. Understanding basic concepts and properties. 2. Analytical functions (weight: 0.20): derivatives, Cauchy-Riemann conditions, elementary analytical functions (exponential, trigonometric, logarithmic, power functions). It's important to understand the methods for determining these functions and performing basic operations involving them. 3. Integrals of complex functions (Weight: 0.20): Concepts related to complex integrals, Cauchy's integral theorem, Cauchy's integral formulas, formulas for higher-order

	derivatives. Must be able to calculate integrals and apply them in practical situations. 4. Series and residues (Weight: 0.20): Power series, Taylor series, Laurent series, isolated singularities, residue theorem, calculation of residues using real integrals. Mastering the expansion of series and the application of residues. 5. Fourier transform (weight: 0.15): Definition of Fourier transform, properties of Fourier transform, common transform pairs, convolution theorem. It is necessary to master the basic transforms and their simple applications. 6. Laplace transform (weight: 0.10): definition, properties, common transform pairs, inverse transformation, solving ordinary differential equations. Familiarity with basic methods and their engineering applications.
Assessment methods	Regular homework, classroom quizzes, and closed-book exams
Requirements for learning and assessment	Complete homework on time, actively participate in classroom discussions and exercises; master the basic theories, methods, and typical examples related to the course. Regular grades account for 30% of the total evaluation, while final exam scores account for 70%. Students who achieve a total score of 60 points or above will receive credits for this course.
Read a list of items to be considered	1. Zhong Yujuan. Complex Function Theory (5th Edition). Higher Education Press, 2020. 2. Zhang Yuanlin. Integral Transforms (5th Edition). Higher Education Press, 2019. 3. Department of Mathematics, Xi'an Jiaotong University. Complex Variables and Integral Transforms (3rd Edition). Higher Education Press, 2018. 4. Zheng Jianhua. Basics of Complex Analysis. Tsing Hua University Press, 2017. 5. Wu Changchi. Engineering Mathematics: Complex Variables and Integral Transforms. Scientific Publishers, 2021. 6. Brown, J.W., Churchill, R.V. Complex Variables and Applications (9th ed.). McGraw-Hill, 2013.

Probability Theory and Mathematical Statistics

Course Name	Probability Theory and Mathematical Statistics
Semester in which the course is taught	Third Semester
Course Coordinator	Yang Jiankun
language	Chinese
Nature of the course	Comprehensive Core Courses
Teaching methods	Lectures, projects, etc.
Workload (including teaching hours and self-study hours)	Total workload: 54 class hours Teaching hours: 32 Self-study hours: 22
credit points	Chinese credits: 2
Prerequisite courses	Ideological and Moral Education, Rule of Law, Introduction to Modern Chinese History, Introduction to Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, Mental Health Education for College Students, Military Theory and Military Training, College Chinese Language, College English (1), College English (2), Innovation and Entrepreneurship Education and Career Planning, Literature Review and Scientific Paper Writing, Advanced Mathematics (1), Advanced Mathematics (2), Linear Algebra, College Physics, College Physics Experiments, Basic Engineering Drawing, Basics of Information Science, Principles of Electrical Circuits (1), Introduction to Electrical Engineering, Engineering Training, Professional Internship, Electrical Equipment Manufacturing Training
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the basic concepts, theories, and methods of probability theory and mathematical statistics. This includes understanding the concept of random events, grasping the relationships and operations between events, and being able to correctly calculate the probabilities of random events. It also involves using the basic properties of numerical characteristics to calculate the numerical characteristics of specific distributions. Additionally, students should understand the concept of confidence intervals and be able to correctly calculate the confidence intervals for the mean and variance of a normal distribution. Supported graduation requirement indicators: 1.1, 1.2, 1.3. Course Objective 2: To develop the ability to handle random problems effectively, and to use the learned probability and statistics methods to solve practical problems. For example, to be able to correctly describe one-dimensional and two-dimensional random variables in practical engineering problems using probability distributions; to be able to model independent and identically distributed random variables in practical engineering problems, and to make relevant inferences about the distributions of random variables under consideration, using certain common sampling distributions of the normal distribution. Political and Ethical Objectives: To understand the tasks of probability theory and mathematical statistics, as well as their historical development. To cultivate a spirit of continuous pursuit of truth, a strong curiosity about

	the unknown world, and a desire for knowledge. To foster a commitment to the prosperity of the country and the strength of the nation, as well as a scientific worldview. Supported graduation requirement indicators: 1.1, 1.2, 1.3, 2.2.
Content	Module 1: Basic Concepts of Probability Theory Goal 1 (A11=10%): Understand concepts such as random events, probability, and independence. Master the principles of classical probability. Be able to use conditional probability, multiplication formulas, total probability formulas, and Bayes' formulas for calculations. Goal 2 (A21=10%): Mastering the calculation of classical and geometric probabilities, conditional probabilities and multiplication formulas. Also, be able to apply the total probability formula and Bayes' formula effectively. Module 2: Random Variables and Their Distributions Goal 1 (A12=10%): To understand one-dimensional random variables and their distribution functions. To master the differences between discrete and continuous random variables, as well as common distributions of random variables. To understand two-dimensional random variables and their distribution functions. To grasp the basic characteristics of two-dimensional discrete and continuous random variables. To be able to calculate marginal distributions efficiently based on joint distributions. To be able to determine the independence between random variables. To have an understanding of conditional distributions and the distributions of functions of two random variables. Goal 2 (A22=10%): Mastering the solution of distributions for functions of one-dimensional random variables; being able to calculate related problems such as distributions of functions like the sum and difference of two random variables; calculating distributions of maximum and minimum values. Course Module 3: Numerical Properties of Random Variables Goal 1 (A13=10%): To be able to calculate the mathematical expectation, variance, covariance, and correlation coefficients of random variables accurately. Also, to have a good understanding of moments and covariance matrices. Course Module 4: Laws of Large Numbers and Central Limit Theorems Goal 1 (A14=5%): Understand the application of Chebyshev's inequality. Also, be able to comprehend the law of large numbers, and master the Central Limit Theorem. Course Module 5: Samples and Their Distributions Goal 1 (A51=5%): Understanding basic concepts such as the population, individuals, and simple random samples. Goal 2 (A52=5%): Mastering the distributions of common statistics, including expectations and variances. Understanding the construction and properties of various statistical distributions, as well as quantile concepts and the theorem of

	sampling distributions. Course Module 6: Parameter Estimation Goal 1 (A61=5%): Understand the principles of Moment estimation and maximum likelihood estimation, mastering the standard methods of point estimation, and becoming familiar with the concept of confidence intervals for parameters of a normal population and related conclusions. Goal 2 (A62=15%): Ability to use the method of moments and maximum likelihood estimation to estimate parameters in practical problems; master the application of interval estimation of parameters under a normal population. Course Module 7: Hypothesis Testing Goal 1 (A71=5%): Understand the concepts of the null hypothesis and the alternative hypothesis, as well as the two types of errors that can occur during hypothesis testing. Goal 2 (A72=10%): Mastering the hypothesis testing of parameters under a normal distribution.
Assessment methods	Class discussions, homework assignments, class attendance checks, and closed-book exams, etc.
Requirements for learning and assessment	Students should have a solid understanding of the basic concepts of probability theory, including random events, probability distributions, random variables, and their numerical characteristics. Master the basic knowledge of mathematical statistics, such as sample distribution, parameter estimation, hypothesis testing, etc. Understand and master common statistical inference methods, including interval estimation, analysis of variance, regression analysis, etc.
Read a list of items to be considered	[1] Cai Shisong, Cheng Yiming, Pu Xiaolong. Introduction to Probability Theory and Mathematical Statistics. Higher Education Press. 2004. [2] Zhang Guofen, Zhang Yi, Huang Boqin, Huang Wei. Probability Theory and Mathematical Statistics. Higher Education Press. 2017. [3] Chen Xiru. Probability Theory and Mathematical Statistics. University of Science and Technology of China Press. 2018. [4] Sheng Qiu, Xie Shiqian, Pan Chengyi. Probability Theory and Mathematical Statistics. Higher Education Press. 2008.

Linear Algebra

Course Name	Linear Algebra
Semester in which the course is taught	Second Semester
Course Coordinator	Yang Zuyuan
language	Chinese
Nature of the course	Basic course requirements for each discipline
Teaching methods	Teaching, discussion, self-study, etc.
Workload (including teaching hours and self-study hours)	Total workload: 60 class hours Teaching hours: 32 Self-study hours: 28
credit points	Chinese credits: 2; European credit system credits: 2
Prerequisite courses	Advanced mathematics, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Students should understand the basic concepts, properties, and operations of determinants, matrices, vectors, and linear equations. They should also master basic operations and methods related to matrix transformations, rank, inverse matrices, and block matrices. Students should be able to understand the linear dependence of vector groups, maximal independent groups, rank, bases, and dimensions. Additionally, they should be able to determine the conditions for the solution of linear equations and find methods for solving them. Supported graduation requirement indicators: 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4, 9.1, 9.2. Course Objective 2: Students should be able to proficiently perform algebraic operations such as determinants, matrices, vectors, and systems of equations. They should also be able to prove, determine, and derive solutions to linear algebra problems. Students should be able to abstract mathematical models such as matrices, vectors, and linear relationships from practical problems. Finally, they should be able to convert real-world problems from engineering, economics, computer science, etc. into linear algebra models and solve them. Students should be able to analyze and solve simple practical problems using matrices and systems of equations. Supported graduation requirement indicators: 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4, 9.1, 9.2. Course Objective 3: The ability to independently and proactively acquire knowledge and skills, in order to adapt to the development of society and the field of electrical engineering. Supported graduation requirement indicators: 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4, 9.1, 9.2.
Content	1. Definition of determinants (Weight: 0.05; Required level: Mastery + Familiarity) 2. Properties of determinants (Weight: 0.2; Required level: Mastery + Familiarity + Application) 3. Expand the determinant along rows (columns) (Weight: 0.05, Requirement: Proficient/Familiar) 4. Definition of matrices (Weight: 0.05, Difficulty level: Proficient/Familiar) 5. Matrix operations (Weight: 0.05, Difficulty:

	Familiar+Intermediate) 6. Matrix partitioning (Weight: 0.05, Requirement Level: Proficient + Familiar) 7. Elementary transformations of matrices (Weight: 0.15; Required Level: Proficient + Familiar + Application) 8. Solving linear equations (Weight: 0.2, Difficulty level: Proficient/Familiar) 9. Linear correlation of vector groups (Weight: 0.2, Requirement Level: Familiar+Basic)
Assessment methods	Attendance, unit tests, classroom performance, homework, written exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes 8% based on attendance, 8% based on unit tests, 8% based on classroom behavior, and 16% based on homework completion. The final assessment accounts for 60% of the total evaluation. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Tongji University School of Mathematics. Linear Algebra (7th Edition)[M]. Beijing: Higher Education Press, 2023. 2. He Suyan, Cao Hongju, Wan Liying. Linear Algebra [M]. Beijing: Tsinghua University Press, 2023. 3. Gao Yubin. Linear Algebra [M]. Beijing: Higher Education Press, 2024. 4. Li Xuefei, Pang Shichun. Linear Algebra [M]. Beijing: Tsinghua University Press, 2024. 5. Chen Li, Tan Yingyi, Hu Chaolang. Linear Algebra [M]. Chengdu: Sichuan University Press, 2024. 6. Feng Qinghua. Linear Algebra[M]. Beijing: Mechanical Industry Press, 2025. 7. Liu Baiyu. Linear Algebra[M]. Beijing: Mechanical Industry Press, 2025.

University Physics (Mechanics + Thermodynamics)

Course Name	University Physics (Mechanics + Thermodynamics)
Semester in which the course is taught	Second Semester
Course Coordinator	Zou Mei, Deng Shuping
language	Chinese
Nature of the course	Basic courses in the discipline
Teaching methods	Teaching methods such as lecture, discussion, and case analysis
Workload (including teaching hours and self-study hours)	Total workload: 120 teaching hours. Number of teaching hours: 64 Self-study hours: 56
credit points	Chinese credits: 4; European credit system credits: 4
Prerequisite courses	Advanced Mathematics (1)
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To thoroughly understand the basic concepts, principles, and laws of mechanics and thermodynamics, as well as to gain knowledge of the fundamental research methods in physics. Supported graduation requirement indicators: 1.1. Course Objective 2: To be able to flexibly apply the basic principles and laws of mechanics and thermodynamics to solve practical problems. To possess the ability to comprehensively use physical and mathematical knowledge to solve real-world problems, thereby enhancing the ability to identify, analyze, and solve problems. Supported graduation requirement indicators: 1.1, 1.3, 1.4, 2.1. Course Objective 3: To establish a scientific materialist worldview, methodology, and epistemology; to possess the ability to independently analyze and handle related issues, as well as to have strong self-learning and ability to absorb new knowledge. Supported graduation requirement indicators: 1.1, 1.3.
Content	The main contents of this course include kinematics and dynamics of point masses, conservation laws in mechanics, mechanics of rigid bodies, vibrations and waves, kinetic theory of gases, and basic principles of thermodynamics. The content and weights of each section are as follows: Vector basis and kinematics/dynamics of particles (Weight: 0.25) Vector operations; description of point motion (displacement, velocity, acceleration); circular motion; Newton's laws and their applications. (Required level: proficient/able to apply the concepts) Conservation laws and rigid body mechanics (Weight: 0.22) Conservation laws of momentum; laws of kinetic energy, principles of work and energy, and conservation laws of mechanical energy; laws of rotational motion of rigid bodies, conservation laws of angular momentum, and laws of rotational kinetic energy. (Required level: Proficient/Advanced) Vibration and Waves (Weight: 0.25) Description of harmonic vibration, the method of rotating vectors, combination of harmonic vibrations; generation and propagation of mechanical waves, wave functions for plane harmonic waves, Huygens' principle, interference of waves. (Required level: Proficient/Advanced) Gas dynamics theory (Weight: 0.12)

	Ideal gas state equation, pressure formula, and statistical interpretation of temperature; energy distribution Internal energy formulas for ideal gases; Maxwell's laws of distribution of speeds. (Required level: Master/Understand) Thermodynamics (Weight: 0.16) The First Law of Thermodynamics and its applications in isothermal, isobaric, isothermal, and adiabatic processes; cyclic processes and the Carnot cycle; the Second Law of Thermodynamics. (Required level: Mastery/Application)
Assessment methods	Closed-book exams, mid-term tests, homework, class summaries, classroom behavior, attendance
Requirements for learning and assessment	Students are required to attend classes on time, actively participate in classroom discussions, and complete their homework carefully. The overall course grade consists of two parts: periodic assessments (attendance, classroom performance, homework, class summaries, mid-term exams) and final assessments (final exams). Students who achieve a total score of 60 points or above will receive credits for this course.
Read a list of items to be considered	Ma Wenwei. Physics Course. Volume 1. Higher Education Press. 2023 (Fourth Edition). ISBN: 9787040436747. Zhang Sanhui. University Physics. Tsinghua University Press. 2009 (3rd edition). ISBN: 9787302193449, 9787302193432. Douglas C. Giancoli. Physics for Scientists and Engineers with Modern Physics (Third Edition). Higher Education Press. 2005. ISBN: 9787040165630. Cheng Shouzhu. General Physics. Higher Education Press. 2006 (Sixth Edition, Volume 1). ISBN: 9787040200591. Feynman. Feynman Lectures on Physics: New Millennium Edition. Volume 1. Shanghai Scientific and Technical Publishers. 2020. ISBN: 9787547847176. Charles Kittel. Berkeley Physics Course (SI edition), Volume I: Mechanics. Published by Mechanical Industry Publishing Company. ISBN: 9787111464570.

University Physics Experiments (Force, Heat)

Course Name	University Physics Experiments (Force, Heat)
Semester in which the course is taught	Second semester of the 2024-2025 academic year
Course Coordinator	Deng Shuping, Xu Wei
language	Chinese
Nature of the course	Professional Education Practice Course
Teaching methods	Lectures, seminars, experiments, etc.
Workload (including teaching hours and self-study hours)	Total workload: 28 class hours Teaching hours: 16 Self-study hours: 12
credit points	Chinese credits: 1; European credit system credits: 1
Prerequisite courses	Advanced Mathematics, College Physics
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the principles and functions of common basic physical instruments, and to learn how to use, adjust, and read them correctly. To understand the methods of measuring basic physical quantities and analyzing errors, and to know how to determine experimental plans, select appropriate experimental instruments, and reduce experimental errors. To master common experimental data processing methods such as graphing, difference elimination, extrapolation, and compensation. To learn how to use experimental methods to discover physical laws, observe and analyze physical phenomena. To deepen understanding of important physical laws through experiments. To apply theoretical and experimental knowledge to guide experiments and analyze problems that arise during experiments. To learn how to analyze experimental errors, master the basic methods of uncertainty assessment, correctly use significant figures, and learn to qualitatively judge and quantitatively estimate the reliability of experimental results. Supported graduation requirement indicators: 1.1, 1.3, 1.4, 2.1, 4.2, 4.3, 4.4. Course Objective 2: To enhance the comprehensive abilities required for conducting scientific experiments, including practical skills, analytical judgment, independent thinking, ability to summarize information, and oral communication skills. Supported graduation requirement indicators: 1.1, 1.3, 1.4, 2.1, 2.2, 4.3, 12.2. Course Objective 3: Develop good experimental habits and a rigorous scientific approach. This includes taking experimental data seriously, avoiding any form of falsification, and adopting a truth-seeking scientific attitude. This will help improve students' scientific literacy. Supported graduation requirement indicators: 4.3.
Content	Module 1: Introduction (Error Theory and Data Processing) – 20% Course Module 2: Basic Mechanics Experiments (Length measurement, density determination, pendular motion, and motion of sliders on inclined air cushion tracks) – 40% Course Module 3: Basic Thermophysical Experiments (Measurement of specific heat capacity of solids using mixed methods, measurement of linear expansion coefficients of metals, measurement of viscosity using the falling ball method) 40%
Assessment methods	Regular experimental results

	Course Objectives 1 Master the basic knowledge, methods, and skills related to mechanics experiments and thermodynamics experiments. Weight A: 30% 1. Completeness of experimental principles: 20% 2. Accuracy of the instruments used in the experiments: 10% (in the first 3 experiments) 1. Pre-class preview report (to be completed before the experiment) 2. Discussions in the classroom, as well as records and actions taken during the recording of raw data. (Teachers use discussions and guidance to guide students during the experiment.) Course Objective 2 Possesses strong practical and innovative abilities Weight B: 50% 1. Rationality of the experimental plan: 15% 2. The accuracy of experimental data measurement: 15% 3. Accuracy and completeness of data processing: 20% (for the last 5 experiments) 1. Data recording (completed after being reviewed and guided by the teacher during the experiment) 2. Processing of data (to be completed after the experiment) Course Objective 3 It possesses a rigorous and meticulous scientific attitude, as well as a scientific spirit of seeking truth from facts. Weight C: 20% 1. The completeness of experimental error analysis. 10% 2. The depth of discussion regarding the issues involved. The average of 10% of the total experimental scores. 1. Analysis of experimental results (to be completed after the experiment) 2. Thought Questions (To be completed after the experiment)
Requirements for learning and assessment	1. Basically proficient in the basic knowledge, methods, and skills related to general physics experiments. Possess sufficient professional knowledge to engage in physics-related experiments and related work. 2. The design of experimental plans is reasonable, experimental data measurement is accurate, and data processing is both accurate and generally complete. Possess certain practical skills and innovative capabilities. 3. The analysis of experimental errors is basically complete and reasonable.
Read a list of items to be considered	（1）Yang Shuwu, Editor-in-Chief. "General Physics Experiments, Volume 1 (Mechanics and Thermodynamics)" (4th Edition), Higher Education Press, December 2007. (2) Edited by Zhang Zhaoqiu. *University Physics Experiments* (First Edition), Higher Education Press, December 2001. (3) Edited by Zhou Dianqing. Basic Physics Experiments (First Edition), Scientific Publishers, January 2009.

C Language Programming

Module designation	*C Language Programming*
Semester(s) in which the module is taught	*Third Semester*
Course Coordinator	*Wang Wei*
Language	*Chinese*
Relation to curriculum	*Foundational Discipline Course*
Teaching methods	*Lecture, discussion, experiment, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 48 hours* *Contact hours: 24* *self-study hours: 24*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*Fundamentals of Computer Information Technology*
Module objectives/intended learning outcomes	Course Objective 1: Understand the representation and description of computer data; master basic concepts of C language such as data types, identifiers, constants, variables, and expressions; grasp the characteristics and usage of arithmetic, relational, logical, and conditional operations; comprehend function definitions and calls; familiarize with the syntax rules of C language; Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.1, 5.2, 5.3, 5.4. Course Objective 2: Understand the role and characteristics of computer algorithms; master methods for describing algorithms; design reasonable algorithms based on computer working characteristics; master three program algorithm structures—sequential, selection, and loop—and apply them flexibly according to practical needs; develop the ability to analyze and solve problems using computational thinking methods; Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.1, 5.2, 5.3, 5.4. Course Objective 3: Master the basic principles, concepts, characteristics, and methods of C language; become familiar with the C language program development environment; acquire skills to read, write, and debug C programs; develop capabilities in program design, development, and testing; understand the ideas and principles of structured programming; cultivate good programming style and habits; Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.1, 5.2, 5.3, 5.4.
Content	*1. Programming fundamentals and algorithms (weight: 0.25, requirement level: familiarity + understanding)* *2. Data representation and operations (weight: 0.15, requirement level: mastery + familiarity + application)* *3. Basic program structures and design (weight: 0.45, requirement level: mastery + familiarity + application)* *4. Batch data processing using arrays (weight: 0.05, requirement level: mastery + familiarity + application)*

	5. Modular program design using functions (weight: 0.1, requirement level: familiarity + understanding)
Examination forms	*Assignments, experiments, discussions, learning attitude, 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%, experiments 10%, discussions 10%, learning attitude 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. Tan Haoqiang. C Programming (5th Edition) [M]. Tsinghua University Press, 2017.* *2. Tan Haoqiang. C Programming (5th Edition) Study Guide [M]. Tsinghua University Press, 2017.* *3. Chen Meng, Bao Shudi. C Language Programming Thinking [M]. Tsinghua University Press, 2019.* *4. Wang Haibin, Liu Xia. C Language Programming Fundamentals Tutorial [M]. Electronic Industry Press, 2018.* *5. Lv Haiyang, Zhang Zhifen, Liu Jingnan. National Computer Rank Examination Training Textbook (Level 2 C) [M]. Electronic Industry Press, 2016.* *6. Chen Dongfang. C Language Programming Fundamentals [M]. Tsinghua University Press, 2010.* *7. Cai Qixian. Fundamentals of Computer Programming (C Language Edition) [M]. Tsinghua University Press, 2012.* *8. Chen Liang, Huo Wei, Wu Tao. C Language Programming [M]. Electronic Industry Press, 2020.* *9. Liu Qiang, Tong Qi. C Language Programming Experiment Tutorial [M]. Electronic Industry Press, 2018.* *10. Sun Chengxiu, Wang Chunhong. C Language Programming Case Tutorial [M]. Electronic Industry Press, 2020.* *11. Zhao Jianhui, Li Guohe, Zhang Xiumei. C Language Study Guide and Practice [M]. Electronic Industry Press, 2018.* *12. He Yichen, Gu Wanrong. C Language Programming from Beginner to Expert [M]. Electronic Industry Press, 2018.* *etc.*

Engineering Electromagnetic Field Theory

Course Name	Engineering Electromagnetic Field Theory
Semester in which the course is taught	Third Semester
Course Coordinator	Yang Zuyuan
language	Chinese
Nature of the course	Basic course requirements for each discipline
Teaching methods	Teaching, discussion, etc.
Workload (including teaching hours and self-study hours)	Total workload: 60 class hours Teaching hours: 32 Self-study hours: 28
credit points	Chinese credits: 2; European credit system credits: 2
Prerequisite courses	University physics, advanced mathematics, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the mathematical and physical foundations of engineering electromagnetic field theory, and to apply this knowledge to solve problems in the field of electrical engineering. Supported graduation requirement indicators: 1.1, 2.2. Course Objective 2: To proficiently apply the knowledge of engineering electromagnetic field theory to analyze complex problems in the field of electrical engineering, and to develop solutions to these problems. Supported graduation requirement indicators: 1.1, 1.3, 1.4. Course Objective 3: Develop teamwork skills and communication abilities, enabling effective collaboration with members of other disciplines. Supported graduation requirement indicators: 9.1, 9.2.
Content	1. Basic physical quantities of electromagnetic fields, vector analysis, fundamentals of field theory, electric field strength and potential, Gauss' law (Weight: 0.3, Requirement level: Mastery + Familiarity) 2. The basic equations of the electrostatic field and the conditions for connecting different regions within the field. The boundary value problems in the electrostatic field and the uniqueness theorem. Methods for solving electrostatic problems. Capacitance and partial capacitance. Energy and forces in the electrostatic field (Weight: 0.5; Required level: Master+Familiar+Application) 3. Current in conductive media, electromotive force of the power source and external fields, basic equations for constant electric fields, and conditions for interfacial transitions. Comparison between constant electric fields and electrostatic fields in conductive media. Conductance and ground resistance (weight: 0.2, required level: proficient/aware)
Assessment methods	Attendance, classroom performance, after-class assignments, unit tests, open-book exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course.

	2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes 10% based on attendance, 10% based on classroom behavior, 10% based on unit test performance, and 10% based on after-class homework completion. The final assessment accounts for 60% of the total evaluation. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Masikui, Feng Zhizhang. Introduction to Engineering Electromagnetic Fields[M]. Beijing: Higher Education Press, 2023. 2. Guo Huiping, Liu Xueguan. Electromagnetic Fields and Electromagnetic Waves [M]. Xi'an: Xi'an University of Science and Technology Press, 2022. 3. Ding Jun, Guo Chenjiang. Engineering Electromagnetic Fields and Electromagnetic Waves [M]. Beijing: Higher Education Press, 2019. 4. Ni Guangzheng. Principles of Engineering Electromagnetic Fields[M]. Beijing: Higher Education Press, 2016. 5. Zhang Huijuan, Yang Wenrong, Li Lingling. Basics of Engineering Electromagnetic Fields and Electromagnetic Waves [M]. Beijing: Mechanical Industry Press, 2009. 6. Wang Zézhong, Quan Yushēng. Engineering Electromagnetic Fields [M]. Beijing: Tsinghua University Press, 2021. 7. Pan Shilong, He Xiaoxiang, Liu Bing, et al. Engineering Electromagnetic Fields [M]. Beijing: Electronic Industry Publishing House, 2024. Wait.

Basic Engineering Drawing Techniques

Course Name	Basic Engineering Drawing Techniques
Semester in which the course is taught	First Semester
Course Coordinator	Yellow Yue
language	Chinese
Nature of the course	Basic course requirements for each discipline
Teaching methods	Teaching, discussion, self-study, etc.
Workload (including teaching hours and self-study hours)	Total workload: 80 class hours Teaching hours: 48 Self-study hours: 32
credit points	Chinese credits: 3; European credit system credits: 3
Prerequisite courses	Nothing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To develop students' ability to think in terms of spatial shapes, as well as their skills in drawing and reading engineering drawings. We will also study the basic principles and methods involved in drawing and reading engineering drawings. This will enable students to have a basic understanding of reading drawings and performing simple drafting tasks. Supported graduation requirement indicators: 1.1. Course Objective 2: To cultivate students' engineering awareness, a responsible and meticulous work attitude, and a rigorous and thorough approach to work. Students should also be able to learn and comply with the national standards and relevant regulations regarding mechanical drawing. Supported graduation requirement indicators: 1.1, 1.2, 1.3, 1.4, 8.1, 8.2, 8.3, 12.1, 12.2. Course Objective 3: To possess a flexible and innovative mindset, to have a broad perspective, to be capable of self-study, to be innovative in thinking, and to keep up with the development of the industry and society. Supported graduation requirement indicators: 1.1, 1.2, 1.3, 1.4, 8.1, 8.2, 8.3, 12.1, 12.2.
Content	1. Basic knowledge and skills in mapping techniques (Weight: 0.08; Required level: Mastery + Awareness) 2. Basic knowledge of projection techniques (Weight: 0.15; Required level: Proficient + Familiar + Application-oriented) 3. Basic entities and their surface intersection lines (Weight: 0.15; Required proficiency level: Proficient + Familiar + Applied) 4. Projection view (Weight: 0.06, Requirement Level: Familiar+Intermediate) 5. Three-view diagram of the combined structure (Weight: 0.16; Required level: Proficient + Familiar + Competently applied) 6. Methods of representing designs (Weight: 0.16; Required level: Proficient + Familiar + Application) 7. Standard and commonly used components (Weight: 0.1; Requirement Level: Familiarity + Knowledge)

	8. Part drawings (Weight: 0.08, Required level: Proficient/Familiar) 9. Assembly drawing (Weight: 0.06, Required level: Familiar+Intermediate)
Assessment methods	Pre-study, questions, homework, discussions, drawing preparation, closed-book exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes 5% for discussions, 5% for questions, 20% for assignments, and 10% for attitude towards learning. The final assessment accounts for 60% of the total evaluation. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Hu Jian-sheng. Engineering Drawing and AutoCAD (3rd Edition)[M]. Beijing: Mechanical Industry Press, 2024. 2. Hu Jian-sheng. Engineering Drawing and AutoCAD Exercises (Third Edition)[M]. Beijing: Mechanical Industry Press, 2024. 3. Zeng Ping, Ren Zhongwei, Han Zhenggong. Engineering Drawing (Double-color Edition)[M]. Northwestern Polytechnical University Press, 2018. 4. Chang Ming. Descriptive Geometry and Mechanical Drawing (4th Edition)[M], Huazhong University of Science and Technology Press, 2009. 5. Chen Yiping. Mechanical Drawing [M]. Northeast University of Technology Press, 2013. 6. Pang Zhenggang. Mechanical Drawing [M]. Beijing University of Aeronautics and Astronautics Press, 2012. 7. Zhou Kaiqin. Mechanical Parts Handbook (5th Edition)[M]. Higher Education Press, 2006. 8. Zhao Fang, Yang Xiaojin, Luo Yue. SolidWorks 2019 Chinese Edition: Mechanical Design – From Beginner to Expert [M]. People's Posts and Telecommunications Press, 2019. 9. Yang Yugen, Zhu Shimin. Modern Engineering Graphics (3rd Edition)[M]. Beijing University of Posts and Telecommunications Press, 2006.

Core modules of electrical engineering major

Circuit Principles (1)

Module Name	Circuit Principles (1)
Module-based teaching semester	Second Semester
Course Coordinator	Hu Zhongyu, Associate Professor
Language used in teaching	Chinese
Relationship with the curriculum system	Compulsory courses
Teaching methods	Class lectures, practice sessions, and blended online teaching methods
Workload (including contact hours and self-study hours)	(Estimated) Total workload: 152 hours In-person instruction: 72 class hours (64 hours of classroom lectures + 8 hours of laboratory work) Time spent on self-study and exam preparation: 80 class hours
credit points	4.5
Required and recommended prerequisites for taking these modules	Required: Advanced mathematics, basic knowledge of physics from college level. Recommended: Basic computer application skills, basic knowledge of circuits
Module Objectives/Expected Learning Outcomes	Course Objective 1: Students will grasp the basic concepts, laws, and analysis methods of series-parameter circuits. They will also understand the characteristics of AC and DC circuits, as well as theories related to transient and steady-state analysis. Supported graduation requirement indicators: 1.1, 1.3. Course Objective 2: Students should be able to analyze and calculate typical linear/nonlinear circuits; complete basic circuit experiments, and operate electrical instruments correctly. Supported graduation requirement indicators: 1.2, 1.3, 4.3. Course Objective 3: Students will integrate circuit theory with practical operations, thereby developing skills in circuit design and fault analysis. This will provide a solid foundation for subsequent professional

	courses. Supported graduation requirement indicators: 1.3, 2.1.
Module content	1. Basic concepts and laws of circuits (Weight: 20%, Basic level): Circuit components, Kirchhoff's laws, power calculation. 2. Analysis of DC resistance circuits (Weight: 25%, intermediate level): Node voltage method, Mesh current method, Superposition theorem. 3. Analysis of AC circuits (Weight: 30%, intermediate level): Analysis of sinusoidal steady-state situations, three-phase circuits, power factor correction. 4. First-order circuit transient analysis (Weight: 15%, intermediate level): Zero-input response, zero-state response, full response. 5. Circuit experiments (Weight: 10%, Practical level): Basic circuit measurements, AC parameter testing.
Assessment methods	Closed-book exam (50%) + Experimental report (10%) + Regular performance assessment (40%)
Requirements for learning and assessment	Complete all classroom lectures, experiments, and assignments; pass the final written test with a score of 60 or above; the total score must be 60 or above to pass this module.
References/Bibliography	1. 《Circuit Theory》 (9th edition), written by James W. Nelson 2. Circuit Analysis, Author: Qiu Guanyuan 3. "Practical Guidelines for Circuit Experiments", compiled by the Electrical Engineering Teaching and Research Department of Kunming College

Analog electronic technology

Course Name	Analog electronic technology
Semester in which the course is taught	Implementation based on the talent development plan
Course Coordinator	Chen Weimin
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Teaching methods include lectures, simulation-based learning, extracurricular activities, classroom discussions, and self-study exercises.
Workload (including) Teaching hours, as specified in While learning…	Total workload: 56 class hours Teaching hours: 56 hours in total (48 hours for theory courses + 8 hours for practical activities)
credit points	Chinese credit points: 3.5; European credit system credit points: 3.5
Prerequisite courses	Advanced Mathematics, College Physics, Circuit Theory
Course Objectives/ Preliminary Expected learning outcomes	Course Objective 1: To master the basic concepts and theories of analog electronic technology. Familiarize oneself with the characteristics and main parameters of common electronic components, and understand the structure and operating principles of various analog circuits. Supported graduation requirement indicators: 1.1. Course Objective 2: Mastering the analytical methods for analog circuits. Ability to analyze and calculate basic amplification circuits and applications involving integrated operational amplifiers. Ability to correctly use common analog integrated circuits. Supported graduation requirement indicators: 1.1, 1.2, 1.3. Course Objective 3: Ability to analyze and design analog circuit systems. Ability to understand analog circuit diagrams, analyze the functioning of analog systems; ability to use instruments to detect and repair faults in small-scale analog systems; ability to design and create analog systems according to functional requirements. Supported graduation

	requirement indicators: 1.1, 1.3, 2.1, 3.2.
Content	1. Diodes, triodes, and field effect transistors (Weight: 0.15; Required proficiency: Familiarity + Application knowledge) 2. The basic principles of various amplification circuits, frequency response, and circuit feedback mechanisms (Weight: 0.3; Required proficiency: Familiarity + Application level) 3. Composition and operating principles of integrated operational amplifiers. Applications of integrated amplifiers in signal processing, signal generation, and other related tasks (Weight: 0.3; Required proficiency: Familiar + Practical) 4. Rectifier circuits, filter circuits, and voltage regulator circuits (Weight: 0.15; Required proficiency: Familiar + Experienced)
Assessment methods	Learning attitude, classroom discussions, after-class assignments, experiments, case studies from companies, final exams (closed-book exams)
Learning and assessment should follow the guidelines of . Please	1. Process-based assessments (40%): Attendance (10%), classroom discussions (10%), after-class assignments (10%), experiments (10%); 2. Final exam (60%): It is a closed-book exam. 3. Students are required to complete pre-class preparation and post-class review tasks on time. They should also actively participate in classroom discussions, case studies, and analysis of engineering problems. 4. Submit homework on time. It is important to understand the working principles, characteristics, and main parameters of diodes, triodes, and field-effect transistors, as well as the applications of these devices. 5. Understand the structural characteristics of various amplification circuits, as well as the methods for analyzing and calculating their performance. Also, be familiar with the frequency characteristics of amplification circuits. Ability to analyze feedback mechanisms within amplification circuits, and familiarity with common types of typical circuits. 6. Ability to understand the circuit structure and operating principles of integrated operational amplifiers, as well as their applications in signal processing, signal generation, and other related areas. Proficiency in understanding the composition and functions of DC regulated power supplies, as well as the working principles of various rectification, filtering, and voltage regulation circuits. Ability to analyze and design DC power supplies. 7. A total score of 60 points or above is considered passing, and students will receive course credits as a result.
Read a list of items to be considered	Teaching materials: Edited by Yang Suxing. A Concise Course in Basic Analog Electronic Technology (4th Edition)[M]. Beijing: Higher Education Press, 2024. Reference book: [1] Edited by Hua Chengying and Tong Shibai. Basic Analog Electronic Technology. 3rd

	edition. Beijing: Higher Education Press, 2001 [2] Compiled by the Electronic Engineering Teaching and Research Section of Huazhong University of Science and Technology. Edited by Kang Huaguang. Basic Electronic Technology: Analog Section (Fourth Edition). Beijing: Higher Education Press, 2006 [3] Compiled by the Electronics Group of the Basic Electrical and Electronic Teaching Center at Zhejiang University. Edited by Zheng Xiaolong et al. Basic Integrated Electronic Technology Course. 3rd edition. Beijing: Higher Education Press, 2002. [4] Published by the Electronic Science Teaching and Research Group of Xi'an Jiaotong University. Edited by Yang Shuanke. Basic Analog Electronic Technology. Beijing: Higher Education Press, 2003. [5] Published by the Electronic Science Teaching and Research Group of Harbin Institute of Technology. Edited by Cai Weizheng. Basic Electronic Technology. Beijing: Higher Education Press, 2004.

Digital Electronic Technology

Course Name	Digital Electronic Technology
Semester of Classes	Implementation based on the talent development plan
Course Coordinator	Chen Weimin
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Teaching methods include lectures, simulation-based learning, extracurricular activities, classroom discussions, and self-study exercises.
Workload (including) Teaching hours, as specified in While learning…	Total workload: 56 class hours Teaching hours: 56 hours in total (48 hours for theory courses + 8 hours for practical activities)
credit points	Chinese credit points: 3.5; European credit system credit points: 3.5
Prerequisite courses	Advanced Mathematics, College Physics, Circuit Theory, Analog Electronic Technology
Course Objectives/Preliminary Expected learning outcomes	Course Objective 1: To master the basic concepts and theories of digital electronic technology. Familiarize oneself with different number systems and encoding methods. Understand logic functions and their simplification techniques. Become familiar with the characteristics and technical parameters of common gate circuits. Also, understand the logical functions of various comb and sequential logic components, as well as circuits for pulse generation and shaping. Supported graduation requirement indicators: 1.1. Course Objective 2: To master the basic analysis and design methods of digital electronic technology. Ability to analyze and design combinational and sequential logic circuits, and to correctly use commonly used medium-scale integrated circuits. Supported graduation requirement indicators: 1.1, 1.3, 3.1, 3.2. Course Objective 3: Ability to analyze and design digital systems. Ability to understand digital system circuit diagrams, and to analyze the functioning of digital systems. Ability to use instruments and equipment to detect and repair faults in small digital systems. Ability to design and build simple digital systems according to functional requirements. Supported graduation requirement indicators: 1.1, 1.3, 2.1, 3.2.
Content	1. Logical algebra and gate circuits (Weight: 0.30; Required proficiency: Familiarity + Application) 2. Analysis and design of combinational logic circuits. Key

	combinational logic components (Weight: 0.30; Required proficiency: Familiar + Applied) 3. Analysis and design of sequential logic circuits, as well as an understanding of typical sequential logic components (Weight: 0.30; Required proficiency level: Familiar + Applied) 4. Schmitt trigger, monostable oscillator, multivibrator, quartz crystal oscillator (Weight: 0.10; Required proficiency: Familiar + Applied)
Assessment methods	Learning attitude, classroom discussions, after-class assignments, experiments, case studies from companies, final exams (closed-book exams)
Learning and assessment should follow the guidelines of . Please	1. Process-based assessments (40%): Attendance (10%), classroom discussions (10%), after-class assignments (10%), experiments (10%); 2. Final exam (60%): It is a closed-book exam. 3. Students are required to complete pre-class preparation and post-class review tasks on time. They should also actively participate in classroom discussions, case studies, and analysis of engineering problems. 4. Submit homework on time. Master various number systems, code systems, and methods for simplifying logical algebras. Understand the working principles of gate circuits, and become proficient in using gate circuits. 5. Ability to analyze and design combinational logic circuits effectively. Familiarity with common combinational logic circuits, and proficiency in using typical integrated circuits. 6. Understand the working principle of triggers, master the general analysis and design methods for sequential logic circuits. Be familiar with common sequential logic circuits such as counters and registers. Be able to use typical integrated circuits effectively. 7. Understand the structure and logical functions of the 555 timer circuit. Be able to use the 555 circuit to create common pulse generation and shaping circuits. Also, have familiarity with quartz crystal oscillators. 8. A total score of 60 points or above is considered passing, and students will receive course credits as a result.
Read a list of items to be considered	Teaching materials:

	Yu Mengchang (Editor). Basic Digital Electronic Technology Course (4th Edition)[M]. Beijing: Higher Education Press, 2024. Reference book: [1] Edited by Yan Shi. Digital Electronic Technology Basics (5th Edition), Higher Education Press, 2011. [2] Edited by Kang Huaguang. Basic Electronic Technology: Digital Section (Fourth Edition), Higher Education Press, 2008. [3] Edited by Shen Shangxian. Introduction to Electronic Technology, Volume 1. Higher Education Press, 1985. [4] Zhang Duan (ed.). Digital Circuits and Logic Design. Higher Education Press, 1985. [5] Wang Zhigong and Shen Yongchao (eds.). Basic Principles of Integrated Circuit Design. Electronic Industry Publishing House, May 2004. [6] Xu Haijun, Hu Yueshan (eds.). Basic Electronic Technology Supplementary Lectures (Digital Section). Aviation Industry Press, August 2004. [7] Edited by Chen Xinlong. Digital Electronic Technology Basics, Tsinghua University Press, September 2018

Principles of Automatic Control

Course Name	Principles of Automatic Control
Semester of Classes	Fourth Semester
Course Coordinator	Li Yunjuan, Yang Zuyuan, Liu Qingxue, etc.
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Lectures, exercise classes, simulation experiments, and classroom discussions, etc.
Workload (including teaching hours and self-study hours)	Total workload: 48 class hours Teaching hours: 36 hours Self-study hours: 12 hours
credit points	Chinese credit points: 4; European credit system credit points: 6
Prerequisite courses	Advanced mathematics, college physics, circuit theory, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the basic concepts, principles, and typical models of automatic control, and to understand the core concept of feedback control. Supported graduation requirement indicators: 1.1. Course Objective 2: To master the analysis methods of time-domain, frequency-domain, and root locus analysis for linear time-invariant systems. Students should possess the ability to analyze system stability, rapidity, and accuracy. Supported graduation requirement indicators: 1.1, 1.3. Course Objective 3: Master the design methods for typical correction devices, and be able to perform corrections and integrations on single-input, single-output systems. Supported graduation requirement indicators: 1.1, 1.4, 3.1, 3.2. Course Objective 4: Understand the basic theories of state-space methods, and master the process of constructing state equations, solving them, as well as analyzing system controllability and observability. Supported graduation requirement indicators: 1.1, 1.2, 1.3. Course Objective 5: To understand the basic methods for analyzing nonlinear systems and discrete control systems. Students should possess the initial ability to apply control theory to solve practical engineering problems. Supported graduation requirement indicators: 1.3. Course Objective 6: Develop engineering thinking skills, systems analysis and design capabilities, thereby laying a solid theoretical foundation for subsequent professional courses and engineering applications. Supported graduation requirement indicators: 1.3, 3.2.
Content	1. Basic concepts of automatic control (Weight: 0.10): Components of control systems, classifications, basic requirements, history of development. Understanding basic concepts and the development trajectory of control systems. 2. Control system mathematical models (weight: 0.20): differential equations, transfer functions, structural diagrams, signal flow charts, and typical components. It is important to understand the methods for constructing and simplifying these models.

	3. Time-domain analysis methods (weight: 0.20): responses of first-order/second-order systems, stability criteria, steady-state errors, and dynamic performance metrics. It is important to understand time-domain analysis and performance calculations. 4. Frequency Domain Analysis Method (Weight: 0.20): Frequency characteristics, Nyquist criterion, Bode plot, stability margin. Essential knowledge of frequency domain analysis and stability assessment. 5. Root locus method and system correction techniques (Weight: 0.15): Ability to draw root locus diagrams, perform lead/lag correction designs, and understand the methods of root locus analysis and correction. 6. State space analysis (weight: 0.10): state equations, controllability, observability, pole placement – understanding the basic theories and analysis methods. 7. Basics of nonlinear and discrete systems (Weight: 0.05): Concepts related to descriptive functions, basic concepts of sampled systems, and approaches to basic analysis.
Assessment methods	Regular homework, simulation experiment reports, classroom quizzes, and closed-book exams
Requirements for learning and assessment	Complete homework on time, actively participate in classroom discussions and exercises; master the basic theories, methods, and typical examples related to the course. Regular grades account for 30% of the total evaluation, while final exam scores account for 70%. Students who achieve a total score of 60 points or above will receive credits for this course.
Read a list of items to be considered	1. Hu Shousong. Principles of Automatic Control (7th Edition). Scientific Publishers, 2019. 2. Cheng Peng. Principles of Automatic Control (3rd Edition). Higher Education Press, 2020. 3. Wang Hua Yi. Principles of Automatic Control (Second Edition). Mechanical Industry Press, 2018. 4. Liu Bao, Tang Wansheng. Modern Control Theory (3rd Edition). Mechanical Industry Press, 2017. 5. Ogata, K. Modern Control Engineering (5th ed.). Prentice Hall, 2010. 6. Wu Qi. Principles of Automatic Control (Volume 2). Tsing Hua University Press, 2019.

Power electronics technology

Course Name	Power electronics technology
Semester of Classes	Fourth Semester
Course Coordinator	Yang Zuyuan
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Teaching, discussion, self-study, etc.
Workload (including teaching hours and self-study hours)	Total workload: 90 hours Teaching hours: 48 Self-study hours: 42
credit points	Chinese credits: 3; European credit system credits: 3
Prerequisite courses	Circuit theory, electronic technology, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Master the working principles, characteristics, and main parameters of power electronic devices. Master the topology, principles, and parameter calculations of the four basic power conversion circuits: rectification, chopper, inversion, and frequency conversion. Understand the principles of PWM control technology, harmonic suppression, and power factor correction. Gain knowledge of the typical applications of power electronics technology in fields such as new energy and electric power transmission.; Supported graduation requirement indicators: 1.1, 1.2, 1.3. Course Objective 2: Ability to analyze waveforms, calculate parameters, and select appropriate components for typical switching circuits. Ability to create models using simulation software, analyze results, and perform basic experimental operations. Ability to identify common circuit faults, propose preliminary solutions, and have the ability to perform simple engineering design and debugging tasks. Supported graduation requirement indicators: 1.2, 1.3, 1.4, 4.3, 5.1, 5.2, 5.3, 5.4. Course Objective 3: Students should be able to consider the impact of power electronics technology on the power grid, develop awareness of engineering safety, energy efficiency, and environmental protection, and cultivate a rigorous and pragmatic approach to scientific and engineering thinking. Supported graduation requirement indicators: 7.2.
Content	1. Basic concepts of power electronics technology (Weight: 0.05, Requirement Level: Mastery + Understanding) 2. Overview of key power electronics components, operating principles, characteristics, main parameters, and selection criteria (Weight: 0.15; Required level: Mastery + Understanding) 3. Analysis of rectifier circuits (Weight: 0.13, Required level: Proficient + Experienced) 4. Rectifier Circuit Experiment (Weight: 0.12, Difficulty Level: Proficient + Advanced) 5. Analysis of inverter circuits (Weight: 0.08, Difficulty level: Proficient + Advanced) 6. Analysis of DC chopper circuits (Weight: 0.08, Difficulty

	level: Proficient + Advanced) 7. DC chopper circuit experiment (Weight: 0.08; Required level: Proficient + Advanced) 8. Analysis of AC current conversion circuits (Weight: 0.06, Required level: Proficient + Experienced) 9. PWM Control Technology (Weight: 0.15; Required Level: Mastery + Comprehension) 10. Review of relevant literature and application of knowledge (Weight: 0.1, Requirement Level: Mastery + Application)
Assessment methods	Attendance, classroom performance, assignments, experiments, written exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes 4% for attendance, 6% for classroom behavior, 24% for homework, and 8% for laboratory performance. The final assessment accounts for 60% of the total evaluation. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Wang Zhaoan, Liu Jinjun. Power Electronics Technology (6th Edition)[M]. Beijing: Mechanical Industry Press, 2022. 2. Gao Feng, Ding Guangqian, Fang Jingyang. Basics of Power Electronics Technology[M]. Beijing: Mechanical Industry Press, 2023. 3. Ding Shuo. Power Electronics Technology[M]. Beijing: Electronic Industry Press, 2024. 4. Wang Yong. Power Electronics Technology (2nd Edition)[M]. Beijing: Higher Education Press, 2024. 5. He Yikang, Pan Zaiping. Power Electronics Technology (3rd Edition)[M]. Beijing: Science Press, 2019. 6. Liu Yan. Power Electronics Technology[M]. Beijing: Mechanical Industry Press, 2020. 7. Song Wensheng, Zhou Guohua. Power Electronics Technology[M]. Beijing: Science Press, 2024. Wait.

Power system analysis

Course Name	Power system analysis
Semester of Classes	Term 5
Course Coordinator	Wang Lifang
language	Chinese
Nature of the course	Compulsory courses in professional education
Teaching methods	Teaching methods include lectures, experiments, case studies, discussions, and self-study.
Workload (including teaching hours and self-study hours)	Total workload: 120 hours Teaching hours: 72 hours in total (64 hours for theoretical courses + 8 hours for practical activities) Self-study hours: 48
credit points	Chinese credit points: 4.5; European credit system credit points: 5
Prerequisite courses	Circuit theory, motor science, automatic control principles, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To be able to use theoretical knowledge in mathematics, physics, circuits, and electromagnetism to create models of power system components, as well as to perform calculations related to component parameters. Supported graduation requirement indicators: 1.1, 1.2. Course Objective 2: To be able to apply the principles of power systems to address engineering problems related to power system planning, operation, and control. It is necessary to establish mathematical models for power system flow analysis, short-circuit analysis, and stability analysis, and to be able to correctly solve these models. Supported graduation requirement indicators: 1.1, 1.2, 1.3, 2.2. Course Objective 3: To be able to apply the principles of power system analysis to various engineering problems, thereby calculating, analyzing, and determining the operational conditions of power systems under different scenarios. This will help identify the key factors that affect the operation of power systems. Supported graduation requirement indicators: 1.1, 1.2, 1.3, 2.1. Course Objective 4: To be able to apply the basic principles of power system operation and control, and to select appropriate solutions to address engineering problems related to frequency regulation, voltage control, economic operation, and stability management in power systems. Supported graduation requirement indicators: 1.1, 1.3, 1.4. Course Objective 5: To be able to proficiently use power system analysis software to perform Power flow analysis, short-circuit analysis, and stability analysis。 Additionally, students should be able to select appropriate mathematical models for various components of the power system. They should also learn how to use power system analysis software to create graphical models and analyze specific networks. Supported graduation requirement indicators: 1.2, 1.3, 2.2, 5.1, 5.3. Course Objective 6: To learn how to use the power system integrated automation test bench. Students will be able to use the test bench to simulate the startup and operation of generators, as well as the connection of generators to the grid. They will also be able to modify the steady-state operating mode of single-machine-infinity systems, and conduct experiments related to the power characteristics of power systems, as well as the regulation of active and reactive power. Supported graduation requirement indicators: 1.4, 4.3.
Content	1. Overview of power systems, analysis and calculation of power network flows (Weight: 0.2; Required proficiency level: Mastery +

	Application) 2. Adjustment and control of the normal operating mode of the power system (Weight: 0.2; Required proficiency level: Proficient + Familiar) 3. Analysis of power system failures and practical calculations (Weight: 0.2; Required proficiency level: Proficient + Applied) 4. Analysis of power system operational stability (Weight: 0.2; Required proficiency level: Proficient + Familiar) 5. Use power system simulation software to perform power flow analysis, short-circuit analysis, and stability analysis for power systems (Weight: 0.1; Requirement Level: Application + Proficiency) 6. Utilizing the power system integrated automation test bench to perform experiments related to generator grid connection regulation, changes in steady-state operating conditions, active and reactive power regulation, as well as experiments involving power characteristics and power limits of the power system. (Weight: 0.1; Requirement level: Application-based)
Assessment methods	Class performance, in-class learning activities, after-class assignments, experiments, short papers, final exams (closed-book exams)
Requirements for learning and assessment	1. Process-based assessment (40%): Classroom performance (10%), lecture participation (5%), after-class assignments (10%), experiments (10%), and short papers (5%). 2. Final exam (60%): It is a closed-book exam. 3. Students are required to complete pre-class preparation and post-class review tasks on time. They also need to actively participate in classroom interactions (such as those conducted through "Rain Classroom" technology). 4. Students must complete the learning activities associated with each chapter's lessons, as well as the unit tests. The completion rate must exceed 70%. 5. Submit homework on time (the accuracy rate should be above 70%); 6. Complete the experimental procedures and submit the experimental report.

	7. Submit two short papers; 8. A total score of 60 points or above is considered passing, and students will receive course credits as a result.
Read a list of items to be considered	Textbooks: [1] Zhou Renjun. Power System Analysis (4th Edition)[M]. Beijing: China Electric Power Press, 2023. Reference book: [2] He Yangzan. Analysis of Power Systems [M]. Wuhan: Huazhong University of Science and Technology Press, 2019. [3] Xia Daozhi. Analysis of Power Systems [M]. Beijing: China Electric Power Press, 2015. [4] Chen Heng. Steady State Analysis of Power Systems [M]. Beijing: China Electric Power Press, 2017. [5] Chen Heng. Transient Analysis of Power Systems[M]. Beijing: China Electric Power Press, 2019. [6] Liu Tianqi, Qiu Xiaoyan. Theory of Power System Analysis[M]. Beijing: Science Press, 2005. [7] Meng Xiangping. Power System Analysis (2nd Edition)[M]. Beijing: Higher Education Press, 2010. Network resources: [8] China University MOOC, Lecture by Su Hongsheng from Lanzhou Jiaotong University, "Power System Analysis" [9] China University MOOC, Mu Gang from Northeast Electric Power University, "Power System Analysis" [10] China University MOOC, course taught by Hao Liangliang from Beijing Jiaotong University, "Power System Analysis" [11] China University MOOC, Professor Sun Hongbin from Tsing University, "Power System Analysis"

Electric Machinery

Course Name	Electric Machinery
Semester of Classes	Fourth Semester
Course Coordinator	Li Yangqing
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Lectures, discussions, experiments, etc.
Workload (including teaching hours and self-study hours)	Total workload: 120 hours Teaching hours: 72 Self-study hours: 48
credit points	Chinese credit points: 4.5; European credit system credit points: 5
Prerequisite courses	Electrical components of power plants, analysis of power systems, motor theory, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the basic principles, structures, and classifications of motors. Understand the electromagnetic relationships, operating characteristics, and mathematical models of various types of motors (such as DC motors, transformers, asynchronous motors, synchronous motors, etc.). Supported graduation requirement indicators: 1.1. Course Objective 2: To be able to apply theories related to motors to analyze and solve practical engineering problems such as motor selection, operation control, and fault diagnosis. Students should possess basic engineering design and calculation skills. They should be able to conduct research on the performance, parameters, and operating conditions of motors based on scientific principles and using experimental methods. This includes designing experiments, analyzing and interpreting data, and drawing reasonable and effective conclusions through comprehensive information analysis. Supported graduation requirement indicators: 1.1, 1.2, 1.3, 1.4, 2.1, 4.2, 4.3. Course Objective 3: To understand the latest developments and trends in motor technology. To be able to understand and evaluate the impact of engineering practices on environmental and social sustainability, especially those related to complex motor engineering problems. To cultivate awareness of engineering ethics, teamwork skills, and a sustainable approach to engineering. Supported graduation requirement indicators: 1.1, 1.3, 7.1, 7.2.
Content	1. The basic laws of magnetic circuits, as well as the fundamental principles, structures, and classifications of transformers. The electromagnetic relationships, operating characteristics, and mathematical models of transformers. (Weight: 0.05, Required Level: Proficient + Knowledgeable) 2. Characteristics of transformers under no-load and short-circuit conditions, determination of connection groups for three-phase transformers, calculation of load distribution in parallel-connected transformers. (Weight: 0.15; Required level: Proficient + Familiar +

	Application) 3. Test methods for determining transformer parameters (Weight: 0.05; Required level: Familiar + Good understanding) 4. Transformer efficiency ratings and energy-saving technologies. The role of transformers in energy conservation within power systems. Environmentally friendly transformers (Weight: 0.03; Requirement level: Familiarity + Understanding) 5. The basic principles, structure, and classification of AC motors. The electromagnetic relationships, operating characteristics, and mathematical models of AC motors. (Weight: 0.1; Required level: Proficient + Familiar + Application-oriented) 6. Understanding the mechanical characteristics of AC motors, addressing the issue of power-angle stability in synchronous motors, and calculating the reactive power regulation capabilities of synchronous motors (Weight: 0.2; Requirement Level: Proficient + Familiar + Applied) 7. Experimental scheme for testing the characteristics of AC motors. Analyze experimental data of AC motors, obtain performance parameters, and study the impact of various control strategies on motor performance (Weight: 0.1; Requirement level: Proficient + Familiar + Applied) 8. The energy-saving principles of high-performance asynchronous motors, exploration of the application of synchronous motors in new energy generation, and methods for optimizing the efficiency of AC motor systems (Weight: 0.05, Requirement Level: Proficient/Familiar) 9. The basic principles, structure, and classification of DC motors. The electromagnetic relationships, operating characteristics, and mathematical models of DC motors. (Weight: 0.05; Required level: Understanding + Proficiency + Familiarity) 10. The operating characteristic curve of DC motors, used to solve problems related to the design of DC motor speed control systems. This involves calculating the startup resistance parameters of DC motors (Weight: 0.15; Requirement Level: Familiarity + Basic Knowledge) 11. DC motor characteristics testing experiment. This experiment aims to study the impact of different excitation methods on motor characteristics, as well as to analyze the process of commutation and possible ways to improve it. Weight: 0.05; Requirement level: Basic understanding + Proficiency + Familiarity 12. The impact of DC motors on the sustainable development of the environment and society. (Weight: 0.02; Required level: Awareness + Proficiency)
Assessment methods	Calculation method for total score: Course score = Final exam score × 50% + Classroom performance × 8% + Class discussion × 8% + After-class assignments × 8% + Chapter test score × 8%

	+ In-class experiments × 8% + Self-study activities × 10%
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes 5% based on attendance, 5% based on questions asked, 10% based on homework completion, 10% based on participation in discussions, and 10% based on experimental performance. The final assessment accounts for 60% of the total evaluation. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1、Zhao Lihua, Zeng Chengbi. Electrical Engineering[M]. China Electric Power Press, December 2019. 1. Zhang Chi, Pan Binghong, Yang Hongzhi. Road Survey and Design (6th Edition)[M]. Beijing: People's Transportation Publishing House, 2024. 2、 2. Hu Qian-sheng, Hu Min-qiang. Electrical Engineering[M]. China Electric Power Press, July 2019. 3. Ge Baojun. Manuals and Solutions for Learning Electromechanics[M]. China Electric Power Press, December 2021. 4. Li Fahai, Wang Yan. Basics of Electric Motors and Drives (5th Edition)[M]. Tsinghua University Press, 2020. 5. Wang Chengyuan. Modern Motor Control Technology[M]. Mechanical Industry Press, 2015 6. Sun Xudong et al., Analysis of Typical Problems in Electrical Machinery and Practical Simulation Exercises [M]. Mechanical Industry Press, 2018. 7. Wang Xiuhe et al. Electric Machinery[M]. Mechanical Industry Press, 2023, 6 8. Tang Yunqiu, Shi Nai. Electrical Engineering (5th Edition) [M]. Mechanical Industry Press, 2014, 9 9. Huang Lipei et al., eds. Energy-Saving Technology for Motor Systems [M]. Science Press, 2020. 10. Ge Baojun. Electrical Machines [M]. China Electric Power Press, 2020.12

Electrical components of power plants

Course Name	Electrical components of power plants
Semester of Classes	Implementation based on the talent development plan
Course Coordinator	Liu Qingxue
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Lecture teaching, case-based learning, simulation-based education, practical operations, classroom discussions, self-study, and collaborative education between schools and enterprises.
Workload (including) Teaching hours, as specified in While learning…	Total workload: 80 hours Teaching hours: 48 hours in total (42 hours of theory and 6 hours of practice) Self-study hours: 32
credit points	Chinese credits: 3; European credit system credits: 3
Prerequisite courses	Circuit theory, fundamentals of electrical engineering, basics of motors and electric drive systems
Course Objectives/Preliminary Expected learning outcomes	Course Objective 1: To master the basic concepts, structures, and operating characteristics of electrical systems in power plants and substations. It is necessary to be able to apply engineering knowledge related to conductor heating, electrical dynamics, etc., in the selection and calibration of electrical equipment. Supported graduation requirement indicators: 1.1, 1.2. Course Objective 2: To master the design of electrical main circuits in power plants and substations, as well as the design of power distribution systems and the selection of major electrical equipment. Students should be able to conduct comprehensive designs of the electrical components of power plants and substations, and analyze the rationality of main circuit designs, the selection of electrical equipment, and issues related to the operation and maintenance of electrical equipment. Supported graduation requirement indicators: 1.1, 1.3, 1.4. Course Objective 3: To be able to analyze the electrical wiring solutions for power plants and substations, as well as the selection of electrical equipment and their operation and maintenance scenarios, by leveraging the engineering cases provided by TaoXuan Technology. This will enable students to develop skills in comparative analysis, technical judgment, and effective communication. Supported graduation requirement indicators: 1.1, 1.3, 1.4. Course Objective 4: To understand the impact of the design of power plant and substation main circuits, the selection of electrical

	equipment, and the layout of distribution systems on society, the environment, safety, and sustainable development. To foster awareness of safety standards, engineering ethics, and the concept of green development. Supported graduation requirement indicators: 1.1, 7.1, 7.2.
Content	1. Basic concepts of power plants and substations; general overview of the development of the power industry. Basic concepts of conductor heating and electric energy calculation (weight: 0.25; requirement for mastery level: proficient + practical application) 2. The concept of arc and the principle of arc extinction. The structural characteristics, engineering applications, and selection methods of major electrical devices such as switches, conductors, and transformers. (Weight: 0.30; Requirement level: Mastery + Application) 3. Basic requirements for electrical main wiring, power supply wiring methods, typical wiring configurations, operating modes, and comprehensive design approaches. Comparisons of main wiring solutions and analysis of operating modes will be conducted by integrating real-world engineering cases (weight: 0.25; mastery level: Mastery + Application) 4. Basic concepts, basic requirements, layout principles, and typical examples of power distribution devices. Analysis of the configuration and operational requirements of high-voltage switchgear, power distribution devices, and the “five-measures” prevention system in engineering applications (weight: 0.10; proficiency level: familiarized + applied) 5. Utilizing simulation software for power plants and substations to conduct practical training in electrical diagram interpretation and application of electrical equipment, simulation of switchgear operations in substations, and simulation of operations related to 10kV high-voltage switchgear and five-level prevention systems (Weight: 0.10; Requirement Level: Application)
Assessment methods	Learning attitude, classroom discussions, after-class assignments, experiments, case studies from companies, final exams (closed-book exams)
Learning and assessment should follow the guidelines of . Please	1. Process-based assessments (40%): Learning attitude (10%), classroom discussions (10%), after-class assignments (10%), experiments (10%); 2. Final exam (60%): It is a closed-book exam. 3. Students are required to complete pre-class preparation and post-

	class review tasks on time. They also need to actively participate in classroom discussions, case studies, and analysis of engineering problems. 4. It is necessary to submit homework on time. Students should be able to complete tasks such as calculating heat generation in conductors, electrical forces, selecting appropriate electrical equipment, and analyzing main wiring schemes. 5. Complete the analysis of electrical diagrams and the application of electrical equipment. Conduct simulations related to the switching operations of electrical main circuits in substations. Also, carry out simulations related to 10kV high-voltage switchgear and the five-measurement safety system. Finally, submit reports based on the experiments or simulations carried out. 6. Ability to analyze the application of electrical equipment in power plants and substations, main wiring designs, and safety operation standards, by drawing on practical examples from Tao Xuan's technology engineering projects. 7. A total score of 60 points or above is considered passing, and students will receive course credits as a result.
Read a list of items to be considered	Teaching materials: [1] Edited by Miao Shihong and Zhu Yongli. Electrical Systems of Power Plants (5th Edition)[M]. Beijing: China Electric Power Press, 2015. Reference book: [2] Edited by Xiong Xinyn. Electrical Systems of Power Plants (Fourth Edition)[M]. Beijing: China Electric Power Press, 2009. [3] Edited by Yao Chunqiu. Electrical Systems of Power Plants (Second Edition)[M]. Beijing: China Electric Power Press, 2013. [4] Edited by Yao Chunqiu. Electrical Systems of Power Plants (Fourth Edition)[M]. Beijing: China Electric Power Press, 2020. [5] Edited by Zheng Xiaodan. Electrical Systems of Power Plants (3rd Edition)[M]. Beijing: Science Press, 2019. Online Connections and Corporate Resources: [6] National Intelligent Education Public Service Platform, China University MOOC, and other online course resources related to electrical engineering. [7] Simulation software for power plants and substations – educational resources. [8] Tao Xuan Technology's case studies and simulation teaching materials related to school-enterprise cooperation projects.

Electrical control and PLC systems

Course Name	Electrical control and PLC systems
Semester of Classes	Semester 6
Course Coordinator	Li Yangqing
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Lectures, discussions, experiments, etc.
Workload (including teaching hours and self-study hours)	Total workload: 106 hours Teaching hours: 64 Self-study hours: 42
credit points	Chinese credits: 4; European credit system credits: 4.5
Prerequisite courses	Electric machinery theory, principles and applications of microcontrollers, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To understand the composition, operating characteristics, and usage principles of common low-voltage control devices; to master the basic principles and design methods of general electrical control circuits; to be able to implement conventional "relay-contact" electrical control systems for the technological operations of production machinery and equipment. Supported graduation requirement indicators: 3.1, 3.2. Course Objective 2: To understand the electrical control principles of common production machinery and equipment, and to possess the ability to analyze and design electrical systems. To master the standards for installing electrical circuits, and to be able to install, debug, repair, and maintain the electrical control systems of general production equipment. To understand the structure and working principles of PLC programmable controllers, and to master the instruction system of programmable controllers, as well as the methods and techniques for programming ladder diagram programs. To be able to analyze and design sequential control systems for general analog control systems. To have the ability to develop and design electrical control systems for general production equipment, as well as PLC-based systems. Supported graduation requirement indicators: 3.2, 3.3, 5.3. Course Objective 3: To master the proper use of electrical testing instruments and equipment, as well as knowledge of electrical safety practices. To meet the professional requirements of senior electricians in the country, and to possess good professional skills and ethical qualities in the field of electrical engineering. Students should have a passion for science, a spirit of teamwork, and a desire for innovation. Supported graduation requirement indicators: 3.2, 3.3, 5.2, 8.2.
Content	1. The structural composition, operating characteristics, and usage principles of common low-voltage control devices; (Weight: 0.12, Required Level: Proficient + Knowledgeable) 2. The basic principles and design methods of electrical drive control systems; the "relay-contact" electrical control mechanisms used in common industrial machinery devices. (Weight: 0.1; Required level: Proficient + Familiar +

	Application-oriented) 3. Basic knowledge of electrical control systems; analysis of typical equipment circuits and basic control circuits of motors. Principles of design for electrical control systems (Weight: 0.18, Requirement Level: Mastery + Familiarity + Application) 4. Introduction to PLC performance and applications; Basic structure and working principles of PLCs; Classification and development trends of PLCs; (Weight: 0.15, Requirement level: Familiar + Knowledgeable) 5. The performance of FX series PLCs and their hardware configurations; programming components used in FX series PLCs; basic logical instructions available in FX series PLCs (Weight: 0.22, Required level: Proficient + Familiar + Applied) 6. Programming rules for ladder diagrams; experienced methods for designing ladder diagrams and implementing sequential controls; programming techniques for functional instructions; basic format and execution methods of functional commands; common functional modules of FX2N series PLCs; principles and steps for designing PLC control systems; measures to improve the reliability of PLC control systems. (Weight: 0.23; Requirement level: Mastery + Familiarity + Application)
Assessment methods	Calculation method for total score: Course score = Final exam score × 50% + Classroom performance × 8% + Class discussion × 8% + After-class assignments × 8% + Chapter test score × 8% + In-class experiments × 8% + Self-study activities × 10%
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes 5% based on attendance, 5% based on questions asked, 10% based on homework completion, 10% based on participation in discussions, and 10% based on experimental performance. The final assessment accounts for 60% of the total evaluation. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.

Read a list of items to be considered	1. “Electrical Control and PLC Project-Based Training Course” (FX Series) Published by Harbin Institute of Technology in May 2018 2. “Electrical Control and PLC: Textbooks for the ‘13th Five-Year Plan’ for the Development of Applied Talents” published by Northwest University of Technology in 2017 3. “Electrical Control and PLC Applications”: A textbook under the “12th Five-Year Plan” for higher education. Published by Electronic Industry in 2015. 4. “Electrical Control and PLC Application Technology” is a textbook designed under the “12th Five-Year Plan” for higher education. It was published by Electronic Industry Press in June 2015, as the second edition. 5. “Electrical Control and PLC”, edited by Xiong Xingming. Published by Machinery Industry Press, 2011 edition. 6. 'Electrical Control and PLC Applications' (3rd Edition), Chief Editor: Wang Shuying, published by China Machine Press. 7. Factory Electrical Control Technology (4th Edition), Chief Editor: Li Zhen'an, published by Chongqing University Press. 8. “Programmable Controller Applications Technology” (4th Edition), edited by Liao Changchu. Published by Chongqing University Press. 9. Electrical Control and PLC Application Technology (2nd Edition), Chief Editor: Huang Songwei, Publishing House of Electronics Industry 10. “Electrical Control and PLC Project-Based Tutorial” (1st Edition) Chief Editor: Hou Xiuli Publisher: Harbin Institute of Technology Press 11. Liao Changchu. Programming methods and engineering applications of programmable controllers. Chongqing University Press, 2001. 12. Zhang Jiheng. Principles and Applications of Programmable Controllers. China Railway Publishing House, 2007. 13. Zhang Fayu. Applications of Programmable Controllers. Xi’an University of Science and Technology Press, 2006. 14. Zhou Yajun. Electrical Control and PLC Principles and Applications. Xi'an University of Science and Technology Press, 2008. 15. Mitsubishi Corporation of Japan. FX Series PLC Programming Manual (Combined Edition), 2010. 16. Mitsubishi Corporation of Japan. MELSEC-FX2N series PLC User Manual, 2010.

Power system relay protection

Course Name	Power system relay protection
Semester of Classes	Semester 6
Course Coordinator	Yellow Yue
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Lectures, discussions, experiments, etc.
Workload (including teaching hours and self-study hours)	Total workload: 106 hours Teaching hours: 64 Self-study hours: 42
credit points	Chinese credits: 4; European credit system credits: 4.5
Prerequisite courses	Electrical components of power plants, analysis of power systems, motor theory, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the basic requirements of relay protection in power systems. Understand the principles of grid current protection, grid distance protection, grid longitudinal protection, automatic reclosing, power transformer protection, generator protection, and busbar protection. Have the ability to select appropriate relay protection solutions for power systems with different voltage levels. Supported graduation requirement indicators: 2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4, 11.1, 11.2, 11.3. Course Objective 2: To master the calculation methods for current protection, grounding protection, distance protection, longitudinal protection, transformer protection, and generator protection. Ability to adjust the settings and calculate the protection parameters for various equipment in the power system according to actual needs. Familiarity with the debugging methods of relay protection systems. Supported graduation requirement indicators: 2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4, 11.1, 11.2, 11.3. Course Objective 3: To master the configuration of inter-phase short-circuit protection and grounding protection for various components of the power system. It is necessary to be able to analyze and use appropriate primary protection configurations and backup protection schemes for various components of the power grid, thereby optimizing engineering solutions. Supported graduation requirement indicators: 2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4, 11.1, 11.2, 11.3. Course Objective 4: To enable students to master the use of relay protection testing instruments and related equipment. This will help develop students' ability to analyze the operation of relay protection systems. Students will also become familiar with the basic skills required for debugging relay protection devices. As a result, students will gradually become capable of analyzing and solving practical problems related to relay protection systems. Supported graduation requirement indicators: 4.3.
Content	1. Basic knowledge of relay protection systems (Weight: 0.06, Requirement: Mastery + Awareness) 2. Three-stage current protection mechanism (Weight: 0.15; Required level: Proficient + Familiar + Experienced)

	3. Principles and wiring of directional current protection and power direction relays (Weight: 0.08; Required level: Familiar + Knowledgeable) 4. Grounding protection for the power grid (Weight: 0.08; Required level: Familiar + Knowledgeable) 5. Distance protection for power grids (Weight: 0.15; Required level: Proficient + Familiar + Experienced) 6. Vertical protection for power grids (Weight: 0.15; Required level: Proficient + Familiar + Experienced) 7. Automatic reset of the relay protection system (Weight: 0.05; Required level: Familiar + Knowledgeable) 8. Transformer protection (Weight: 0.1, Required level: Proficient/Familiar) 9. Generator protection (Weight: 0.1, Required level: Proficient/Familiar) 10. Bus protection (Weight: 0.06; Required level: Familiar + Knowledgeable) 11. Other protections (Weight: 0.02, Requirement Level: Informational)
Assessment methods	Pre-study, questions, homework, discussions, drawing preparation, closed-book exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes 5% based on attendance, 5% based on questions asked, 10% based on homework completion, 10% based on participation in discussions, and 10% based on experimental performance. The final assessment accounts for 60% of the total evaluation. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Han Xiao. Principles of Relay Protection in Power Systems (3rd Edition)[M]. Beijing: Mechanical Industry Press, 2025. 2. Zhang Baohui, Yin Xianggen. Principles of Relay Protection in Power Systems (2nd Edition)[M]. Beijing: China Electric Power Press, 2010. 3. He Jia Li. Principles of Relay Protection in Power Systems (4th Edition)[M]. Beijing: China Electric Power Press, 2010. 4. Chen Deshu, Zhang Zhe, Yin Xianggen. Microcomputer Relay Protection [M]. Beijing: China Electric Power Press, 2000. 5. Ge Yaozhong. Principles and Technologies of New Types of

	Relay Protection and Fault Location [M]. Xi'an: Xi'an Jiaotong University Press, 2007. 6. Yang Qixun. Basics of Microcomputer Relay Protection [M]. Beijing: China Electric Power Press, 1988. 7. Zhu Shengshi. Principles and Technologies of High-Voltage Power Grid Protection (2nd Edition)[M]. Beijing: China Electric Power Press, 1996. 8. National Electric Power Dispatching and Communication Center. Relay Protection Training Manual for State Grid Corporation of China[M]. Beijing: China Electric Power Press, 2009.

High-voltage technology

Course Name	High-voltage technology
Semester of Classes	Semester 6
Course Coordinator	Wang Lifang
language	Chinese
Nature of the course	Compulsory courses in professional education
Teaching methods	Teaching methods include lectures, experiments, case studies, discussions, and self-study.
Workload (including teaching hours and self-study hours)	Total workload: 54 class hours Teaching hours: 32 (28 hours of theoretical instruction + 4 hours of practical activities) Self-study hours: 22
credit points	Chinese credits: 2; European credit system credits: 2.5
Prerequisite courses	University physics, circuit theory, engineering electromagnetic fields, power system analysis, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To be able to use the principles of university physics, electromagnetic fields, and insulation discharge to explain typical gas insulation discharge phenomena, as well as the aging and degradation processes of liquid and solid insulators. Supported graduation requirement indicators: 2.1, 2.2, 2.3. Course Objective 2: To be able to consider the requirements for evaluating the insulation status of electrical equipment, to select appropriate electrical testing methods, to understand the principles and methods of electrical equipment insulation testing, and to be able to analyze and interpret the test results. Supported graduation requirement indicators: 2.1. Course Objective 3: To be able to understand the mechanisms of overvoltage formation in power systems, and apply these knowledge to the protection against overvoltage in transmission line engineering. Supported graduation requirement indicators: 2.1, 2.2, 2.3, 3.1, 3.2, 3.3. Course Objective 4: To be able to apply circuit theory, basic principles of wave processes, and overvoltage calculation software to analyze overvoltage phenomena in power systems. Supported graduation requirement indicators: 2.1, 2.2, 2.3, 3.1, 3.2, 3.3.
Content	1. Insulation strength of gases, liquids, and solid media (Weight: 0.2; Required level of mastery: Proficient + Familiar + Applied) 2. Electrical equipment insulation testing (Weight: 0.2; Required proficiency levels: Proficient, Familiar, Basic) 3. Atmospheric overvoltage and its protection measures (Weight: 0.4; Required proficiency level: Master + Apply + Familiar)

	4. Internal overvoltages in power systems and their prevention measures (Weight: 0.2; Required proficiency level: Master + Apply + Familiar)
Assessment methods	Note down the situation during class, performance in class activities, learning during 幕课, homework after class, experiments, and final exams (closed-book exams).
Requirements for learning and assessment	1. Process-based assessment (40%): Note-taking behavior (5%), classroom performance (10%), experimental activities (10%), seminar participation (5%), and after-class assignments (10%) 2. Final exam (60%): Closed-book exam 3. Students must take careful notes during class, noting down the key points and difficult concepts, as well as any additional information provided by the teacher. 4. Complete pre-class preview and post-class review tasks on time, and actively participate in classroom interactions (Rain Classroom). 5. Complete the learning tasks and unit tests for each chapter (the completion rate should be above 70%); 6. Submit homework on time (the accuracy rate should be above 70%); 7. Complete the experimental procedures and submit the experimental report. 8. A total score of 60 points or above is considered passing, and students will receive course credits as a result.
Read a list of items to be considered	Teaching materials: [1] Liu Qingxue. High Voltage Technology [M]. Chongqing: Beijing University of Aeronautics and Astronautics Press, 2023. Reference book: [2] Wu Guangning. High Voltage Technology [M]. Beijing: Mechanical Industry Press, 2023. [3] Shi Weier. Basics of High-Volt Engineering (2nd Edition)[M]. Beijing: Higher Education Press, 2017.

	[4] Zhou Zecun. High Voltage Technology [M]. Beijing: Water Resources and Hydropower Publishing House, 2019. [5] Tao Jinsong. Guide to High-Voltage Engineering Studies[M]. Beijing: China Electric Power Press, 2016. National standards and guidelines: [6] GB 311.1-2012 Insulation Coordination. Part 1: Definitions, Principles, and Rules[S]. 7) GB/T 311.2-2013 Insulation compatibility – Part 2: Guidelines for application[S]. 8) GB/T 507-2002 Insulated oil: Method for determining breakdown voltage [S]. [9] GB/T 11021-2014 Electrical insulation – Heat resistance and methods of representation[S]. [10] GB 50057-2010 Design Code for Lightning Protection of Buildings [S]. [11] GB/T 50064-2014 Design specifications for overvoltage protection and insulation coordination in AC electrical systems[S]. [12] GB/T 50065-2011 Design Code for Grounding of AC Electrical Equipment[S]. [13] GB 50545-2010 Design Code for 110kV~750kV Overhead Transmission Lines[S]. [14] DL/T 596-2021 Preventive Maintenance Procedures for Electric Equipment [S]. Network resources: [15] China University MOOC, course “High Voltage Technology” taught by Southwest Jiaotong University, https://www.icourse163.org/course/SWJTU-1206508804

Automation of power systems

Course Name	Automation of power systems
Semester of Classes	Semester 6
Course Coordinator	Liang Shibin
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Teaching, experiments, discussions, self-study, etc.
Workload (including teaching hours and self-study hours)	Total workload: 90 hours Teaching hours: 48 Self-study hours: 32
credit points	Chinese credits: 3; European credit system credits: 3.5
Prerequisite courses	Circuit theory, power system analysis, motor science, power electronics technology, automatic control principles, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the basic theories of automatic control systems in power systems; to understand the principles of parallel operation of synchronous generators, excitation control, frequency and active power regulation, as well as voltage and reactive power control. Familiarize oneself with the basic theories and technical systems related to power system dispatching automation, distribution network automation, comprehensive automation of substations, and safety automation devices. Supported graduation requirement indicators: 3.3. Course Objective 2: Students should be able to analyze the operating principles of automatic control devices in power systems by referring to domestic and international literature related to complex power system problems. They should also be able to conduct experiments and debugging on typical automatic control devices such as generator grid connection and excitation regulation systems. Additionally, students should be capable of designing new types of power system automatic control devices using modern tools, and analyzing the feasibility of these designs. Supported graduation requirement indicators: 2.3, 3.2. Course Objective 3: Students will be familiar with the technical standards, norms, procedures, national policies, and laws and regulations related to power automation systems, cultivating a rigorous and pragmatic engineering attitude as well as a pursuit of excellence; they will establish professional qualities of safe electricity use and reliable power supply; possess teamwork and innovative spirit, and be able to serve the high-quality development of the power industry with an engineer's professionalism.; Supported graduation requirement indicators: 3.2, 3.3.
Content	1. Introduction (Weight: 0.02, Difficulty Level: Basic Knowledge): Basic concepts, development history, and overall structure of automation in power systems. 2. Synchronous generator automatic paralleling (Weight: 0.10; Required proficiency level: Proficient + Familiar + Applied): Principles of quasi-synchronous paralleling, devices for maintaining a constant excitation time, digital paralleling systems.

	3. Synchronous generator excitation automatic control system (Weight: 0.15; Requirements: proficient knowledge + familiarity with the system + ability to apply it): components of the excitation system, establishment of the rotor magnetic field and demagnetization process, excitation regulator, stability controller for the excitation system, and stability controller for the power system. 4. Automatic adjustment of power system frequency and active power (Weight: 0.18; Required proficiency levels: Proficient + Experienced + Expert): Characteristics of power system frequency, frequency modulation methods and equations, economic load distribution, low-frequency load reduction, and frequency control technology systems. 5. Voltage regulation and reactive power control techniques in power systems (Weight: 0.08; Requirement Level: Proficient + Familiar + Applied): The significance of voltage control, the relationship between reactive power balance and voltage levels, automatic voltage control, comprehensive voltage control, and optimal control of reactive power sources. 6. Power system scheduling automation (Weight: 0.17, Requirement Level: Familiar + Knowledgeable): Scheduling automation system architecture, remote terminals, data communication protocols, computer systems for scheduling centers, automatic power generation control, and EMS network analysis capabilities. 7. Automation in power system distribution and supply (Weight: 0.15, Requirements: Familiarity + Understanding): Distribution management systems, feeder automation, load control and demand management, geographic information systems for distribution network data, remote automatic meter reading, comprehensive automation of substations, digital substations, and fault diagnosis and location of distribution network failures. 8. Power system safety automation devices (Weight: 0.15, Required proficiency level: Proficient/Familiar): Overview of safety automation devices, automatic reclosing systems, automatic switching of backup power sources, automatic disconnection devices, fault recording devices, and small-current grounding detection devices.
Assessment methods	After-class assignments, laboratory reports, classroom discussions, and final written exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final exam score × 60%. 3. The proportion of performance-based assessment scores is 40%. This includes 10 points for learning attitude, 10 points for classroom discussions, 10 points for after-class assignments, and 10 points for experimental reports.

	The final exam accounts for 60% of the total score. The assessment method is a closed-book exam. 5. Both the periodic assessments and the final exam are scored on a percentage-based scale.
Read a list of items to be considered	1. Zhang Hengxu, Shi Fang, Shi Xiaohan. Power System Automation (2nd Edition)[M]. Beijing: Mechanical Industry Press, 2023. 2. Wang Kui, Sun Ying. Automation in Power Systems [M]. Beijing: China Electric Power Press, 2004. 3. Li Xianbin. Power System Automation (6th Edition)[M]. Beijing: China Electric Power Press, 2014. 4. Yang Guancheng. Principles of Automatic Control Systems in Power Systems (4th Edition)[M]. Beijing: China Electric Power Press, 2009. 5. Liu Dong et al. Object-Oriented Automation of Power Systems [M]. Beijing: China Electric Power Press, 2009. 6. Li Yan Song. Power System Automation. Beijing: China Electric Power Press, 2014. 7. Technical Regulations for Relay Protection and Safety Automation Devices: GB/T 14285-2023 [S]. Beijing: State Administration of Market Regulation, National Standardization Management Committee, 2023. 8. Automatic Synchronization Equipment General Technical Standards: DL/T 1348-2014 [S]. Beijing: China Electric Power Press, 2014.

Detection and conversion technologies

Course Name	Detection and conversion technologies
Semester of Classes	Implementation based on the talent development plan
Course Coordinator	Chen Weimin
language	Chinese
Nature of the course	Professional elective courses
Teaching methods	Teaching, experiments, extracurricular activities, classroom discussions, self-study, etc.
Workload (including) Teaching hours, as specified in While learning…	Total workload: 40 class hours Teaching hours: 40 hours in total (32 hours for theory courses + 8 hours for experiments)
credit points	Chinese credit points: 2.5; European credit system credit points: 2.5
Prerequisite courses	Advanced Mathematics, College Physics, Circuit Theory, Analog Electronic Technology, Digital Electronic Technology
Course Objectives/ Preliminary Expected learning outcomes	Course Objective 1: To understand the definition, components, classification, and development trends of sensors. To grasp the static and dynamic characteristics of sensors, as well as common technical indicators. To cultivate high-quality talents with a sense of teamwork and craftsmanship. Supported graduation requirement indicators: 1.1. Course Objective 2: Able to design basic testing and build signal processing systems; Supported graduation requirement indicators: 3.2. Course Objective 3: Ability to conduct preliminary fault analysis and troubleshooting on specific automation systems. Supported graduation requirement indicators: 1.3, 2.1.
Content	1. Composition of the measurement and control system; measurement errors; accuracy of instruments (weight: 0.30; required proficiency: familiarization + application) 2. The concept, composition, classification, characteristic parameters, and frequency

	characteristics of sensor detection systems (Weight: 0.30; Difficulty level: Familiarity + Application). 3. The experimental principles and measurement methods of common sensors (Weight: 0.30; Requirement level: Familiarity + Application)
Assessment methods	Attendance checks, classroom discussions, after-class assignments, experiments, final exams (open-book exams)
Learning and assessment should follow the guidelines of . Please	1. Process-based assessments (40%): Attendance (10%), classroom discussions (10%), after-class assignments (10%), experiments (10%); 2. Final exam (60%): Open-book exam; 3. Students are required to complete pre-class preparation and post-class review tasks on time. They also need to actively participate in classroom discussions and analyze engineering problems. 4. Submit homework on time to understand the basic principles of various sensors. 5. Understand the application scenarios of various common sensors, as well as their accuracy levels. 6. Complete the experiments and debugging of all sensors. 7. A total score of 60 points or above is considered passing, and students will receive course credits as a result.
Reading list	Teaching materials: Sun Haiming et al. Editor-in-Chief. Sensor and Detection Technology [M]. Harbin: Harbin Institute of Technology Press, 2025. Reference book: [1] Edited by Jiang Quansheng. Sensor and Detection Technology, [M]. Hefei: University of Science and Technology of China Press, 2013. [2] Chang JianSheng et al. eds. Detection and Conversion Technology. Beijing: Mechanical Industry Press, 2006. [3] Wu Jianping. Principles and Applications of Sensors. Beijing: Mechanical Industry Press, 2016. 3rd edition. [4] Matthew Shu, Sensor and Detection Technology, [M]. Hangzhou: Zhejiang University Press, 2012 [5] Zhou Xingpeng, “Sensors and Detection Technology”, [M]. Beijing: Tsinghua University Press, 2010

Principle and Application of Microprocessor

Module designation	*Principle and Application of Microprocessor*
Semester(s) in which the module is taught	*Fourth Semester*
Course Coordinator	*Wang Wei*
Language	*Chinese*
Relation to curriculum	*Specialisation compulsory*
Teaching methods	*Lecture, discussion, experiment, etc.*
Workload (incl. contact hours, self-study hours)	*Total workload: 48 hours* *Contact hours: 24* *self-study hours: 24*
Credit points	*Chinese credits: 3; ECTS credits: 3*
Required and recommended prerequisites for joining the module	*Circuit Principle, C Language Programming, etc.*
Module objectives/intended learning outcomes	Course Objective 1: Master the composition, pin functions, and working principles of microcontrollers; Supported graduation requirement indicators: 1.1, 1.2, 1.3, 1.4, 3.1, 3.2, 3.3. Course Objective 2: Master the characteristics, structure, and modular programming methods of microcontroller program design; Supported graduation requirement indicators: 1.1, 1.2, 1.3, 1.4, 3.1, 3.2, 3.3. Course Objective 3: Master the internal functions and external interface applications of microcontrollers, and become familiar with microcontroller development tools and procedures; Supported graduation requirement indicators: 1.1, 1.2, 1.3, 1.4, 3.1, 3.2, 3.3.
Content	*1. Basic concepts, characteristics, and structural programming fundamentals and algorithms of microcontrollers. (weight: 0.24, requirement level: familiarity + understanding)* *2. Programming languages for microcontrollers (weight: 0.33, requirement level: mastery + familiarity + application)* *3. General I/O, interrupts, and timing of microcontrollers. (weight: 0.23, requirement level: mastery + familiarity + application)* *4. Serial communication of microcontrollers (weight: 0.1, requirement level: mastery + familiarity + application)* *5. Peripheral interface expansion of microcontrollers (weight: 0.1, requirement level: familiarity + understanding)*
Examination forms	*Assignments, experiments, discussions, 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 × 40% +*

	summative assessment score × 60%. *3. Formative assessment accounts for 40%, including assignments 10%, experiments 10%, discussions 10%, learning attitude 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 are graded on a 100-point scale.*
Reading list	*1. Lin Li, Zhang Junliang. Principles and Applications of Microcontrollers—Based on Proteus Simulation [M]. Beijing: Electronic Industry Press, 2022.* *2. Zhang Yigang. Principles and Applications of Microcontrollers—C51 Programming + Proteus Simulation [M]. Beijing: Higher Education Press, 2012.* *3. Wu Yifeng, Chen Dewei. Principles and Interface Technology of Microcontrollers [M]. Beijing: Electronic Industry Press, 2014.* *4. Ding Xiangrong. Principles and Interface Technology of Microcontrollers—Based on STC15F Series Microcontrollers [M]. Beijing: Electronic Industry Press, 2012.* *5. Tan Haoqiang, Zhang Jiwen. C Programming Language Tutorial. Beijing: Higher Education Press, 2006.* *6. Ma Zhongmei, Ji Shunxin, Zhang Kai. C Language Application Programming for Microcontrollers [M]. Beijing: Beihang University Press, 2007.* *7. Wei Lifeng, Wang Baoxing. Principles and Application Technology of Microcontrollers [M]. Beijing: Peking University Press, 2006.* *8. Wang Jingxia. Application Technology of Microcontrollers (C Language Edition) [M]. Beijing: Electronic Industry Press, 2009.* *9. Su Jiajian, Cao Bairong, Wang Zhifeng. Principles and Application Technology of Microcontrollers [M]. Beijing: Higher Education Press, 2004.* *10. Yu Bin. Principles and Interface Technology of Microcontrollers [M]. Beijing: Posts and Telecom Press, 2008.* *11. Li Quanli. Principles and Interface Technology of Microcontrollers [M]. Beijing: Higher Education Press, 2009.* *12. Chen Guiyou. Principles and Interface Technology of Microcontrollers [M]. Beijing: Higher Education Press, 2012.* *etc.*

Introduction to Electrical Engineering

Course Name	Introduction to Electrical Engineering
Semester of Classes	First Semester
Course Coordinator	Yellow Yue
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Teaching, discussion, self-study, etc.
Workload (including teaching hours and self-study hours)	Total workload: 28 class hours Teaching hours: 16 Self-study hours: 12
credit points	Chinese credits: 1; European credit system credits: 1
Prerequisite courses	Nothing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To understand the basic concepts, theories, and professional developments in the field of electrical engineering and its automation. Students should also be familiar with the training programs, as well as the technical standards, intellectual property rights, and industrial policies related to the field of electrical engineering. Supported graduation requirement indicators: 6.1. Course Objective 2: To understand the knowledge structure and system of the field of Electrical Engineering and Automation. To comprehend the training objectives and positioning of professionals in this field. To gain knowledge about the curriculum of Electrical Engineering and Automation. To understand the domestic and international trends and research hotspots in the field of Electrical Engineering. Supported graduation requirement indicators: 6.1, 6.2. Course Objective 3: To understand the main disciplines of electrical engineering and its automation, as well as the corresponding major professions and industries. Students should have a sense of career planning. They should possess the ability for self-study, including the ability to understand technical issues, summarize information, and ask questions, in order to adapt to the needs of society and the development of the electrical engineering industry. Supported graduation requirement indicators: 12.2.
Content	1. Overview of Electrical Engineering and Related Disciplines (Weight: 0.25, Requirement Level: Proficient/Familiar) 2. Overview and Development of Power Electronics Technology and Electric Drive Systems (Weight: 0.18, Requirement Level: Familiar+Basic Knowledge) 3. Overview and Development of the Secondary Discipline of Electrical Motors and Controls (Weight: 0.13, Requirement Level: Familiar+Knowledgeable) 4. Overview and Development of the Secondary Discipline of Power Systems and Its Automation (Weight: 0.18, Requirement Level: Familiar+Basic Knowledge) 5. Overview and Development of High-Vacuum and Insulation Technology (Weight: 0.13; Required Level:

	Familiar+Knowledgeable) 6. Overview and Development of Electrical Engineering Theory and New Technologies (Weight: 0.13, Requirement Level: Familiar + Knowledgeable)
Assessment methods	Pre-study, asking questions, discussing topics, self-study, submitting study reports, final exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 70% + Final assessment score × 30%. 3. The performance-based assessment accounts for 70% of the total score. This includes 10% based on discussions, 10% based on questions asked, 10% based on previewing materials, and 40% based on learning reports. 4. The final assessment accounts for 30% of the total score. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Ge Baojun et al. Introduction to Electrical Engineering and Its Automation [M]. Beijing: Mechanical Industry Press, 2020. 2. Xiong Xinnian. Introduction to Electrical Engineering[M]. Beijing: China Electric Power Press. 2008. 3. Fan Yu. Introduction to Electrical Engineering[M]. Beijing: Higher Education Press, 2006. 4. Sun Yuanzhang et al. Entering the Electrical World – An Introduction to Electrical Engineering and Automation [M]. China Electric Power Press, 2009. 5. Liu Dichen et al., Basics of Electrical Engineering [M]. Wuhan: Wuhan University of Technology Press, 2002. 6. Jia Wenchao, Introduction to Electrical Engineering[M]. Xi'an: Xi'an University of Science and Technology Press, 2007.

Professional Expansion and Cutting-edge Technology Modules

Circuit Principles (2)

Module Name	Circuit Principles (2)
Module-based teaching semester	Second Semester
Course Coordinator	Chai Bin, Lecturer
Language used in teaching	Chinese
Relationship with the curriculum system	investigation
Teaching methods	Class lectures, practice sessions, and blended online teaching methods
Workload (including contact hours and self-study hours)	(Estimated) Total workload: 104 hours In-person instruction: 64 class hours (64 hours of classroom lectures) Time spent on self-study and exam preparation: 40 class hours
credit points	Nothing
Required and recommended prerequisites for taking these modules	Required: Advanced mathematics, basic knowledge of physics from college level. Recommended: Basic computer application skills, basic knowledge of circuits
Module Objectives/Eanticipated Learning Outcomes	Course Objective 1: Students will grasp the basic concepts, fundamental laws, and common analysis methods of series-parameter circuits. They will also understand the basic characteristics of AC and DC circuits, as well as the basic theories of transient and steady-state analysis. Supported graduation requirement indicators: 1.1, 1.3. Course Objective 2: Students should be able to analyze typical circuits using circuit theory, perform basic circuit experiments and simulations, and correctly use common electrical measurement instruments. Supported graduation requirement indicators: 1.3, 4.3.

	Course Objective 3: Students should be able to combine theoretical knowledge with practical training, thereby developing skills in circuit analysis, simple circuit design, and problem-solving in engineering contexts. This will lay the foundation for further studies in related professional courses. Supported graduation requirement indicators: 1.3.
Module content	1. Basic concepts and laws of circuits (Weight: 20%, Basic level): Circuit components, Kirchhoff's laws, power calculation. 2. Analysis of DC resistance circuits (Weight: 30%, intermediate level): Node voltage method, Mesh current method, Superposition theorem. 3. Analysis of AC circuits (Weight: 30%, intermediate level): Analysis of sinusoidal steady-state situations, three-phase circuits, power factor correction. 4. First-order circuit transient analysis (Weight: 20%, intermediate level): Zero-input response, zero-state response, full response.
Assessment methods	Closed-book exam (60%) + Performance during regular classes (40%)
Requirements for learning and assessment	Complete all classroom lectures and assignments; pass the final written exam with a score of 60 or above; only those who meet these requirements will be considered successful in this module.
References/Bibliography	1. 《Circuit Theory》 (9th edition), written by James W. Nelson 2. Circuit Analysis, Author: Qiu Guanyuan 3. "Circuit Study Guide and Exercise Solutions (4th Edition)" Tsinghua University Press, 2023

AC/DC speed control system

Course Name	AC/DC speed control system
Semester of Classes	Semester 6
Course Coordinator	Yang Zuyuan
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Teaching, discussion, self-study, etc.
Workload (including teaching hours and self-study hours)	Total workload: 90 hours Teaching hours: 48 Self-study hours: 42
credit points	Chinese credits: 3; European credit system credits: 3
Prerequisite courses	Circuit theory, electronic technology, motor science, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Master the composition of DC and AC speed regulation control systems, the torque control laws, and the load torque characteristics of production machinery. Be able to analyze the operating principles and speed regulation characteristics of DC speed regulation systems under open-loop speed control, as well as the existing problems. Be able to analyze the operating principles and speed regulation characteristics of DC speed regulation systems with closed-loop speed control and dual closed-loop control of current and speed.; Supported graduation requirement indicators: None. Course Objective 2: To be able to conduct relevant experiments using experimental equipment or simulation software, and to observe and analyze the results of these experiments. Students will be able to design DC speed control systems with dual-loop control mechanisms for current and rotational speed. Supported graduation requirement indicators: None. Course Objective 3: To understand the pollution caused by AC/DC speed control systems on the power grid, as well as the measures taken to mitigate this issue. Students should develop an awareness of environmental protection. Supported graduation requirement indicators: None.
Content	1. Basic concepts of AC/DC speed control systems (Weight: 0.1, Requirement level: Mastery + Understanding) 2. Steady-state speed regulation performance metrics and analysis of open-loop systems (Weight: 0.2, Requirement level: Mastery + Comprehension) 3. Experiment on DC speed control system with open-loop speed control (Weight: 0.06; Required level: Mastery + Application) 4. Analysis of DC speed control systems with closed-loop speed regulation mechanism (Weight: 0.15; Required level: Proficiency + Application) 5. Experimental study of DC speed control systems with closed-loop speed regulation (Weight: 0.06; Required level: Mastery + Application) 6. Analysis of DC speed control systems with rotational speed and current feedback control (Weight: 0.15; Required level: Proficiency + Application) 7. Experiment on DC speed control system with dual closed-loop control of speed and current (Weight: 0.08; Requirement level: Mastery +

	Application) 8. Design of DC speed control systems with rotational speed and current feedback control (Weight: 0.1; Required level: Proficient + Applied) 9. Review of relevant literature and application of knowledge (Weight: 0.1, Requirement Level: Mastery + Application)
Assessment methods	Attendance, classroom performance, assignments, experiments, written exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes 4% for attendance, 6% for classroom behavior, 24% for homework, and 8% for laboratory performance. The final assessment accounts for 60% of the total evaluation. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Reading list	1. Gu Chunlei, Chen Zhong, Chen Chong. Automatic Control Systems for Electric Drive Systems and MATLAB Simulation (3rd Edition), Tsinghua University Press, 2021. 2. Li Zheng, Ma Lixin. Simulation and Experiments of Automatic Control Systems for Electric Drive Systems, China Electric Power Press, 2022. 3. Pan Yuedou, Li Qing, Li Huade. Automatic Control Systems for Electric Drive Systems, 3rd Edition (National Standard Textbook). Mechanical Industry Press, 2021. 4. Wang Binrui, Li Jing, Zhou Kun, Xu Hong. Motion Control Systems, Tsinghua University Press, 2020. 5. Song Wenxiang. Motion Control Systems (2nd Edition), Tsinghua University Press, 2024. 6. Gu Hexiang. Applications and Case Studies of Motion Control Systems, Mechanical Industry Press, 2022. Wait.

Professional Practice and Engineering Training Module

Engineering Training

Module projects	Detailed content
Module Name	Engineering Training (Metalworking Practice)
Semester in which the course is taught	First Semester
Course Coordinator	An Yu
Language used in teaching	Chinese
Course system affiliation	Compulsory Course in Professional Education Practice
Teaching methods	Practical training, demonstration teaching, on-site guidance, error correction during practice, and summary of training results
The number of hours spent on work and the amount of work done	**Total workload: 32 class hours. Of these, 32 hours are spent on practical training activities, including 10 hours of handiwork practice, 10 hours of lathe work practice, 10 hours of welding practice, and 2 hours spent on drafting internship reports. All these hours are dedicated to hands-on practical teaching. Time for self-study includes preparation before the training session, reviewing training materials, discussing and resolving issues encountered during the training, and finalizing and refining internship reports. This also includes time spent reinforcing key training concepts.**
credit points	1 credit points
Prerequisite requirements	There are no prerequisites required. This module is suitable for freshmen. You only need to have basic engineering skills, a willingness to engage in hands-on activities, and a basic understanding of safety precautions to participate in this module.
Module	Course Objective 1: Students should be able to establish a mindset of

Objectives/Eanticipated Learning Outcomes	safety in production and prioritizing quality in engineering projects. They should develop rigorous, standardized, and safe practices in engineering operations. Additionally, students should understand the connection between engineering practices and the sustainable development of the ecological environment and society. They should possess basic professional skills in engineering. Supported graduation requirement indicators: 6.2. Course Objective 2: Students should be able to understand the basic characteristics of handcrafting techniques, as well as the application scenarios and related tools and measuring instruments. They should also master the operation methods of core handcrafting processes such as cutting, filing, marking, and drilling. Students should be able to independently complete the processing of basic handcrafted components. Supported graduation requirement indicators: 6.1, 6.2, 9.1, 9.2. Course Objective 3: Students should understand the technological characteristics and application scope of turning processing. They should also be familiar with the structure and model parameters of horizontal lathes. Students should be able to operate the lathe equipment properly, and have the ability to independently manufacture simple shaft components. Supported graduation requirement indicators: 9.1, 9.2. Course Objective 4: Students should master the process and technical characteristics of arc welding, as well as its applications. They should be familiar with the structure and functions of welding electrodes and welding equipment. Students should also be able to recognize common types of welding joints and groove configurations. They should be capable of independently performing the debugging of welding equipment and basic welding tasks. Additionally, students should be able to identify common welding defects and their causes. Supported graduation requirement indicators: 9.1, 9.2. Course Objective 5: Students should be able to actively participate in teamwork within multidisciplinary training scenarios, communicate effectively with others, and complete training tasks either individually or in groups. They should possess basic skills in team leadership, organization, and professional communication across different scenarios. Supported graduation requirement indicators: 9.1, 9.2.
Module content	This module requires a total of 32 class hours. It consists of four core training modules, with the content allocated according to reasonable weights, aiming to meet the needs of cultivating practical skills in the field of electrical engineering and its automation. The specific content is as follows: 1. Hand-hammer manufacturing training (10 class hours, 30% weight): This module focuses on teaching students about the structure of tools such as bench vise and other equipment, as well as safety operation procedures. Students will undergo practical training in sawing, filing, marking lines, drilling, etc. They will also learn how to use and maintain tools like vernier calipers, micrometers, and height gauges, thereby strengthening their practical skills in carpentry work. 2. Turning hammer handles training (10 class hours, 30% weight): This module teaches students about the structure, working principles, and safety procedures of C6132 horizontal turning machines. Students will undergo practical training in turning simple shaft-like parts, including hammer handles. This training aims to help students develop skills in standard operation of turning machines and control of turning processes. 3. … (The rest of the content seems to be missing

	here.)Arc welding practice session (10 hours, 30% of the total score): This session focuses on introducing the usage of BX1 AC arc welding machines and welding tools. It also covers the characteristics of welding electrodes, as well as the types of welding joints and groove configurations. Practical welding exercises are conducted to demonstrate how to perform butt joint welding. The session also discusses the causes and prevention methods for common welding defects, thereby enhancing students' practical skills in welding. 4. Writing of internship reports (2 hours, 10% of the total score): Students are required to summarize the content of the entire training session, their experiences during practical operations, and key technical points. They must fill out the internship manual carefully and complete a comprehensive engineering training report. This report should summarize the knowledge acquired during the training session and practical engineering experience. The focus of this section is on practical skills related to mechanical processing. At the same time, it also emphasizes safety awareness and the cultivation of craftsmanship skills. This approach is suitable for students at the early stages of their undergraduate studies, who need to develop basic engineering skills.
Assessment methods	It involves a comprehensive assessment process, with no final exam at the end of the semester. The assessment includes three main aspects: practical training performance, daily behavior, and the quality of documentation completed.
Requirements for passing the learning and assessment courses	1. Participated in all training sessions throughout the process. There were no instances of absence or improper operation. Strictly followed all safety and production regulations in the training workshops. 2. Successfully completed the practical tasks related to carpentry, turning, and welding. The quality of the processed components met standards, and all operations were carried out in accordance with standardized procedures. 3. Completed the internship handbook thoroughly and accurately. Submitted high-quality internship reports on time. The summary of the training experience was genuine and relevant to the actual work performed. 4. The overall performance, quality of the components processed, and completion of documentation all contributed to meeting the qualifying criteria. Only those who meet these criteria can pass the assessment for this module. Score composition: 100 points total. Of this, 10 points are awarded for training performance and report quality, 30 points for carpentry training, 30 points for turning training, and 30 points for welding training.
References/Bibliography	1. 《Metalworking Practice Course》, edited by Gao Qi, Mechanical Industry Press, 2021. 2. 《Metalworking Practice

	Core Skills Training Series》, edited by Gao Qi, Mechanical Industry Press, 2016. 3. 《Metalworking Practice Course for Excellent Engineers》, edited by Wang Haocheng, Tsinghua University Press, 2015. 4. 《Metalworking Practice Course (3rd Edition)》, edited by Yu Wenqiang et al., Tsinghua University Press, 2015. 5. 《Metalworking Practice》, edited by Jing Yuhai, Beihang University Press, 2011. 6. Self-compiled training materials for the course.	

Professional awareness and internship experience

Course Name	Professional awareness and internship experience
Semester in which the course is taught	Second Semester
Course Coordinator	Li Yunjuan, Huang Yue, Yang Zuyuan
language	Chinese
Nature of the course	Professional Education Practice Course
Teaching methods	On-site visits, corporate research, specialized lectures, and interactive discussions, etc.
Workload (including teaching hours and self-study hours)	Total workload: 16 class hours Teaching hours: 8 hours Self-study hours: 8 hours
credit points	Chinese credits: 2; European credit system credits: 3
Prerequisite courses	Advanced Mathematics, College Physics, Engineering Drawing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To understand the nature of the discipline in this field, the educational goals, knowledge system, as well as the current status and trends in the industry's development. Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.1, 5.2, 5.3, 5.4. Course Objective 2: To become familiar with professional-related companies, production processes, typical equipment, technology applications, and engineering management models. Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.1, 5.2, 5.3, 5.4. Course Objective 3: To develop an intuitive understanding of professional engineering practices, and to enhance professional identity and motivation for learning. Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.1, 5.2, 5.3, 5.4. Course Objective 4: To gain a basic understanding of engineering professional ethics, safety standards, and industry norms. This will help develop engineering skills and a sense of responsibility. Supported graduation requirement indicators: 3.3. Course Objective 5: Ability to write internship reports and summarize internship experiences, as well as improved skills in observation, analysis, and written communication. Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.1, 5.2, 5.3, 5.4.
Content	1. Professional knowledge education (weight: 0.20): This includes information on professional training programs, curriculum structure, industry trends, and career prospects. You will gain an understanding of the overall framework and development prospects of the profession. 2. Corporate visits and internships (weight: 0.50): opportunities to observe typical production processes, equipment, automation systems, and quality control measures. This helps to gain practical experience in real-world engineering scenarios. 3. Special lectures and discussions (Weight: 0.20): Latest industry technologies, engineering cases, career planning, safety regulations, understanding of professional technical

	skills and career requirements. 4. Writing of internship summaries and reports (Weight: 0.10): Organizing materials, analyzing problems, recording experiences and insights, and preparing reports. It is important to master the techniques for writing effective internship summaries and reports.
Assessment methods	Internship attendance, performance on-site, internship logs, internship reports
Requirements for learning and assessment	Attend internship activities on time, and comply with the rules and regulations of both the company and the school. Observe and record observations carefully, engage in active communication and thoughtful discussions. Submit a complete internship log and internship report. The performance during the internship period accounts for 40%, while the internship report accounts for 60%. Students who achieve a total score of 60 points or above will be awarded credits for this course.
Reading list	1. Curriculum for cultivating professionals in this field, based on official school materials, and includes the latest updates. 2. Industry Development Reports (2024–2025), published by industry associations. 3. Enterprise safety management regulations, GB series of standard documents. 4. Engineering Ethics and Professional Competencies, Higher Education Press, 2022.

Electrical Equipment and Manufacturing Practice

Course Name	Electrical Equipment and Manufacturing Practice
Semester in which the course is taught	Second Semester
Course Coordinator	Yellow Yue
language	Chinese
Nature of the course	Professional Education Practice Course
Teaching methods	Teaching, guidance, and accompanying exercises, etc.
Workload (including teaching hours and self-study hours)	Total workload: 28 class hours Teaching hours: 16 Self-study hours: 12
credit points	Chinese credits: 0.5; European credit system credits: 1
Prerequisite courses	Circuit Principles (1)
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the principles of working with basic circuit components, various analysis methods, and debugging techniques. Also, to understand the methods of circuit equivalence transformations. Supported graduation requirement indicators: 5.1, 5.2, 5.3, 5.4, 8.1, 8.2, 8.3. Course Objective 2: To be able to correctly use common electronic instruments and meters, to master the selection and testing of electronic components, and to understand the basic methods for testing electronic circuits. Supported graduation requirement indicators: 5.2. Course Objective 3: Ability to access electronic device manuals and online resources related to electronic devices. Ability to properly process measurement data, draw circuit diagrams, and write training reports that meet the required standards. Supported graduation requirement indicators: 5.3. Course Objective 4: To initially learn how to analyze, identify, and troubleshoot faults in electrical circuits. To understand and apply the requirements of electrical safety standards. Supported graduation requirement indicators: 5.1, 5.2, 5.3, 5.4, 8.1, 8.2, 8.3.
Content	1. Familiarity with the operating principles of various basic circuits in small electronic devices and Arduino systems. Ability to demonstrate programming methods (Weight: 0.22, Requirement Level: Familiar+Basic Knowledge) 2. Have a basic understanding of common electronic components, and be able to perform manual soldering on electronic components (Weight: 0.25; Requirement Level: Proficient + Familiar + Experienced) 3. Demonstrating the design of basic circuit components. Students will be asked to draw circuit diagrams and learn how to design printed circuit boards. Any questions students may have during this process will be addressed. (Weight: 0.25; Requirement Level: Proficient + Familiar + Application-oriented)

	4. Self-installation of electronic components for welding, debugging of circuits, and programming of programs into the Arduino development board. Assistance is provided in addressing any issues that students may encounter during this process. (Weight: 0.18; Requirement Level: Proficient + Familiar + Application-oriented) 5. Students are asked to test and use the small electronic devices they have created. They also need to think about ways to expand the functionality of these devices (Weight: 0.1, Requirement Level: Proficient + Familiar + Basic)
Assessment methods	Pre-study, questions, discussions, programming exercises, welding exercises, safety operations, projects, training reports.
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 70% + Final assessment score × 30%. 3. The performance-based assessment accounts for 70% of the total score. This includes 5% for discussions, 5% for questions, 5% for previewing materials, 5% for programming exercises, 5% for safety operations, 15% for welding exercises, and 30% for final projects. 4. The final assessment accounts for 30% of the total score. The assessment is based on the training reports submitted by students. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Reading list	1. Lin Xiujie, Huang Xiangben (eds.). Practical Electronic Assembly Techniques [M]. Beijing: Mechanical Industry Press, 2017 2. Gao Xuanyi, Editor-in-Chief. Electronic Internship Tutorial [M]. Beijing: Higher Education Press, 2020 3. Murata Corporation. Manual Welding Training Manual[M]. Beijing: People's Post and Telecommunications Press, 2010 4. Zhang Dabiao, Editor-in-Chief. Electronic Technology Skills Training [M]. Beijing: Electronic Industry Press (3rd Edition), 2015 5. Edited by Chen Xiaoyu and Hou Yinshan. Electronic Skills and Training [M]. Beijing: People's Posts and Telecommunications Press, 2012

Course Design of C Language Programming

Module designation	*Course Design of C Language Programming*
Semester(s) in which the module is taught	*Third Semester*
Course Coordinator	*Wang Wei*
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: 32 hours* *Contact hours: 16* *self-study hours: 16*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*C Language Programming*
Module objectives/intended learning outcomes	Course Objective 1: Master the methods and steps of program design and project development using an integrated development environment; become proficient in program editing, compilation, linking, execution, and debugging; Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.1, 5.2, 5.3, 5.4. Course Objective 2: Deepen the understanding of fundamental programming concepts, integrate related knowledge points, enhance the ability to connect theory with practice, and cultivate problem analysis, problem-solving skills, and teamwork spirit; Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.1, 5.2, 5.3, 5.4.
Content	*1. Installation and use of integrated development environments, establishment and management of project workspaces, program editing, compilation, linking, execution, and debugging. (weight: 0.4, requirement level: mastery + familiarity + application)* *2. Data types, expressions, operations, and three basic program structures in C language, functions, data structures, and file reading/writing. (weight: 0.2, requirement level: mastery + familiarity + application)* *3. Overall project design, functional implementation of modules, and report summarization. (weight: 0.4, requirement level: mastery + familiarity + application)*
Examination forms	*Discussions, questioning, practical operations, 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 × 40% +*

	summative assessment score × 60%. *3. Formative assessment accounts for 40%, including discussions 10%, questioning 10%, practical operations 10%, learning attitude 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 are graded on a 100-point scale.*
Reading list	*1. Tan Haoqiang. C Programming (5th Edition) [M]. Tsinghua University Press, 2017.* *2. Tan Haoqiang. C Programming (5th Edition) Study Guide [M]. Tsinghua University Press, 2017.* *3. Chen Meng, Bao Shudi. C Language Programming Thinking [M]. Tsinghua University Press, 2019.* *4. Wang Haibin, Liu Xia. C Language Programming Fundamentals Tutorial [M]. Electronic Industry Press, 2018.* *5. Lv Haiyang, Zhang Zhifen, Liu Jingnan. National Computer Rank Examination Training Textbook (Level 2 C) [M]. Electronic Industry Press, 2016.* *6. Chen Dongfang. C Language Programming Fundamentals [M]. Tsinghua University Press, 2010.* *7. Cai Qixian. Fundamentals of Computer Programming (C Language Edition) [M]. Tsinghua University Press, 2012.* *8. Chen Liang, Huo Wei, Wu Tao. C Language Programming [M]. Electronic Industry Press, 2020.* *9. Liu Qiang, Tong Qi. C Language Programming Experiment Tutorial [M]. Electronic Industry Press, 2018.* *10. Sun Chengxiu, Wang Chunhong. C Language Programming Case Tutorial [M]. Electronic Industry Press, 2020.* *11. Zhao Jianhui, Li Guohe, Zhang Xiumei. C Language Study Guide and Practice [M]. Electronic Industry Press, 2018.* *12. He Yichen, Gu Wanrong. C Language Programming from Beginner to Expert [M]. Electronic Industry Press, 2018.* *etc.*

Mathematical modeling and MATLAB simulation

Module projects	Detailed content
Module Name	Mathematical modeling and matlab simulation
Semester in which the course is taught	Based on the professional talent cultivation plan
Course Coordinator	Liu Qingxue
Language used in teaching	Chinese
Course system affiliation	Compulsory Course in Professional Education Practice
Teaching methods	Case studies, classroom discussions, hands-on practice, practical training exercises, stage-based quizzes, and project-based activities.
The number of hours spent on work and the amount of work done	**Total workload: 16 class hours** **Class hours: 16 hours in total, all dedicated to practical training. The specific allocation is as follows: 4 hours for basic Matlab knowledge, 6 hours for data acquisition and visualization, and 6 hours for modeling analysis and simulation.** **Self-study hours: Includes after-class practical exercises with software, review of modeling cases, debugging of programming code, completion of training reports, and further study of modeling algorithms. These hours are dedicated to self-study and consolidation of knowledge.**
credit points	0.5 credits
Prerequisite requirements	I have completed the courses in Advanced Mathematics, Probability Theory and Statistical Methods, and Linear Algebra. I possess a solid mathematical foundation, including capabilities in arithmetic, data analysis, and model construction. Additionally, I have basic computer

	operation skills.
Module Objectives/Anticipated Learning Outcomes	Course Objective 1: Students will become proficient in the basic operations of the Matlab software. They will be able to independently create arrays and matrices, perform various operations such as searching, sorting, and calculating values. They will also master data statistics and basic data processing techniques. Additionally, they will develop skills in creating, fitting, and solving polynomials. Students will be able to use Matlab to perform basic mathematical calculations and data processing. They will also be able to identify and analyze the key aspects of engineering problems based on their mathematical knowledge. Supported graduation requirement indicators: 2.1, 5.1, 5.3. Course Objective 2: Students should become proficient in using Matlab to read data from Excel, TXT, and other formats. They should also be able to perform data visualization and analysis. Additionally, students should be able to apply their skills to real-world electrical engineering scenarios, transforming complex engineering problems into mathematical models. They should be able to effectively use algorithms such as regression analysis, clustering analysis, and optimization techniques to solve problems. Students should also master the use of Simulink for modeling and simulation. Finally, they should have the ability to use modern simulation tools to solve practical electrical engineering problems and analyze simulation results. Supported graduation requirement indicators: 2.2, 5.1, 5.4.
Module content	The total number of class hours in this module is 16. The focus is on practical training throughout the course. The objectives of the two major courses are clearly defined, with emphasis on the application of Matlab tools and the development of simulation skills in electrical engineering. The specific content of each module is as follows: 1. Basic Matlab Knowledge (4 class hours, 40% weight): This module focuses on core operations related to arrays and matrices in Matlab. Topics include array creation, searching, sorting, arithmetic operations, matrix construction, and various matrix operations. We will also cover basic data processing and statistical methods. Additionally, we will discuss key concepts related to polynomial creation, manipulation, fitting, and solving. Through practical exercises, students will enhance their ability to perform basic Matlab calculations and handle data. This will help them develop the necessary skills for breaking down engineering problems and constructing models. 2. Data acquisition and visualization module (6 class hours, 30% weight): The focus will be on teaching techniques for reading external data in Matlab, including methods for importing data in Excel and TXT formats. Practical skills for visualizing basic data and data distributions will also be taught. Through practical exercises, students will gain the ability to quickly obtain engineering data and visualize data patterns, thereby laying a solid data foundation for subsequent modeling and analysis. 3. Modeling analysis and simulation module (6 class hours, 30% weight): Focus on modeling practical engineering problems. Explain classic modeling algorithms such as linear/nonlinear regression models, K-means clustering analysis, and linear/nonlinear programming methods. Teach Simulink visualization modeling and simulation exercises, guiding students through the entire process of "practical engineering problems → mathematical abstraction → model construction → simulation solution →

	result analysis". This approach aligns with the needs of modern tools in the field of electrical engineering and helps solve practical engineering problems. The overall content aligns well with the practical application scenarios of electrical engineering. It combines software operations, mathematical modeling, and engineering simulations, thereby being suitable for training students in engineering tool applications at the undergraduate level.
Assessment methods	It involves a comprehensive evaluation process, with no final exam. The evaluation includes four aspects: classroom performance, classroom discussions, stage-based tests, and practical training reports.
Requirements for passing the learning and assessment courses	1. Participate fully in all hands-on training sessions and teaching activities. Follow classroom rules, maintain a positive learning attitude, and actively engage in classroom discussions. 2. Complete all training tasks and quizzes on time, and master the practical skills related to each module. The results of the training should be accurate and consistent. 3. Complete the training report as required. The report should be comprehensive, with accurate data and proper formatting. It should clearly describe the process of the experiment and the analysis of its results. 4. Only those who score 60 points or above in the overall assessment will pass this module's assessment. Evaluation criteria: The total score is 100 points. The process assessment accounts for 40% of the total score (including classroom performance, discipline, discussions, and periodic quizzes), while the practical training report accounts for 60%. For each course objective, the weight is 40% for objective 1 and 60% for objective 2. The scores for each objective are calculated separately, and then combined to determine the final total score.
References/ Bibliography	1. Zhuo Jinwu et al. "MATLAB for Mathematical Modeling and Practice", Beijing University of Aeronautics and Astronautics Press, 2023 2. Liu Rengen. MATLAB and Mathematical Experiments (2nd Edition), National Defense Industry Press, 2014 3. Li Xin. MATLAB Mathematical Modeling. Tsinghua University Press, 2017. 4. Yu Shengwei. MATLAB Mathematical Modeling: Classic Cases and Practical Applications. Tsinghua University Press, 2014. 5. Wu Libing. MATLAB Data Analysis Methods (2nd Edition). Mechanical Industry Press, 2017 6. Jiang Qiyuan. Mathematical Models (5th Edition). Higher Education Press, 2016

Integrated Electronic Technology Course Design

Course Name	Integrated Electronic Technology Course Design
Semester in which the course is taught	Implementation based on the talent development plan
Course Coordinator	Chen Weimin
language	Chinese
Nature of the course	Professional elective courses
Teaching methods	Teaching, experiments, design, simulation, classroom discussions, self-study, etc.
Workload (including) Teaching hours, as specified in While learning…	Total workload: 32 class hours Teaching hours: 32 hours in total (4 hours for theoretical courses + 28 hours for practical courses)
credit points	Chinese credits: 1; European credit system credits: 1
Prerequisite courses	Advanced Mathematics, College Physics, Circuit Theory, Analog Electronic Technology, Digital Electronic Technology
Course Objectives/ Preliminary Expected learning outcomes	Course Objective 1: To master the use of common electronic circuit design simulation software, such as Multisim and Protues. Additionally, students should be able to create schematic diagrams for small electronic circuits, as well as perform tests and simulations on various parameters and waveforms. Supported graduation requirement indicators: 3.2, 5.1, 5.2, 5.3, 5.4. Course Objective 2: To master the design, simulation, PCB fabrication, soldering, installation, and troubleshooting of electronic circuit systems. To possess the rigorous work ethic and professional ethics required of a skilled electronic engineer. To have a sense of teamwork and patriotism. Supported graduation requirement indicators: 3.2, 5.4.

Content	1. Use Multisim to simulate typical analog circuits (Weight: 0.30; Requirement level: Familiarity + Application). 2. Use Protues to simulate typical analog and digital circuits (Weight: 0.30; Difficulty level: Familiarity + Application). 3. Mastering basic electronic circuit design techniques (Weight: 0.40; Required proficiency level: Familiar + Applied)
Assessment methods	Attendance, class discussions, assignments, experiments, and experiment reports
Learning and assessment should follow the guidelines of . Please	1. Process-based assessments (40%): Attendance (10%), Class assignments (20%), Experiments (10%); 2. Experimental Report (60%); 3. Students are required to complete the assigned tasks on time, and actively participate in classroom discussions and analysis of engineering problems. 4. Master the design methods of basic electronic circuits. 5. A total score of 60 points or above is considered passing, and students will receive course credits as a result.
Reading list	Teaching materials: Wang Junjie et al. (eds.). Electronic Integrated Practice and Innovation [M]. Beijing: Tsinghua University Press, 2023. Second edition. Reference book: [1] A Concise Course in Analog Electronic Technology (3rd Edition)[M]. Published by the Electronic Science Research Group of Tsinghua University, edited by Yang Suxing. Published by Higher Education Press, 2006. [2] Mutisim9 Basic Electronic Technology Simulation Experiments [M]. Zhao Chunhua, Zhang Xuejun. Mechanical Industry Press. 2007 [3] Digital Electronic Technology Simulation, Experiments, and Course Design[M]. By Zhang Hongmei. Chongqing University Press. 2017 [4] Protues Tutorial – Electronic Circuit Design, Board Layout, and Simulation[M]. By Zhu Qinghui, Zhang Fengrui, Zhai Tiansong, Wang Zhikui. Tsinghua University Press. 2016

Integrated design of control system modeling and simulation

Course Name	Integrated design of control system modeling and simulation
Semester in which the course is taught	Term 5
Course Coordinator	Yang Zuyuan
language	Chinese
Nature of the course	Professional Education Practice Course
Teaching methods	Teaching, guidance, and practical project implementation etc.
Workload (including teaching hours and self-study hours)	Total workload: 60 class hours Teaching hours: 32 Self-study hours: 28
credit points	Chinese credits: 1; European credit system credits: 2
Prerequisite courses	Automatic control theory, power electronics technology, fundamentals of motor drive, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To be able to comprehensively apply mathematical and physical theories, and based on the operating principles of electrical equipment, to establish a mathematical model for the entire system, as well as to analyze its stability. Supported graduation requirement indicators: 2.1, 2.2, 2.3, 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4. Course Objective 2: To be able to use simulation software to analyze, design, and simulate automatic control systems, as well as to interpret and analyze the simulation results. Supported graduation requirement indicators: 5.1, 5.2, 5.3, 5.4. Course Objective 3: To be able to independently complete one's own design by researching literature and discussing it with teachers and classmates. Ultimately, to develop solutions to complex engineering problems in the field of electrical engineering. Supported graduation requirement indicators: 2.3, 4.1.
Content	1. Using simulation software to perform control system modeling, model conversion, and stability analysis. Also, implementing series correction techniques (weight: 0.3, required level: proficient + understanding + application). 2. Use simulation software to perform frequency-domain analysis of control systems. Also, use simulation software to model DC speed control systems (Weight: 0.3; Requirement Level: Proficiency + Application) 3. Use simulation software to conduct simulation analysis of typical components, including the DC speed control system (Weight: 0.4; Requirement Level: Proficiency + Application)
Assessment methods	Attendance tracking, classroom discussions, classroom discipline, stage-based assessments, design reports
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course.

	2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes 4% for attendance, 4% for classroom discussions, 8% for classroom discipline, and 24% for periodic assessments. The final assessment accounts for 60% of the total evaluation. The basis for the assessment is based on the design reports submitted by the students. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Reading list	1. Yang Ping et al. Principles of Automatic Control – Experiments and Applications. [M]. Beijing: China Electric Power Press, 2019. 2. Xiong Xiaojun. Experimental Course in Automatic Control Principles (Hardware Simulation and MATLAB Simulation)[M]. Beijing: Mechanical Industry Press, 2020. 3. Wang Jianhui, Wang Yanting. Comprehensive Experiments in Automatic Control Principles[M]. Beijing: Tsinghua University Press, 2020. 4. Hong Niegang. Simulation Techniques for Power Electronics and Motor Control Systems[M]. Beijing: Mechanical Industry Press, 2010. 5. Yuan Qingqing. MATLAB and Simulation of Power Electronics Systems[M]. Shanghai: Shanghai Science and Technology Press. 2021. 6. Chen Zhong. Simulation of Power Electronics and AC/DC Speed Control Systems Using MATLAB (2nd Edition)[M]. Beijing: Tsinghua University Press, 2019. 7. Lin Hua. Experimental Course in Automatic Control Principles[M]. Xi'an: Xi'an University of Science and Technology Press, 2020. Wait.

Electrical Control and PLC Course Design

Course Name	Electrical Control and PLC Course Design
Semester in which the course is taught	Semester 6
Course Coordinator	Li Yangqing
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Lectures, discussions, experiments, etc.
Workload (including teaching hours and self-study hours)	Total workload: 56 class hours Teaching hours: 32 Self-study hours: 24
credit points	Chinese credits: 1; European credit system credits: 2
Prerequisite courses	Motor science, electrical control, and PLC etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To be able to fully understand and accurately draw the schematic diagrams of General Electric's control systems. Students should have a clear understanding of various concepts in electrical control, such as starting and stopping mechanisms, self-locking functions, dual-starting methods, electrical interlocks, mechanical interlocks, interlocks between components, and the use of parallel and series connections for control switches. Students should also be proficient in using CAD software for electrical engineering, and able to use basic drawing commands and editing tools to create diagrams of electrical components, as well as engineering drawings (electrical schematics, layout diagrams of electrical components, and electrical installation diagrams). Students should be familiar with and comply with the national standards for electrical engineering drawings. Electrical engineering drawings are created using specified graphic symbols, text symbols, and drawing methods. Through practical training in the installation, wiring, debugging, and operation of relay-based electrical control circuits, students will gain a solid understanding of electrical safety protection measures. As a result, students will be able to effectively perform practical operations related to electrical wiring, installation, and fault repair. Supported graduation requirement indicators: 5.1, 5.3. Course Objective 2: Students will undergo practical training in PLC applications related to industrial production control and commercial/Civilian Electrical Control Requirements. They must complete the design of entire PLC control systems and ensure that the PLC programs are properly tested and validated. The design of a PLC control system should include basic elements such as an introduction to control principles, I/O allocation tables, external wiring diagrams, sequence functions, timing diagrams, ladder diagrams, and instruction lists. The programs written must be complete, concise, and versatile. Supported graduation requirement indicators: 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4, 9.1, 9.2. Course Objective 3: To gain a deep understanding of the importance of electrical equipment, to enhance sense of responsibility towards society, to develop awareness of safety issues, and to foster professional ethics in engineering. The course aims to cultivate students' love for their country,

	their homes, and society as a whole, as well as their sense of responsibility to save energy and prioritize safety. Supported graduation requirement indicators: 9.1, 9.2.
Content	1. The structural composition, operating characteristics, and usage principles of common low-voltage control devices; (Weight: 0.1, Requirement Level: Proficient + Knowledgeable) 2. The basic principles and design methods of electrical drive control systems; the "relay-contact" electrical control mechanisms used in common industrial machinery devices. (Weight: 0.2; Required level: Proficient + Familiar + Application-oriented) 3. Application of relay control systems (Weight: 0.2, Requirement Level: Proficient + Familiar + Experienced) 4. Introduction to PLC performance and applications; Basic structure and working principles of PLCs; (Weight: 0.1, Requirement level: Familiar + Knowledgeable) 5. The performance of FX series PLCs and their hardware configurations; programming components of FX series PLCs; basic logical instructions used in FX series PLCs (Weight: 0.1, Required level: Proficient + Familiar + Applied) 6. PLC control system design (Weight: 0.3; Required level: Proficient + Familiar + Applied)
Assessment methods	Calculation method for total score: Total score = Classroom performance × 8% + Discussion skills × 8% + Report submission × 8% + In-class test score × 8% + Safety compliance criteria × 8% + Final assessment score × 60%.
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The proportion of performance-based assessments is 40%. This includes 8 points for classroom activities, 8 points for discussion skills, 8 points for reports, 10 points for in-class quizzes, and 8 points for compliance with safety regulations. The final assessment accounts for 60% of the total evaluation. The assessment method involves an operational defense session. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.

Read a list of items to be considered	1. 《Electrical Control and PLC Engineering Applications》 (FX Series). Published by Mechanical Industry Press in June 2016. 2. “Electrical Control and PLC Project-Based Training Course” (FX Series). Published by Harbin Institute of Technology in May 2018. 3. “Electrical Control and PLC: Textbooks for the ‘13th Five-Year Plan’ for the Development of Applied Talents” published by Northwest University of Technology in 2017 4. “Electrical Control and PLC Applications”: A textbook under the “12th Five-Year Plan” for higher education. Published by Electronic Industry in 2015. 5. “Electrical Control and PLC Application Technology”. A textbook under the “12th Five-Year Plan” for higher education. Published by Electronic Industry Press in June 2015, 2nd edition. 6. "Electrical Control and PLC Project-Based Tutorial" (1st Edition), Chief Editor: Hou Xiuli, Publisher: Harbin Institute of Technology Press 7. Mitsubishi Corporation of Japan. FX Series PLC Programming Manual (Combined Edition), 2010. 8. Mitsubishi Corporation of Japan. MELSEC-FX2N Series PLC User Manual, 2010.

Configuration Control Technology Training

Course Name	Configuration Control Technology Training
Semester in which the course is taught	Semester 6
Course Coordinator	Li Yangqing
language	Chinese
Nature of the course	Professional compulsory courses
Teaching methods	Lectures, discussions, experiments, etc.
Workload (including teaching hours and self-study hours)	Total workload: 28 class hours Teaching hours: 16 Self-study hours: 12
credit points	Chinese credits: 0.5; European credit system credits: 1
Prerequisite courses	Motor science, electrical control, and PLC etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Basic Concepts and Characteristics of Configuration Control Technology; Supported graduation requirement indicators: 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4, 12.1, 12.2. Course Objective 2: Establishing five essential components: database, configuration interface, operating strategies, device connections, and main control system. Supported graduation requirement indicators: 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4, 12.1, 12.2. Course Objective 3: Basic Steps for Establishing an Engineering Configuration Project; Supported graduation requirement indicators: 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4, 12.1, 12.2. Course Objective 4: Establishment and Design of Various Automation System Configuration Screens; Supported graduation requirement indicators: 4.1, 4.2, 4.3, 4.4, 5.1, 5.2, 5.3, 5.4. Course Objective 5: Proficiency in modern instruments, information technology tools, engineering tools, and simulation software. Development of teamwork skills. Supported graduation requirement indicators: 5.1, 5.2, 5.3, 5.4.
Content	1. Understanding of configuration software; (Weight: 0.1, Requirement Level: Proficient + Knowledgeable) 2. Real-time database management, user window configuration, operating strategy setup, device window configuration, and master window configuration (weight: 0.2; required level: proficient+familiar+basic knowledge). 3. Implementing automatic control for liquid level systems in single-capacity water tanks using MCGS technology (Weight: 0.3; Required level of expertise: Proficient + Familiar + Applied) 4. Selecting topics for students to design independently (Weight: 0.3; Requirements: proficient knowledge + familiar understanding + basic knowledge)

Assessment methods	Calculation method for total score: Total score = Classroom performance × 8% + Discussion skills × 8% + Report submission × 8% + In-class test score × 8% + Safety compliance criteria × 8% + Final assessment score × 60%.
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The proportion of performance-based assessments is 40%. This includes 8 points for classroom activities, 8 points for discussion skills, 8 points for reports, 10 points for in-class quizzes, and 8 points for compliance with safety regulations. The final assessment accounts for 60% of the total evaluation. The assessment method involves an operational defense session. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Reading list	1、Meng Qingyi. Basics and Applications of MCGS Configuration Software [M]. Shanghai Jiao Tong University Press, 2025. 2、Cao Hui. Configuration Software Technology and Applications. Electronic Industry Publishing House, August 2019. 3、3. Design and debugging of computer monitoring systems – Configuration control technology (4th edition). Electronic Industry Publishing House. 2021. 4、Kunlun Tongtai. MCGS General Version User Manual [Z]. Kunlun Tongtai Official Version. 5、Kunlun Tongtai. MCGS Embedded Version (TPC Series) User Manual [Z]. Official version by Kunlun Tongtai. 6、Liu Changguo, Huang Junqiang. MCGS Embedded Configuration Application Technology (2nd Edition)[M]. Mechanical Industry Press, 2026. 7. Li Hongping. Industrial Control Configuration Technology and Applications – MCGS (Third Edition)[M]. Xi'an University of Science and Technology Press, 2023.

Comprehensive design of electrical engineering drafting

Course Name	Comprehensive design of electrical engineering drafting
Semester of Classes	Semester 7
Course Coordinator	Wang Lifang, Huang Yue
language	Chinese
Nature of the course	Professional Education Practice Course
Teaching methods	Teaching, discussion, guidance, etc.
Workload (including teaching hours and self-study hours)	Total workload: 106 class hours Teaching hours: 64 Self-study hours: 42
credit points	Chinese credits: 2; European credit system credits: 2
Prerequisite courses	Power system analysis, power system relay protection, electrical components of power plants
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Students should possess skills in computer-aided drawing and instrument-based drawing techniques. They should also be able to effectively use graphic symbols in electrical diagrams, as well as master the methods and skills involved in interpreting and creating common electrical system diagrams, circuit diagrams, and wiring diagrams. Students should understand the principles of computer-aided drawing processes and general drawing techniques. Additionally, the course aims to develop students' spatial imagination and practical skills in reading and drawing diagrams. It also seeks to enhance students' abilities in spatial analysis and solving spatial geometry problems. Supported graduation requirement indicators: 5.2, 5.3. Course Objective 2: Through the overall design of power substations, students will gain proficiency in power supply design methods. They will become familiar with national policies and regulations related to technical and economic aspects, as well as safety guidelines and measures. Students will also be trained to utilize various regulations, design manuals, and technical materials effectively. Their ability to prepare technical documents and create drawings will be enhanced. Basic training in power supply system design for electrical technicians will be completed. Students will understand and become familiar with the engineering concepts, design methods, and procedures related to electrical components and systems. Additionally, they will gain practical experience in primary engineering techniques. Supported graduation requirement indicators: 3.1, 3.2, 3.3, 5.3, 6.1, 6.2. Course Objective 3: To gain a basic understanding of electrical automation control in rail transit systems, safety aspects of power distribution, and the operation of various equipment. Students will be able to apply their knowledge of electrical systems to analyze and understand the practical aspects of rail transit electrification, intelligent electrical control technologies, and related electrical equipment. After graduation, students will be capable of working in fields such as rail transit power distribution systems and control, as well as automatic detection, as applied professionals. Supported graduation requirement indicators: 3.3, 6.2.
Content	1. Be able to master the basic operations of the AutoCAD software, and complete the drawing of component diagrams.

	Have a good understanding of the drawing methods for ordinary mechanical figures. Be able to create diagrams for basic electrical components and symbols. Master the layout and planning of electrical wiring diagrams (Weight: 0.15, Requirement Level: Familiar + Basic Knowledge) 2. Familiarity with the drawing methods for common equipment and components in electrical engineering drawings, as well as the representation of terminals and wires. Students will use software to create several electrical engineering drawings under the guidance of the instructor. Questions encountered during the process will be addressed by the instructor. (Weight: 0.25; Requirement Level: Proficient + Familiar + Application) 3. Students should be familiar with the national standards, regulations, and specifications related to electrical engineering. They should also be able to create electrical installation drawings. Exercises involving case studies on electrical engineering projects are provided to encourage students to work independently or in groups. The goal is to develop students' abilities in writing technical documents and creating drawings (Weight: 0.45; Requirements: proficient knowledge, familiarity, and application skills) 4. Visit the rail transit power distribution system. Gain an understanding of the power distribution system in rail transit, as well as the basics of rail transit electrical automation control, power distribution safety, and the operation of operating equipment. Analyze and become familiar with the practical problems in related fields such as rail transit electrification, intelligent electrical control technology in rail transit, and rail transit electrical equipment. (Weight: 0.15; Requirement Level: Familiarity + Application)
Assessment methods	Attendance records, reports on the results of CAD training in electrical engineering, reports on the overall design of substations, and reports on visits to rail transit power distribution systems.
Requirements for learning and assessment	1. The grading system for this course is a five-point scale. Students who achieve a score of 60 or above will be considered qualified, and thus will receive credits for this course. 2. Course grade = Attendance × 10% + Electrical Engineering Training CAD × 30% + Substation Design × 45% + Tour of Rail Transit Power Distribution Systems × 15% 3. Both the periodic assessments and the final evaluations use a five-level grading system.
Read a list of items to be considered	1. Self-compiled. Comprehensive design guidelines and task documents for electrical engineering drafting 2. Wu Xiuhua. AutoCAD Electrical Engineering Drawing

Tutorial (2nd Edition)[M]. Beijing: Mechanical Industry Press, 2012.

3. Liu Zengliang, Liu Guoting. CAD for Electrical Engineering (Second Edition)[M]. Beijing: China Water Resources and Hydropower Press, 2009.

4. National Standards of the People's Republic of China. National Standards for Electrical Drawing: GB/T 6988[S]. Beijing: China Standards Press, 2008.

5. National Standards of the People's Republic of China. Basic Rules for Graphic Symbols Used in Electrical Equipment: GB/T 23371.1-2013[S]. Beijing: China Standards Press, 2013.

6. National Standards of the People's Republic of China. Graphic symbols for electrical diagrams: GB/T 4728[S]. Beijing: China Standards Press, 2005.

7. National Standards of the People's Republic of China. Graphic symbols for electrical equipment: GB/T 5465-1996[S]. Beijing: China Standards Press, 1996.

8. National Standards of the People's Republic of China. CAD Drawing Rules for Electrical Engineering: GB/T 18135-2008[S]. Beijing: China Standards Press, 2008.

9. National Standards of the People's Republic of China. Technical Regulations for Relay Protection and Automatic Protection Devices: GB/T 14285-2006[S]. Beijing: China Electric Power Press, 2006.

10. National Standards of the People's Republic of China. Design Specifications for Relay Protection and Automatic Control Devices in Electric Power Systems: GB/T 50062-2008[S]. Beijing: China Planning Press, 2008.

11. National Standards of the People's Republic of China. Standardized Design Specification for Relay Protection Equipment: DL/T 317-2010[S]. Beijing: China Electric Power Press, 2010.

12. National Standards of the People's Republic of China. Technical Regulations for the Design of Thermal Power Plants: DL/T 5000-2000. Beijing: China Electric Power Press, 2000.

Comprehensive Electrical Engineering Training

Course Name	Comprehensive Electrical Engineering Training
Semester in which the course is taught	Semester 7
Course Coordinator	Li Yunjuan, Li Yangqing, Liu Qingxue
language	Chinese
Nature of the course	Professional Education Practice Course
Teaching methods	Practical training, project-based activities, teamwork, troubleshooting, etc.
Workload (including teaching hours and self-study hours)	Total workload: 64 class hours Teaching hours: 48 hours Self-study hours: 16 hours
credit points	Chinese credit points: 4; European credit system credit points: 6
Prerequisite courses	Circuit theory, motor science, analog electronic technology, digital electronic technology, principles of automatic control, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the methods of selection, installation, and debugging of common equipment, components, and tools used in electrical engineering. Supported graduation requirement indicators: 5.1. Course Objective 2: To develop skills in designing electrical control circuits, wiring, debugging, and troubleshooting. Supported graduation requirement indicators: 5.1, 5.2, 5.3, 5.4, 9.1, 9.2, 10.1, 10.2, 10.3. Course Objective 3: Familiarity with the programming and application of industrial control devices such as PLCs, frequency converters, and touchscreens. Supported graduation requirement indicators: 5.3. Course Objective 4: Mastering electrical safety standards, electrical operation guidelines, and requirements for drafting engineering documents. Supported graduation requirement indicators: 5.1, 5.2, 5.3, 5.4, 9.1, 9.2, 10.1, 10.2, 10.3. Course Objective 5: To develop skills in engineering practice, teamwork, problem-solving, and innovative design, thereby meeting the basic skill requirements for positions in the field of electrical engineering. Supported graduation requirement indicators: 9.1, 9.2.
Content	1. Basic electrical training (Weight: 0.20): Use of common low-voltage electrical devices and instruments, understanding electrical diagrams, safe use of electricity, and mastery of basic operations and safety guidelines. 2. Electrical Control Circuit Training (Weight: 0.25): Relay-contact control, motor start/stop/revolution, protection circuit design and debugging, as well as skills in building typical control circuits. 3. PLC Application Training (Weight: 0.25): PLC hardware wiring, basic command programming, sequential control, analog applications. Students will gain proficiency in basic PLC programming and debugging techniques.

	4. Variable frequency control and touchscreen integration training (Weight: 0.20): Setting parameters of frequency converters, motor speed control, touchscreen configuration, human-computer interaction design, and familiarity with variable frequency control and configuration applications. 5. Comprehensive Project Training (Weight: 0.10): Design, installation, debugging, and reporting of small-scale electrical control systems. Students will apply their skills to complete practical engineering projects.
Assessment methods	Practical assessment, project reports, performance during the process, compliance with safety standards
Requirements for learning and assessment	Strictly abide by electrical safety regulations and operate equipment in a standardized manner. Complete practical training tasks independently and actively participate in team efforts. Submit a comprehensive record of the training experience and a project report. Performance during the process accounts for 30%, practical skills assessment accounts for 40%, and the project report accounts for 30%. Students who achieve a total score of 60 points or above will receive credits for this course.
Reading list	1. Wang Zhaoan, Huang Jun. Electrical Engineering Technology (7th Edition). Mechanical Industry Press, 2020. 2. Liao Changchu. PLC Programming and Applications (5th Edition). Mechanical Industry Press, 2019. 3. Zhang Yanbin. Tutorial on Frequency Converters (3rd Edition). Electronic Industry Publishing House, 2021. 4. GB 50149-2010, “Construction and Acceptance Code for Busbar Equipment in Electrical Installation Projects”. 5. Li Baonian. Electrical Control and PLC Application Technology. Higher Education Press, 2022. 6. Mitsubishi Electric. FX Series PLC User Manual, 2023.

Labor

Course Name	Labor
Semester of Classes	Semesters 1-4
Course Coordinator	Li Chenchen, Luo Dayou
language	Chinese
Nature of the course	General Education Practice
Teaching methods	Lectures, work, etc.
Workload (including teaching hours and self-study hours)	Total workload: 28 class hours. Number of teaching hours: 28 Self-study hours: 0
credit points	Chinese credits: 1; European credit system credits: 1
Prerequisite courses	Nothing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To help students understand the laws and regulations, professional ethics, specialized skills, practical experience, and work-related qualities that are closely related to the engineering industry, while still focusing on their academic studies. By integrating labor education into the academic curriculum, both aspects can benefit from each other. Supported graduation requirement indicators: 1.1, 6.1, 6.2. Course Objective 2: To cultivate students' understanding of Marxist labor concepts, establish correct labor attitudes, develop good labor habits, and strengthen their willpower through labor activities. Students will also gain practical skills in construction engineering and water conservancy engineering. Additionally, their teamwork and self-management abilities will be enhanced. Labor education will be integrated with professional production and social service practices, enabling students to possess the necessary labor skills for engineering-related work, strong innovation and entrepreneurship capabilities, and the ability to identify and solve new problems in labor practice. This will provide a solid foundation for their future careers. Supported graduation requirement indicators: 1.3, 2.1. Course Objective 3: Establish good professional ethics, cultivate students' professional awareness and dedication to their work. Strengthen their sense of responsibility and recognition of engineering disciplines, and establish correct values of labor. Through labor education, foster virtue, enhance intelligence, strengthen the body, and cultivate aesthetic appreciation, ultimately promoting the comprehensive development of students and enabling them to meet the social development needs of university students in the new era.; Supported graduation requirement indicators: 6.2.
Content	1. The Marxist view of labor and the spirit of labor (Weight: 0.4, Requirement Level: Basic Knowledge) 2. Daily school-related tasks (Weight: 0.3; Required level: Familiar + Proficient + Knowledgeable) 3. Professional engineering labor services (Weight: 0.3, Requirement Level: Familiar+Intermediate)
Assessment methods	Work summary, work performance
Requirements for learning and assessment	The final grade for this course is based on a five-level scale. Students who achieve a grade of pass or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 75% + Final assessment score × 25%. 3. The performance assessment accounts for 75% of the total score, and the evaluation is based primarily on work

	performance. 4. The final assessment accounts for 25% of the total assessment score. The assessment method is based on a work summary report. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Zhao Xinquan, Zhang Yong: Labor Education for College Students in the New Era. Mechanical Industry Press, 2021 edition. 2. Huang Haijun: 《Labor Education for College Students》, Xinhua Publishing House, 2022 edition. 3. Shi Zhongfeng, Dong Aiqin, Zhang Yanxia: "Labor Education for College Students in the New Era", Tsinghua University Press, 2022. 4. Xie Yan: 《Labor Education for College Students》, Renmin University of China Press, 2022 edition.

Thematic practices centered on core socialist values

Course Name	Thematic practices centered on core socialist values
Semester of Classes	Semesters 1-6
Course Coordinator	Yu Wenzheng, Gao Li, Li Chenchen
language	Chinese
Nature of the course	General Education Practice Course (Practical Course)
Teaching methods	Hold theme class meetings, conduct educational activities related to themes such as party meetings or youth group meetings, organize group discussions, analyze case studies, hold debates, conduct social surveys, organize volunteer services, and carry out public welfare activities.
Workload (including teaching hours and self-study hours)	Total workload: 28 class hours Teaching hours: 16 Self-study hours: 12
credit points	Chinese credits: 1; European credit system credits: 1
Prerequisite courses	Nothing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To enable students to understand the scientific essence and theoretical logic of the core socialist values, and to deeply appreciate their contemporary value and practical significance. The goal is to help students establish a firm political stance in the context of diverse cultures, distinguish between right and wrong, develop a stable professional ethical judgment, and strengthen the professional ethics and sense of social responsibility of engineers. Supported graduation requirement indicators: 1.1, 1.3, 2.1, 6.2. Course Objective 2: To cultivate students' ability to translate the core values of socialism into their daily behaviors. This is achieved through case analysis and project-based learning activities, thereby enhancing their awareness of actively practicing these values in professional settings. Emphasis is placed on the role of teamwork in guiding students towards responsible behavior in cross-role collaborations. Supported graduation requirement indicators: 1.3. Course Objective 3: To stimulate students' intrinsic motivation to continue learning, and to help them align their personal career plans with national strategic needs. We aim to cultivate students as disseminators and practitioners of core values, while developing their ability to adapt to changes in the industry. Supported graduation requirement indicators: 2.1, 2.2, 2.3, 6.1, 6.2, 10.1, 10.2, 10.3.
Content	1. Content related to thematic practices (Weight: 1.00; Requirement Level: Understanding + Mastery) 1. Course 1: Comprehensive Practice on Prosperity, Democracy, and Freedom 2. Course 2: Comprehensive Practice on Civilization and Harmony 3. Course Three: Freedom, Equality, Justice 4. Course Four: Comprehensive Practice in Law and Patriotism 5. Module 5: Dedication, Integrity, and Friendliness 6. Course Six: Progress Reports
Assessment methods	The evaluation is conducted using a five-level scoring system: excellent, good, medium, pass, and fail. The total score for each semester consists of a periodic assessment (accounting for 60%) and a final assessment (accounting for 40%).
Requirements for learning and assessment	1. grading criteria: The grade for this course is based on a five-point scale. Scores above 90 are considered excellent, 80-89 points are considered good, 70-79 points are considered

	medium, 60-69 points are considered pass, and scores below 60 are considered failing. Students who fail the course will not receive any credits.
	2. Process-based assessment (60%): The weight is allocated dynamically based on the characteristics of each semester's courses. Again. For example: - Courses 1, 2, 4: Attendance scores account for 10%, overall practical performance scores account for 10%, and the completion of the "Student Learning Activity Handbook" accounts for 40%; - Course 3 and 5: Attendance score: 15%; Comprehensive practical skills assessment: 15%; Completion of the "Student Learning Activity Handbook": 30% - Course 6 (Performance Evaluation): Attendance: 10%, Overall Performance: 10%, Performance Evaluation: 40%. 3. Final assessment (40%): Students are required to write and submit a reflection on their learning experiences in this course, taking into consideration their professional interests and career plans. Additionally, they must complete the required records for the "Student Learning Activity Handbook" at the corresponding stages of their studies.
Reading list	1] Edited by Guo Hua. "Education Materials on Core Socialist Values for College Students" [M]. Beijing: China Forestry Publishing House, 2020. (ISBN: 978-7-5219-0676-9) 2] Compiled by the Institute for the Study of Chinese Communist Party History and Literature. "Excerpts from Xi Jinping's Speeches on Core Socialist Values" [M]. Beijing: Central Literature Publishing House, 2014. 3] Compiled by the Publicity Department of the Central Committee of the Communist Party of China. "An Introduction to Core Socialist Values" [M]. Beijing: Study Publishing House, 2015. 4] Han Zhen. "Explanation of Core Socialist Values". Beijing: People's Publishing House, 2014. 5] Yuwen Li. "Research on College Students' Recognition 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.

Graduation Internship and Graduation Project Module

Graduation internship

Course Name	Graduation internship
Semester of Classes	Semester 7
Course Coordinator	Liang Shibin
language	Chinese
Nature of the course	Practical education
Teaching methods	On-site training, practical experience, equipment observation, hands-on demonstrations, case analysis, and group discussions
Workload (including teaching hours and self-study hours)	Total workload: 160 hours Teaching hours: 96 Self-study hours: 64
credit points	Chinese credits: 3; European credit system credits: 3.5
Prerequisite courses	Circuit theory, power system analysis, motor science, power electronics technology, automatic control principles, etc. Power system automation
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master the production process of 200 MW thermal power generating units, as well as the structure and operating principles of main and auxiliary equipment. Additionally, to become familiar with the operation and control methods of boilers, steam turbines, generators, and their auxiliary systems. Students should also be able to understand the electrical systems, relay protection mechanisms, automatic control systems, power distribution systems, and safety regulations in thermal power plants. Supported graduation requirement indicators: 6.1, 6.2. Course Objective 2: To be able to identify major equipment and system processes on-site, understand electrical diagrams related to primary and secondary systems; to comprehend operations such as startup and shutdown of equipment, monitoring during operation, adjustment of parameters, and analysis of simple faults; to carry out routine inspections, record data, and write internship reports in a standardized manner. Supported graduation requirement indicators: 10.1. Course Objective 3: Strictly adhere to the safety regulations of the power industry and the management systems of power plants. Establish a professional mindset that prioritizes safety and ensures standardized operations. Develop a rigorous, pragmatic, and team-oriented approach to work. Possess the necessary sense of responsibility and ability to perform tasks properly, which are essential for working in the power generation industry. Supported graduation requirement indicators: 6.1, 6.2, 8.3, 9.1, 9.2.
Content	1. Safety production regulations and standards for thermal power plants (Weight: 0.05, Required Level: Mastery):

	Electrical safety work regulations, two-paper three-system system, on-site safety protection measures, fire prevention and emergency response procedures. 2. The overall process flow for a 300 MW unit (weight: 0.05, requirement level: familiar with the process): fuel transportation, boiler combustion, steam generation, steam turbine operation, generator electricity generation, condensation and heat recovery, and exhaust gas purification and emission control. 3. Boiler systems and operations (Weight: 0.18, Requirement Level: Familiar): Structure of the boiler itself, combustion system, steam-water system, coal preparation system, fans and pumps, parameter adjustment, and operation monitoring. 4. Steam turbine systems and operation (Weight: 0.18, Requirement Level: Familiarity): Steam turbine components, lubrication systems, regulation and safety systems, condensing vacuum systems, heat recovery systems, startup, shutdown, and maintenance operations. 5. Electrical systems and equipment (weight: 0.20, required level: Familiar): 300MW generator structure, excitation system, step-up stations, main transformers, auxiliary power systems, high and low voltage distribution devices, relay protection and automation devices. 6. Thermal automation and control systems (Weight: 0.15, Requirement Level: Familiar): DCS system architecture, major measurement points, control loops, interlock protection mechanisms, AGC/AVC and other automatic control functions. 7. Auxiliary production systems (weight: 0.10, required level: basic knowledge): chemical treatment of water, circulating water systems, ash and slag removal processes, desulfurization and denitrification, coal transportation and storage systems. 8. Unit operation and fault analysis (Weight: 0.09, Requirement Level: Basic Knowledge): Procedures for starting and stopping units, adjustment of parameters under typical operating conditions, identification of common abnormalities, and principles for preventing and handling accidents.
Assessment methods	On-site attendance tracking, safety assessments, probationary period records, internship summary reports, and on-site discussions.
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 60% + Internship summary score × 40%. 3. The performance assessment accounts for 60% of the total score. This includes 15% due to attendance and discipline, 15% due to safety-related tests, 15% due to internship logs, and 15% due to the completion of assigned tasks during the internship

	period. 4. The performance assessment for internships accounts for 40% of the total score. This includes tasks such as drawing system diagrams, preparing equipment analysis reports, writing internship summaries, and participating in evaluation presentations. 5. Both the procedural assessment and the internship summary are scored on a percentage basis.
Reading list	1. Ye Jiangming. Principles and Equipment of Power Plant Boilers (4th Edition)[M]. Beijing: China Electric Power Press, 2016. 2. Jin Zhiping, Wang Xiang. Principles and Systems of Power Plant Steam Turbines (3rd Edition)[M]. Beijing: China Electric Power Press, 2025. 3. Wang Xiuhe. Electrical Engineering (4th Edition)[M]. Beijing: Mechanical Industry Press, 2025. 4. Yao Chunqiu, Wang Jian. Electrical Systems of Power Plants (4th Edition)[M]. Beijing: China Electric Power Press, 2020. 5. Zhu Xiaoxing. Thermal Automation and DCS Control Systems [M]. Beijing: China Electric Power Press, 2021. 6. Safety Work Procedures for Electric Power Operations (Thermal and Mechanical Engineering, Electrical Engineering) [S]. Beijing: China Electric Power Press, 2012. 7. 300 MW thermal power generation unit operation regulations (internal regulations of Guoneng Yangzonghai Power Plant). 8. Thermal Power Plant Design Technical Regulations DL5000-2014 [S]. Beijing: China Electric Power Press, 2014.

Graduation project

Module projects	**Detailed content**
Module Name	Graduation project
Semester of Classes	Semester 7-8
Course Coordinator	Li Yangqing, Wang Lifang
Language used in teaching	Chinese (including reading of foreign-language literature)
Course system affiliation	Professional education and practical courses; integrated practical courses that combine theory with practice
Teaching methods	Thematic lectures, group discussions, literature research, project inquiries, practical exercises, one-on-one guidance, thesis writing, public defense
The number of hours spent on work and the amount of work done	**Total workload: 192 hours** **Class hours: 192 hours in total. Of this, 6 hours are allocated for theoretical teaching, and 186 hours for practical training. The specific allocation is as follows: 16 hours for topic selection and task assignment, 32 hours for literature review and project proposal preparation, 96 hours for project research and paper writing, and 48 hours for paper defense.** **Self-directed study hours: Includes research and analysis of domestic and international literature, development of project plans, simulation and experimental debugging, revision of research papers, preparation of presentation slides for presentations, and ongoing learning about cutting-edge technologies. These hours are dedicated to self-directed research and learning.**
credit points	6 credits
Prerequisite requirements	Basic courses and specialized courses, including core courses such as 'Fundamentals of Electrical Machines and Power Drive' and 'Principles and Applications of Microcontrollers,' equip students with fundamental theoretical knowledge in the electrical engineering field, engineering practice skills, as well as proficiency in computer and foreign language applications.

Module Objectives/Anticipated Learning Outcomes	Course Objective 1: Students will be able to effectively apply theoretical knowledge in mathematics, natural sciences, and electrical engineering disciplines to independently analyze complex engineering problems in the field of electrical engineering. They will be able to design engineering solutions, evaluate feasibility, conduct simulation experiments, and analyze data. Students will also develop the ability to solve practical engineering problems independently. Supported graduation requirement indicators: 3.2. Course Objective 2: Students should be able to assess the entire process of electrical engineering practices from the perspectives of environmental protection and sustainable social development. They should be able to scientifically evaluate the impact of electrical products and engineering projects throughout their lifecycle on the ecological environment and social development, and foster a sense of green engineering principles. Supported graduation requirement indicators: 3.1, 3.3, 7.1, 7.2. Course Objective 3: Students should develop good interpersonal skills and a sense of teamwork. They should be able to work independently within multidisciplinary teams, fulfill roles as team members or leaders, and effectively collaborate on comprehensive engineering research and design tasks. Supported graduation requirement indicators: 3.2, 9.1, 9.2. Course Objective 4: Students should be able to proficiently complete the preparation of design documents and research reports regarding complex electrical engineering problems. They should also be able to communicate effectively through oral presentations and defense statements. Additionally, students should possess cross-cultural communication skills and a basic international perspective. Supported graduation requirement indicators: 3.2, 3.3, 10.1, 10.2, 10.3. Course Objective 5: Students should develop a sense of self-directed learning and lifelong education. They should be able to actively keep track of new technologies and developments in the field of electrical engineering. By doing so, they can fully leverage their initiative, continuously update their professional knowledge, and improve their skills to meet the needs of industry development and societal demands. Supported graduation requirement indicators: 12.1, 12.2.
Module content	This module is the core part of the comprehensive practical training for students majoring in Electrical Engineering and Automation. It consists of a total of 192 class hours. The objectives of these five courses are reasonably distributed across various aspects, ensuring a comprehensive assessment of students' professional capabilities. The specific content of each module is as follows: 1. Selection of graduation project topics and issuance of task statements (16 hours, 22% of the total weight): The topics for graduation projects should be determined in accordance with the professional training objectives and practical engineering requirements. The principle of "one student, one project" should be followed. Students are encouraged to choose their own projects, taking into consideration research findings and practical applications in industry. Supervisors should prepare and issue task statements, clarifying the project tasks, technical requirements, and schedule. They should also provide guidance on project design and conceptual aspects, thereby laying a solid foundation for the professional and practical aspects of the project. 2. Literature review and data collection, as well as the preparation of research proposals (32 hours, 22% of the total weight): Students are guided to search and study relevant domestic and international literature

	(no less than 10 articles). They are also asked to summarize the current state of research at home and abroad, identify key technical issues, and determine focus areas for their research. Students are required to prepare research proposals thoroughly, including key elements such as literature review, technical approach, research plan, experimental arrangements, and schedule. This process helps to develop students' abilities in data organization and research planning. 3. Research and thesis writing (96 hours, 22% of the total grade): Students carry out research projects under the guidance of teachers, compare various solutions, conduct simulation designs, perform experimental tests, and analyze data results. They must strictly follow the school's guidelines when writing, revising, and refining their graduation theses. Additionally, they should summarize their research findings, identify key technical aspects, and incorporate environmental protection concepts, a rigorous scientific attitude, and innovative thinking into their work. 4. Graduation project defense (thesis presentation) (48 hours of instruction, with a weight of 22%): Students must submit their theses and have them reviewed by their supervisors and evaluators. Students also need to prepare materials for the defense and a presentation PowerPoint. The defense process involves presenting their work and responding to questions. This assessment measures the student's professional knowledge, language skills, and ability to handle unexpected situations. The overall content covers various aspects such as professional comprehensive application skills, scientific research thinking, engineering capabilities, teamwork skills, and the cultivation of lifelong learning abilities. It is designed to enhance students' comprehensive abilities at the undergraduate graduation stage, as well as to prepare them for employment and further education opportunities.
Assessment methods	The comprehensive assessment covers both ongoing evaluations and final assessments. Specifically, it includes four main aspects: performance during regular hours, quality of the research project and thesis, grading by reviewers, and the defense evaluation.
Requirements for passing the learning and assessment courses	1. Participated in all stages of the graduation project, strictly adhering to the management regulations. Maintained a rigorous attitude and followed all deadlines and requirements. There were no instances of absenteeism, negligence, plagiarism, or unauthorized participation by others. 2. Complete the research projects independently, design research plans, conduct experimental tests, and write research papers. The documents related to project initiation reports and graduation projects must meet the standard requirements of the school; 3. After being reviewed by the supervisors and examiners, the candidate successfully completes the public defense. The candidate's presentation

	is clear, their knowledge of professional matters is solid, and they can answer questions accurately. 4. Only those who score 60 points or above in the overall assessment will pass this module's assessment. Score composition: The total score is 100 points. The instructor's evaluation accounts for 40%, the evaluators' evaluation accounts for 30%, and the defense performance accounts for 30%. The five major course objectives are weighted at 22%, 22%, 22%, 22%, and 12% respectively.
References/Bibliography	1. "Kunming University Graduation Project (Thesis) Manual", Academic Affairs Office, 2019 2. All undergraduate textbooks for the Electrical Engineering and Automation program: 3. Design manuals related to electrical engineering, industry standards, and engineering reference materials 4. Relevant domestic and international academic journals, literature, research papers, and foreign language materials 5. Customized teaching materials and guidance for the course

Basic Sciences and Humanistic Literacy Module

Ideological Thought, Morality, and Rule of Law

Course Name	Ideological Thought, Morality, and Rule of Law
Semester in which the course is taught	First Semester
Course Coordinator	Miao Wenwu
language	Chinese
Nature of the course	Comprehensive Core Courses
Teaching methods	Teaching, discussion, online learning, social practice, etc.
Workload (including teaching hours and self-study hours)	Total workload: 75 class hours. Number of teaching hours: 48. Self-study hours: 27
credit points	Chinese credits: 3; European credit system credits: 3
Prerequisite courses	Nothing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Students should fully grasp the historical orientation of China's development in the new era, understand the basic content of life outlook, ideals and beliefs, Chinese spirit, socialist core values, socialist morality, socialist rule of law, and the constitutional and legal system; Supported graduation requirement indicators: 6.1, 6.2, 8.1. Course Objective 2: Students should be able to apply the theoretical knowledge from the course to analyze, judge, and express their thoughts regarding real-world issues related to personal growth, social life, moral practices, and the construction of a rule-of-law society. In doing so, they should develop correct values, moral judgments, and a legal mindset. Supported graduation requirement indicators: 6.1, 6.2, 7.1, 7.2, 8.1, 8.2, 8.3. Course Objective 3: Students should develop strong ideals and beliefs, as well as confidence in the correct path to follow. They should also cultivate a sense of patriotism, a sense of social responsibility, moral integrity, and awareness of the rule of law. They should actively practice the core values of socialism, respect laws, abide by laws, and use laws to protect their rights and fulfill their obligations. Supported graduation requirement indicators: 6.2, 8.1, 8.2, 8.3.
Content	1. Be individuals who can take on the responsibility of rejuvenating the nation; understand the historical responsibilities and values of young people in this new era. (Weight: 0.083; Requirement Level: Understanding + Action) 2. Overview of basic issues related to worldview, outlook on life, and values. It is necessary to understand and master the relationships between these concepts, as well as fundamental issues such as life goals, attitude towards life, and values. (Weight: 0.083; Required level: Comprehension + Mastery) 3. Create a meaningful life, understand the unity of personal value and social value, and develop a proactive attitude towards life. (Weight: 0.083; Requirement Level: Understanding + Application)

	4. Develop strong ideals and beliefs, and pursue youthful dreams. Understand the nature of ideals and beliefs, their role in society, as well as the relationship between personal ideals and societal ideals. (Weight: 0.083; Required level: Understanding) + mastered) 5. Specialized teaching on religious issues, aiming to help students understand China's religious policies and relevant legal regulations, thereby fostering a correct understanding of these matters. (Weight: 0.042; Requirement Level: Awareness + Comprehension) 6. The rich connotations and practical significance of the Chinese spirit. Understanding the national spirit, the spirit of the times, and its role in guiding the growth of young people. (Weight: 0.083; Required level: Comprehension + Mastery) 7. Be a loyal patriot in the new era, and understand the fundamental principles of patriotism as well as the characteristics of the new era. (Weight: 0.083; Requirement Level: Understanding + Application)
	8. Embrace the core values of socialism, and understand the fundamental principles of these values. Significant features and practical requirements. (Weight: 0.083; Requirement Level: Mastery + Application) 9. Develop excellent moral qualities through practice, and understand the core principles of socialist morality, as well as the ethical standards for citizens. (Weight: 0.083; Requirement Level: Understanding + Application) 10. Develop a legal mindset, adhere to the path of the rule of law, understand the concept of comprehensive law-based governance, the authority of the constitution, the functioning of laws, rights and obligations, and the process of developing a legal mindset. (Weight: 0.125; Requirement Level: Mastery + Application) 11. Practical teaching activities involve online learning, note-taking, social practice, case discussions, or specialized seminars related to themes such as ideology, morality, and law. (Weight: 0.169; Required Level: Application-based)
Assessment methods	Learning notes, online learning, practical training, performance assessment, closed-book exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 60% + Final assessment score × 40%. 3. The performance assessment accounts for 60% of the total score, including aspects such as study notes, online learning activities, practical teaching experiences, and daily performance. 4. The final assessment accounts for 40% of the total score.

	The assessment method is a closed-book exam, focusing on examining core concepts such as worldview, ideals and beliefs, Chinese spirit, moral integrity, and legal literacy. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Xi Jinping. Selected Works of Xi Jinping (Volumes 1 and 2)[M]. Beijing: People's Publishing House, 2023. 2. Xi Jinping. Xi Jinping on Governance and State Administration (Volumes 1 to 5) [M]. Beijing: Foreign Languages Publishing House. 3. Marx, Engels. Selected Works of Marx and Engels (Volumes 1–4)[M]. Beijing: People's Publishing House, 2012. 4. Central Committee of the Communist Party of China. Decisions on Several Major Issues Related to the Comprehensive Implementation of the Rule of Law [Z]. 2014. 5. The Constitution of the People's Republic of China (Amended Edition of 2018)[Z]. 6. "Ideological, Moral, and Legal Education" Teaching Case Collection [M]. Beijing: Guangming Daily Publishing House. 2024 7. "Ideological Thought, Morality, and Rule of Law" Special Topic Teaching Research [M]. Beijing: Capital University of Economics and Trade Press, 2024. 8. Xi Jinping. On the History of the Communist Party of China[M]. Beijing: Central Literature Publishing House, 2021. 9. The Editorial Team of this book. A Brief History of the Communist Party of China [M]. Beijing: People's Publishing House, 2021. Wait.

Introduction to Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era

Course Name	Introduction to Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era
Semester in which the course is taught	Semesters 1-2
Course Coordinator	Chen Zongbo
language	Chinese
Nature of the course	Comprehensive Core Courses
Teaching methods	Lecture-based teaching method, topic-based teaching method, case-based teaching method
Workload (including teaching hours and self-study hours)	Total workload: 75 class hours. Number of teaching hours: 48. Self-study hours: 27
credit points	Chinese credits: 3; European credit system credits: 3
Prerequisite courses	Ideological Thought, Rule of Law, and an Introduction to the Chinese National Community
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To gain a systematic understanding of the background, scientific framework, core principles, essence, and practical requirements of Xi Jinping's thoughts on socialism with Chinese characteristics. It is necessary to grasp the worldview, methodology, and the underlying principles and perspectives underlying these ideas. Supported graduation requirement indicators: 8.1. Course Objective 2: To be able to analyze topics such as Chinese-style modernization, high-quality development, national governance, comprehensive rule of law, ecological civilization construction, and national security, in light of the significant practices related to the development of the Party and the country in the new era. Students should also be able to apply these concepts in professional studies and social practices. Supported graduation requirement indicators: 8.1, 8.2, 8.3, 12.1, 12.2. Course Objective 3: Enhance confidence in roads, theory, systems, and culture. Develop a sense of responsibility to serve national development, national rejuvenation, and regional construction. Students should be able to participate in classroom discussions, case analyses, and practical learning activities in a rational, standardized, and cooperative manner. Supported graduation requirement indicators: 8.3.
Content	1. Historical context, scientific framework, core principles, worldview, and methodology. The study focuses on the changes in the principal contradictions in Chinese society during the new era, the logical framework of the Party's innovative theories, the structure of the theoretical system, and the "six principles that must be adhered to". (Weight: 0.20; Requirement Level: Understanding + Mastery) 2. The overall layout and strategic arrangements of the cause of socialism with Chinese characteristics. Focus on learning about economic development, political construction, cultural development, social development, and ecological civilization

	construction. Also, focus on building a modern socialist country in its entirety, carrying out comprehensive reforms, and governing the country in accordance with the law. Strategic arrangements such as strengthening governance at all levels in the country. (Weight: 0.25; Requirement level: Understanding) + mastered) 3. Chinese-style modernization, high-quality development, and national rejuvenation. By integrating concepts such as innovation-driven development, common prosperity, rural revitalization, regional coordinated development, and new types of productive forces, we can understand the unique characteristics, essential requirements, and important principles of Chinese-style modernization. (Weight: 0.25, Difficulty Level: Proficient + Applied) 4. National security, defense and foreign affairs, as well as the comprehensive leadership of the Party. We need to understand the concept of overall national security, the modernization of defense and military forces, diplomacy with Chinese characteristics, the concept of a community with a shared future for mankind, and the advantages of the Party's leadership system. We also need to grasp the basic requirements for modernizing national governance. (Weight: 0.20, Difficulty level: Understanding + Application) 5. Practical teaching methods, online learning, and thematic discussions. Through activities such as social surveys, case studies, current affairs analysis, theme presentations, and online resource utilization, students are trained to develop a problem-solving mindset. Ability to recognize information, analyze data, and express ideas clearly. (Weight: 0.10; Required level: Applications)
Assessment methods	Class performance, online learning, topic discussions, flipped classroom demonstrations, social practice outcomes, topic presentations or course papers, final exams, etc.
Requirements for learning and assessment	1. The course grade is based on a 100-point scale, with a score of 60 or above considered satisfactory. 2. Overall evaluation = Procedural assessment: 50% + Final assessment: 50%. The procedural assessment includes classroom attendance and behavior, online learning, group discussions, case analysis, practical tasks, and presentation reports. The final assessment is conducted through written or open-book exams, as well as course-related essays. 3. Students should complete the assigned reading, online learning, and practical tasks on time. In class discussions, students should be able to present their opinions on the course topic, cite relevant materials, and express their thoughts in a proper manner. 4. All assessment components are scored on a percentage basis. The evaluation focuses on theoretical comprehension, material analysis, practical skills, ethical

	judgment, and overall written communication abilities. 5. Course learning requires students to combine thorough study of textbooks with classroom discussions and observations of real-world issues. Students should be able to develop well-structured analysis texts around topics such as Chinese-style modernization, national governance, regional development, and the responsibilities of young people. 6. Practical tasks should reflect an awareness of problems, sources of information, and personal insights. Students are encouraged to combine their professional knowledge, social services, and practical experiences to demonstrate the practical significance of theoretical learning.
Read a list of items to be considered	1. "Xi Jinping on Governance and State Administration" (Volumes 1 to 5), Foreign Language Publishing House, 2014 2025 Edition. 2. Selected Works of Xi Jinping (Volumes I and II), People's Publishing House, 2023 edition。 3. "Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era", Higher Education Press, 2023 edition. 4. Central Committee of the Communist Party of China Publicity Department: "An Outline of Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era", Learning Publishing House, People's Publishing House, 2023 edition.

An Outline of Modern and Contemporary Chinese History

Course Name	An Outline of Modern and Contemporary Chinese History
Semester in which the course is taught	Second Semester
Course Coordinator	Jiang Bingqing
language	Chinese
Nature of the course	Comprehensive Core Courses
Teaching methods	Interactive lectures and discussions, questions and answers
Workload (including teaching hours and self-study hours)	Total workload: 75 class hours. Number of teaching hours: 48. Self-study hours: 27
credit points	Chinese credits: 3; European credit system credits: 3
Prerequisite courses	Ideological Thought, Morality, and Rule of Law
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To enable students to fully understand the basic context, key events, important figures, and historical conclusions of modern and contemporary Chinese history. Students should also be able to comprehend the changes in the principal contradictions and historical tasks of Chinese society since modern times. Supported graduation requirement indicators: 8.1, 8.2, 8.3. Course Objective 2: To be able to use Marxist perspectives, viewpoints, and methods to analyze historical issues, and to understand the historical rationale behind the Chinese people's choice of Marxism, the Communist Party of China, and the socialist path. Supported graduation requirement indicators: 8.1, 8.2, 8.3. Course Objective 3: Enhance confidence in history, theory, and patriotism, and develop a sense of responsibility to integrate personal development into the process of national rejuvenation. Supported graduation requirement indicators: 8.3.
Content	1. The beginning of modern Chinese history lies in the evolution of the principal social contradictions after the Opium War. (Weight: 0.10, Difficulty level: Familiar + Moderate) 2. The early attempts by the Taiping Heavenly Kingdom, the Westernization Movement, and other national reform movements to find solutions to national problems (Weight: 0.10, Difficulty level: Familiar + Intermediate) 3. The Xinhai Revolution and the attempts to establish a bourgeois republic, along with its limitations (Weight: 0.10, Difficulty level: Understanding + Analysis) 4. The New Culture Movement, the May Fourth Movement, and the establishment of the Communist Party of China (Weight: 0.12, Difficulty level: Understanding + Analysis) 5. The New Democratic Revolution includes the National Revolution, the Land Revolution, the War of Resistance against Japan, and the Liberation War. (Weight: 0.18, Difficulty Level: Proficient + Advanced)

	6. The establishment of the People's Republic of China, socialist transformation, and the exploration of socialist construction (Weight: 0.14, Difficulty level: Proficient + Understanding) 7. Reform and opening up, the development of socialism with Chinese characteristics, and the historic achievements of the new era (Weight: 0.16, Difficulty level: Proficient + Advanced) 8. The main trends in modern Chinese history, historical conclusions, and practical lessons (Weight: 0.10, Difficulty level: Understanding + Application)
Assessment methods	Process-based assessments (learning notes, mid-term tests, classroom performance, online learning) account for 50% of the total evaluation. Final exam assessment, accounting for 50% of the total score.
Requirements for learning and assessment	The comprehensive evaluation score is above 60 points.
Read a list of items to be considered	1.Outline of Modern Chinese History, Higher Education Press, February 2023, 9th Edition 2. Hu Sheng: From the Opium War to the May Fourth Movement. People’s Publishing House, 1980 edition. 3. “Xi Jinping on Governance” (Volumes 1–5), Foreign Language Publishing House, 2014– 2025 Edition. 4. “The Communist Party of China’s Major Achievements and Historical Experiences in Its Century-long Struggle”, People’s Publishing House, 2021 edition. 5. Xi Jinping: “In Commemoration of the Victory of the Chinese People’s War of Resistance Against Japan and the World Anti-Fascist War” 6."Speech at the Symposium Celebrating the 80th Anniversary of the Founding," People's Publishing House, 2025 edition.

Basic Principles of Marxism

Course Name	Basic Principles of Marxism
Semester in which the course is taught	Third semester
Course Coordinator	Liu Xiyun
language	Chinese
Nature of the course	Comprehensive courses required for graduation
Teaching methods	Teaching, discussion, etc.
Workload (including teaching hours and self-study hours)	Total workload: 75 class hours. Number of teaching hours: 48. Self-study hours: 27
credit points	Chinese credits: 3; European credit system credits: 3
Prerequisite courses	Ideological and Moral Standards, Rule of Law, Overview of Modern and Contemporary Chinese History
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To comprehensively understand and grasp Marxist theory, to recognize and accept the guiding role of Marxism in socialist modernization. To develop confidence in Marxist theory and cultural traditions. To learn and master the basic principles of dialectical materialism and historical materialism, and to gradually develop a scientific worldview and methodology. To be able to use dialectical materialism to analyze and solve real-world social problems. To continuously enhance thinking skills and the ability to learn and reflect. To improve the ability to correctly understand history and reality, as well as the laws of social development, through the application of historical materialism. Supported graduation requirement indicators: 8.1. Course Objective 2: To apply Marxist principles, perspectives, and methods to enhance theoretical thinking and analytical skills. Students should be able to use the basic principles of Marxism to analyze important theoretical and practical issues encountered in social development. They should accurately understand the inherent contradictions of the capitalist mode of production, deeply comprehend the nature of the capitalist economic system, as well as the historical role of capitalism and its inevitable replacement by socialism. Students should firmly believe that capitalism will inevitably perish, while socialism will inevitably prevail. They should also be able to consciously identify and resist the influence of various negative social trends. Students should grasp the dialectical relationship between the lofty ideals of communism and the common ideals of socialism with Chinese characteristics. They should organically link their personal ideals with the goals of socialism with Chinese characteristics. They should willingly take on the glorious mission of achieving national rejuvenation, national prosperity, and happiness for the people. They should actively engage in the cause of socialism with Chinese characteristics in the new era. Supported graduation requirement indicators: 8.1, 8.2, 8.3.
Content	1. Content related to course topics (Weight: 1.00; Requirement level: Understanding + Mastery) Topic 1: The Concept of Marxism: 6 class hours Topic 2: Dialectical Materialism and World View: 10 class hours Topic Three: Dialectical Materialist Epistemology: 6 class hours Topic Four: Human Society and Its Development Laws: 6 class hours

	Topic Five: The Theory of Capitalism in Marxism: 8 hours of study Special Topic Six: Scientific Socialism: 4 Class Hours Practical training section: 8 class hours
Assessment methods	Regular homework assignments and closed-book exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 60% + Final assessment score × 40%. 3. The performance assessment accounts for 60% of the total score, including aspects such as study notes, online learning activities, and practical skills. 4. The final assessment accounts for 40% of the total score. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Selected Works of Marx and Engels, Volumes 1–4, Published by People's Publishing House in 2012. 2. Marx and Engels, "The Communist Manifesto"; 3. Marx, "Critique of the Gotha Program"; 4. Engels, "The Development of Socialism from Ideation to Science". 5. Lenin, "The State and Revolution"; 6. Mao Zedong's "On Contradiction" and "On Practice"; 7. Deng Xiaoping said, "Only by relying on ideals and discipline can we achieve unity." 8. Jiang Zemin's speech at the ceremony celebrating the 80th anniversary of the founding of the Communist Party of China; 9. Hu Jintao's speech at the seminar on the theory of the "Three Represents"; 10. Xi Jinping: "Realizing the Chinese Dream through vibrant practices." 11. "Documents of the 19th National Congress of the Communist Party of China", published by People's Publishing House in October 2017, first edition. 12. Xi Jinping's speech at the ceremony commemorating the 200th anniversary of Marx's birth. Published by the People's Publishing House in 2018. 13. Xi Jinping, "Speech at the Ceremony Marking the 100th Anniversary of the Founding of the Communist Party of China", People's Publishing House, 2021 edition. 14. "Xi Jinping on Governance", Volumes 1, 2, 3, and 4. Published by Foreign Languages Publishing House in 2014. 2017 edition, 2020 edition, 2022 edition; 15. "Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era", published by the Publicity Department of the CPC Central Committee, Learning Publishing House, first edition, May 2018.

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

Course Name	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics
Semester in which the course is taught	Fourth Semester
Course Coordinator	Zhang Chunmei
language	Chinese
Nature of the course	Comprehensive Core Courses
Teaching methods	Teaching, discussion, self-study, etc.
Workload (including teaching hours and self-study hours)	Total workload: 75 class hours. Number of teaching hours: 48. Self-study hours: 27
credit points	Chinese credits: 3; European credit system credits: 3
Prerequisite courses	Ideology, Morality, and the Rule of Law; Overview of Xi Jinping 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.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Students are able to accurately grasp the theoretical achievements formed in the process of Sinicizing and modernizing Marxism, and profoundly understand the historical process, historical changes, and historical accomplishments of the Chinese Communist Party leading the people in revolution, construction, and reform.; Supported graduation requirement indicators: 8.1, 8.2, 8.3. Course Objective 2: Students should gain a deeper understanding of why the Communist Party of China can succeed, why Marxism is effective, and why socialism with Chinese characteristics is superior. Students should also be able to apply Marxist principles, perspectives, and methods to identify, analyze, and solve problems. Supported graduation requirement indicators: 8.1, 8.2, 8.3, 9.1, 9.2. Course Objective 3: Students should be able to establish a common ideal of building socialism with Chinese characteristics. They should also become more conscious and determined in implementing the Party's basic guidelines and policies. Additionally, students should improve their ideological and political qualities as well as their theoretical knowledge, and actively participate in the great practice of socialist modernization. Supported graduation requirement indicators: 8.1, 8.2, 8.3, 9.1, 9.2.
Content	1. Mao Zedong Thought (Weight: 0.4, Required Level: Master + Familiar + Understand + Apply) 2. Deng Xiaoping Theory (Weight: 0.3, Difficulty Level: Proficient + Familiar + Comprehensible + Capable of Application) 3. The important concept of "Three Represents" (Weight: 0.15; Difficulty level: Proficient + Familiar + Understanded + Competent in application) 4. Scientific Outlook on Development (Weight: 0.15; Required level: Proficient + Familiar + Understandable +

	Capable in application)
Assessment methods	Questions, assignments, discussions, practical applications, paperless exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 50% + Final assessment score × 50%. 3. The performance assessment accounts for 50% of the total score, including 10% based on daily performance and 10% based on online learning activities. 10% for material writing, 10% for in-depth reading of classic texts, and 10% for discussions on current political issues. 4. The final assessment accounts for 50% of the total score. The assessment method is a paperless exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. “Mao Zedong Selected Works”, Volumes 1-4, People’s Publishing House, 1991 edition. 2. “Selected Works of Deng Xiaoping”, Volumes 1-3, People’s Publishing House, 1994, 1993 edition. 3. “Selected Works of Jiang Zemin”, Volumes 1-3, People’s Publishing House, 2006 edition. 4. “Hu Jintao’s Selected Works”, Volumes 1-3, People’s Publishing House, 2016 edition. 5. “Xi Jinping on Governance” (Volumes 1-5), Foreign Language Publishing House, 2014. 2017, 2020, 2022, 2025 editions. 6. Jiang Zemin: “Hold High the Great Banner of Deng Xiaoping's Theory and Fully Advance the Cause of Building Socialism with Chinese Characteristics into the 21st Century – Report Delivered at the 15th National Congress of the Communist Party of China”, People's Publishing House, 1997 edition. 7. Jiang Zemin: “Speech at the Ceremony Marking the 80th Anniversary of the Founding of the Communist Party of China”, Selected Works of Jiang Zemin, Volume 3, People’s Publishing House, 2006 edition. 8. Central Committee of the Communist Party of China, Department of Public Affairs: “The Important Thought of the ‘Three Represents’”, Study Guide, Study Publishing House, 2003 edition. 9. Xi Jinping: “Speech at the Symposium Marking the 130th Anniversary of Comrade Mao Zedong’s Birth”, People’s Publishing House, 2023 edition. 10. “Series of Important Speeches by General Secretary Xi Jinping”, compiled by the Publicity Department of the CPC Central Committee. Published by Study Publishing House

	and People's Publishing House, 2016 edition. 11. Outline for Studying Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, Xuexi Publishing House, 2019 edition。 12."Thirty Lectures on Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era", Xuexi Publishing House, 2019 edition。 13. Xi Jinping: “On the History of the Communist Party of China”, Central Literature Publishing House, 2021 edition. 14. Xi Jinping: “Speech at the Ceremony Marking the 100th Anniversary of the Founding of the Communist Party of China”, People’s Publishing House, 2021 edition. 15. Xi Jinping: “Hold high the great banner of socialism with Chinese characteristics and strive together to build a modern socialist country—Report delivered at the 20th National Congress of the Communist Party of China”, People’s Publishing House, 2012 edition.

Situation and Policy

Course Name	Situation and Policy
Semester in which the course is taught	Semesters 1 to 8
Course Coordinator	Li Shoulei
language	Chinese
Nature of the course	Comprehensive Core Courses
Teaching methods	Lecture method, discussion method, video-based teaching
Workload (including teaching hours and self-study hours)	Total workload: 100 class hours. Class hours allocated for teaching: 64 hours. Hours allocated for self-study: 36 hours.
credit points	Chinese credits: 2; European credit system credits: 4
Prerequisite courses	Nothing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To understand the latest achievements of the Party's theoretical innovation, the basic national conditions, the situation at home and abroad, as well as major practical issues that require attention. It is necessary to accurately grasp contemporary Chinese Marxism and be able to provide theoretical explanations for current social situations, policies, and significant events. Supported graduation requirement indicators: 6.1. Course Objective 2: To help students understand the historical responsibilities and missions of the youth in the new era. By integrating personal ideals with the pursuit of achieving the great rejuvenation of the Chinese nation, students can develop strong beliefs and ideals, improve their ideological and political capabilities, and develop a sense of responsibility to serve the country, society, and engage in professional learning and practice. Supported graduation requirement indicators: 6.2, 8.3. Course Objective 3: To be able to collect information, engage in classroom discussions, and write papers related to the course topics. This requires clear reasoning, appropriate use of materials, and logical presentation of ideas. Additionally, it involves enhancing the ability to discern right from wrong, analyze problems, and express one's opinions in both academic, work-related, and everyday situations. Supported graduation requirement indicators: 6.1, 6.2, 7.1, 7.2, 8.1, 8.2, 8.3.
Content	This course uses the official textbook for the "Situation and Policy" course in universities, titled "Current Affairs Report for College Students". The content of the course is updated every semester, based on the latest thematic arrangements. The teaching focuses on topics such as the Party's theoretical innovations, national major policies, economic and social development, international situations and China's foreign policy, national unity and social governance, as well as the responsibilities of young people. The course also takes into account changes in domestic and international situations, and updates its content accordingly. The course emphasizes the integration of theory with practice, guiding students to combine classroom learning, observation of current events, discussion and communication, with writing assignments. Through continuous learning, students can develop a stable understanding of national development, social realities, and their own responsibilities.
Assessment methods	Exams (regular attendance, classroom interactions, final papers)
Requirements for learning and	1. This course uses a 100-point scale for evaluation. The total

assessment	grade is composed of both ongoing assessments and final exams. The usual assessments account for 40% of the total score, while the final essay exam accounts for 60%. 2 Performance assessment is based primarily on attendance, participation in class activities, learning attitude, and completion of assigned studies. Students are required to complete the specified teaching hours and participate in class discussions as required.
	Regarding attendance policies: Students who miss one or more classes will be disqualified from taking the exam. Additionally, those who take personal leave, sick leave, etc. will also be unable to take the exam. Public classes must be completed according to the regulations, and corresponding supplementary lectures must also be attended. 3. Class participation evaluations include active response to questions, participation in discussions, and the ability to analyze and express opinions regarding current events. Evaluation of learning attitudes also includes classroom discipline, preparation of materials, engagement in learning activities, and the quality of tasks completed. 4. The final assessment will be conducted in the form of group
Read a list of items to be considered	A Concise History of the Communist Party of China, People's Publishing House and CPC Party History Press, published in 2021 Xi Jinping: On the History of the Communist Party of China, Central Literature Publishing House, 2021. "Mao Zedong, Deng Xiaoping, Jiang Zemin, and Hu Jintao on the History of the Communist Party of China", Central Literature Publishing House, 2021. Questions and Answers on Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, published by Xuexi Publishing House and People's Publishing House, 2021. "Xi Jinping on Governance and State Administration" (Volume 5), Foreign Language Publishing House, 2025.

University sports

Course Name	University sports
Semester in which the course is taught	Semesters 1-6
Course Coordinator	Shen Yu, Wang Yuhong, Yang Yurong
language	Chinese
Nature of the course	Comprehensive Core Courses
Teaching methods	Lectures, specialized technical training, group exercises, competitive practices, and guidance on extracurricular training
Workload (including teaching hours and self-study hours)	Total workload: 128 teaching hours. Number of teaching hours: 128 Self-study hours: 0
credit points	Chinese credits: 4; European credit system credits: 4
Prerequisite courses	Nothing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To understand the basic theories of sports and health, master the basic rules of various sports activities, technical structures, training methods, as well as methods for preventing sports injuries and evaluating physical health. Students should develop a sense of scientific exercise practices and safety awareness when engaging in sports. Supported graduation requirement indicators: 8.1, 8.2, 8.3. Course Objective 2: To be able to master the basic techniques, combined techniques, and simple tactical combinations of the selected sport. It is also necessary to be able to develop personalized exercise plans based on physical fitness test results, and to continuously improve physical fitness through classroom competitions and extracurricular activities. Supported graduation requirement indicators: 8.1, 8.2, 8.3, 9.1, 9.2. Course Objective 3: To foster teamwork, a sense of discipline, a competitive mindset, and strong willpower among participants. It aims to help them develop a positive and healthy lifestyle, as well as enhance their awareness of lifelong sports participation and self-management skills. Supported graduation requirement indicators: 9.1, 9.2. Course Objective 4: To be able to understand the training benefits of different sports activities regarding cardiovascular endurance, strength, speed, agility, flexibility, and coordination skills. Gradually develop a long-term exercise plan that suits one's own physical condition. Supported graduation requirement indicators: 8.1, 8.2, 8.3, 9.1, 9.2.
Content	1. Overview of sports events. This section covers the development of sports events, their fitness benefits, characteristics, necessary facilities and equipment, safety requirements, as well as guidelines for physical health testing. It also outlines the basic norms for classroom training and extracurricular exercise. (Weight: 0.25; Requirement Level: Mastery + Awareness) 2. Sports techniques. Focus on the basic posture, movement techniques, core skills, combined actions, and common mistakes correction for the selected sport. Conduct hierarchical training to improve movement accuracy and physical control abilities. (Weight: 0.25; Requirement level: Mastery + Awareness) 3. Sports tactics. This section focuses on learning how to coordinate between individuals and teams, how to switch between offensive and defensive strategies, how to organize matches, how to make quick decisions during games, and how to apply basic tactics. Skills such as teamwork and

	collaborative abilities are developed through group battles and training matches. (Weight: 0.25; Requirement: Mastery + Understanding) 4. Sports rules and health management. Learning about competition rules, basic Judicial Knowledge, sports etiquette, monitoring exercise intensity, warm-up and relaxation techniques, injury prevention methods, and ways of recording extracurricular exercise activities. (Weight: 0.25; Required level: Mastery + Knowledge)
Assessment methods	Basic skills, physical fitness, classroom performance, extracurricular exercise records, physical health assessments, theoretical knowledge tests, or online quizzes, etc.
Requirements for learning and assessment	1. The basic skills assessment accounts for 50% of the total score. The examination content is selected from a specified list of items. The focus is on evaluating the accuracy of movements, the quality of technical execution, and stability during performance.
	2 The physical fitness assessment accounts for 30% of the total score. The assessment is based on the results of physical fitness tests conducted throughout the semester, with individual scores being calculated based on those results. The evaluation is based on a combination of standard test results and physical health indicators. 3 Regular performance scores account for 20%, including attendance, participation in class activities, attitude towards practice, teamwork skills, as well as performance in extracurricular theoretical studies and classroom competitions. 4 It is a mandatory requirement to have a running app or records of extracurricular exercise activities. Students must complete the prescribed exercise load over the course of a semester. The theoretical assessment must be completed online, and students must meet the required standards to pass the assessment. 5 Students should comply with classroom safety regulations. They must complete warm-up exercises, specialized training, relaxation exercises, and record their exercise intensity as required by the teacher. If they experience any injuries or physical abnormalities, they should report them immediately and adjust their training activities according to the rules. 6 The course emphasizes process-based learning and continuous improvement. Students are encouraged to choose projects that suit their current level of skill, allowing them to improve their athletic skills and physical health through phased goal-based management. 7. Teachers organize hierarchical training based on the students' physical capabilities, the characteristics of the exercises, and the needs of classroom safety. Students are required to complete technical assessments, physical fitness tests, and classroom competition tasks within the specified time frame. The evaluation takes into account not only the final scores but also aspects such as improvement in movement skills, commitment to training, compliance with rules, and

	development of healthy behaviors.
Read a list of items to be considered	1. Edited by Zhou Ming, “College Students’ Physical Fitness and Health”, Shanghai Jiao Tong University Press, 2017 Year. 2. Zhou Ming, Wang Yuhong, Zhao Yunpeng. Editor-in-Chief of “Comprehensive Tutorial on Sports and Health for College Students”, Beijing Sport University Press, 2019. 3. Edited by Wang Chongxi, “Ball Games – Football”. Higher Education Press, 2005. 4. Edited by Wang Jiahong, “Ball Games – Basketball”. Higher Education Press. 2005 July of the year. 5. Edited by Sun Zhenwu, “Volleyball”. Beijing Sport University Press, 2017.

Mental health education for college students

Course Name	Mental health education for college students
Semester in which the course is taught	Second Semester
Course Coordinator	Luo Cheng
language	Chinese
Nature of the course	Comprehensive Core Courses
Teaching methods	The teaching method involves a combination of classroom lectures, case analyses, psychological assessments and experiential activities, group discussions, situational training, after-class reflection exercises, and specialized practical projects. The course emphasizes both the imparting of knowledge and the importance of personal experience. It aims to help students understand mental health knowledge in real-life situations, thereby enhancing their ability to self-adjust and seek help when needed.
Workload (including teaching hours and self-study hours)	Total workload: 50 teaching hours. Number of teaching hours: 32 Self-study hours: 18
credit points	Chinese credits: 2; European credit system credits: 2
Prerequisite courses	None.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To understand the basic concepts, evaluation criteria, and influencing factors of mental health among college students. To master the common psychological challenges and issues at the college level, such as emotional distress, interpersonal problems, study pressure, and crisis situations. To recognize that seeking psychological help is not a sign of weakness, but rather an important way to maintain physical and mental health. Supported graduation requirement indicators: 9.1. Course Objective 2: To be able to use basic knowledge of mental health to identify common sources of stress in learning, life, interpersonal relationships, emotions, and development planning. To be able to recognize emotions, assess stress levels, accept oneself, communicate effectively, and solve problems. To be able to seek support from peers, teachers, counselors, psychological counseling centers, or medical institutions when encountering significant psychological difficulties or crisis signals. Supported graduation requirement indicators: 9.1, 9.2, 10.1, 10.2, 10.3. Course Objective 3: To be able to integrate personal growth experiences with the context of university life, thereby completing tasks such as interpreting psychological assessments, reflecting on personal growth, developing stress management strategies, improving interpersonal communication skills, and exploring meaning in life. It is also necessary to be able to apply psychological adjustment techniques in professional studies, collective life, career preparation, and social interactions, thereby developing positive, stable, and rational psychological qualities. Supported graduation requirement indicators: 9.1, 9.2, 10.1, 10.2, 10.3. Course Objective 4: Cultivate students' awareness of respecting life, respecting differences, and caring for themselves and others, foster a rational, peaceful, positive, and open-minded psychological attitude, and enhance their sense of social responsibility, teamwork awareness, and capacity for continuous self-growth.; Supported graduation requirement indicators: 9.1, 9.2.
	1. Mental health foundations and adaptation to university life (Weight: 0.15, Requirement Level: Comprehension + Mastery): This section covers the concepts of mental health,

Content	its criteria and influencing factors, the psychological development characteristics of college students, the challenges associated with changes in university lifestyle, interpersonal environments, and the resources available for mental health counseling and seeking help. 2. Self-awareness, personality development, and emotional management (Weight: 0.20, Requirement Level: Mastery + Application): This includes understanding oneself, accepting oneself, maintaining self-esteem and confidence, identifying personality traits and behavioral styles, recognizing, expressing, and regulating common emotions. It also covers basic strategies for dealing with negative emotions such as anxiety, depression, and anger.
	3. Study psychology, stress management, and coping skills for setbacks (Weight: 0.20, Required Level: Intermediate) (Including learning motivation, time management, attention and procrastination issues, the diagnosis of test anxiety, academic pressure, and career-related stress, stress assessment, relaxation training, cognitive adjustment, goal decomposition, and the cultivation of resilience.) 4. Interpersonal relationships, intimate connections, and online psychology (weight: 0.15; requirement level: proficient + analytical): This includes relationships within dormitories, with peers, communication between teachers and students, psychological aspects of love relationships, awareness of boundaries, handling conflicts, and psychological characteristics in online interactions. The goal is to help students develop respectful, sincere, moderate, and responsible ways of interacting with others. 5. Life education, identification of psychological crises and mechanisms for seeking help (Weight: 0.20, Requirement Level: Understanding + Application): This includes understanding the meaning of life, identifying common signs of psychological crises, recognizing severe psychological problems, understanding safety principles in crisis situations, understanding the boundaries of peer support and the need for referrals. It also involves knowledge about school counseling services, hotlines, role of counselors, and the use of medical resources. 6. Reflection on Growth and Mental Health Practices (Weight: 0.10, Requirement Level: Analysis + Evaluation): This activity involves combining course assessments, case studies, situational training, and growth reports to analyze individual psychological resources, support systems, stress management strategies, and future development goals. The goal is to develop actionable plans for self-care and mental health maintenance.
Assessment methods	It is recommended to combine procedural assessments with final evaluation assessments. The procedural assessments account for 60% of the total score, including 10% for classroom attendance and participation, 15% for psychological assessments or experience-based activities, and 15% for regular homework and self-reflection. Group discussions or

	case analyses make up the remaining 20%. The final evaluation assessment can take the form of course essays, growth reports, theme-based presentations, or open-ended comprehensive quizzes.
Requirements for learning and assessment	1 This course is scored on a 100-point scale, with a score of 60 or above considered satisfactory. 2 Students should attend class sessions on time, participate in psychological experiences and group discussions. They must respect classroom rules and protect the privacy of themselves and their peers. Additionally, they should avoid evaluating others based on stereotypes or stigmatization. 3 Students are required to complete tasks such as interpreting psychological assessments, reflecting on their own growth, analyzing case studies, and developing stress management plans. They must be able to apply these insights to their own college life experiences. It is not allowed to plagiarize or fabricate important experiences during these tasks. 4 The assessment of the course focuses on evaluating students' understanding of basic mental health knowledge, their ability to recognize their own psychological states, their ability to analyze common issues, their ability to apply appropriate coping strategies and resources for help, as well as their attitude towards respecting life and caring for themselves and others. 5 In situations involving serious psychological crises or obvious risks, students should be aware of and follow the principles of seeking help promptly, reporting incidents immediately, seeking professional assistance, and prioritizing safety.
Read a list of items to be considered	1. Department of Ideological and Political Work of the Ministry of Education: "Guidelines for Mental Health Education for College Students", related documents and learning materials. 2. Compilation Team for "Mental Health Education for College Students": Mental Health Education for College Students, Higher Education Press. 3. Richard J. Gerrig, Philip G. Zimbardo: Psychology and Life, People's Post and Telecommunications Press. 4. Lin Chongde: Developmental Psychology, People's Education Press. 5. Information on ethics and consulting services related to the registration system for professional institutions and individuals in the field of clinical and counseling psychology within the Chinese Psychological Society.

University Chinese Literature

Course Name	University Chinese Literature
Semester in which the course is taught	Semesters 1-6
Course Coordinator	Sun Berlin, Chen Yusi, Wu Xiaomei, etc.
language	Chinese
Nature of the course	General Education Electives
Teaching methods	Lectures, projects, seminars, etc.
Workload (including teaching hours and self-study hours)	Total workload: 50 teaching hours. Number of teaching hours: 32 Self-study hours: 18
credit points	Chinese credits: 2; European credit system credits: 2
Prerequisite courses	Nothing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Focusing on the comprehensive development of students, this course aims to cultivate students' literary skills, basic language abilities, cross-cultural communication skills, and knowledge of language. It seeks to improve students' overall quality and cultural literacy. By studying classic literary works, students' language expression, reading comprehension, and writing skills will be enhanced. Their cultural literacy and humanistic spirit will also be improved. Students will develop their literary appreciation skills, aesthetic taste, critical thinking abilities, and innovation capabilities. At the same time, through the influence of literary works, the excellent traditional Chinese culture will be promoted, and students' humanistic feelings and sense of social responsibility will be cultivated. Supported graduation requirement indicators: None.
Content	1. A benevolent person loves others.(Weight: 0.08, Required Level: Familiar, Understand) 2. Being different yet harmonious (Weight: 0.06, Difficulty level: Familiar+Intermediate) 3. Learning from history (Weight: 0.08, Difficulty level: Familiar+Intermediate) 4. Possessing great authority across the world (Authority: 0.08, Difficulty: Familiar+Easy) 5. Deep affection for my hometown (Weight: 0.08, Difficulty level: Familiar+Intermediate) 6. Praise Love (Weight: 0.06, Required Level: Familiar+Intermediate) 7. Having a clear understanding of the world around us (Weight: 0.08, Required Level: Familiar+Knowledgeable) 8. Natural affinity (Weight: 0.08, Requirement Level: Familiar+Understanding) 9. Valuing life (Weight: 0.08, Required Level: Familiar+Knowledgeable) 10. Noble and upright character (Weight: 0.08; Required level: Familiar + Experienced) 11. Courage and determination in the face of ice and snow (Weight: 0.06; Required Level: Familiar+Intermediate) 12. Poetic Life (Weight: 0.08, Difficulty Level: Familiar+Intermediate) 13. Ancient Poetry Recitation Training (Weight: 0.05) Requirements: Mastery + Familiarity + Application level 14. Essay writing training (Weight: 0.05, Difficulty level:

	Proficient + Familiar + Basic)
Assessment methods	Pre-class preparation, questions, homework, discussions, and in-class assessments, etc.
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 50% + Final assessment score × 50%. 3. The proportion of performance-based assessment scores is 50%. This includes 5% for previewing materials, 5% for asking questions, 15% for taking notes and completing assignments, 10% for reciting ancient poems, and 15% for writing essays. 4. The final assessment accounts for 50% of the total score. The assessment consists of 25% based on in-class quizzes and 25% based on surveys. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	（1）Xia Zhongyi, Chief Editor. Reader of University Humanities. Guangxi Normal University Press, 2005. (2) Edited by Liu Wenxiao. Essentials 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 Classical Works of China. Commercial Printing House, 2022. （5）Ye Jiaying. Classical Poetry Course. Sanlian Bookstore, 2018.

Foreign Languages and International Communication Module

College English

Course Name	College English
Semester in which the course is taught	Semesters 1-3
Course Coordinator	Li Heng is a humble person; Duan Lirui is also a humble one.
language	English
Nature of the course	Comprehensive Core Courses
Teaching methods	Teaching methods such as lectures, discussions, classroom presentations, and task-based learning
Workload (including teaching hours and self-study hours)	Total workload: 300 hours Teaching hours: 192 Self-study hours: 108
credit points	Chinese credit points: 12; European credit system credit points: 12
Prerequisite courses	English (primary school), English (middle school), English (high school), etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Master the basic points of the language and develop skills in listening, speaking, reading, writing, and translation. On the premise of solidly laying a foundation in basic English language skills and firmly grasping basic English knowledge, broaden students' knowledge of linguistics and apply it to daily life and communication.; Supported graduation requirement indicators: 10.3. Course Objective 2: To develop skills in analysis and synthesis, abstraction and generalization, reflection and innovation. To foster independent learning abilities, as well as critical thinking, creative thinking, and teamwork skills. Through language learning, students will gain an understanding of the similarities and differences between Eastern and Western languages, cultures, ethics, etc. This will lay the foundation for their cultural literacy in subsequent courses. Supported graduation requirement indicators: 10.1, 10.2, 10.3, 12.1, 12.2.
Content	1. Hearing module. Mastering speech skills, including rules like liaison, weak forms, lost plosives, stress placement, and intonation; using materials such as campus conversations, classroom instructions, academic lectures, news reports, interviews, etc., to train skills in extracting main ideas, identifying details, and organizing logical arguments; through daily communication, scenario-based expressions, presentation of opinions, discussion interactions, and short speeches, to develop oral communication skills in presenting information, making suggestions, refuting arguments, providing explanations, and summarizing. The entire process includes interactive activities such as dialogue exercises, group discussions, topic reports, and role-playing. (Weight: 0.3; Difficulty level: Familiarize oneself + Understand

	+ Apply) 2. Reading module. This section teaches various reading strategies such as skimming, scanning, and intensive reading. It also covers different types of texts, including explanatory essays, scientific articles, news reports, and literary texts. Students learn about text structure, paragraph logic, complex sentences, and key vocabulary. The entire process involves interactive activities like intensive reading, task-based reading, and hierarchical reading. (Weight: 0.4; Difficulty level: Familiarize oneself + Understand + Apply effectively) 3. Writing module. This section focuses on establishing a solid foundation in sentence structure, paragraph organization, and overall text composition. Students will also engage in training in writing applications, argumentative essays, essay writing with charts and diagrams, book reviews, and academic essays. The goal is to develop logical thinking skills and effective written communication abilities. Throughout the process, various interactive activities such as imitation writing, expansion of existing texts, and rewriting will be incorporated. (Weight: 0.15; Required level: Familiar + Understandable + Capable of application) 4. Translation module. Explains basic translation methods and techniques at the vocabulary, sentence structure, and text level; helps overcome challenges related to word order, passive voice, complex sentence structures, and the translation of culturally specific terms.
	Challenge: Conducting sentence, paragraph, and text translation training. The entire process involves comparing and translating texts. Translation, sentence structure adaptation, context adaptation, and other interactive activities. (Weight: 0.15; Required level: Familiar + Understandable + Capable of application)
Assessment methods	Attendance, classroom performance, self-directed learning, after-class assignments, periodic test assessments, final exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The proportion of performance assessment scores is 40%, which includes 4% for attendance, 4% for classroom behavior, 4% for independent learning, 12% for after-class assignments, and 16% for periodic learning quizzes. The final assessment accounts for 60% of the total evaluation. The assessment criteria are determined by the college's own set of questions. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.

Read a list of items to be considered	1. Cao Yufang (ed.). College English Writing. Jilin University Press, 2019. 2. He Qiren (ed.). New Concept English. Foreign Language Teaching and Research Press, 2020. 3. Bao Bing Bian. *English Grammar in Detail*, Foreign Language Teaching and Research Press, 2021. 4. Wang Qiang (ed.). *English Teaching Methods*. Foreign Language Teaching and Research Press, 2020 Year. 5. Zheng Xiaotang. Learning Strategies for English Acquisition. Foreign Language Teaching and Research Press, 2019. 6. New Oriental. “CET-6 Mock Test Questions Set (with MP3s) (Latest Edition)”, Qunyan Publishing House, 2023.

English for Electrical Engineering Professionals

Course Name	English for Electrical Engineering Professionals
Semester in which the course is taught	Term 5
Course Coordinator	Yang Zuyuan
language	English
Nature of the course	Professional compulsory courses
Teaching methods	Teaching, discussion, self-study, etc.
Workload (including teaching hours and self-study hours)	Total workload: 60 class hours Teaching hours: 32 Self-study hours: 28
credit points	Chinese credits: 2; European credit system credits: 2
Prerequisite courses	College English, Circuit Theory, Electronic Technology, Power Electronics Technology, Principles of Automatic Control, etc.
Course Objectives/Estimated Learning Outcomes	Course Objective 1: Students master core professional vocabulary and commonly used terms in the field of electrical engineering, including standard English expressions in areas such as power systems, power electronics, electrical machines, electrical control, new energy, and automation. They also master the grammatical features of professional English; become proficient in common sentence patterns in professional English; and acquire knowledge of common genres in professional and scientific English, particularly in the writing of academic papers.; Supported graduation requirement indicators: 6.1, 10.1, 10.3. Course Objective 2: Students should be able to understand English-language textbooks on electrical engineering, technical documents, equipment manuals, and basic academic papers. They should be able to translate between Chinese and English, with accurate and compliant expressions that meet engineering standards. Students should also be able to engage in simple technical discussions, describe equipment, provide instructions for experiments, and give presentations on engineering topics. Supported graduation requirement indicators: 10.1, 10.3. Course Objective 3: Students should possess knowledge of international engineering safety and green energy concepts. They should develop a rigorous and pragmatic scientific and engineering mindset. It is essential that their use of professional English be accurate, standardized, and unambiguous. Supported graduation requirement indicators: 6.2, 10.3.
Content	1. Key terms and common concepts in English for electrical engineering professionals (Weight: 0.4; Requirement: Mastery + Familiarity) 2. The grammatical features and common sentence patterns in English for electrical engineering professionals (Weight: 0.2, Requirement Level: Proficient/Familiar) 3. Analysis of reading materials related to electrical engineering in English (Weight: 0.2, Requirement Level: Proficient/Familiar) 4. Translation skills for English texts related to electrical

	engineering (Weight: 0.2, Requirement Level: Proficient/Familiar)
Assessment methods	Attendance, active participation in discussions, classroom discipline, answering questions, homework, open-book exams
Requirements for learning and assessment	The grade for this course is based on a 100-point scale. Students who achieve a score of 60 or above will be considered qualified and will receive credits for this course. 2. Course grade = Procedural assessment score × 40% + Final assessment score × 60%. 3. The performance assessment accounts for 40% of the total score. This includes factors such as attendance (8%), active participation in discussions (8%), classroom discipline (8%), response to questions (8%), and completion of assignments (8%). The final assessment accounts for 60% of the total evaluation. The assessment method is a closed-book exam. 5. Both the periodic assessment and the final evaluation use a percentage-based scoring system.
Read a list of items to be considered	1. Edited by Chen Qing and Cong Wei. English for Electrical Engineering Professionals (1st Edition)[M]. Beijing: China Electric Power Press, 2015. 2. Wang Wei, Zhang Dianhai. English for Electrical Engineering and Automation (3rd Edition)[M]. Beijing: Mechanical Industry Press, 2024. 3. Xue Shilong. English for Electrical Engineering Professionals (1st Edition). Beijing: China Electric Power Press, 2011. 4. Xu Cunshan. Professional English for Automation [M]. Beijing: Mechanical Industry Press, 2010. 5. Kang Zhongjian. English for Electrical Engineering and Automation [M]. Beijing: Mechanical Industry Press, 2022. 6. Hua Zhen, Zhang Jing. English for Electrical Engineering and Automation. Beijing: Mechanical Industry Press, 2012. 7. Zhang Qianghua, Si Aixia. Practical English Course for Electrical Engineering Majors [M] (4th Edition). Beijing: Tsinghua University Press, 2024. Wait.

Communication, cooperation, and innovation and entrepreneurship module

Literature Retrieval and Writing of Scientific and Technological Papers

Module designation	*Literature Retrieval and Writing of Scientific and Technological Papers*
Semester(s) in which the module is taught	*Second Semester*
Course Coordinator	*Wang Wei*
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: 16 hours* *Contact hours: 8* *self-study hours: 8*
Credit points	*Chinese credits: 1; ECTS credits: 2*
Required and recommended prerequisites for joining the module	*Fundamentals of Computer Information Technology*
Module objectives/intended learning outcomes	Course Objective 1: Master the application of modern information technology and equipment, and grasp the retrieval methods and techniques of computer-based literature searches; Supported graduation requirement indicators: 10.1, 10.2, 10.3, 12.1, 12.2. Course Objective 2: Understand the format and writing characteristics of scientific papers, and be able to organize and summarize the content of scientific papers; Supported graduation requirement indicators: 10.1, 10.2, 10.3, 12.1, 12.2.
Content	*1. Basic concepts, principles, and steps of literature retrieval. (weight: 0.4, requirement level: mastery + familiarity)* *2. Common computer-based literature retrieval systems and retrieval methods, as well as the standards and writing of literature retrieval reports. (weight: 0.4, requirement level: mastery + familiarity + application)* *3. Concepts, classification, significance, composition, and writing characteristics of scientific papers, as well as the organization and summarization of scientific papers. (weight: 0.4, requirement level: mastery + familiarity)*
Examination forms	*Discussions, questioning, practical operations, 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 × 40% + summative assessment score × 60%.* *3. Formative assessment accounts for 40%, including discussions 10%, questioning 10%, practical operations 10%, learning attitude 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 are graded on a 100-point scale.*
Reading list	*1. Wang Qi, Wang Guantao. Literature Information Retrieval Tutorial (2nd Edition) [M]. Electronic Industry Press, 2017.* *2. Chen Donghua. Literature Information Retrieval and Utilization [M]. Shanghai Jiaotong University Press, 2005.* *3. Li Zhenhua. Literature Retrieval and Paper Writing [M]. Tsinghua University Press, 2016.* *4. Sun Ping, Yi Xuefeng, Tian Fang. Scientific Writing and Literature Retrieval (2nd Edition) [M]. Tsinghua University Press, 2016.* *5. Fang Lei, Gu Qiong. Literature Retrieval and Utilization [M]. Tsinghua University Press, 2020.* *6. Wang Hongjun. Introduction to Literature Retrieval and Scientific Paper Writing [M]. Mechanical Industry Press, 2018.* *7. Hua Fang. Literature Retrieval and Utilization (2nd Edition) [M]. Tsinghua University Press, 2014.* *8. Chen Pingxiu. Practical Tutorial on Literature Information Retrieval [M]. Mechanical Industry Press, 2020.* *9. Liu Taihong. Practical Training Tutorial on Literature Retrieval and Review [M]. China Renmin University Press, 2018.* *10. Liu Zongqi, Fang Yanhong, Liu Jinzhao. Practical Tutorial on Scientific Literature Retrieval [M]. Science Press, 2018.* *etc.*

Innovation and entrepreneurship education, as well as career planning and employment guidance

Course Name	Innovation and entrepreneurship education, as well as career planning and employment guidance
Semester in which the course is taught	Semesters 2-7
Course Coordinator	Luo Dayou
language	Chinese
Nature of the course	Comprehensive Core Courses
Teaching methods	Teaching, discussion, self-study, etc.
Workload (including teaching hours and self-study hours)	Total workload: 70 class hours. Number of teaching hours: 32. Self-study hours: 38
credit points	Chinese credit points: 2.5; European credit system credit points: 2.5
Prerequisite courses	Nothing
Course Objectives/Estimated Learning Outcomes	Course Objective 1: To master basic knowledge such as innovative thinking, identification of business opportunities, business model design, career planning, employment policies and procedures, and job application processes. Additionally, students should understand the types of positions in the field of civil engineering and related industries, the required skills, as well as current trends in this field. Supported graduation requirement indicators: 1.1, 2.1. Course Objective 2: To be able to conduct self-awareness and career interest analysis, develop phased career development goals, and complete practical tasks such as market research, innovation project planning, business model development, startup pitch presentations, resume preparation, and interview preparation. Supported graduation requirement indicators: 1.3, 2.3. Course Objective 3: To foster an awareness of proactive development, honest employment practices, innovation and entrepreneurship, as well as lifelong learning. This will help develop skills such as teamwork, communication, risk identification, resource integration, and a sense of professional responsibility. Supported graduation requirement indicators: 1.1, 2.1, 2.2.
Content	Career planning involves various aspects such as self-awareness, assessment of career interests and abilities, analysis of industry positions, setting career goals, planning studies during university years, consideration of professional ethics, and designing career paths. All these aspects should be tailored to meet the requirements of civil engineering-related professions. (Weight: 0.35; Difficulty level: Proficient + Familiar + Applied) Innovation and entrepreneurship. This includes training in innovative thinking, problem identification, user needs analysis, identification of entrepreneurial opportunities, market research, business model development, team building, risk management, project presentation, and the preparation of business plans.

	(Weight: 0.35; Difficulty level: Proficient + Familiar + Applied) Job guidance. This includes information about the job market and related policies, protection of employment rights, search for job opportunities, writing resumes and cover letters, etiquette and communication skills during interviews, preparation for written and oral exams, adaptation to the workplace, and proper presentation of employment documents. (Weight: 0.30; Requirement Level: Proficient + Familiar + Applied)
Assessment methods	Online theoretical assessments, offline classroom assignments, career planning documents, business plans, resume preparation and interview training, as well as achievements in academic competitions or innovation and entrepreneurship projects.
Requirements for learning and assessment	The grading system for this course is based on a 100-point scale, with a score of 60 or above considered satisfactory. Overall evaluation score = Theoretical score 80% + Competitive or practical score 20%. The theoretical score is determined by a combination of online theoretical studies and offline classroom assignments. Students should complete career assessments, create career plans, analyze innovation and entrepreneurship projects, and submit their applications. They also participated in processes such as resume preparation and mock interviews. Competition or practical achievements can be evaluated based on various factors, such as participation in innovation and entrepreneurship training programs, career planning competitions, resume writing contests, and startup project presentations. Career planning tasks should include elements such as self-awareness, industry research, capabilities required for the target position, learning plans, and phased action arrangements. Avoid using vague or general statements in these tasks. Innovation and entrepreneurship-related tasks should include details such as the source of the problem, user needs, solutions proposed, available resources, team assignments, and risk analysis. Employment guidance-related tasks, on the other hand, should focus on optimizing resumes, improving interview skills, and ensuring that application materials are well prepared. The course encourages students to choose real-world positions, projects, or competitions as their analysis subjects, based on their professional backgrounds. This approach helps students develop actionable learning plans, strategies for accessing resources, and milestones to achieve. Classroom discussions, case analyses, and group presentations should

	reflect clear division of labor, thorough evidence presentation, and standardized methods of communication.
Read a list of items to be considered	1. Qu Xiuqin, Nie Ailin, Liu Qiaozhi: Guidance for Career Development and Employment Planning (Volumes 1 and 2, along with the practice manual), Higher Education Press, 2023 edition. 2. Jiang Chengyong: “Career Development Planning for College Students and Guidance on Employment and Entrepreneurship”, Higher Education Press, 2015 edition. 3. Zhao Chixuan, Yang Pin: Professional Development and Employment Guidance. People's Post & Telecommunications Press, 2022 edition. 4. Li Jiahua, Zhang Xiaohui, Lei Yumei: Guidance for Career Development and Employment Entrepreneurship. Scientific Publishers, 2020 edition.

Appendix: Explanation of graduation requirement indicators

1. Engineering Knowledge

1.1 Ability to use the language tools of mathematics, natural sciences, and engineering sciences to describe problems in the field of electrical engineering.

1.2 Ability to establish mathematical models and solve them for specific problems in the field of electrical engineering.

1.3 **1.3 Ability to apply relevant knowledge and mathematical modeling methods to analyze complex engineering problems in the field of electrical engineering.**

1.4 **1.4 Ability to compare and integrate solutions to complex engineering problems in the field of electrical engineering by applying relevant knowledge and mathematical modeling methods.**

2. Problem Analysis

2.1 Ability to apply relevant scientific principles to identify and analyze key aspects of complex engineering problems in the field of electrical engineering.

2.2 Ability to correctly describe complex engineering problems in the field of electrical engineering based on relevant scientific principles and mathematical modeling methods.

2.3 Ability to recognize that there are multiple solutions to problems, and to seek alternative solutions through literature research. Additionally, ability to use basic principles and literature research to analyze the factors affecting the process, thereby reaching effective conclusions.

3. Design/Development of Solutions

3.1. Possess knowledge of the entire process of engineering design and product development, as well as basic design/development methods and techniques. Understand various factors that affect design objectives and technical solutions.

3.2 Ability to design components/units for complex equipment or power distribution systems in the field of electrical engineering. Capable of designing systems or processes, with an emphasis on innovative thinking in design solutions.

3.3 When developing complex equipment or power distribution systems that meet specific requirements, ability to consider factors such as safety, health, legal considerations, cultural factors, and environmental impacts.

4. Research

4.1 Ability to solve complex engineering problems in the field of electrical engineering through scientific principles, literature research, surveys, and analysis.

4.2 Ability to select research approaches and design experimental plans based on the characteristics of objects in the field of electrical engineering.

4.3 Ability to construct experimental systems based on designed experimental plans, conduct experiments safely, and collect scientific data effectively.

4.4 Ability to analyze and interpret experimental results, and draw reasonable and effective conclusions through comprehensive information analysis.

5. Using Modern Tools

5.1. Understand the principles and methods of using various information technology tools and engineering tools in the field of electrical engineering and automation. Also, recognize their limitations.

5.2 Understand the principles and methods of using modern instruments and simulation software in the field of electrical engineering and automation. Additionally, recognize their limitations.

5.3 Be able to select and utilize appropriate instruments, information resources, engineering tools, and professional simulation software to analyze, calculate, and design complex engineering problems in the field of electrical engineering.

5.4 Be able to develop or choose modern tools that meet specific needs, simulate and predict related problems in electrical engineering and automation. Additionally, be able to analyze the limitations of these tools.

6. Engineering and Society

6.1 Understand the technical standards, intellectual property rights, industrial policies, and laws and regulations related to the field of electrical engineering. Also, recognize the impact of different cultural backgrounds on engineering activities.

6.2 Be able to analyze and evaluate the impact of electrical engineering practices on society, health, safety, law, and culture. Additionally, understand the constraints imposed by these factors on project implementation, and recognize the responsibilities that must be borne.

7. Environment and Sustainable Development

7.1. Establish a scientific approach to development, understand the importance of national environmental protection policies and sustainable social development.

7.2 Ability to consider the sustainability of engineering practices in the field of electrical engineering and automation from the perspectives of environmental protection and sustainable development. Ability to assess the potential harms and risks to humans and the environment during the product lifecycle.

8 Professional Standards

8.1 Possession of knowledge in humanities and social sciences. Understanding and acceptance of core socialist values, knowledge of China's national conditions, and understanding of the relationship between individuals and society.

8.2 Awareness of ethical principles and norms in engineering practice, including honesty, fairness, and integrity. Ability to adhere to these principles in electrical engineering practices.

8.3 Understanding of the social responsibilities of electrical engineers regarding the safety, health, and well-being of the public, as well as environmental protection. Ability to fulfill these responsibilities in engineering practices.

9 Individuals and Teams

9.1 Possession of interpersonal skills and teamwork awareness. Ability to communicate effectively with members of other disciplines and work collaboratively.

9.2. Ability to work independently or collaboratively in a multidisciplinary context. Ability to organize and lead teams, and to assume roles as team member or leader.

10. Communication: Ability to express one's opinions accurately through oral communication, written documents, charts, etc., regarding issues related to electrical engineering and its automation. Ability to handle various communication styles with industry peers and the general public.

10.1. Understanding the international trends and research hotspots in the field of electrical engineering. Respecting the differences and diversity of cultures around the world.

10.2. Possessing language and written communication skills for cross-cultural interactions. Ability to communicate effectively in a cross-cultural context regarding professional issues.

11. Project Management:

11.1. Understanding the cost structure involved in electrical engineering projects. Grasping the

management and economic decision-making methods applicable to electrical engineering projects.

11.2. Understanding the entire cost process of engineering projects in the electrical field, including the management and economic decision-making aspects involved.

11.3. Ability to correctly apply engineering management and economic decision-making methods in the development of solutions related to electrical engineering, within a multidisciplinary environment.

12. Lifelong learning.

12.1. Ability to recognize the necessity of continuous learning within the context of societal development, with a conscious effort towards autonomous and lifelong learning.

12.2. Possession of autonomous learning abilities, including the ability to understand technical issues, summarize information, and ask questions, in order to adapt to the needs of society and the development of the electrical engineering industry.