

Taizhou University



Self-Assessment Report for ASIIN Programme  
Accreditation for the Bachelor Degree of  
Computer Science and Technology

Appendix D

Syllabus - Mathematics, Physics, and Chemistry

Department of Computer Science and Technology  
School of Information Engineering

2025

## Contents

Advanced Mathematics A (1).....	2
Advanced Mathematics A (2).....	7
Linear Algebra A.....	13
College Physics B.....	19
Discrete Mathematics.....	26
Probability and Mathematical Statistics A.....	30

### Advanced Mathematics A (1)

Module designation	Advanced Mathematics A (1)
Semester(s) in which the module is taught	1 <sup>st</sup> semester
Person responsible for the module	Associate professor Shen Hongbing
Language	Chinese
Relation to curriculum	<p>Advanced mathematics is a compulsory basic course for computer majors. It is the main mathematical theory course for this kind of major in colleges and universities, and it is the basis for subsequent professional courses.</p> <p>The teaching purpose of this course is to enable students to master the basic concepts, theories and methods of calculus, improve their mathematical literacy and the ability to solve practical problems with the knowledge they have learned, and lay a solid foundation for the subsequent study of professional courses.</p> <p>The main task of this course is to teach the knowledge of calculus such as limit, derivative, differential and integral, and cultivate students' ability to analyze and solve practical problems by applying the idea of calculus.</p>
Teaching methods	<p>Target students: students of Computer Science and Technology.</p> <p>Type of teaching: theoretical teaching, experiment teaching</p> <p>Contact hour: 80 hours</p> <p>Including:</p> <p>Theoretical teaching: 80 hours</p> <p>Experiment teaching: 0 hours</p> <p>Computer practice: 0 hours</p> <p>Size of class: 40-60 students</p>
Workload (incl. contact hours, self-study hours)	<p>Total workload = 150 hours</p> <p>Contact hours = 80 hours</p> <p>Self-study hours = 70 hours</p>
Credit points	5
Required and recommended	None.

prerequisites for joining the module	
Module objectives/intended learning outcomes	<p>Learning outcomes:</p> <ul style="list-style-type: none"> <li>● <b>Knowledge:</b> Master the basic knowledge of function limit, continuity, differential and integral, be able to correctly carry out operations according to rules and formulas, and be able to use mathematical software such as Mathematica for research; understand the application of advanced mathematics in computer-related courses, and improve the ability of professional learning.</li> <li>● <b>Skill:</b> <ol style="list-style-type: none"> <li>1. Have strong ability of analysis, demonstration, calculation and application, be able to organically connect this course with related courses, consciously use the knowledge learned to observe life, establish simple mathematical model and solve practical problems.</li> <li>2. Understand the dialectical relationship between the concrete and the abstract, the special and the general, the finite and the infinite, the whole and the local, improve the ability of abstract thinking and dialectical thinking, and lay a good foundation for future scientific research work.</li> </ol> </li> <li>● <b>Competence:</b> Understand the achievements of ancient and modern Chinese mathematicians in calculus, fostering a mission to scale academic heights and cultivate patriotic spirit; comprehend the educational value of advanced mathematics in rational thinking, scientific spirit, mathematical applications, and historical context. Integrate advanced mathematics into thematic activities for comprehensive education, developing teamwork capabilities.</li> </ul>
Content	<p><b>Part A. Theoretical teaching</b> (80 contact hours; 70 self-study hours)</p> <p><b>Chapter 1 Functions and Limits</b> (18 credit hours; 16 self-study hours)</p> <ol style="list-style-type: none"> <li>1. The concept of a function Definition of a function; inverse function; composite function; inverse trigonometric function</li> <li>2. Limits of sequences Limit of a sequence; properties of limit of a sequence</li> </ol>

	<p>3. Limits of functions Definition of limit of a function; properties of limit of a function</p> <p>4. Infinitesimals and infinities Definition of infinitesimal and infinite; properties of infinitesimals; comparison of infinitesimals</p> <p>5. Calculation of limits Operations of limits; operations of indeterminate limits</p> <p>6. Criteria for the existence of limits and two important limits There are limits to existence; the first important limit; the second important limit</p> <p>7. Continuity and discontinuities of functions Continuity of functions; types of discontinuities</p> <p>8. Operations of continuous functions and continuity of elementary functions Operations of continuous functions; Continuity of elementary functions</p> <p>9. Properties of continuous functions on closed intervals</p> <p><b>Chapter 2 Derivatives and Differentiation</b> (12 credit hours; 10 self-study hours)</p> <p>1. Concept of derivative The definition of derivative; the geometric meaning of derivative; the relationship between derivative and continuity</p> <p>2. Derivative rules of functions Derivative formula; Derivative of the four rules; derivative of the inverse function; derivative of the composite function</p> <p>3. Higher-order derivatives</p> <p>4. Implicit functions and derivatives of functions defined by parametric equations Derivatives of implicit functions; derivatives of parametric equations</p> <p>5. Differentiation of functions The concept of differential; the relationship between differentiability and derivability; the calculation and application of differential</p> <p><b>Chapter 3 Mean Value Theorem and Application of Derivatives</b> (18 credit hours; 16 self-study hours)</p> <p>1. Mean value theorem of differential</p>
--	--

	<p>Rolle's theorem; Lagrange's mean value theorem; Cauchy's mean value theorem</p> <p>2. Lobida's Law</p> <p>3. Taylor's formula</p> <p>4. Monotonicity of functions and concavity and convexity of curves. Monotonicity of functions; concavity and convexity of curves</p> <p>5. Extreme values and maximum/minimum values of functions. Extreme values of functions and their methods; maximum and minimum values</p> <p>6. Drawing of function graphs</p> <p>7. Curvature. Arc differential; curvature and its calculation formula; curvature circle and curvature radius</p> <p><b>Chapter 4 Indeterminate integral</b> (12 credit hours; 10 self-study hours)</p> <p>1. The concept and properties of indefinite integral The concept of the original function and indefinite integral; basic integration formula; properties of indefinite integral</p> <p>2. Substitution and partial integration of indefinite integral Summation method; root substitution method; trigonometric substitution method; partial integration method</p> <p>3. Integration of rational functions</p> <p><b>Chapter 5 Definite integral</b> (10 credit hours; 8 self-study hours)</p> <p>1. The concept and properties of definite integral Definition of definite integral; properties of definite integral</p> <p>2. Basic formulas of calculus Integral upper function and its derivative; N-L formula</p> <p>3. Substitution and partial integration of definite integrals Substitution method of definite integral; partial integration method of definite integral</p> <p>4. Abnormal integrals Infinite improper integrals; Improper integrals of unbounded functions; * Convergence methods for improper integrals</p> <p><b>Chapter 6 Application of definite integral</b> (10 credit hours; 10 self-study hours)</p> <p>1. Element method of definite integral</p> <p>2. Applications of definite integrals in geometry</p>
--	--

	<p>Area of plane figures; volume; arc length of plane curves</p> <p><b>Part B. Experiment teaching</b> (0 contact hours; 0 self-study hours)</p>
Examination forms	Closed-book written exam
Study and examination requirements	<p>Homework should be completed by the students independently after each lesson.</p> <p>No late arrivals, early departures or unapproved absences are allowed.</p> <p>The result consists of homework (10%), classroom performance (10%), experimental score (20%) and final score (60%).</p>
Reading list	<p><b>1. Required books</b></p> <p>School of Mathematical Sciences, Tongji University. Advanced Mathematics [M]. 8th edition. Beijing: Higher Education Press, 2023.</p> <p><b>2. Reference books</b></p> <p>[1] Wang Bin, Zhang Xuemao. Advanced Mathematics [M]. Shanghai: Shanghai Jiao Tong University Press, 2019.</p> <p>[2] Department of Mathematics, East China Normal University. Advanced Mathematics [M]. Beijing: Higher Education Press, 2006.</p>
Data of last amendment	Sep 1, 2024

**Advanced Mathematics A (2)**

Module designation	Advanced Mathematics A (2)
Semester(s) in which the module is taught	1 <sup>st</sup> semester
Person responsible for the module	Associate professor Shen Hongbing
Language	Chinese
Relation to curriculum	<p>Advanced mathematics is a compulsory basic course for computer majors. It is the main mathematical theory course for this kind of major in colleges and universities, and it is the basis for subsequent professional courses.</p> <p>The teaching purpose of this course is to enable students to master the basic concepts, theories and methods of calculus, improve their mathematical literacy and the ability to solve practical problems with the knowledge they have learned, and lay a solid foundation for the subsequent study of professional courses.</p> <p>The main task of this course is to teach the knowledge of calculus such as limit, derivative, differential and integral, and cultivate students' ability to analyze and solve practical problems by applying the idea of calculus.</p>
Teaching methods	<p>Target students: students of Computer Science and Technology.</p> <p>Type of teaching: theoretical teaching, experiment teaching</p> <p>Contact hour: 80 hours</p> <p>Including:</p> <p>Theoretical teaching: 80 hours</p> <p>Experiment teaching: 0 hours</p> <p>Computer practice: 0 hours</p> <p>Size of class: 40-60 students</p>
Workload (incl. contact hours, self-study hours)	<p>Total workload = 150 hours</p> <p>Contact hours = 80 hours</p> <p>Self-study hours = 70 hours</p>
Credit points	5
Required and recommended	None.



prerequisites for joining the module	
Module objectives/intended learning outcomes	<p>Learning outcomes:</p> <ul style="list-style-type: none"> <li>● <b>Knowledge:</b> Master the basic knowledge of function limit, continuity, differential and integral, be able to correctly carry out operations according to rules and formulas, and be able to use mathematical software such as Mathematica for research; understand the application of advanced mathematics in computer-related courses, and improve the ability of professional learning.</li> <li>● <b>Skill:</b> <ol style="list-style-type: none"> <li>1. Have strong ability of analysis, demonstration, calculation and application, be able to organically connect this course with related courses, consciously use the knowledge learned to observe life, establish simple mathematical model and solve practical problems.</li> <li>2. Understand the dialectical relationship between the concrete and the abstract, the special and the general, the finite and the infinite, the whole and the local, improve the ability of abstract thinking and dialectical thinking, and lay a good foundation for future scientific research work.</li> </ol> </li> <li>● <b>Competence:</b> Understand the achievements of ancient and modern Chinese mathematicians in calculus, fostering a mission to scale academic heights and cultivate patriotic spirit; comprehend the educational value of advanced mathematics in rational thinking, scientific spirit, mathematical applications, and historical context. Integrate advanced mathematics into thematic activities for comprehensive education, developing teamwork capabilities.</li> </ul>
Content	<p><b>Part A. Theoretical teaching</b> (80 contact hours; 70 self-study hours)</p> <p><b>Chapter 1 Differential Equations</b> (12 contact hours; 10 self-study hours)</p> <ol style="list-style-type: none"> <li>1. Basic concepts of differential equations</li> <li>2. Solutions of first-order differential equations</li> </ol> <p>Differential equations with separable variables; homogeneous equations; first-order linear differential</p>

	<p>equations</p> <p>3. Reduced-order higher-order differential equations</p> <p>4. Second-order linear differential equations</p> <p>Structure of solutions to second-order linear differential equations; Solutions of second-order constant coefficient linear differential equations (homogeneous, non-homogeneous)</p> <p><b>Chapter 2 Vector algebra and spatial analytic geometry</b></p> <p>(14 credit hours; 12 self-study hours)</p> <p>1. Vectors and linear operations</p> <p>Basic concepts of vectors; linear operations of vectors; modulus and direction Angle of vectors</p> <p>2. Dot product and vector product</p> <p>The dot product of vectors; the cross product of vectors</p> <p>3. Planes and their equations</p> <p>The concept of a curved surface equation and a space curve; the point method equation of a plane; the general equation of a plane; the Angle between two planes</p> <p>4. Spatial lines and their equations</p> <p>General equation of a space line; Point-to-form equations of a space line; Angle between two lines; Angle between a line and a plane</p> <p>5. Curves and their equations</p> <p>Rotational surface; cylinder; secondary surface</p> <p><b>Chapter 3 Differential methods of multivariate functions and their applications</b></p> <p>(20 credit hours; 20 self-study hours)</p> <p>1. Basic concepts of multivariable functions</p> <p>Basic concepts of multivariable functions; limits of multivariable functions; continuity of multivariable functions</p> <p>2. partial derivative</p> <p>Definition of partial derivatives; calculation methods of partial derivatives; higher-order partial derivatives</p> <p>3. Total differentiation</p> <p>Definition of total differential; calculation of total differential</p> <p>4. Derivative rules for multivariate composite functions</p> <p>Composite of a function of one variable and a function of several variables; composite of a function of several variables and a function of several variables; full</p>
--	--

	<p>differential form invariance</p> <p>5. Derivative formula for implicit functions The case of an equation; the case of a system of equations</p> <p>6. Geometric applications of multivariable differential calculus The tangent and normal plane of a spatial curve; the tangent plane and normal of a surface</p> <p>7. Directional derivatives and gradients Directional derivative calculation; gradient calculation</p> <p>8. Extremum of a function of several variables and its method of finding it Extreme values and maximum values of multivariate functions; calculation of conditional extreme values (Lagrange multiplier method)</p> <p><b>Chapter 4 Multiple Integrals</b> (10 credit hours; 8 self-study hours)</p> <p>1. The concept and properties of double integrals The concept of double integral; the properties of double integral</p> <p>2. Calculation of double integral Use rectangular coordinates to compute double integrals; use polar coordinates to compute double integrals; change the order of successive integrals</p> <p>3. The concept and properties of triple integrals The concept of triple integral; the properties of triple integral; the calculation of triple integral</p> <p>4. Applications of heavy integrals Applications of integrals in geometry (surface area); * Applications of integrals in physics</p> <p><b>Chapter 5 Curve integral and surface integral</b> (6 credit hours; 4 self-study hours)</p> <p>1. Integration of curves with arc length The concept and properties of the integral along the arc; the calculation method of the integral along the arc</p> <p>2. The integral of a curve with respect to coordinates The concept and properties of the integral of a curve with respect to coordinates; the calculation method of the integral of a curve with respect to coordinates; the connection between the two kinds of integrals</p> <p>3. Green's formula Green's formula; the condition that the integral of a curve</p>
--	---

	<p>on a plane is independent of the path; the integral of the full differential of a binary function</p> <p>4. Surface integrals over areas</p> <p>The concept and properties of the integral of a surface with respect to its area; the method of calculating the integral of a surface with respect to its area</p> <p>5. Surface integral with respect to coordinates</p> <p>The concept and properties of the integral of a surface with respect to coordinates; the calculation method of the integral of a surface with respect to coordinates; the connection between the two kinds of integrals</p> <p>6. Gauss formula and Stokes formula</p> <p>Gauss formula; Stokes formula</p> <p><b>Chapter 6 Infinite Series</b></p> <p>(18 credit hours; 16 self-study hours)</p> <p>1. Concepts and properties of constant series</p> <p>The concept of a constant series; the properties of a constant series</p> <p>2. Convergence methods for constant series</p> <p>Positive series and their convergence methods; alternating series and their convergence methods; absolute convergence and conditional convergence</p> <p>3. Power series</p> <p>The concept of function series; the concept of power series and its convergence; the sum function of power series and its properties</p> <p>4. Expand the function into a power series</p> <p>Taylor series; MacLeod series; the direct and indirect expansion methods of expanding a function into a power series</p> <p>5. Fourier series</p> <p>Triangular series; the concept of Fourier series; expansion of a function into a Fourier series; sine series and cosine series</p> <p><b>Part B. Experiment teaching</b></p> <p>(0 contact hours; 0 self-study hours)</p>
Examination forms	Closed-book written exam
Study and examination requirements	<p>Homework should be completed by the students independently after each lesson.</p> <p>No late arrivals, early departures or unapproved absences are allowed.</p>

	The result consists of homework (10%), classroom performance (10%), experimental score (20%) and final score (60%).
Reading list	<p><b>1. Required books</b></p> <p>School of Mathematical Sciences, Tongji University. Advanced Mathematics [M]. 8th edition. Beijing: Higher Education Press, 2023.</p> <p><b>2. Reference books</b></p> <p>[1] Wang Bin, Zhang Xuemao. Advanced Mathematics [M]. Shanghai: Shanghai Jiao Tong University Press, 2019.</p> <p>[2] Department of Mathematics, East China Normal University. Advanced Mathematics [M]. Beijing: Higher Education Press, 2006.</p>
Data of last amendment	Sep 1, 2024

## Linear Algebra A

Module designation	Linear Algebra A
Semester(s) in which the module is taught	1 <sup>st</sup> semester
Person responsible for the module	Associate professor Xu Zhiyong
Language	Chinese
Relation to curriculum	<p>"Linear Algebra" is an important basic mathematics theory course for science and engineering majors after advanced mathematics. "Linear Algebra" has important applications in mathematics, mechanics, physics, computer science and engineering technology, so it occupies an important position in science and engineering majors.</p> <p>This course serves dual purposes: First, it equips students with essential knowledge and fundamental skills in linear algebra to build a solid mathematical foundation for advanced studies. Second, through structured instructional components, it systematically bridges geometric intuition with algebraic abstraction, cultivating students' abilities in abstract reasoning, logical deduction, and comprehensive analysis. The program empowers learners to master algebraic methodologies for problem-solving, enabling them to view real-world challenges through a mathematical lens, apply mathematical thinking to address practical issues, and ultimately resolve problems using mathematical approaches.</p> <p>The tasks of this course are (1) to systematically teach the basic content of linear algebra; (2) to understand the connection and application of linear algebra with other branches of mathematics; (3) to cultivate students' research consciousness of mathematical problems.</p>
Teaching methods	<p>Target students: students of Computer Science and Technology.</p> <p>Type of teaching: theoretical teaching, experiment teaching</p> <p>Contact hour: 48 hours</p>

	<p>Including:</p> <p>Theoretical teaching: 48 hours</p> <p>Experiment teaching: 0 hours</p> <p>Computer practice: 0 hours</p> <p>Size of class: 40-60 students</p>
Workload (incl. contact hours, self-study hours)	<p>Total workload = 90 hours</p> <p>Contact hours = 48 hours</p> <p>Self-study hours = 42 hours</p>
Credit points	3
Required and recommended prerequisites for joining the module	None.
Module objectives/intended learning outcomes	<p>Learning outcomes:</p> <ul style="list-style-type: none"> <li>● <b>Knowledge:</b> Master theoretical knowledge, such as determinant, matrix, linear equation system, eigenvalues of matrix, quadratic type, etc.</li> <li>● <b>Skill:</b> Students will master abstract and rigorous algebraic methods to solve fundamental algebraic problems, including calculating determinants, solving systems of linear equations, and determining eigenvalues and eigenvectors of matrices. Through training in abstract and logical thinking, students will build essential mathematical foundations for advanced courses in their major. Have the initial ability and innovative consciousness to use mathematical knowledge to establish mathematical models and solve practical problems. Be able to carry out mathematical modeling and data analysis, and apply the learned mathematical knowledge and methods to the related fields of automation.</li> <li>● <b>Competence:</b> To cultivate students' independent learning ability, research ability, problem analysis and problem solving ability. To improve students' basic core literacy of abstraction, reasoning and modeling.</li> </ul>
Content	<b>Part A. Theoretical teaching</b>

	<p>(48 contact hours; 42 self-study hours)</p> <p><b>Chapter 1 Arrays</b></p> <p>(10 contact hours; 9 self-study hours)</p> <ul style="list-style-type: none"> <li>● Definition of the n-order determinant</li> <li>● Properties and calculation of determinants <ul style="list-style-type: none"> <li>(1) Properties of determinants</li> <li>(2) Calculation of determinant</li> <li>(3) The determinant of the product of a square matrix</li> </ul> </li> <li>● Kramer's Law</li> <li>● Key points: definition of n-order determinant, properties and calculation of determinant, Cramer's rule.</li> <li>● Difficult point: flexible use of the properties of determinants for calculation.</li> </ul> <p><b>Chapter 2 Matrix operations</b></p> <p>(8 contact hours; 7 self-study hours)</p> <ul style="list-style-type: none"> <li>● Matrix and its operations <ul style="list-style-type: none"> <li>(1) The concept of matrix</li> <li>(2) Linear operations of matrices</li> <li>(3) Matrix multiplication</li> <li>(4) Transpose of the matrix</li> </ul> </li> <li>● Block matrix</li> <li>● The determinant of a square matrix and its inverse matrix <ul style="list-style-type: none"> <li>(1) The determinant of a square matrix</li> <li>(2) The concept and properties of inverse matrix</li> <li>(3) Find the inverse matrix by elementary row transformation</li> </ul> </li> <li>● Key points: matrix and its operations, block matrix, finding the determinant of a square matrix and its inverse matrix.</li> <li>● Difficulties: the law of matrix operation, the basis and principle of finding inverse matrix.</li> </ul> <p><b>Chapter 3 Elementary transformations of matrices</b></p> <p>(8 contact hours; 7 self-study hours)</p> <ul style="list-style-type: none"> <li>● Elementary transformations of matrices and elementary matrices <ul style="list-style-type: none"> <li>(1) Gauss elimination method</li> <li>(2) Elementary transformations of matrices</li> <li>(3) Elementary matrices</li> </ul> </li> <li>● Rank of matrices</li> </ul>
--	--



	<p>(1) The concept of matrix rank (2) Calculation of matrix rank (3) Properties of matrix rank</p> <ul style="list-style-type: none"> <li>● Solutions to systems of linear equations <ul style="list-style-type: none"> <li>(1) The concept of a system of linear equations</li> <li>(2) Determination of the solution of a system of linear equations</li> </ul> </li> <li>● Key points and difficulties: elementary transformation of matrix and elementary matrix, how to find the rank of matrix, how to solve (non) homogeneous linear equation group.</li> </ul> <p><b>Chapter 4 Vector Spaces and the Structure of Solutions to Linear Equations</b> (11 contact hours; 10 self-study hours)</p> <ul style="list-style-type: none"> <li>● n-dimensional vectors and their linear operations</li> <li>● Linear correlation of vector groups <ul style="list-style-type: none"> <li>(1) Linear combinations of vector groups</li> <li>(2) Linear correlation of vector group</li> </ul> </li> <li>● Rank of vector group and extremely noncommunal.</li> <li>● Vector space</li> <li>● Vector inner product and orthogonal matrices <ul style="list-style-type: none"> <li>(1) Vector inner product</li> <li>(2) Standardize orthogonal bases</li> <li>(3) Schmidt orthogonal method</li> <li>(4) Orthogonal matrices</li> </ul> </li> <li>● Structure of solutions to systems of linear equations <ul style="list-style-type: none"> <li>(1) The structure of the solution to a homogeneous linear equation system</li> <li>(2) The structure of the solution to a non-homogeneous system of linear equations</li> </ul> </li> <li>● Key points: n-dimensional vectors and their linear operations, linear correlation of vector groups, rank of vector groups and maximal independent group, vector space, vector inner product and orthogonal matrix, structure of solutions to linear equation systems.</li> <li>● Difficulties: to judge the linear correlation of vector group, to find the rank and maximum independent group of vector group, to find orthogonal matrix, to find the solution of linear equation group.</li> </ul> <p><b>Chapter 5 Eigenvalues and diagonalization of matrices</b></p>
--	---

	<p>(6 contact hours; 5 self-study hours)</p> <ul style="list-style-type: none"> <li>● Concepts, calculations and properties of eigenvalues and eigenvectors</li> <li>● Similar matrices and diagonalization of square matrices <ul style="list-style-type: none"> <li>(1) The concept of similarity matrix</li> <li>(2) Similar diagonalization of matrices</li> </ul> </li> <li>● Similar diagonalization of real symmetric matrices</li> <li>● Key points: the concept and calculation of eigenvalues and eigenvectors, their properties; similar matrices and diagonalization of square matrices.</li> </ul> <p>The difficulty: diagonalization of matrices.</p> <p><b>Chapter 6 quadratic type</b></p> <p>(5 contact hours; 4 self-study hours)</p> <ul style="list-style-type: none"> <li>● Quadratic forms and their matrix representations <ul style="list-style-type: none"> <li>(1) The concept of quadratic type</li> <li>(2) Contractual relationship between matrices</li> </ul> </li> <li>● Transform the quadratic type into the standard type <ul style="list-style-type: none"> <li>(1) Use orthogonal transformation to transform the quadratic type into standard type</li> <li>(2) Use the completing method to transform the quadratic type into the standard type</li> </ul> </li> <li>● Positive definite quadratic type</li> <li>● Key points: quadratic type and its matrix representation; transformation of quadratic type to standard type.</li> <li>● Difficulties: the determination of positive definite quadratic type.</li> </ul> <p><b>Part B. Experiment teaching</b></p> <p>(0 contact hours; 0 self-study hours)</p>
Examination forms	Closed-book written exam
Study and examination requirements	Class performance 10%; course test: 15%; coursework 15%; final exam 60%.
Reading list	<p><b>1. Required books</b></p> <p>Chen Qun. Linear Algebra [M]. Shanghai: Shanghai Jiao Tong University Press, 2022.</p> <p><b>2. Reference books</b></p> <p>[1] Huang Tingzhu. Linear Algebra [M]. Beijing: Higher Education Press, 2021.</p>

	[2] Department of Mathematics of Tongji University. College Mathematics: Linear Algebra [M]. Beijing: Higher Education Press, 2008.
Data of last amendment	Sep 1, 2024

**College Physics B**

Module designation	College Physics B
Semester(s) in which the module is taught	Associate professor Zhou Rongrong
Person responsible for the module	2 <sup>nd</sup> semester
Language	Chinese
Relation to curriculum	<p>Physics is the discipline that explores fundamental laws governing material structure and motion. The most basic forms of motion in matter, which are studied in physics, typically exist within more complex patterns of movement. Understanding these fundamental principles of motion serves as both the starting point and foundation for comprehending complex physical phenomena. This makes physics the theoretical cornerstone and pillar for numerous disciplines in natural sciences and engineering. As the bedrock of scientific methodology and worldview, physics has established its foundational concepts, laws, and research methods. Furthermore, various instruments and devices designed based on these principles have been widely applied across all fields of natural science. Among these, it has driven the advancement of science and technology as well as societal progress. Physics stands as a vital component of human civilization. Throughout history, mathematics and physics have developed in tandem, mutually reinforcing each other's growth. Studying physics greatly enhances our understanding of mathematical concepts. "University Physics" serves as a foundational course for students majoring in computer technology and Internet of Things engineering.</p>
Teaching methods	<p>Target students: students of Computer Science and Technology.</p> <p>Type of teaching: theoretical teaching, experiment teaching</p> <p>Contact hour: 64 hours</p> <p>Including:</p> <p>Theoretical teaching: 48 hours</p> <p>Experiment teaching: 16 hours</p> <p>Computer practice: 0 hours</p> <p>Size of class: 40-60 students</p>

Workload (incl. contact hours, self-study hours)	Total workload = 120 hours Contact hours = 64 hours Self-study hours = 56 hours
Credit points	4
Required and recommended prerequisites for joining the module	Advanced Mathematics
Module objectives/intended learning outcomes	<p>Learning outcomes:</p> <ul style="list-style-type: none"> <li>● <b>Knowledge:</b> Clarify the logical structure of the physics knowledge system, enabling students to master the basic theories of physics and general problem-solving methods. Establish a scientific dialectical materialist worldview, methodology, and epistemology, develop strong self-learning and knowledge absorption capabilities, possess independent analytical and problem-solving abilities, and cultivate a certain level of scientific literacy.</li> <li>● <b>Skill:</b> 1. Proficient in the representation and application of vectors and calculus in physics, and understand the infiltration relationship between physics and mathematics. 2. To master the main process and basic methods of scientific experiments, learn and understand the principles and use methods of common instruments and meters. To enable students to have certain scientific experiment ability and team communication and cooperation ability.</li> <li>● <b>Competence:</b> Through understanding the philosophical thought, development process and outstanding deeds of representative historical figures in physics, students can establish correct values and outlook on life, cultivate scientific spirit of not fearing difficulties and daring to explore, and stimulate patriotic feelings of serving the country through science.</li> </ul>
Content	<p><b>Part A. Theoretical teaching</b> (48 contact hours; 42 self-study hours)</p> <p><b>Chapter 0 Introduction</b> (2 contact hours; 1 self-study hours)</p> <p>1. The object of physics</p>

	<p>The spatial scale, temporal scale and mass scale of the material world; the five basic theories of physics; physics is what everything is made of the basis of natural science: physics and technology.</p> <p>2. Comparison between college physics and high school physics</p> <p>3. Requirements on learning methods and style of study</p> <p><b>Chapter 1 Kinematics of particles</b> (8 contact hours; 7 self-study hours)</p> <p>1. Reference frame, coordinate frame, physical model</p> <p>(1) The absoluteness and relativity of motion</p> <p>(2) Reference frame</p> <p>(3) Coordinate system</p> <p>(4) Physical model</p> <p>2. Position vector, displacement, velocity, acceleration</p> <p>(1) Position vector</p> <p>(2) Displacement</p> <p>(3) Speed</p> <p>(4) Acceleration</p> <p>3. Description of curved motion</p> <p>(1) General planar curve motion: tangential acceleration, normal acceleration</p> <p>(2) Circular motion angular velocity angular acceleration</p> <p>Two types of problems in kinematics</p> <p>(1) Find the velocity and acceleration from the known motion equation</p> <p>(2) Find the velocity and motion equation given the acceleration and initial conditions</p> <p><b>Chapter 2 Particle Dynamics</b> (10 contact hours; 9 self-study hours)</p> <p>1. Newton's laws of motion</p> <p>(1) Newton's three laws of motion</p> <p>(2) Application of Newton's laws</p> <p>2. Momentum The law of momentum and the law of conservation of momentum</p> <p>(1) The momentum theorem of a particle</p> <p>(2) Momentum theorem of particle system</p> <p>(3) Momentum conservation law of particle system</p> <p>3. Law of conservation of kinetic energy, potential energy and mechanical energy</p> <p>(1) Work The work of the conservative force</p> <p>(2) Kinetic energy The kinetic energy theorem</p>
--	--

	<p>(3) Potential energy</p> <p>(4) Kinetic energy theorem of particle system functional principle</p> <p>(5) Law of conservation of mechanical energy</p> <p>(6) The law of conservation of energy</p> <p><b>Chapter 3 Electrostatic Field in vacuum</b></p> <p>(10 contact hours; 9 self-study hours)</p> <p>1. Electric field, electric field strength</p> <p>(1) Charge</p> <p>(2) Coulomb's Law</p> <p>(3) Electric field strength</p> <p>(4) Principle of electric field strength superposition</p> <p>(5) Calculation of electric field intensity</p> <p>2. Electric flux Gauss theorem</p> <p>(1) Electric field lines</p> <p>(2) Electric flux</p> <p>(3) Gauss theorem</p> <p>(4) Application of Gauss theorem</p> <p>3. Work of electric field force Potential</p> <p>(1) The work of the electric field force</p> <p>(2) Loop theorem of electrostatic field</p> <p>(3) Electric potential energy</p> <p>(4) Potential potential difference</p> <p>(5) Calculation of potential</p> <p>4.* The relationship between electric field strength and potential</p> <p>5. Conductors in electric fields</p> <p>6. Electric media in electric fields</p> <p>7.* Capacitors and capacitors</p> <p><b>Chapter 4 Steady magnetic field</b></p> <p>(10 contact hours; 9 self-study hours)</p> <p>1. Current and electromotive force</p> <p>(1) Current density</p> <p>(2) The electromotive force of the power supply</p> <p>2. Magnetic field magnetic induction intensity</p> <p>(1) Basic magnetic phenomena</p> <p>(2) Magnetic induction intensity</p> <p>(3) Biot-safal law</p> <p>(4) Application of Biot-safal law</p> <p>3. Gauss's theorem and Ampere's loop theorem for magnetic fields</p> <p>(1) Magnetic induction line</p>
--	---

	<p>(2) Magnetic flux  (3) Gauss theorem  (4) Ampere's loop theorem  (5) Application of Ampere's loop theorem  4. The effect of magnetic field on current carrying wire  (1) Ampere's Law  (2) * The effect of uniform magnetic field on plane current coil  5. The effect of magnetic field on moving charge  (1) Lorentz force  (2) Motion of charged particles in uniform magnetic field  (3) * Hall effect</p> <p><b>Chapter 5 Changing electromagnetic fields</b>  (8 contact hours; 7 self-study hours)  1. Law of electromagnetic induction  (1) Faraday's law of electromagnetic induction  (2) Lenz's Law  2. Motional electromotive force and induced electromotive force  (1) Electromotive force generated by motion  (2) Induced electromotive force  3. Self-sense and mutual sense  (1) Self-induction  (2) Mutual induction</p> <p><b>Part B. Experiment teaching</b>  (16 contact hours; 14 self-study hours)  <b>Experimental 0 introduction Experimental data and error processing</b>  Explain and demonstrate the specific operational steps of the experiment  (1 contact hours; 1 self-study hours)  Section 1 Tasks and procedures of physics experiment course  Section 2 Basic knowledge of data processing  1. Measurement of physical quantities and measurement errors  2. Precision and significant figures of the instrument  3. Calculation of direct measurement error  4. Absolute and relative errors of indirect measurements  5. Processing of experimental data  6. Explanation and demonstration of specific operation steps of the experiment and matters needing attention</p>
--	--



	<p><b>Experiment 1 Basic measurement</b> (2.5 contact hours; 2 self-study hours)</p> <ol style="list-style-type: none"> <li>1. The structural principle and reading rule of vernier caliper</li> <li>2. The structural principle and reading rules of micrometer</li> </ol> <p><b>Experiment 2: Use of air cushion guide rail</b> (16 contact hours; 2 self-study hours)</p> <ol style="list-style-type: none"> <li>1. Level the air cushion guide rail with static leveling method</li> <li>2. Measurement of velocity and acceleration in uniform motion</li> <li>3. Verify Newton's second law</li> </ol> <p><b>Experiment 3 Measurement of rotating Inertia</b> (2.5 contact hours; 2 self-study hours)</p> <ol style="list-style-type: none"> <li>1. Installation and adjustment of moment of inertia measuring instrument</li> <li>2. Measurement, data recording and processing</li> </ol> <p><b>Experiment 4: Resistance measurement with Wheatstone bridge</b> (2.5 contact hours; 2 self-study hours)</p> <ol style="list-style-type: none"> <li>1. Structure, name and function of the resistive bridge measuring instrument with mature interest</li> <li>2. Connect the Wheatstone bridge circuit correctly</li> <li>3. Understand the sensitivity of Wheatstone bridge and its influencing factors</li> </ol> <p><b>Experiment 5: Measuring magnetic fields with Helmholtz coils</b> (2.5 contact hours; 2 self-study hours)</p> <ol style="list-style-type: none"> <li>1. Instrument structure and debugging</li> <li>2. Zero adjustment to avoid interference with the magnetic field</li> <li>3. Data recording and plotting</li> </ol> <p><b>Experiment 6 Study of photoelectric effect</b> (2.5 contact hours; 3 self-study hours)</p> <ol style="list-style-type: none"> <li>1. Installation and adjustment of instruments</li> <li>2. Measurement steps and methods</li> <li>3. Data processing and graphing method</li> </ol>
Examination forms	Closed-book written exam
Study and examination requirements	<p>Homework should be completed by the students independently after each lesson.</p> <p>No late arrivals, early departures or unapproved absences are allowed.</p> <p>The result consists of homework (10%), classroom</p>

	performance (10%), experimental score (20%) and final score (60%).
Reading list	<p><b>1. Required books</b></p> <p>Zhao Jinfang, Wang Denglong. College Physics [M]. 6th Edition. Beijing: Beijing University of Posts and Telecommunications Press, 2021.</p> <p><b>2. Reference books</b></p> <p>[1] Zhou Yuqing. College Physics [M]. Nanjing: Southeast University Press, 2019.</p> <p>[2] Yuan Xiaochun. College Physics [M]. Shanghai: Tongji University Press, 2014.</p> <p>[3] Cheng Shoushu, Jiang Zhiyong. General Physics [M]. (1-3) Fifth edition. Beijing: Higher Education Press, 2006.</p>
Data of last amendment	June, 2025

**Discrete Mathematics**

Module designation	Discrete Mathematics
Semester(s) in which the module is taught	2 <sup>nd</sup> semester
Person responsible for the module	Professor Lei Hongxuan
Language	Chinese
Relation to curriculum	Discrete Mathematics serves as a foundational course for majors such as Computer Science and Technology, Internet of Things Engineering, Data Science and Big Data Technology. This course aims to equip students with mathematical modeling techniques, theoretical frameworks, and computational solutions for discrete problems while cultivating their ability to abstract mathematical concepts and develop rigorous logical reasoning skills. Through this curriculum, students will not only master descriptive tools and research methodologies for discrete structures—but also enhance their capacity for abstract thinking, logical deduction, and inductive reasoning. The concepts, methods, and theories covered are extensively applied in digital circuits and compiler design Theory, data structure, operating system, database, algorithm, artificial intelligence and other fields.
Teaching methods	<p>Target students: students of Computer Science and Technology, Internet of Things Engineering, Data Science and Big Data Technology, network space security</p> <p>Type of teaching: theoretical teaching, experiment teaching</p> <p>Contact hour: hours</p> <p>Including:</p> <p>Theoretical teaching: 48 hours</p> <p>Experiment teaching: 0 hours</p> <p>Computer practice: 0 hours</p> <p>Size of class: 40-60 students</p>
Workload (incl. contact hours,	<p>Total workload = 90 hours</p> <p>Contact hours = 48 hours</p>

self-study hours)	Self-study hours = 42 hours
Credit points	3
Required and recommended prerequisites for joining the module	Advanced Mathematics, Linear Algebra
Module objectives/intended learning outcomes	<p>Learning outcomes:</p> <ul style="list-style-type: none"> <li>● <b>Knowledge:</b> <ol style="list-style-type: none"> <li>1. To recognize and understand the views, methods, principles and development trends of modern mathematics on discrete mathematics.</li> <li>2. Master the relevant concepts, basic theories and certain application skills of propositional logic, predicate logic, sets, relations and functions, graphs, trees and other models.</li> <li>3. Through systematic study of discrete mathematics, we can complete the reasoning process with computer thinking.</li> </ol> </li> <li>● <b>Skill:</b> <ol style="list-style-type: none"> <li>1. Be able to have strong intuitive thinking ability and reverse thinking ability, be able to redefine new problems and transfer knowledge, and be able to use discrete mathematical model to analyze and solve some common problems.</li> <li>2. Be able to build and analyze models for practical engineering problems, and use models to solve problems.</li> </ol> </li> <li>● <b>Competence:</b> <p>Be able to present knowledge in different modes, magnify concepts, and be able to "recreate" and "rediscover" the knowledge in textbooks by tracing back to the source. Combined with special cases in the course, it can stimulate learning enthusiasm, patriotism, sense of mission and responsibility.</p> </li> </ul>
Content	<p><b>Part A. Theoretical teaching</b> (48 contact hours; 42 self-study hours)</p> <p><b>Chapter 1 Propositional logic</b> (10 contact hours; 8 self-study hours)</p> <ul style="list-style-type: none"> <li>● Propositional symbolization and conjunctions.</li> <li>● Proposition formula and classification.</li> </ul>

	<ul style="list-style-type: none"> <li>● Equivalent calculus.</li> <li>● Canonical form</li> </ul> <p><b>Chapter 2. First-order logic</b> (6 contact hours; 4 self-study hours)</p> <ul style="list-style-type: none"> <li>● Basic concepts of first-order logic.</li> <li>● First-order logical formula and interpretation.</li> <li>● First-order logical equivalence and antiparallel paradigm.</li> </ul> <p><b>Chapter 3 Basic concepts and operations of sets</b> (4 contact hours; 4 self-study hours)</p> <ul style="list-style-type: none"> <li>● Basic concepts of sets.</li> <li>● Basic operations of sets.</li> <li>● Counting the elements in a set.</li> </ul> <p><b>Chapter 4 Binary Relations and Functions</b> (10 contact hours; 8 self-study hours)</p> <ul style="list-style-type: none"> <li>● Cartesian product of sets and binary relations.</li> <li>● Relational operations.</li> <li>● The nature of the relationship.</li> <li>● Closure of relations.</li> <li>● Equivalence relations and partial order relations.</li> <li>● Definitions and properties of functions.</li> <li>● Combinations and inverse functions.</li> </ul> <p><b>Chapter 5 Basic concepts of graphs</b> (6 contact hours; 6 self-study hours)</p> <ul style="list-style-type: none"> <li>● Undirected and directed graphs.</li> <li>● Connectivity of paths, circuits and graphs.</li> <li>● Matrix representation of graphs.</li> </ul> <p><b>Chapter 6. Trees</b> (4 contact hours; 4 self-study hours)</p> <ul style="list-style-type: none"> <li>● Directed tree and generation tree.</li> <li>● Roots and their applications.</li> </ul> <p><b>Chapter 7 Introduction to Algebraic Systems</b> (8 contact hours; 8 self-study hours)</p> <ul style="list-style-type: none"> <li>● Binary operations and their properties.</li> <li>● Algebra system.</li> <li>● Several typical algebraic systems.</li> </ul> <p><b>Part B. Experiment teaching</b> (0 contact hours; 0 self-study hours) None.</p>
Examination forms	Close-written exam

Study and examination requirements	<p>Homework should be completed independently by the students after each lesson.</p> <p>No late arrivals, early departures or unapproved absences are allowed.</p> <p>Regular grades account for 30%, including homework (10%), classroom performance (10%) and midterm tests (10%).</p> <p>The final assessment (closed written test) accounts for 70%.</p>
Reading list	<p><b>1. Required books</b></p> <p>[1] Geng Suyun, Qu Wanling, Zhang Liang. Discrete Mathematics [M]. 6th edition. Beijing: Tsinghua University Press, 2021.</p> <p><b>2. Reference books</b></p> <p>[1] Geng Suyun, Qu Wanling, Zhang Lian., Discrete Mathematics Problem Solutions [M]. 6th edition. Beijing: Tsinghua University Press, 2021.</p> <p>[2] Ma Dianfu, Li Jianxin, Ma Shuai, Du Bowen, Lv Jianghua, Deng Ting. Discrete Mathematics and Its Applications - Modeling and Implementation with Python [M]. Beijing: Higher Education Press, 2021.</p>
Data of last amendment	June 29, 2025

### Probability and Mathematical Statistics A

Module designation	Probability and Mathematical Statistics A
Semester(s) in which the module is taught	3 <sup>rd</sup> semester
Person responsible for the module	Associate professor Liu Weijing
Language	Chinese
Relation to curriculum	<p>This course is an important professional mathematics theory course after advanced mathematics and linear algebra, and it is the main core mathematics theory course required by colleges and universities for this kind of major.</p> <p>The teaching purpose of this course is to enable students to master the basic concepts, theories and methods of probability and statistics, improve their mathematical literacy and the ability to solve practical problems with the knowledge they have learned, and lay a solid foundation for the subsequent study of professional courses.</p> <p>This course focuses on studying widely occurring random phenomena in practical applications to explore their statistical regularities. Methodologically, it converts random events into sets and introduces random variables, utilizing advanced mathematical techniques to investigate probability calculation methods for random events and distribution patterns of random variables. Through the tool of probability theory, we develop statistical inference methods to estimate population parameters and conduct hypothesis testing.</p>
Teaching methods	<p>Target students: students of Computer Science and Technology.</p> <p>Type of teaching: theoretical teaching, experiment teaching</p> <p>Contact hour: 48 hours</p> <p>Including:</p> <p>Theoretical teaching: 48 hours</p> <p>Experiment teaching: 0 hours</p> <p>Computer practice: 0 hours</p> <p>Size of class: 40-60 students</p>

Workload (incl. contact hours, self-study hours)	Total workload = 90 hours Contact hours = 48 hours Self-study hours = 42 hours
Credit points	3
Required and recommended prerequisites for joining the module	Advanced mathematics, linear algebra
Module objectives/intended learning outcomes	<p>Learning outcomes:</p> <ul style="list-style-type: none"> <li>● <b>Knowledge:</b> Learn the basic knowledge. Understand and master the basic concepts and theories in the course, understand its thinking method, meaning and use, as well as its connection with other concepts and laws.</li> <li>● <b>Skill:</b> 1.Master basic skills. Be able to perform operations correctly according to rules and formulas. Be able to seek and design reasonable and simple operation methods according to the problem situation. Be able to use computers to carry out relevant calculations, table lookup or data processing according to certain procedures and steps. 2.Develop thinking ability. Be able to observe, compare, abstract and generalize the research object. Be able to use the concepts, theorems and properties in the course to carry out logical reasoning. Be able to analyze, summarize and analogize the calculation results in accordance with reality.</li> <li>● <b>Competence:</b> 1.Enhance practical problem-solving capabilities. Students will be able to integrate this course with related subjects, identify and resolve interdisciplinary issues connected to the curriculum. They should consciously apply acquired knowledge to observe real-world scenarios, develop basic mathematical models, and address relevant mathematical challenges in daily life. 2.To deeply understand the idea of probability and statistics, clarify the principle of small probability events, the dialectical relationship between necessity and contingency, and cultivate students' dialectical materialism view and scientific spirit.</li> </ul>



Content	<p><b>Part A. Theoretical teaching</b> (48 contact hours; 42 self-study hours)</p> <p><b>Chapter 1 Basic concepts of probability theory</b> (6 contact hours; 5 self-study hours)</p> <ol style="list-style-type: none"> <li>1. Randomized trials</li> <li>2. Sample space and random events <ol style="list-style-type: none"> <li>(1) The concept of random experiment, sample space and sample point</li> <li>(2) Random events</li> <li>(3) The relationship and operation of events</li> </ol> </li> <li>3. Frequency and probability <ol style="list-style-type: none"> <li>(1) The concept and properties of frequency</li> <li>(2) The axiomatic definition of probability</li> <li>(3) Properties of probability</li> </ol> </li> <li>4. Possible prototypes <ol style="list-style-type: none"> <li>(1) Definition of classical probability model</li> <li>(2) Calculation of classical probability</li> </ol> </li> <li>5. conditional probability <ol style="list-style-type: none"> <li>(1) Conditional probability formula, multiplication formula, multiplication formula for multiple events</li> <li>(2) Total probability formula</li> <li>(3) Bayes formula</li> </ol> </li> <li>6. Independence <ol style="list-style-type: none"> <li>(1) The two events are independent of each other</li> <li>(2) Multiple events are independent of each other and mutually independent. The relationship between two events is independent and mutually independent</li> </ol> </li> </ol> <p><b>Chapter 2 Random Variables and their distributions</b> (10 contact hours; 9 self-study hours)</p> <ol style="list-style-type: none"> <li>1. Random variable <ol style="list-style-type: none"> <li>(1) Definition of random variable</li> <li>(2) Classification of random variables</li> </ol> </li> <li>2. Discrete random variables and their distribution laws <ol style="list-style-type: none"> <li>(1) Definition of discrete random variable</li> <li>(2) The relationship between the distribution law of discrete random variables and the Poisson distribution and the binomial distribution</li> <li>(3) Common distribution</li> </ol> </li> <li>3. The distribution function of random variables <ol style="list-style-type: none"> <li>(1) Definition of distribution function of random variable</li> <li>(2) Properties and methods of finding the distribution function</li> </ol> </li> </ol>
---------	---

	<p>4. Continuous random variables and their probability densities</p> <p>(1) Definition of continuous random variable and its probability density</p> <p>(2) Properties of probability density and related calculations</p> <p>(3) The properties and related calculations of uniform distribution, exponential distribution and normal distribution</p> <p>5. Distribution of random variable functions</p> <p>(1) The distribution of a function of a discrete random variable</p> <p>(2) The distribution of a function of a continuous random variable</p> <p><b>Chapter 3 Multivariate random variables and their distributions</b></p> <p>(6 contact hours; 5 self-study hours)</p> <p>2D random variables and their distributions</p> <p>(1) The distribution function of two-dimensional random variables</p> <p>(2) Two-dimensional discrete random variables</p> <p>(3) Two-dimensional continuous random variables</p> <p>2. marginal distribution</p> <p>(1) Edge distribution function</p> <p>(2) The edge distribution law of discrete random variables</p> <p>(3) The edge density function of a continuous random variable</p> <p>3. Condition distribution</p> <p>(1) Conditional distribution of discrete random variables</p> <p>(2) Conditional distribution of continuous random variables</p> <p>4. Independent random variables</p> <p>(1) The definition of independence of random variables</p> <p>(2) Independence of normal random variables</p> <p>(3) Independence of n-dimensional random variables</p> <p>5. The distribution of a function of two random variables</p> <p><b>Chapter 4 Numerical characteristics of random variables</b></p> <p>(10 contact hours; 9 self-study hours)</p> <p>1. Mathematical expectation</p> <p>(1) The definition of mathematical expectation of discrete random variables</p>
--	--

	<p>(2) Definition of mathematical expectation of continuous random variables</p> <p>(3) The mathematical expectation of a function of a random variable</p> <p>(4) The properties of mathematical expectation</p> <p>2. variance</p> <p>(1) Definition of variance</p> <p>(2) The nature of variance</p> <p>(3) Calculation of variance</p> <p>(4) Chebyshev inequality</p> <p>3. Covariance and correlation coefficients</p> <p>(1) Definition, properties and calculation of covariance</p> <p>(2) Definition, properties and calculation of correlation coefficient</p> <p>4. Matrix and covariance matrix</p> <p><b>Chapter 5 Law of large numbers and Central Limit Theorem</b></p> <p>(2 contact hours; 1 self-study hours)</p> <p>1. Law of large numbers</p> <p>(1) The concept of law of large numbers</p> <p>(2) The common law of large numbers</p> <p>2. Central limit theorem</p> <p>(1) The concept of the central limit theorem</p> <p>(2) The common central limit theorem</p> <p><b>Chapter 6 Sample and Sampling distribution</b></p> <p>(2 contact hours; 1 self-study hours)</p> <p>1. Random sampling</p> <p>(1) General concepts</p> <p>(2) Master the concept of sample</p> <p>(3) Empirical distribution function</p> <p>2. Sampling distribution</p> <p>(1) Statistical quantities and empirical distribution functions</p> <p>(2) Three sampling distributions</p> <p>(3) Several important distribution theorems</p> <p><b>Chapter 7 Parameter estimation</b></p> <p>(4 contact hours; 4 self-study hours)</p> <p>1. Point estimator</p> <p>(1) Matrix estimation</p> <p>(2) maximum likelihood estimation</p> <p>2. Selection criteria for estimates</p> <p>3. Interval estimation</p>
--	--

	<p>(1) Interval estimation (2) Interval estimation of normal population mean and variance, interval estimation of 0-1 distribution parameters, one-sided confidence interval.</p> <p><b>Chapter 8 Hypothesis Test</b> (8 contact hours; 8 self-study hours)</p> <p>1. Hypothesis test (1) The basic idea of hypothesis testing (2) The basic method of hypothesis testing (3) Two types of errors</p> <p>2. Hypothesis testing for the normal population mean (1) Test of the mean of a single normal population (2) The test of the mean of two normal populations</p> <p>3. Hypothesis testing of normal population variance (1) Hypothesis test of variance of a single normal population Hypothesis testing for two normal population variances</p> <p><b>Part B. Experiment teaching</b> (0 contact hours; 0 self-study hours)</p>
Examination forms	Closed-book written exam
Study and examination requirements	<p>Formative assessment (40%) + summative assessment (60%)</p> <p>Formative assessment includes class performance 40%; Course test 30%; Course assignment 30%.</p>
Reading list	<p><b>1. Required books</b> Sheng Su, Xie Shiqian, Pan Chengyi. Probability Theory and Mathematical Statistics [M]. Beijing: Higher Education Press, 2019.</p> <p><b>2. Reference books</b> [1] Wu Ganchang, Probability Theory and Mathematical Statistics, China Renmin University Press, 2011. [2].Wang Zikun. Basic Probability Theory and Its Applications [M]. Beijing: Science and Technology Press, 2007.</p>
Data of last amendment	Aug 30, 2024