Module Descriptions for CE
Contents of Reading Marks

1. Advanced Mathematics

Module designation	**Advanced Mathematics**
Semester(s) in which the module is taught	1st semesters，2nd semesters
Person responsible for the module	Zhou Yanli
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lecture
Workload	**Required time** Workload = 195 hours Contact hours = 160 hours Self-study hours = 35 hours
Credit points(ECTS)	**6.5**
Recommended prerequisites	**Prerequisite for course selection** nothing
Module objectives/intended learning outcomes	Module objectives: **Knowledge:** Master mathematical knowledge such as calculus, definite integrals, generalized integrals, differential equations, vector operations, multivariate functions, double integrals, triple integrals, series, etc. **Skills:** Through the study of this course, students will not only master the necessary foundational knowledge, but also develop a certain mathematical modeling mindset, which will be integrated into the entire process of proposing, analyzing, and solving problems. **Competencies:** Cultivate students' mathematical thinking ability, scientific problem analysis ability, and basic calculation ability, with strong learning ability and hardworking spirit.
Content	**Part A. Theoretical teaching (160 contact hours)** **Chapter 1**. Functions and Limits (20 contact hours) ● Master: the properties of basic elementary functions and be able to depict their graphs; Find the limit using two important limits; The method of finding the limit of equivalent infinitesimal quantities; Determine the type of discontinuity point. **Chapter 2**. **Derivatives and Differentiation** (12 contact hours) ● Master the geometric meaning of derivatives and the relationship between the differentiability and continuity of functions; The method for calculating the first derivative of functions determined by implicit functions and parametric equations involves finding the simpler second derivative of these two types of functions; Simplify the calculation of derivatives using logarithmic differentiation method; The four rules of operation for derivatives and the derivative formula for basic elementary functions; Composite function differentiation method; The method $n$of finding the first and second derivatives of elementary functions. **Chapter 3**. **Differential Mean Value Theorem and Applications of Derivatives** (14 contact hours) ● Mastery: The method of using L'Hospital's rule to find the limit of an infinitive; The method of using derivatives to determine the concavity and convexity of function graphs, finding inflection points, extreme values, and depicting the graphs of some functions; Can use derivatives to prove some simple inequalities and function identities. **Chapter 4**. **Indefinite Integral** (12 contact hours) ● Understanding: The concepts and properties of primitive functions and indefinite integrals. ● Mastery: Basic formulas for indefinite integral calculation, substitution method, and partial integral method; Integrate simpler rational functions, irrational functions, and trigonometric rational expressions. ● Familiar with: Permutation method and fractional integration method for indefinite integral calculation. **Chapter 5**. **Definite Integral** (10 contact hours) ● Understanding: the concept and geometric significance of definite integrals; The properties of definite integrals and the mean value theorem of integrals; The definite integral with a variable upper limit serves as a function of its upper limit; The concept of anomalous integration.

	● Mastery: Newton Leibniz formula; The substitution method and partial integration method for definite integrals; The derivative formula of variable upper bound definite integral; Can calculate simple anomalous integrals. ● Familiarity: Permutation method and fractional integration method for definite integrals. **Chapter 6**. **Application of definite integrals** (8 contact hours) ● Understanding: definite integral element method. ● Understanding: The application of definite integrals in medicine (physics). ● Master the application methods of definite integrals in geometry, and establish integral expressions for certain geometric quantities. **Chapter 7**. **Differential Equations** (14 contact hours) ● Understanding: concepts such as differential equations, solutions, general solutions, initial conditions, and specific solutions; The structure of solutions to second-order linear differential equations; The solution of high-order constant coefficient homogeneous linear differential equations; The solution of Bernoulli equation; ● Mastery: Solutions for equations with separable variables and first-order linear equations; Can solve homogeneous equations and understand the idea of using variable substitution to solve equations from them **Chapter 8**. **Spatial Analytic Geometry and Vector Algebra** (14 contact hours) ● Master the representation method of vectors; The method of performing vector operations (linear operation, quantity product, vector product) using the coordinate expression of vectors, and the relationship and calculation method between the unit vector and the direction cosine of the vector; Can solve the equations for a rotating surface with the coordinate axis as the rotation axis and a cylindrical surface with the generatrix parallel to the coordinate axis; Can solve the projection equation of the intersection line of two simpler surfaces on the coordinate plane; I am proficient in solving problems related to plane equations, line equations, and their solutions using the relationship between lines and planes; The equations of planes and lines, as well as their solutions, can be solved using the relationship between lines and planes. **Chapter 9**. **Multivariate Function Differentiation Method and Its Applications** (20 contact hours) ● Master: the method of finding the first and second partial derivatives of composite functions; Partial derivatives of implicit functions; Can find the tangent of a curve and the normal plane equation; Can calculate the tangent plane and normal equation of a surface; Can calculate directional derivatives; The problem of finding the extremum of a binary function; Lagrange multiplier method for finding conditional extremum. **Chapter 10**. **Re integration** (8 contact hours) ● Understanding: double integral; The property of double integration; The element method for the expression of multiple integrals. ● Mastery: The calculation method of double integration Understanding: Calculation of triple integral (Cartesian coordinate, cylindrical coordinate) **Chapter 11**. **Infinite Series** (16 contact hours) ● Mastery: Convergence of geometric series and p-series; Comparative review method of positive series; Ratio analysis method for positive series; The method for finding the convergence domain of simpler power series; The sum function of simpler power series; The Maclaurin expansion expands some simple functions into power series. **Part B. Experiment / practice teaching: 0 hour.**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ≥60 points will be considered a pass.
Reading list	1.Department of Applied Mathematics, Tongji University. Advanced Mathematics (Seventh Edition). Beijing: Higher Education Press, 2014.

2. Probability Theory and Mathematical Statistics B

Module designation	Probability Theory and Mathematical Statistics B
Semester(s) in which the module is taught	3th semester
Person responsible for the module	Hou Liying
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lecture
Workload	Workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours
Credit points(ECTS)	3
Recommended prerequisites	**Prerequisite for course selection** nothing
Module objectives/intended learning outcomes	Module objectives: **Knowledge:** This course introduces probability theory and mathematical statistics. **Skills:** Through course learning, students will understand the basic concepts of probability theory and mathematical statistics; Familiar with basic properties and operations (excluding the case of two-dimensional random variables); Master the application of mathematical and statistical methods in medical imaging technology work; Learn how to effectively collect, organize, and analyze data with randomness to make inferences or predictions about practical problems, and provide basis and suggestions for taking certain decisions and actions; Understand the use of function calculators or statistical analysis software SPSS for statistical data processing.. **Competencies:** Provide students with basic ideas and methods for studying physics problems, cultivate their mathematical thinking ability, scientific problem analysis ability, and basic computational ability, and improve their learning ability for subsequent professional courses.
Content	**Part A. Theoretical teaching (32 contact hours)** **Chapter 1**. **Random Events and Their Probability** (4 contact hours) ● Master the relationship and operation between events, probability calculation of classical models, addition theorem and multiplication formula calculation of probabilities, calculation of total probability and inverse probability formula; ● Understand the concepts of randomized trials, sample space, sample points, random events, inevitable events, and impossible events; The concept of frequency, statistical definition of probability, axiomatic definition of probability, classical definition of probability; The concepts of conditional probability and independence; Master the application of inverse probability formula in medicine. **Chapter 2. Random Variables and Their Distribution** (6 contact hours) Understand the concepts of random variables, discrete random variables, probability functions, and distribution functions; The concepts of continuous random variables and probability density functions; ● Master the calculation of probability and distribution functions for discrete random variables; Calculation of continuous random variable distribution function; Probability calculation of two-point distribution, binomial distribution, and Poisson distribution; Probability calculation of uniform distribution, exponential distribution, normal distribution, and standard normal distribution; ● Analyze the distribution of prizes in welfare lottery applications; Investigate normal distribution data and verify the σcorrectness of the "3 principles" of normal distribution. **Chapter 3**. **Numerical Characteristics of Random Variables** (4 contact hours) ● Understand the concept of mathematical expectations; The concepts of variance and standard deviation; ● Master the properties and calculations of mathematical expectations;

	Mathematical expectations of several commonly used distributions; The nature and calculation of variance; Variance of several commonly used distributions; ● Determination of the optimal group size in disease screening applications; The pattern of multiple randomized trials. **Chapter 4**. **Random Sampling and Sampling Distribution** (5 contact hours) ● Understand the concepts of population, individual, sample, sample size, and statistical measures; The concepts of sample mean, sample variance, and sample standard deviation; Several commonly used sampling methods; The concept of sampling distribution; ● Master the calculation of sample mean, sample variance, and sample standard deviation; $\overline{X}$ Distribution, χ^2 distribution, t distribution, and F related theorems of distribution. ● Apply a survey to collect data from all students in the class, such as height, weight, or grades in a certain course, and calculate the sample mean, sample variance, and sample standard deviation of this set of data. **Chapter 5**. **Sampling Estimation** (5 contact hours) ● Understand concepts such as estimates, estimated values, point estimates, interval estimates, confidence intervals, and confidence levels; Concepts such as maximum likelihood estimation and moment estimation. ● Master the use of maximum likelihood estimation method to obtain estimates; Interval estimation of the mean of a normal population; Interval estimation of normal population variance. ● Apply point estimation and interval estimation based on a survey data of the entire class. **Chapter 6**. **Hypothesis Testing** (8 contact hours) ● Understand concepts such as hypothesis testing, null hypothesis, alternative hypothesis, rejection domain, threshold, significance level, and two types of errors; Small probability principle; The P-value method, confidence interval method, and critical value method for hypothesis testing; The F concepts of u inspection, t testing, χ^2 testing, and testing. ● Master the hypothesis testing of the mean of a single normal population; Hypothesis testing of the variance of a single normal population; Pairing comparison, group comparison; Hypothesis testing of two normal population variances; ● Apply hypothesis testing based on survey data from all students in the class.
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of $\geqslant$ 60 points will be considered a pass.
Reading list	1. It is recommended to use textbooks [1] Zhu Guoqiang, Methods of Medical Mathematical Statistics (4th edition), Higher Education Press, July 2021. 2. Main reference materials [1] Ye Cinan, Probability Theory and Mathematical Statistics, Science Press, 2015.

3. Linear Algebra

Module designation	**Linear Algebra**
Semester(s) in which the module is taught	4st semester
Person responsible for the module	Min Jianzhong
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lecture
Workload	**Required time** Workload = 120 hours Contact hours = 48 hours Self-study hours = 72 hours
Credit points(ECTS)	**4**
Recommended prerequisites	**Prerequisite for course selection** nothing
Module objectives/intended learning outcomes	Module objectives: ● **Knowledge:** This course focuses on the theory of solutions to linear systems of equations, discussing the linear correlation of determinants, matrices, vectors, theories of linear systems of equations, and related knowledge. ● **Skills:** Master the calculation methods for solving linear equation systems, be familiar with the basic conclusions of solving linear equation systems, commonly used matrix methods, linear equation systems and their related basic calculation methods in science and technology, and understand the application of linear algebra knowledge in some practical problems ● **Competences:** Cultivate students' serious, meticulous, and rigorous learning habits, improve their abstract and logical thinking abilities, and exercise their spirit of fearlessness and perseverance in discovering and solving problems during their learning process.
Content	**Part A. Theoretical teaching (48 contact hours)** **Chapter 1**: **Determinants** (12 contact hours) ● Master the properties of determinants and expand theorems; ● Familiar with the definition of n-order determinants, concepts of cofactors, algebraic cofactors, and the relationship between determinants and solutions to linear systems of equations; ● Understand the concept of arranging reverse order numbers. **Chapter 2**. **Matrix and its Operations** (12 contact hours) ● Master the concept of matrix and the definition and operation rules of linear operations, multiplication, power multiplication, transposition, square matrix determinant, conditions for matrix reversibility, conditions for non-homogeneous linear equations to have solutions, no solutions, infinite solutions, and conditions for homogeneous linear equations to have non-zero solutions; ● Familiar with the concept of inverse matrix and the properties of reversible matrix, the concept of elementary transformation and its role in simplifying linear equation systems, calculating inverse matrix, and the concept and properties of matrix rank; ● Understand the concept of adjoint matrix, the relationship between matrix and its adjoint matrix, the purpose of block matrix, and the theoretical basis for calculating matrix rank. **Chapter 3**. **Elementary transformations** of **matrices and systems of linear equations** (12 contact hours) ● Master the conditions for non-homogeneous linear equation systems to have solutions, no solutions, and infinite solutions, as well as the conditions for homogeneous linear equation systems to have non-zero solutions; ● Familiar with the concept of elementary transformations and their role in simplifying linear equation systems, calculating inverse matrices, and the concept and properties of matrix rank; ● Understand the theoretical basis for calculating matrix rank. **Chapter 4**: **Linear Correlation of Vector Groups** (12 contact hours)

	● Master the concepts and discrimination methods of n-dimensional vectors, linear representation, linear correlation, and linear independence; ● Familiar with the concepts of vector systems, linear representation, the relationship between linear independence and linear equation system solutions, vector system equivalence, the concepts of maximum independence and vector system rank, the structure of homogeneous linear equation system solutions, basic solution systems, etc., and understand the structure of non-homogeneous linear equation system solutions; ● Understand the concept of vector space, the dimensionality and basis of vector space, the concept of vector group stretching into space, and the fact that the entire solution of a homogeneous linear equation system constitutes a linear space, and the fundamental solution system is the basis of the solution space. **Part B. Experiment / practice teaching: 0 hour.**
Study and examination requirements and forms of examination	Course assessment is a combination of process assessment and summative assessment. Process assessment includes attendance (30%), classroom performance (20%), homework (30%), and in class quizzes (20%). Through these assessments, students will receive a 100% daily grade. The final assessment adopts the format of a closed book written test at the end of the term, and the final written test score is obtained on a percentage scale. Overall course evaluation score=Regular score x 50%+Final written exam score x 50%
Media employed	PPT courseware, multimedia computers, projectors, laser pens, blackboards, etc.
Reading list	1. It is recommended to use textbooks Engineering Mathematics - Linear Algebra, 6th edition, edited by Tongji University, Higher Education Press, June 2, 2014 2. Main reference materials [1] Edited/written by Zhao Shuyi, Linear Algebra, Renmin University Press, 2013 edition; [2] Edited by Ju Yuma, Linear Algebra, Tsinghua University Press, 2002 edition; [3] Wu Ganchang, Linear Algebra, China Renmin University Press, 2006. [4] Fang Xiaojuan, Wang Min, Hou Renmin, A Concise Course in Linear Algebra, Science Press, 2005

4. College Physics

Module designation	College Physics
Semester(s) in which the module is taught	2nd semesters
Person responsible for the module	Xie Yinyue
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lecture
Workload	**Required time** Workload = 75 hours Contact hours = 32 hours Self-study hours = 43 hours
Credit points (ECTS)	**2.5**
Recommended prerequisites	**Prerequisite for course selection** nothing
Module objectives/intended learning outcomes	Module objectives. ● **Knowledge:** This course introduces the basic knowledge of mechanics, optics and electromagnetism,. ● **Skills:** Mastery of the basic theories of mechanics, optics and electromagnetism, familiarity with the analysis of relevant physical problems and the calculation of relevant physical quantities, and an understanding of the application of physics knowledge ● **Competences:** To provide students with basic ideas and methods for studying physical problems, to develop mathematical and rational thinking skills, scientific problem analysis skills and basic arithmetic skills, and to enhance the learning ability of subsequent specialized courses.
Content	**Part A. Theoretical teaching (32 contact hours)** **Chapter 1. Basic Laws of Mechanics** (8 contact hours) ● Master: the description of the state of motion of an object; ● Knowledge: Newton's laws of motion, laws of rotation of rigid bodies on fixed axes, and laws of conservation of angular momentum; ● Familiar with the concepts of conservative and non-conservative forces; ● Understand: the basic methods of describing circular motion in a natural coordinate system. **Chapter 2. Elasticity of objects** (2 contact hours) ● Understand: the concepts and calculations of stress, strain and modulus of elasticity in the case of deformation of the length of an object;the concepts of stress, strain and modulus of elasticity in the case of changes in shape and volume of an object. ● Familiar with the relationship between positive stress and positive strain in the case of lengthwise deformation of an object; **Chapter 3. Fluctuating optics** (8 contact hours) ● Master: the basic principles and formulas of Young's double-slit interference and Marius' law; ● Familiar with the concepts of optical range, optical range difference, and the basic principles and formulas of single-slit diffraction by Fraunhofer; ● Understand: the basic principles of thin film interference, the phenomenon of circular hole diffraction, and concepts related to polarization of light. **Chapter 4. Electrostatic Fields** (4 contact hours) ● Master: the principle of electrostatic field superposition, calculation of electric field strength of point charge, principle of potential superposition, calculation of electric potential of point charge; ● Familiar with the Gauss theorem for electrostatic fields, the loop theorem for electrostatic fields, and the interrelationships between electric potential, potential energy, and potential difference; ● Understand: the basic concepts of electric dipoles, electric dipole layers, and biofilm potentials. **Chapter5. Steady magnetic fields** (6 contact hours) ● Master: the calculation of magnetic induction around a current-carrying

	straight wire, magnetic induction at the center of a current-carrying arc, and magnetic induction inside a long straight solenoid; ● Familiar with the Biot-Saval law, Gauss's theorem in magnetic fields, Ampere's loop theorem, and the characteristics of magnetic fields on moving charges; ● Understand: biomagnetic fields and the biological effects of magnetic fields. **Chapter 6. Electromagnetic Induction and Electromagnetic Waves** (4 contact hours) ● Familiar with the basic concepts of self-sensing and mutual sensing; Master Faraday's law of electromagnetic induction; ● Understand: the use of electromagnetic waves in medicine. **Part B. Experiment / practice teaching: 0 hours**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books [1] Wang L., Ji M. Medical physics (9th ed.). Beijing: People's Health Press, 2019. 2. Reference books [1] Hong, Y., et al. Medical physics (4th ed.). Higher Education Press, 2018.

5. College Physics Experiment

<table>
<tr><td>Module designation</td><td>College Physics Experiment</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>2nd semesters</td></tr>
<tr><td>Person responsible for the module</td><td>Meng Jiang</td></tr>
<tr><td>Language</td><td>Chinese</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory</td></tr>
<tr><td>Teaching methods</td><td>lesson, lab works</td></tr>
<tr><td>Workload</td><td>Required time
Workload=30 hours
Contact hours=16 hours
Self study hours=14 hours</td></tr>
<tr><td>Credit points (ECTS)</td><td>1</td></tr>
<tr><td>Recommended prerequisites</td><td>Prerequisite for course selection
nothing</td></tr>
<tr><td>Module objectives/intended learning outcomes</td><td>Learning Objectives
Module objectives.
● Knowledge: Basic knowledge and skill training of physics experiment, measurement of Young's modulus of artificial bone, measurement of magnetic field by Hall effect method and interference of light.
● Skills: Be able to read the lab instructions and apply the experimental principles and steps to complete the experiments independently.
● Competences: Cultivate students' basic scientific experimental skills, improve students' basic quality of scientific experiments, and enable students to initially master the ideas and methods of experimental science.</td></tr>
<tr><td>Content</td><td>Chapter 1. Basic Physics Laboratory Knowledge and Skills Training (4 contact hours)
● Mastery of the concept of effective numbers, effective number algorithms and basic methods of experimental data processing;
● Familiarize yourself with the structure, operation and use of physical instruments such as vernier calipers and spiral micrometers;
● Understand the specific requirements for the three components of physics lab prep, manipulation, and writing lab reports;
● Understand the basic methods of evaluating measurement results with uncertainty.
Chapter 2. Measurement of Young's modulus of artificial bone (4 contact hours)
Chapter 3. Hall effect method for measuring magnetic fields (4 contact hours)
Chapter 4. Interference of light (measurement of radius of curvature with Newton's ring) (4 contact hours)</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>The course assessment is a whole process evaluation method, which includes attendance, lab prep, lab operation, lab report, quiz, comprehensive literacy, etc., of which comprehensive literacy includes teamwork, mutual help and learning, and behavioral norms, etc. Through these assessments, we get the total evaluation grade of the course in percent.
<table>
<tr><td>Type of assessment</td><td>Weight (%)</td></tr>
<tr><td>Lab prep, attendance</td><td>10</td></tr>
<tr><td>Experimental operations</td><td>30</td></tr>
<tr><td>Lab Report</td><td>30</td></tr>
<tr><td>quiz</td><td>20</td></tr>
<tr><td>general literacy</td><td>10</td></tr>
<tr><td>add up the total</td><td>100</td></tr>
</table></td></tr>
<tr><td>Reading list</td><td>1. Recommended books
[1] University Physics Experiments, Fudan University Press, August 2023, 2nd ed.</td></tr>
</table>

	2. Reference books [1] Experiments in Medical Physics, University of Science and Technology of China Press, May 2013, 2nd ed. [2] Medical Physics Laboratory Tutorial, Science Press, October 2016, 2nd edition

6. Normal Anatomy and Physiology

Module designation	**Normal Anatomy and Physiology**
Semester(s) in which the module is taught	3th semesters
Person responsible for the module	Wang Hongwei
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	lesson, lab works
Workload	**Required time** Workload = 135 hours Contact hours = 64 hours Self-study hours = 71 hours
Credit points (ECTS)	**4.5**
Recommended prerequisites	**Prerequisite for course selection** nothing
Module objectives/intended learning outcomes	Module objectives. ● **Knowledge:** Through the teaching of this course, students will have a comprehensive understanding of the composition of the human body and the location, form, structure and function of the organs, be familiar with the morphology, structure and adjacency of the human body's tissues and organs, and have a basic understanding of the phenomena of the human body's life activities and the function of each component. ● **Skills:** Students will be able to use theoretical knowledge to analyze changes in the structure and physiological functions of the human body in the context of common diseases; they will be able to use commonly used laboratory instruments such as microscopes and surgical equipment. ● **Competences:** To develop students to fully understand the relationship between structure and function, and to be able to link theory to practice, through the combination of specimen and living body, structure and function, simulation training and practical operation, to apply what they have learned, and to lay a solid foundation for future study in specialized courses.
Content	**Part A.Theory teaching:** **Chapter 1. General remarks** **Chapter 2.Cells** **Chapter 3. Basic organization** **Chapter 5.Blood** **Chapter 6. Motion Systems** **Chapter 8. The digestive system** **Chapter 9. Respiratory system** **Chapter 10. Urinary system** **Chapter11 Reproductive system** **Chapter 13. The Vascular System** **Chapter 14. Sense Organs** **Chapter15. The Nervous System** **Chapter 16. Endocrine system** **Part B.Experimental Teaching:** 1. Normal structure of the basic organization 2. Blood group identification and case discussion 3. The locomotor system - the anatomy of the major bones, joints, and muscles of the human body 4. Anatomy of the digestive system 5. Anatomy of the respiratory system 6. Anatomy of the genitourinary system 7. circulatory system - anatomy of the heart and major arteries and veins 8. Anatomy of the central nervous system - brain and spinal cord
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books

	[1] Wang Hongwei and Bao Jianying, editors, Normal Anthropology, People's Health Publishing House, November 2016, 1st ed. 2. Reference books [1] Park Shuling and Ding Wenlong, editors, Systematic Anatomy, People's Health Publishing House, 2018 edition [2] Wang Tinghuai, edited by Wang Tinghuai, Physiology, People's Health Publishing House, 2018 edition [3] Li Success and Zeng Yuanshan, editors, Histology and Embryology, People's Health Press, 2018 edition

7. Foundation of Disease

Module designation	Foundation of Disease
Semester(s) in which the module is taught	4st semesters
Person responsible for the module	Xu Jing
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson, lab works
Workload	**Required time** Workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours
Credit points (ECTS)	**3**
Recommended prerequisites	**Prerequisite for course selection** Normal Anatomy and Physiology
Module objectives/intended learning outcomes	**Module objectives:** ● **Knowledge:** This course aims to introduce a fundamental knowledge of disease. Then, students can master the metabolic changes in the body's functions during the disease process, be familiar with the causes of the disease and various common indicators, and understand the clinical significance and new developments. Then, students can master the metabolic changes in the body's functions during the disease process, be familiar with the causes of the disease and various common indicators, and understand the clinical significance and new developments of this discipline. Then students can master the metabolic changes in the body's functions during the disease process, be familiar with the causes of the disease and various common indicators, and understand the clinical significance and new developments of this discipline. ● **Skills:** On the basis of mastering the pathological changes of the body, analyzing the connections between observations in clinical bioengineering, and On the basis of mastering the pathological changes of the body, analyzing the connections between observations in clinical bioengineering, and improving theoretical knowledge and practical job skills. Exercise students' understanding, induction, analysis and other basic medical thinking methods, and cultivate their ability to solve practical problems. ● **Competences:** By correctly understanding the changes in the body's functional metabolism during diseases and recognizing the phenomena of life, we can By correctly understanding the changes in the body's functional metabolism during diseases and recognizing the phenomena of life, we can establish a scientific attitude of loving life and seeking truth from facts. Through practical operation, we can cultivate a hardworking and scientifically rigorous work style. Being able to care for and respect patients, and improving the ability to serve patients in practical work.
Content	● **Part I. Theory (24 contact hours hours)** **Chapter 1 Introduction (2 contact hours)** **Chapter 2 Cell and Tissue Damage and Repair (4 contact hours)** **Chapter 3 Local circulation disorders (2 contact hours)** **Chapter 4 Inflammation (2 contact hours)** **Chapter 5 Tumors (2 contact hours)** **Chapter 6 Diseases of the Cardiovascular System (2 contact hours)** **Chapter 7 Diseases of the respiratory system (2 contact hours)** **Chapter 8 Diseases of the Digestive System (2 contact hours)** **Chapter 9: Diseases of the Urinary System (2 contact hours)** **Chapter 10: Case Discussion (2 contact hours)** **Chapter 11 Review Exam (2 contact hours)** ● **Part II. Experiments (8 contact hours)** **Tissue damage repair (1 contact hour)** **Local circulation disorders (1 contact hour)** **Inflammation (1 contact hour)**

	Tumors (1 contact hour) **Diseases of the respiratory system (1 contact hour)** **Diseases of the cardiovascular system (1 contact hour)** **Diseases of the digestive system (1 contact hour)** **Diseases of the urinary system (1 contact hour)**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ≥ 60 points will be considered a pass.
Reading list	1. Recommended books [1] Bu Hong, Li Yilei, eds, Pathology, People's Health Publishing House, 9th edition, 2018.

8. Principles and Applications of Medical Statistics

Module designation	Principles and Applications of Medical Statistics
Semester(s) in which the module is taught	5st semesters
Person responsible for the module	Gao Yahan
Language	Chinese
Relation to curriculum	Compulsory
Teaching, methods	**lesson, lab works**
Workload	**Required time** Workload = 120 hours Contact hours = 48 hours Self-study hours = 72 hours
Credit points (ECTS)	**4**
Recommended prerequisites	**Prerequisite for course selection** Higher Mathematics
Module objectives/intended learning outcomes	Module objectives. ● **Knowledge:** To master the basic theory, knowledge and skills of collecting, organizing and analyzing statistical data in clinical practice and medicine. To master the basic theory, basic knowledge and basic skills of collecting, organizing and analyzing statistical data in clinical practice and medicine. Understand the current development of medical statistics, learn to recognize clinical biomedical phenomena with statistical ideas and methods, discover statistical laws, and improve the ability to analyze and solve problems. ● **Skills:** Ability to recognize clinical biomedical phenomena using statistical ideas and methods. Ability to read and understand the results of statistical analysis. Ability to use the methods of medical statistics to identify statistical patterns and analyze and solve problems. ● **Competences:** To have the ability to analyze and solve the practical problems faced in the medical clinic in a rigorous, meticulous and responsible manner with the flexibility to apply the theoretical basic knowledge and skills of statistics. And be able to extend the learning to other work and study.
Content	**Part A. Theoretical teaching (32 contact hours)** **Chapter 1. Introduction to Medical Statistics (2 contact hours)** **Chapter 2. Statistical Description of Quantitative Data (2 contact hours)** **Chapter 3. Normal distribution with medical reference range (2 contact hours)** **Chapter 4 Statistical description of qualitative data (2 contact hours)** **Chapter 5 Statistical tables and charts (2 contact hours)** **Chapter 6 Parameter Estimation and Hypothesis Testing (2 contact hours)** **Chapter 7 t-tests (2 contact hours)** **Chapter 8 Analysis of Variance (4 contact hours)** **Chapter 9 The chi-square test (2 contact hours)** **Chapter 10 Nonparametric Rank Sum Test (2 contact hours)** **Chapter 11 Linear Regression and Correlation (2 contact hours)** **Chapter 12 Multiple Linear Regression (2 contact hours)** **Chapter 13 Logistic Regression Analysis (2 contact hours)** **Chapter 14 Survival Analysis (2 contact hours)** **Chapter 15 Research Design (2 contact hours)** **Part B. Experiment / practice teaching: (16 contact hours)** ● **Experimental Project 1:** Statistical description of quantitative data in SPSS ● **Experimental Project 2:** SPSS statistical plotting ● **Experimental Project 3:** SPSS t-test analysis ● **Experimental Project 4:** SPSS ANOVA ● **Experimental Project 5:** SPSS chi-square test ● **Experimental Project 6:** SPSS Nonparametric Rank Sum Test

	● **Experimental Project 7:** SPSS Correlation and Regression Analysis ● **Experimental Project 8:** SPSS Survival Analysis
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books [1] Li Kang, ed., Medical Statistics (7th ed.), People's Health Publishing House, March 2013, 6th ed. 2. Reference books [1] Zhenqiu Sun, Yongyong Xu, editors, Medical Statistics, People's Health Publishing House, September 2014, fourth edition.

9. College English

Module designation	College English
Semester(s) in which the module is taught	1st, 2nd, 3th, 4th semester
Person responsible for the module	Lu Yiyuan
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson
Workload	Workload = 360 hours Contact hours = 256 hours Self-study hours = 104 hours
Credit points	12
Recommended prerequisites	None
Module objectives/intended learning outcomes	● **Knowledge:** Possess foundational English knowledge in phonetics, vocabulary, grammar, and discourse, with an expanded vocabulary of 2000+ words including 400 profession-related terms. Able to comprehend and communicate on common personal and social topics using oral, written, or digital resources. ● **Skills:** Understand general English conversations and basic professional content. Apply listening, reading, and writing skills to academic and job-related contexts, including abstracts, reports, and introductions. ● **Competencies:** Meet basic English requirements for future job roles. Comprehend and translate moderately difficult texts related to the major or workplace, including manuals and professional literature.
Content	**Theoretical teaching (256 contact hours)** **First Semester College English 1 (64 contact hours)** ● Listening section: General daily English conversations and announcements ● Oral section: General topics and dialogues ● Reading section: Understanding articles on general topics published in English newspapers and magazines ● Writing section: Theme expression of general personal opinions ● Translation section: General literature materials ● General English: Strengthen listening, speaking, reading, writing, and translation skills, consolidate language knowledge such as grammar, vocabulary, discourse, and pragmatics ● Group discussion: self-directed learning and classroom discussion **Second Semester College English 2 (64 contact hours)** ● Listening section: English radio, television programs, and other audio and video materials that are lengthy and have a moderate pace of speech ● Oral section: Expressing personal opinions, emotions, viewpoints, etc; Be able to state facts, reasons, and describe events or items, etc ● Reading section: Review literature related to the major studied, or materials such as manuals and operation manuals related to future work ● Writing section: Write an English abstract and English short essay for the professional paper you are studying ● Translation section: Translate articles with formal genres and familiar themes ● General English: Strengthen listening, speaking, reading, writing, and translation skills, consolidate language knowledge such as grammar, vocabulary, discourse, and pragmatics ● Group discussion: self-directed learning and classroom discussion **Third Semester College English 3 (64 contact hours)** ● Listening section: Practice the main idea, grasp the key points and related details ● Oral section: Elaborate, explain, compare, and summarize familiar viewpoints, concepts, and theories

	● Reading section: Quick reading techniques for reading materials that are lengthy and of moderate difficulty ● Writing section: Describe charts and provide a brief written introduction to future job or position functions, business, products, etc ● Translation section: Practice common translation techniques ● General English: Integrated Course of General English and Cross Cultural Communication **College English 4 of the 4th semester (64 contact hours)** ● Listening section: Practice applying listening skills ● Oral section: Practice using oral expression and communication skills ● Reading section: Practice using common reading strategies ● Writing section: Practice using common written expression and communication skills ● Translation section: Practice common translation techniques ● General English: a combination of listening and speaking courses and specialized English courses
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ≥ 60 points will be considered a pass.
Reading list	Edited by Li Yinhua and Wang Deming, "New Version of College English Comprehensive Course" (Volumes 1-4), Shanghai Foreign Language Education Press, 2nd edition, May 2014.

10. C Program Design

Module designation	C Program Design
Semester(s) in which the module is taught	2th semester
Person responsible for the module	An Meijun
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works
Workload	Workload = 120 hours Contact hours = 48 hours Self-study hours = 72 hours
Credit points	4
Recommended prerequisites	**Prerequisite for course selection** nothing
Module objectives/intended learning outcomes	Module objectives. ● **Knowledge:** Familiar with the development and core syntax of C language, including data types, control structures, arrays, functions, pointers, file operations, and common library functions. Understand algorithm basics, evaluation methods, and typical algorithm applications. ● **Skills:** Able to write, read, analyze, and debug small C programs to solve practical problems. ● **Competences:** Possess independent thinking, self-learning, and innovation abilities; demonstrate good work ethic, communication, collaboration, and adaptability in professional settings.
Content	**Part A. Theoretical teaching (32 contact hours)** **Chapter 1 Programming and C (4 contact hours)** Understand computer programming fundamentals and key features of the C language. Master C program structure and basics; familiarize with other languages and simple examples. **Chapter 2 Algorithms (4 contact hours)** Understand algorithm definitions and key characteristics. Master algorithm representation in various forms; familiarize with control structures and coding implementation. **Chapter 3 Sequential Programming (4 contact hours)** Understand constants, variables, and data types in C. Master operators, expressions, and I/O statements; familiarize with common C syntax and functions. **Chapter 4 Choice Architecture Programming (4 contact hours)** Understand choice structures and conditional logic in C. Master relational, logical, and conditional operators; familiarize with their practical use. **Chapter 5 Cyclic Structured Programming (4 contact hours)** Understand loop control principles and structures in C. Master various loop types and control statements like break and continue. **Chapter 6 Arrays (4 contact hours)** Understand the structure and usage of one-, two-dimensional, and character arrays. Master array operations and string handling functions in C. **Chapter 7 Functions (4 contact hours)** Section I. Overview of Functions Understand functions, calls, parameters, return values, and variable scopes in C. Master function definitions, recursion, and variable storage; familiarize with parameter passing methods. **Chapter 8 Pointers (4 contact hours)** Understand pointers and their role in referencing data, functions, and arrays. Master pointer operations and advanced usage, including arrays, functions, and multi-level pointers. **Chapter 9 Documentation (4 contact hours)** Understand file operation concepts and structure in C programming. Master file pointers, read/write methods, and error handling techniques. **Part B. Experiment / practice teaching: (16 contact hours)** ● **Project 1:** Familiarize yourself with the C program development environment (2 contact hours, 2 self-study hours)

	● **Project 2:** Data Types, Operators and Expressions (2 contact hours) ● **Project 3:** Sequential Structure Programming (2 contact hours) ● **Project 4:** Choice Architecture Programming (2 contact hours) ● **Project 5:** Cyclic Structured Programming (2 contact hours) ● **Project 6:** Application of arrays (2 contact hours) ● **Project 7:** Functions and Compilation Preprocessing (2 contact hours) ● **Project 8:** Using Pointers (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Tan Haoqiang, edited by Tan Haoqiang, C Programming Fifth Edition, Tsinghua University Press, 2017.

11. Literature Retrieval Course

Module designation	Literature Retrieval Course
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	Peng Jun
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson
Workload	Workload = 75 hours Contact hours = 32 hours Self-study hours = 43 hours
Credit points	2.5
Recommended prerequisites	None
Module objectives/intended learning outcomes	● **Knowledge:** Understand the information environment, principles of information retrieval, retrieval languages and methods, major Chinese and foreign retrieval tools, literature organization tools, information evaluation principles, and trends in medical literature. ● **Skill:** Master topic analysis and retrieval techniques; proficiently search Chinese and international databases (e.g., CNKI, Web of Science, PubMed); use literature management tools like NoteExpress and mind mapping software independently. ● **Ability:** Develop strong information literacy, independently access and evaluate information, apply knowledge to solve practical problems, and build a solid foundation for future work in the medical and health fields.
Content	**Part A. Theoretical teaching (16 contact hours)** **Chapter 1 Basic Theory** of **Information Retrieval (4 contact hours)** Understand the connotation of information literacy and the basic concepts of information, knowledge, and literature. Master the classification of literature types and levels, as well as basic principles, methods, and strategies of literature retrieval. Enhance information awareness, recognize intellectual property rights, and grasp the current trends in medical literature development. **Chapter 2**: **Information Retrieval** from **Commonly** Used **Chinese Databases (2 contact hours)** Familiarize with retrieval methods of commonly used Chinese comprehensive databases. Master topic language, classification language, and effective search strategies in Chinese search tools. Develop proficiency in basic and advanced medical literature search functions through practice, and cultivate the habit of using database resources for information acquisition. **Chapter 3**: **Information Retrieval** from **Commonly** Used **Foreign Language Databases (4 contact hours)** Master the retrieval methods of commonly used databases in foreign languages. By practicing search questions, students can master the commonly used search techniques in medical foreign literature retrieval and cultivate the habit of obtaining information through database resources. **Chapter 4**: **Special Literature: Intellectual Property Information Retrieval (2 contact hours)** Master the concepts and types of intellectual property, patents, and patent literature, as well as retrieval methods for domestic patents and the DII patent database, with a focus on engineering majors such as medical devices, medical imaging, and medical technology. **Chapter 5**: **Free Online Resources and Mobile Search (2 contact hours)** Familiarize with retrieval methods using professional and comprehensive search engines, mobile library apps, common medical

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<tr><td></td><td colspan="3">academic websites, medical search engines, and WeChat official account resources.
Chapter 6 Comprehensive Utilization of Medical Information (2 contact hours)
Understand the concept and format of academic papers, and master the use of NoteExpress for literature management. Familiarize with the concept and functions of mind maps, master basic drawing principles and software usage for creating simple maps. Develop tool-based thinking for knowledge management and learning support, especially for medical majors such as clinical medicine, pharmacy, public health, and nursing.
Part B. Experiment / practice teaching: (16 contact hours)
● Experimental Project 1: Retrieval of commonly used Chinese comprehensive databases (4 contact hours)
Master the retrieval methods of commonly used Chinese comprehensive databases; Understand the commonly used free word search and code search in literature retrieval; Master Boolean logic retrieval and advanced database retrieval functions; Cultivate students' habit of obtaining information through database resources.
● Experimental Project 2: Retrieval of commonly used biomedical databases in both Chinese and foreign languages (4 contact hours)
Master the retrieval methods of commonly used biomedical professional databases; Master common retrieval techniques in literature search and cultivate students' habit of obtaining information through database resources.
● Experimental Project 3: Retrieval of commonly used index databases in foreign languages (2 contact hours)
Master the retrieval methods for commonly used Chinese and foreign bibliographic data; Preliminary understanding of journal impact factors and analysis of academic influence.
● Experimental Project 4: Free online resources and mobile information retrieval (2 contact hours)
Master the retrieval skills of commonly used online searches; Understand the methods of obtaining free online resources and literature search on mobile devices.
● Experimental Project 5: Use of Literature Management Software (2 contact hours)
Master the usage of literature management software; Familiar with the entire process management approach from literature search to literature reading and citation.
● Experimental Project 6: Review and test (2 contact hours)
Review and assess the content of practical projects.</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td></td><td colspan="2"><table>
<tr><td colspan="2">Assessment method</td><td>Proportion of total score%</td></tr>
<tr><td rowspan="4">Process assessment</td><td>Sign in</td><td>5</td></tr>
<tr><td>Learning task points</td><td>15</td></tr>
<tr><td>task</td><td>10</td></tr>
<tr><td>Classroom activities (sign in, chapter testing, discussion, PBL, etc.)</td><td>20</td></tr>
<tr><td>Summative assessment</td><td>Final written test/search report</td><td>50</td></tr>
<tr><td>Total score</td><td></td><td>100</td></tr>
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<tr><td>Reading list</td><td colspan="3">Peng Jun, Liu Lihua, etc Medical Information Retrieval and Utilization [M]. Beijing: People's Health Publishing House, 2020</td></tr>
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12. Analog Electronic Technology

Module designation	**Analog Electronic Technology**
Semester(s) in which the module is taught	3th semester
Person responsible for the module	Cao Jingneng
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works
Workload	Workload = 120 hours Contact hours = 64 hours Self-study hours = 56 hours
Credit points	4
Recommended prerequisites	College Physics
Module objectives/intended learning outcomes	**Module objectives:** ● **Knowledge:** Understand key concepts in DC/AC circuits, amplification, feedback, input/output resistance, and signal modes. Familiarize with graphical and differential equivalent methods for analyzing amplification circuits, and grasp concepts of noise, interference, and frequency characteristics. ● **Skills:** Able to identify components, read and draw circuit diagrams, and perform soldering, fabrication, debugging, testing, and simple repairs of electronic devices. Proficient in using common electronic instruments. ● **Competences:** Possess teamwork spirit, humanistic qualities, abstract thinking, and sound judgment in fundamental electrical knowledge.
Content	**Part A. Theoretical teaching (24 contact hours)** **Chapter 1 Common Semiconductor Devices (5 contact hours)** Understand the principles, structure, and functions of semiconductor diodes and transistors. Master their applications and behavior in electronic circuits. **Chapter 2 Basic Amplifier Circuits (8 contact hours)** Understand amplification concepts and key performance indicators. Master common-emitter amplifier principles and circuit analysis methods. **Chapter 3 Integrated Operational Amplifier Circuits (2 contact hours)** Understand the structure and transmission characteristics of operational amplifier circuits. Master component functions and differential amplifier operation. **Chapter 4 Overview of Frequency Response of Amplifier Circuits (1 contact hour)** Understand the necessity and basic concepts of frequency response in amplifier circuits. **Chapter 5 Feedback in Amplifier Circuits (2 contact hours)** Understand the concept of feedback in amplifier circuits. Master feedback configuration identification and its effect on performance. **Chapter 6 Operations and Processing of Signals (4 contact hours)** Understand the principles of proportional arithmetic and active filter circuits. Master the design of arithmetic circuits and familiarize with active filter applications in signal processing. **Chapter 7 Waveform Generation and Signal Conversion (4 contact hours)** Understand the working principles of sine wave oscillator circuits and voltage comparators. Master their circuit structures and typical behaviors.

	Familiarize with their applications in analog signal processing. **Chapter 8 Power Amplifier Circuits (2 contact hours)** Understand core concepts of power amplifier circuits. Master the structure and operation of complementary symmetrical power amplifiers. **Chapter 9 DC Power (4 contact hours)** Understand rectifier filter principles and voltage regulation basics. Master integrated and switching regulators; familiarize with power system applications. **Part B. Experiment / practice teaching: (8 contact hours)** ● **Project 1:** Use of common semiconductor devices and instruments (2 contact hours) ● **Project 2:** Static-dynamic testing of amplifier circuits (2 contact hours) ● **Project 3:** Signal Operations and Waveform Generation (2 contact hours) ● **Project 4:** DC regulated power supply (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Tong Shibai Hua Chengying, editor, Fundamentals of Analog Electronics, Higher Education Press, July 2015, 5th edition.

13. Circuit Theory B

Module designation	**Circuit Theory B**
Semester(s) in which the module is taught	2th semester
Person responsible for the module	Zhang Jun-an
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works
Workload	Workload = 75 hours Contact hours = 48 hours Self-study hours = 27 hours
Credit points	2.5
Recommended prerequisites	Advanced Mathematics A, College Physics A
Module objectives/intended learning outcomes	**Module objectives.** ● **Knowledge:** Knowledge of the basic theory and laws of DC circuits, ability to analyze and perform basic calculations on general circuits. To master the basic knowledge of alternating current (AC), and to analyze and calculate sinusoidal AC circuits. Knowledge of load connection methods, voltage, current and power calculations. Master the knowledge of electrical literacy, basic electrical control circuit principles. ● **Skills:** Master core skills in safe electricity use, electrical tool operation, circuit analysis, and experimentation. Build a strong theoretical foundation with practical problem-solving ability for advanced study and career development. ● **Competences** :Master circuit theory, analysis methods, and experimental skills with problem-solving ability. Possess innovative thinking, teamwork, and practical engineering application skills for future study and careers.
Content	**Part A. Theoretical teaching (32 contact hours)** **Chapter 1 Basic Concepts and Laws of Electric Circuits** (6 contact hours) Understand circuit basics: quantities, directions, and components. Master sources, Kirchhoff's laws, and circuit modeling. **Chapter 2 Equivalent Transformations of Resistive Circuits** (6 contact hours) Understand equivalent circuit transformation principles. Master Y- Δ conversions, source combinations, and apply simplification techniques. **Chapter 3 Methods of Circuit Analysis** (8 contact hours) Understand core circuit analysis methods. Master current/voltage techniques, key theorems, and their application in simplification. **Chapter 4 Sine AC Circuits** (2 contact hours) Understand the basic elements of sinusoidal signals. Master phasor and phase-domain analysis. Familiarize with their application in AC circuits. **Chapter 5 Analysis of Sinusoidal Steady-State Circuits** (4 contact hours) Understand the series-parallel relationships of capacitance and inductance, and master the full response of first-order circuits. **Chapter 6 Power in AC Circuits** (2 contact hours) Understand VCR, active and reactive power in AC circuits. Familiarize with voltage, impedance, and power triangle relationships. **Chapter 7 Waveform Generation and Shaping** (2 contact hours) Understand transformer principles and coupled inductors. Master filter analysis; familiarize with RLC resonance and frequency response. **Chapter 8 Three-Phase AC Circuits** (2 contact hours) Understand three-phase circuit structures and line-phase relationships. Master power calculation and analysis in three-phase systems. **Part B. Experiment / practice teaching: (16 contact hours)** ● **Project 1:** Use of Multimeter and Identification of Electronic Components (2 contact hours) ● **Project 2:** Testing of potentials in DC circuits (2 contact hours)

	● **Project 3:** Experiments on the Superposition Principle and Davignan's Theorem (2 contact hours) ● **Project 4:** Use of common electronic instruments (2 contact hours) ● **Project 5:** Impedance-Frequency Characteristics of Resistive, Inductive, and Capacitive Components in AC Circuits (2 contact hours) ● **Project 6:** Study of R, L, C series resonant circuits (2 contact hours) ● **Project 7:** Simulation of DC Circuit Research on Experimental Platform (2 contact hours) ● **Project 8:** AC Circuit Research on Simulation Lab Platform (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Qiao Lingai, edited by Qiao Lingai, Circuit Principles and Applications, Beijing: Science Press, 2019 edition

14. Digital Electronic Technology

Module designation	**Digital Electronic Technology**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Chen Yongqiang
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works
Workload	Workload = 120 hours Contact hours = 48 hours Self-study hours = 72 hours
Credit points	4
Recommended prerequisites	College Physics, Analog Electronics
Module objectives/intended learning outcomes	**Module objectives.** ● **Knowledge:** Understand number system conversions, logic function expressions, logic algebra simplification, and analysis/design of combinational and sequential circuits. Familiarize with pulse shaping, signal generation, and the basics of programmable logic devices. ● **Skills:** Identify and test digital chips, interpret function tables, and understand typical circuit diagrams. Capable of assembling, debugging, and repairing electronic products, and operating common electronic instruments. ● **Competences:** Possess teamwork spirit, humanistic qualities, abstract thinking, and sound judgment in basic electrical knowledge.
Content	**Part A. Theoretical teaching (32 contact hours)** **Chapter 1 Number system and code system (2 contact hours)** Understand commonly used number systems and binary arithmetic operations. Master conversions between number systems and the application of various coding methods. Familiarize with typical digital codes used in computing and electronics. **Chapter 2 Fundamentals of Logic Algebra (6 contact hours)** Understand the basic operations, laws, and formulas of logic algebra. Master logic functions, their representations, and methods for simplification. Familiarize with applying logic algebra in circuit analysis and design. **Chapter 3 Logic Gate (2 contact hours)** Understand the working principles of semiconductor diode, CMOS, and TTL gate circuits. Master their logical functions and circuit characteristics. Familiarize with their applications in digital circuit design. **Chapter 4 Combinatorial Logic Circuits (8 contact hours)** Understand the principles and design methods of combinational logic circuits. Master common combinational circuit types and their analysis. Familiarize with issues like hazards and race conditions in combinational logic design. **Chapter 5 Triggers (4 contact hours)** Understand RS, level-, and pulse-triggered flip-flops. Master their logic functions and representations; familiarize with their use in sequential circuit design. **Chapter 6 Time-Ordered Logic Circuits (8 contact hours)**

	Understand analysis methods for sequential (temporal) logic circuits. Master the structure and function of counters and registers. Familiarize with the design approach for timing logic circuits. **Chapter 7 Waveform Generation and Shaping (2 contact hours)** Understand the working principles of Schmitt triggers, monostable triggers, and multivibrators. Master the function and application of the 555 timer circuit. Familiarize with the practical use of timing and waveform generation circuits. **Part B. Experiment / practice teaching: (16 contact hours)** ● **Experimental Project 1:** Testing of TTL logic gate circuits (2 contact hour) ● **Experimental Project 2:** Applications of combinational logic circuits (4 contact hours) ● **Experimental Project 3:** Triggers and Their Applications (4 contact hours) ● **Experimental Project 4:** Applications of time-sequential logic circuits (4 contact hours) ● **Experimental Project 5:** 555 Circuit Applications and Simulation (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Yan Shi, edited by Yan Shi, Fundamentals of Digital Electronics, Higher Education Press, April 2016, 6th edition.

15. Engineering Mechanics

Module designation	**Engineering Mechanics**
Semester(s) in which the module is taught	1th semester
Person responsible for the module	Yu Yi
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lecture
Workload	Workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours
Credit points	3
Recommended prerequisites	University Physics, Advanced Mathematics
Module objectives/intended learning outcomes	Module objectives. ● **Knowledge:** Master core concepts and laws of engineering mechanics, apply them to solve typical problems, simplify complex engineering scenarios into mechanical models, and understand material behavior under various stress conditions. ● **Skills:** Apply engineering mechanics in clinical engineering, perform force and equilibrium analysis, assess component strength and stiffness, and solve practical problems using mechanical methods. Proficient in using section steel specifications (GB/T 706-2008) and applying knowledge flexibly in practice. ● **Competences:** Integrate theoretical knowledge to analyze, evaluate, design, and solve real-world engineering problems with practical and effective solutions.
Content	**Theoretical teaching (32 contact hours)** **Chapter 1 Introduction (2 contact hours)** Master the definition of engineering mechanics. Familiarize with the research methods in engineering mechanics. Understand the relationship between engineering mechanics and engineering practice. **Chapter 2 Statics (4 contact hours)** Master the basic concepts of statics. Understand the fundamental axiom of statics, and be able to perform force analysis and draw diagrams. Familiarize with constraints and constraint forces. **Chapter 3 Fundamental Plane Force Systems (2 contact hours)** Master the geometric and analytical methods of synthesis and equilibrium of plane convergent force systems. Understand the moment of a plane force on a point. Familiarize with the plane force-couple theory. **Chapter 4 Generalized Plane Force Systems (4 contact hours)** Understand the translation theorem of lines of force. Master the simplification, equilibrium conditions, and equations of equilibrium for a plane general force system. Familiarize with equilibrium problems in physical systems. **Chapter 5: Overview of Mechanics of Materials (2 contact hours)** Understand the tasks of mechanics of materials and the basic assumptions for deformed solids. Master the concepts of internal forces, the section method, and stresses. Understand deformation, strain, and the classification of members and basic forms of rod deformation. **Chapter 6 Axial Tension and Shear (4 contact hours)** Understand internal forces, stress, and deformation in axial tension or compression. Master the calculation of strength of bars in tension and compression. Familiarize with shear and squeeze. **Chapter 7 Reversal (4 contact hours)** Understand the concept of torsion and its application in engineering

	practice. Master internal forces and stresses in torsion of circular shafts. Understand the shear stress reciprocity theorem, shear Hooke's law, and deformation of circular shafts in torsion. **Chapter 8 Planar Bending (6 contact hours)** Understand the concept of bending, the classification of beams, bending stresses, strength conditions, and measures to improve bending strength. Master shear force, bending moment, their diagrams, and the relationship between load, shear force, and bending moment. Familiarize with the basic equations for beam bending. **Exercises and general review (4 contact hours)** Summary of Hydrostatics & Mechanics of Materials.
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Sun Shuangshuang, edited by Sun Shuangshuang, Concise Tutorial of Engineering Mechanics, Mechanical Industry Press, May 2024, 2nd ed.

16. Mechanical Drawing

Module designation	**Mechanical Drawing**
Semester(s) in which the module is taught	1th semester
Person responsible for the module	Hou Bingyu
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works
Workload	Workload = 135 hours Contact hours = 64 hours Self-study hours = 71 hours
Credit points	4.5
Recommended prerequisites	None
Module objectives/intended learning outcomes	**Module objectives.** ● **Knowledge:** Understand national standards, orthographic projection theory, and mechanical drawing methods. Be familiar with expression techniques for machine parts and know how to consult design manuals and standards. ● **Skills:** Able to install and use AutoCAD software with basic drafting proficiency. ● **Competences:** Possess self-learning, creativity, and aesthetic awareness. Demonstrate responsibility, attention to detail, and professional ethics rooted in patriotism, dedication, and collaboration.
Content	**Part A. Theoretical teaching (32 contact hours)** **Knowledge Unit 1 AutoCAD Basic Training (4 contact hours)** Understand AutoCAD startup, initialization, and file creation. Master drawing/editing commands and tools; familiarize with layers, text, and dimensioning for clear, standardized output. **Unit of knowledge 2 Basic knowledge of mechanical drawing (2 contact hours)** Section I. Overview of mechanical drawings **Knowledge unit 3 Drawing and reading of three views (12 contact hours)** Understand the concept and representation of the three standard views. Master the drawing and labeling of assembly views. Familiarize with techniques for reading and interpreting assembly drawings. **Knowledge unit 4 Common expressions for machines (4 contact hours)** Understand the purpose and types of technical views in mechanical drawings. Master the creation of exploded views and cross-sections. Familiarize with their application in visualizing complex structures. **Unit of knowledge 5 Representation and drawing of standard and common parts (2 contact hours)** Understand Threads and Threaded Connectors. **Knowledge Unit 6 Representation and Drawing of Part Diagrams (4 contact hours)** Understand the structure and purpose of parts and their drawings. Master expression schemes, dimensioning methods, and technical requirements for parts drawings. Familiarize with typical part representations and techniques for reading parts drawings. **Knowledge unit 7 Representation and drawing of assembly drawings (2 contact hours)** Understand assembly drawings and their structure. Master component mapping and part creation from assemblies. Familiarize with reading

	and interpreting assembly drawings. **Part B. Experiment / practice teaching: (32 contact hours)** ● **Experimental Project 1: AutoCAD Basic Command Drawing Training** (6 contact hours) ● **Experimental Project 2: AutoCAD three-view drawing training** (12 contact hours) ● **Experimental Project 3: AutoCAD machine drawing training** (4 contact hours) ● **Experimental Project 4: AutoCAD Comprehensive Application Drafting Training (I)** (4 contact hours) ● **Experimental Project 5:** AutoCAD Integrated Application Drafting Training (II) (6 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of $\geqslant$ 60 points will be considered a pass.
Reading list	Hongkui Jiang, Xiaomei Li, editors, Mechanical Engineering Drawing and Practice, Mechanical Industry Press, 2023 edition

17. Foundation of Mechanical Designing

Module designation	Foundation of Mechanical Designing
Semester(s) in which the module is taught	3th semester
Person responsible for the module	Ni Jun
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works
Workload	Workload = 120 hours Contact hours = 48 hours Self-study hours = 72 hours
Credit points	4
Recommended prerequisites	Mechanical Drawing, Engineering Mechanics
Module objectives/intended learning outcomes/	● **Knowledge:** Understand common mechanisms and their motion principles; master four-bar, cam, gear mechanisms, and transmission ratio calculations. Familiarize with standard parts, their structures, applications, failure modes, and design considerations. ● **Skills:** Apply mechanical design theory to analyze motion and perform simple mechanism design. Capable of using manuals, selecting parameters, and solving basic engineering problems. ● **Competencies:** Able to integrate and apply mechanical design knowledge to analyze and solve engineering problems through critical thinking and reasoning.
Content	**Part A. Theoretical teaching (40 contact hours)** **Chapter 1 Introduction and Analysis of Degrees of Freedom and Velocities of Planar Mechanisms (4 contact hours)** Understand course fundamentals, sketch common mechanism motions, and determine motion definiteness via degrees of freedom. **Chapter 2 Planar linkage (4 contact hours)** To familiarize with the types and applications of planar four-bar mechanisms and to understand their characteristics. **Chapter 3 Cam mechanism (4 contact hours)** Familiarize with the types and applications of cam mechanism, master the laws of motion commonly used in cam mechanism followers, and be able to design disk cam profiles according to the laws of motion and known parameters. **Chapter 4 Gear mechanisms (5 contact hours)** To familiarize with the types and applications of gear mechanism, to understand the involute nature, dimensions and parameters of involute straight toothed cylindrical gears, meshing of involute standard gears, to familiarize with the principles of gear machining, to understand the heel cut, minimum number of teeth and shift gears. **Chapter 5 Rotational system (3.5 contact hours)** Familiarize yourself with the types and applications of gear trains and master the calculation of ratios for fixed-axle and swing wheel trains. **Chapter 6 Intermittent motion mechanism (0.5 contact hour)** Understand the working principles and applications of ratchet mechanisms, groove wheel mechanisms and incomplete gear mechanisms. **Chapter 9: Introduction to Mechanical Design (2 contact hours)** Familiarize yourself with the strength, contact strength, and wear resistance of mechanical parts, an overview of mechanical design, and common materials used in mechanical manufacturing and their selection.

	Chapter 10 Connections (3 contact hours) Knowledge of thread parameters, common threads used in mechanical engineering, basic types of threaded couplings and their applications; familiarity with preloading and anti-loosening of threaded couplings, keyed couplings and splined couplings. **Chapter 11 Gearing (4 contact hours)** Familiar with the failure forms and design calculation guidelines of gear transmission, master the force analysis and strength calculation method of spur gear transmission, understand the gear structure, gear transmission efficiency and lubrication. **Chapter 13 Belt and chain drives (3 contact hours)** Familiarize with belt drive types and uses; master force, stress, and motion analysis, and design calculations for V-belts. **Chapter 14 Axis (3 contact hours)** Familiarize yourself with the types and applications of shafts, understand the materials used for shafts, and master the structural design of shafts. **Chapter 16 Rolling Bearings (4 contact hours)** Familiarize with rolling bearing types, characteristics, and applications. Master bearing coding, selection calculations, and understand combination design. **Part B. Experiment / practice teaching (8 contact hours)** **Experiment 1: Agency mapping (2 contact hours)** **Experiment 2: Gear Van Formation (2 contact hours)** **Experiment 3: belt drive (2 contact hours)** **Experiment 4: Assembly and disassembly of axle system structures (2 contact hours)**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of $\geqslant$ 60 points will be considered a pass.
Reading list	Yang Kezhen, edited by Yang Kezhen, Fundamentals of Mechanical Design. Place of publication: Beijing, Higher Education Press, 2020.

18. Microcontroller Principles and Applications

Module designation	**Microcontroller Principles and Applications**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Shang Kun
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson, lab works
Workload	Workload = 120 hours Contact hours = 48 hours Self-study hours = 72 hours
Credit points	4
Recommended prerequisites	College Physics, Principles of Circuits, Analog Electronics, Digital Electronics
Module objectives/intended learning outcomes/	● **Knowledge objective** Master the basic concepts of microcontroller system, internal structure, working principle, instruction system and program design methodology, understand the basics of interrupt system, timer and its application; familiar with the commonly used peripheral device interface circuits and development tools, understand the basic concepts and characteristics of embedded systems; familiar with the typical needs of microcontrollers and the progress of cutting-edge applications in different application scenarios. ● **Skills objective** To be able to apply the knowledge of microcontroller principles and related technologies to design, develop and optimize microcontroller systems and demonstrate a certain degree of innovation and inquiry; to be able to solve practical engineering problems through the application of microcontroller technology and embedded systems, especially in the automation control, data acquisition and embedded system design involved in the development of key technologies and modules. ● **Competences objective** Comprehensive ability to apply knowledge of microcontroller principles and related technologies to the design, development, debugging and maintenance of microcontroller systems. Possess the ability to reasonably apply basic engineering knowledge and skills to analyze and solve practical problems in microcontroller applications, provide effective technical solutions, and evaluate and optimize the development and application of microcontroller systems.
Content	**Part A. Theoretical teaching (32 contact hours)** **Chapter 1 Microcontroller Overview (2 contact hours)** Knowledge of what is a microcontroller, The history and development of microcontrollers, Major manufacturers and models of 8-bit microcontrollers, Development trend of microcontroller, Microcontroller Applications. Familiar with MCS-51 series microcontroller. **Chapter 2 Hardware Architecture of the MCS-51 Microcontroller (6 contact hours)** Familiar with hardware structure of mcs-51 microcontroller. Master the mcs-51 pinout, mcs-51 cpu, structure of mcs-51 memory, parallel I/O ports, clock circuits and timing, reset operation and reset circuit. **Chapter 3 MCS-51 Microcontroller Instruction System (8 contact hours)** Understand the command system overview, command format.

	Familiar with addressing of the instruction system, mcs-51 instruction system. **Chapter 4 MCS-51 Assembly Language Programming (6 contact hours)** Knowledge of overview of assembly language programming, compilation of assembly language source programs, assembly language utility programming. **Chapter 5 Interrupt System for MCS-51 (4 contact hours)** Master the concept of interruption, structure of the mcs-51 interrupt system, interrupt request source, interrupt control, external interrupt, interrupt service program design, multiple external interrupt source system design. **Chapter 6 Timer/Counter for MCS-51 (4 contact hours)** Master the timer/counter structure, 4 operating modes of timer/counter, timer/counter input signal requirements, timer/counter programming and applications. **Chapter 7 MCS-51 Serial Port and Common Peripheral Interface Circuits (2 contact hours)** Familiar with MCS-51 serial port and serial communication technology, keyboard interface technology, LED display interface principle. **Part B. Experiment / practice teaching: (16 contact hours)** **Experimental Project 1: Microcontroller Programming Software Operation (2 contact hours)** **Experimental Project 2: Decimal to ASCII conversion (2 contact hours)** **Experimental Project 3: Assembler Programming and Practice (Conditional Judgment Structures) - Dual Key Control 3 Lights (2 contact hours)** **Experimental Project 4: Assembler Programming and Practice (Loop Structure) - Memory Block Movements (2 contact hours)** **Experimental Project 5: Flow Cycle Lamp (2 contact hours)** **Experimental Project 6: External Interrupt Experiment - External Interrupt Mode Control Read/Write (2 contact hours)** **Experimental Project 7: Pulse Width Measurement Experiment - Schematic Design Simulation Experiment (2 contact hours)** **Experimental Project 8: Pulse Width Measurement Experiment - Programming and Debugging Experiment (2 contact hours)**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Zhang Zhiliang, edited by Zhang Zhiliang, Microcontroller Principles and Control Techniques-Double Interpretation of Assembly and C51, Mechanical Industry Press, September 2013, 3rd edition.

19. Clinical Engineering Introduction

Module designation	Clinical Engineering Introduction
Semester(s) in which the module is taught	2th semester
Person responsible for the module	Zhao Hui
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson, lab works
Workload	Workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours
Credit points	3
Recommended prerequisites	College Physics, Circuit Principles B, Mechanical Drawing
Module objectives/intended learning outcomes/	● **Knowledge objective** Able to acquire basic knowledge of engineering, mechanics, mechanics, circuit principles, electronics, signals and systems, and other engineering fundamentals and specialized fundamentals. Familiar with the development history of clinical engineering technology, and master the reading and analyzing method of medical equipment classification catalog. Familiar with the clinical needs and progress of clinical application of typical equipment of respiratory machine, anesthesia machine, blood dialysis machine, artificial heart-lung machine and ICU. ● **Skills objective** Ability to analyze various engineering phenomena of respiratory machines, anesthesia machines, hemodialysis machines, artificial heart-lung machines, and typical equipment in ICU in the field of clinical engineering by applying the basic knowledge of engineering fundamentals and specialties; ability to solve practical problems of engineering applications by applying the professional knowledge of clinical engineering technologies, methods, and techniques, especially the operation and troubleshooting of medical devices involved in life support equipment. ● **Competences objective** Mastery of clinical engineering technology and other related concepts and basic principles; Ability to understand engineering problems by continuously analyzing, summarizing, judging, and reasoning about engineering phenomena of ventilators, anesthesia machines, hemodialysis machines, artificial heart-lung machines, and typical equipment in the ICU according to the characteristics of clinical engineering technology. Ability to utilize basic engineering knowledge and skills to rationally analyze practical theoretical and operationally relevant problems.
Content	**Part A. Theoretical teaching (16 contact hours)** **Chapter 1: Development of Clinical Engineering Technologies and Classification of Medical Devices (2 contact hours)** Knowledge of history of clinical engineering technology, concept, scope and development of clinical engineers, medical equipment catalog. **Chapter 2: Ventilator Training with Biological Skills Replacement Devices (2 contact hours)** Familiar with basic and clinical knowledge related to mechanical ventilation, types and principles of ventilators, clinical applications of ventilators **Chapter 3 Hands-on training on anesthesia machine with bio-skill substitution device (2 contact hours)** Master basic knowledge and clinical applications, types and

	principles of anesthesia machines, clinical applications of anesthesia machines. **Chapter 4 Hands-on Training on Hemodialysis Machine with Biological Skills Replacement Device (4 contact hours)** Master the physiologic basis of the kidney, various blood purification therapies, hemodialysis systems: basic principles, structure and components, operation and functioning, malfunction and maintenance, patient management. Understand the treatment of renal insufficiency other than hemodialysis: dialysis filtration, peritoneal dialysis. **Chapter 5 Biological Skills Replacement Device Artificial Heart-Lung Machine Practical Training (2 contact hours)** Master the components and clinical applications of artificial heart-lung machine devices, pathophysiology of artificial heart-lung machines, operation of artificial heart-lung devices, troubleshooting and maintenance of artificial heart-lung machines, periodic checkups of artificial heart-lung machines, auxiliary circulation unit. **Chapter 6: Integrated Operating Room and ICU Cognitive Practical Training (2 contact hours)** Master anesthesia and general monitoring equipment, specialized monitoring devices for operating rooms, endoscopic surgical device. Understand the fundamentals of clean environment operations. **Chapter 7 Examination and Summary Report (2 contact hours)** Knowledge of introduction to clinical engineering knowledge concepts and hands-on assessment, course summary and report writing. **Part B. Experiment / practice teaching: (16 contact hours)** **Experimental Project 1: Medical Equipment Panorama Mastery Practical Training (2 contact hours)** **Experimental Project 2: Biofunctional Substitute Device - Ventilator Practical Training (2 contact hours)** **Experimental Project 3: Biomechanical substitution device - Anesthesia machine training (2 contact hours)** **Experimental Project 4: Biofunctional Substitute Device - Hemodialysis Machine (4 contact hours)** **Experimental Project 5: Biofunctional Substitute Device - Artificial Heart-Lung Machine Practical Training (2 contact hours)** **Experimental Project 6: Integrated Operating Room and ICU Practical Training (2 contact hours)** **Experimental Project 7: Examination of the operation of course-related equipment (2 contact hours)**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Taktak, editor-in-chief, Clinical Engineering, Academic Press, December 2019. Ge Bin et al, editors, Human Functional Replacement Devices, Science Press, March 2018. State Food and Drug Administration Organization and Preparation, Surgical and Emergency Equipment, China Medical Science and Technology Press, October 2010.

20. Comprehensive Practice of Mechanical Drawing

Module designation	**Comprehensive Practice of Mechanical Drawing**
Semester(s) in which the module is taught	2th semester
Person responsible for the module	Meng Qingyun
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lab works
Workload	Workload = 75 hours Contact hours = 32 hours Self-study hours = 43 hours
Credit points	2.5
Recommended prerequisites	Mechanical drawing, AutoCAD software
Module objectives/intended learning outcomes/	● **Knowledge objective** Proficiency in national standards for mechanical drawing and methods of drawing mechanical parts. Acquire general drawing skills and methods of presentation, methods of dimensioning on drawings, and methods of presentation of parts and assembly drawings. Understand the role of general parts in machines, as well as learn the methods and steps involved in mapping general parts. ● **Intellectual skills objective** Ability to be a self-starter. Ability to rationalize work plans. Ability to review materials and literature for information. Develop a conscientious and responsible work attitude and a rigorous and meticulous work style. ● **Practical skills objective** Demonstrated proficiency in applying AutoCAD software to drawings. Ability to assemble and disassemble parts and ability to map parts. Initial ability to independently analyze machine parts and solve problems.
Content	**1. Exercise 1: Gear pump awareness (4 contact hours)** Understand the function, structure and working principle of gear pumps, as well as the contents of parts and assembly drawings. **2. Exercise 2: Gear pump disassembly and mapping (8 contact hours)** Knowledge of gear pump disassembly and mapping methods, as well as the drawing of parts and assembly drawings. **3. Exercise 3: CAD drawing of parts and assemblies (20 contact hours)**
Study and examination requirements and forms of examination	Process assessment accounts for 60% of the total grade, including daily attendance (20%), hand drawing (20%), electronic parts drawing (10%) and electronic assembly drawing (10%). The summative assessment accounts for 40% of the total grade, including practical training report (30%) and defense (10%). A total of ⩾ 60 points will be considered a pass.
Reading list	1. Qin Yongde, edited by Qin Yongde, Machine Mapping - Gear Oil Pump Parts Mapping, Beijing University of Technology Press, December 2012, 2nd edition. 2. Jiang Hongkui and Li Xiaomei, eds., Mechanical Engineering Drawing and Practice, Mechanical Industry Press, 2023 ed.

21. Comprehensive Experiment of Analog Electronic Technology

Module designation	Comprehensive Experiment of Analog Electronic Technology
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Cao Jingneng
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lab works
Workload	Workload = 75 hours Contact hours = 32 hours Self-study hours = 43 hours
Credit points	2.5
Recommended prerequisites	Analog Electronics
Module objectives/intended learning outcomes/	● **Knowledge objective** Master the use of commonly used electronic instruments, with the basic experimental skills of analog circuits, consolidate the basic theoretical knowledge learned in the theoretical teaching of analog electronic technology, master the use of analog circuits discrete components and integrated circuits in the rules, methods, and practical applications in the project, and master the use of simulation software to assist in the analysis of circuits. 2. be familiar with the multisim circuit simulation software in the auxiliary analysis. 3. understand the use of integrated circuit chips. ● **Intellectual skills objective** Be able to use multimeters, signal generators, oscilloscopes, and other commonly used instruments and equipment. Can be soldered and assembled for the training of electronic product circuit debugging, testing and troubleshooting. Ability to prepare technical documents such as summary reports of practical training. ● **Practical skills objective** Cultivate students' scientific quality and scientific style of seeking truth from facts .Cultivate students, consciously absorb new technology, new knowledge, and active research spirit of exploration. Cultivate in students a work style of seriousness and diligence, and the courage to practice without forgetting the beginning.
Content	**Section I. Circuit Design (8 contact hours)** **Section II Component Inspection and Installation Training (8 contact hours)** **Section III: Circuit Fabrication and Debugging (12 contact hours)** **Section IV Circuit Testing and Summarization (4 contact hours)**
Study and examination requirements and forms of examination	Process assessment accounts for 100% of the total grade, including daily attendance (10%), experimental operation (30%), experimental effect (10%), communication and interaction (10%) and pre-training (10%), practical training report (20%) and defense (10%). A total of ⩾ 60 points will be considered a pass.
Reading list	Q. S. Kong, edited by Q. S. Kong, Basic Experiments on Analog and Digital Circuits, Fudan University Press, First Edition, 2014. Tong Shibai, edited by Tong Shibai, Fundamentals of Analog Electronics, Higher Education Press, Fifth Edition, 2015.

22. Comprehensive Experiment of Digital Electronic Technology

Module designation	Comprehensive Experiment of Digital Electronic Technology
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Chen Yongqiang
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lab works
Workload	Workload = 75 hours Contact hours = 32 hours Self-study hours = 43 hours
Credit points	2.5
Recommended prerequisites	College Physics, Analog Electronic Technology, Digital Electronic Technology
Module objectives/intended learning outcomes/	● **Knowledge objective** Master the basic performance of electronic components. Familiar with electronic component identification and testing methods, and common sense of use. Understand the applications of common integrated circuits. ● **Skills objective** Able to read English data manuals for related components. Able to use commonly used instruments and equipment such as multimeters, signal generators, oscilloscopes, etc. Able to debug, test, and troubleshoot the circuits of digital electronic products assembled by welding. Ability to write technical documents such as training summary reports. practical skills objective. ● **Competence objective** Cultivate students' scientific literacy and practical scientific style. Cultivate students' conscious absorption of new technologies and knowledge, as well as their exploratory spirit of active research. Cultivate students' work style of being serious, hardworking, courageous in practice, and never forgetting their original intention.
Content	**Exercise: Comprehensive Experiment of Digital Electronic Technology** (32 contact hours) 1. Clarify the functional design requirements of the project and determine the circuit related design parameters; 2. Information inquiry and selection of main components, including timers, display devices, driver devices, counters, etc., and calculation of design parameters; 3. Circuit principle design of each functional module: signal generation circuit formed by 555 timer, display decoding and driving circuit of digital tube and light-emitting diode, counter control circuit; 4. Component testing: Measure relevant component parameters, calculate circuit parameters, and select suitable components; 5. Circuit board layout: Design the layout of each module circuit on the circuit board according to the circuit schematic, and try to meet the requirements of functionality and aesthetics, such as short and convenient wiring, consistent chip direction, compact structure, etc; 6. Module circuit soldering: Install and solder components in modules to ensure correct polarity and direction, reliable and beautiful solder joints, and isolation between adjacent solder joints; 7. Module circuit debugging: Debugging is carried out after each module is soldered, including power short circuit testing before power on, observation of phenomena after power on, and measurement of parameters at relevant positions using tools such as

	multimeters, signal generators, oscilloscopes, etc., to verify the effectiveness of the module circuit; If the debugging results do not meet the design requirements, troubleshoot the circuit based on the phenomenon and test data; 8. Integrated circuit debugging: After all modules are debugged correctly, power on and debug the entire circuit to check if it meets the system design requirements; 9. Writing experimental reports and presenting works: Complete the writing of experimental reports and analyze test data; Present the effects of the completed work.
Study and examination requirements and forms of examination	The process assessment includes classroom attendance, laboratory preparation, laboratory results, laboratory reports, etc., accounting for 100% of the total score. Among them, attendance accounts for 10%, laboratory preparation accounts for 10%, laboratory operations account for 20%, laboratory results account for 20%, discussions account for 10%, and practical reports account for 30%. A total of ⩾ 60 points will be considered a pass.
Reading list	Edited by Yan Shi, Fundamentals of Digital Electronic Technology, Higher Education Press, 6th edition, April 2016. Edited by Kang Huaguang, Basic Digital Section of Electronic Technology, Higher Education Press, 2013 edition. Edited by Chen Yongqiang, Digital Electronic Technology Experiment, self written lecture notes, 2018.

23. Medical Electrical Safety Training

Module designation	**Medical Electrical Safety Training**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Liu Yang
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lab works
Workload	Workload = 75 hours Contact hours = 32 hours Self-study hours = 43 hours
Credit points	2.5
Recommended prerequisites	College Physics, Principles of Electric Circuits, Medical Electrical Safety
Module objectives/intended learning outcomes/	● **Knowledge objective** Knowledge of safety indicators and testing techniques for medical devices, and safety analysis of typical medical devices. Familiar with failure analysis of some of the major medical electrical equipment commonly used both domestically and internationally. Understand the scope and purpose of GB9706.1 and related terms and definitions, and master the basic content of the standard related to the testing of electrical safety. ● **Skills objective** Ability to apply knowledge of electrical safety engineering to gain a macro understanding of the overall hospital electrical equipment safety system to ensure the safety of the people and property involved. Ability to grasp the principles of energy theory and equipment operation involved in medical appliances in the hospital, with the ability to solve appropriate safety problems in different scenarios as well as the ability to take emergency measures. ● **Competence objective** We are able to do safety analysis of various medical instruments and equipment, such as in vivo instruments, therapeutic instruments, and laser instruments. Will do electrical safety testing of medical electrical equipment, including leakage current testing, insulation resistance testing, grounding wire resistance testing and some general safety testing. Ability to manage electrical safety throughout the hospital.
Content	**Exercise 1: Inspection of medical instrument markings and randomization documents (4 contact hours)** Knowledge of the contents of external markings and how to check them. Familiarize yourself with the requirements of what should be included in product specifications and technical specifications. Understand the color requirements for buttons, wires, gases, etc. in the General Standard. **Exercise 2: Earth leakage current detection (4 contact hours)** Knowledge of the use of medical leakage current testers to measure leakage current to ground of medical electrical equipment,

	understanding of the principles of leakage current measurement to ground, and analysis of test data. **Exercise 3: Leakage Current Detection in Enclosures (4 contact hours)** Master the use of medical leakage current tester, measure the shell leakage current of medical electrical equipment, understand the principle of shell leakage current measurement, and analyze the test data. **Exercise 4: Patient Leakage Current Test (4 contact hours)** Knowledge of the use of medical leakage current testers to measure patient leakage currents in medical electrical equipment, understanding of the principles of patient leakage current measurement, and analysis of test data. **Exercise 5: Patient-assisted current test (4 contact hours)** Knowledge of the use of medical leakage current testers to measure patient-assisted currents in medical electrical equipment, understanding of the principles of patient-assisted current measurement, and analysis of test data. **Exercise 6: Dielectric strength test (4 contact hours)** Master the use of medical voltage withstand testers, measure the dielectric strength of medical appliances, and utilize test data to determine test results. **Exercise 7: Test of insulation resistance (4 contact hours)** Knowledge of the use of a medical megohmmeter to measure the insulation resistance of medical appliances, and the use of test data to determine test results. **Exercise 8: Ground resistance test (4 contact hours)** Learn how to use a grounding resistance tester to measure the grounding resistance of medical appliances and use test data to determine test results.
Study and examination requirements and forms of examination	Process assessment accounts for 40% of the total grade, including daily attendance (8%), laboratory operation (16%), teacher-student interaction (8%) and laboratory discussion (8%). The summative assessment accounts for 60% of the total grade, including lab report (48%) and lab summary (12%). A total of ⩾ 60 points will be considered a pass.
Reading list	Zou Renling, Hu Xiufang, editors, Medical Electrical Safety Engineering, Southeast University Press, 2008 edition. SDA China Standard Publishing House, First Editorial Office, Editor-in-Chief, Compendium of Medical Electrical Safety Standards, China Standard Publishing House, 2002 edition.

24. Medical Electrical Safety Engineering

Module designation	Medical Electrical Safety Engineering
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Liu Yang
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson
Workload	Workload = 135 hours Contact hours = 48 hours Self-study hours = 87 hours
Credit points	4.5
Recommended prerequisites	College Physics, Principles of Electric Circuits
Module objectives/intended learning outcomes/	● **Knowledge objective** Knowledge of the fundamentals of electrical safety engineering, the principles of energy hazards involved in medical instruments and their protection. Master the safety indexes and testing techniques of medical electrical equipment, and the safety analysis of typical medical electrical equipment. Understand the scope and purpose of GB9706.1 and related terms and definitions, and master the basic content of electrical safety testing in the standard. ● **Skills objective** Ability to apply knowledge of electrical safety engineering to understand the overall electrical equipment safety system in the hospital to ensure the safety of people and property. Be able to grasp the principles of energy theory and equipment operation involved in the hospital's medical appliances, and have the ability to solve the corresponding safety problems in different scenarios as well as the ability to take emergency measures. ● **Competence objective** Ability to expand knowledge of clinical engineering techniques and integrate relevant safety knowledge with medical electrical safety. Ability to utilize basic engineering knowledge and skills to analyze and solve practical problems in medical energy safety in a rational manner, with the ability to provide valuable solutions.
Content	**Part A. Theoretical teaching (48 contact hours)** **Chapter 1 Fundamentals of Electrical Safety Engineering (10 contact hours)** Knowledge of medical electrical safety course overview, overview of industrial electricity. Understand the lightning protection technology, electrical fire hazards and accident prevention, grounding technology, static safety. **Chapter 2 The human-energy relationship (2 contact hours)** Knowledge of physical properties of the human body, physiological effects of electric current. **Chapter 3 Classification of Medical Electrical Equipment (5 contact hours)** Knowledge of development of medical electronic instruments Master classification of medical electrical equipment, classification of types of medical electrical equipment against electric shock, classification of the degree of protection against electric shock for medical electrical equipment. **Chapter 4 Safety Analysis of Commonly Used Medical Electrical Equipment (6 contact hours)** Master classification of causes of accidents in medical electrical equipment, safety analysis of medical in vivo instruments, safety

	analysis of medical therapeutic devices, safety analysis of the use of medical instrument combinations. **Chapter 5 Electrical Safety in Medical Rooms (5 contact hours)** Master forms of grounding of the power supply system, grounding safety analysis of power supply system, protective earthing measures for medical rooms, medical safety power supplies. Understand protection of medical room circuits **Chapter 6 Safety test methods for medical electrical equipment (6 contact hours)** Knowledge of general conditions for safety testing of medical electrical equipment, tolerances for leakage currents in medical electrical equipment and their establishment. Master detection of leakage current, testing of grounding wire resistance, detection of dielectric strength, detection of residual voltage and energy. **Chapter 7 Electromagnetic applications in medicine and the hazards and protection against electromagnetic pollution (6 contact hours)** Master electromagnetic properties of the human body and biological effects of magnetic fields, magnetic technology in medical diagnosis and therapy, electromagnetic pollution prevention and control. Knowledge of national standard for electromagnetic compatibility. **Chapter 8 Principles and protection of medical lasers (4 contact hours)** Knowledge of biological effects of light and principles of laser emission, medical laser instruments, laser safety and protection. **Chapter 9 Safety protection against medical ionizing radiation (4 contact hours)** Initialization of basic knowledge of ionizing radiation. Understand medical radiology equipment, ionizing radiation safety and protection and emergency response
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Zou Renling, Hu Xiufang, editors, Medical Electrical Safety Engineering, Southeast University Press, 2008 edition. National Standard GB9706.1-2020 of the People's Republic of China, issued by the State Administration of Market Supervision and Administration of the People's Republic of China and the State Standardization Administration of the People's Republic of China, 2020 Edition. Masao Saito, ed. Safety of Medical Electronic Instruments, People's Health Publishing House, first edition, 1979.

25. Clinical Engineering Creativity

Module designation	Clinical Engineering Creativity
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Lin Xiangde
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lab works
Workload	**Required time** Workload = 75 hours Contact hours = 32 hours Self-study hours = 43 hours
Credit points	2.5
Recommended prerequisites	Advanced Mathematics, College Physics, Mechanical Drawing, Circuit Principles
Module objectives/intended learning outcomes/	**Module objectives:** **Knowledge:** Master the flexible use of conventional information retrieval tools to accurately obtain effective information such as product cases, academic literature, invention patents, and market profiles. Reinforce the theoretical basics of the majors studied, especially in mechanical design, mechanical drawing, microcontroller principles, programming language algorithms, biomedical testing, electronic circuit design, etc., to effectively achieve the integration of science and practice, and to be able to analyze and solve a variety of practical problems arising from clinical engineering positions. **Skills:** Utilizing the basic knowledge of clinical engineering and technology expertise learned, with the help of different tools, focus on clinical pain point problems, accurately find clinical engineering and medical device creative projects, and enhance the ability of independent innovation. Master the creative thinking method of clinical engineering, overcome the singularity and isolation of thinking, and be good at solving problems of clinical pain point needs and practical problems in the development of clinical medical equipment from multiple perspectives and levels.
Contents	**1. Exercise 1: Introduction to Creativity and Project Search (6 contact hours)** Knowledge of the Internet + Student Innovation and Entrepreneurship Competition. Familiar with clinical engineering and medical device research frontiers, as well as market product development cases in the medical device field. Familiar with the use of search tools such as information, literature and patents to explore clinical pain point needs. Propose at least one innovative, creative or entrepreneurial idea, and initially establish the project framework and thoughts. **2. Exercise 2: Creative project design and implementation (24 contact hours)** Skillfully apply the basic knowledge of the profession, especially the comprehensive aspects of clinical medicine, mechanical design, mechanical drawing, microcontroller principle, programming language algorithm, biomedical testing, electronic circuit design, etc., combined with the use of search tools such as information, literature and patents, to enhance the innovation and feasibility of the project, and to improve and optimize the creative project. In-depth optimization of market research, competitor analysis, technology optimization, project implementation, team building, profit model, promotion strategy, financial analysis and other modules involved in the creative project, and preliminary formation of business plan and roadshow presentation. **3. Exercise 3: Creative Project Roadshow and Presentation (2**

	contact hours) Completing business plan and roadshow presentation documents, forming the ability to present creative projects and products, presenting, arguing and promoting creative projects through roadshow presentations, publishing and defending, and business plan writing, forming good logical presentation skills, ability to adapt to the scene, ability to defend and argue, language organization, communication and collaboration, and management and organization skills.
Lab works	Laboratory work consists of two main areas: the design and implementation of innovative and creative products or entrepreneurial projects on clinical medical equipment or medical devices; and the writing of project business plans, roadshow presentations and defenses, and public communication of projects. Based on a certain clinical engineering pain points and needs, using professional basic knowledge, such as mechanical design, mechanical drawing, microcontroller principles, programming language algorithms, electronic circuit design, etc., combined with the use of information, literature and patents and other retrieval tools, to independently determine the innovative and creative products about medical devices, refinement of the implementation of the pain point needs analysis, market research, feasibility demonstration, literature review, creative solution design, technical route, project demonstration, project optimization, works roadshow presentation, business plan, roadshow presentation and defense, project communication and other links.
Study and examination requirements and forms of examination	Process assessment accounts for 40% of the total grade. The summative assessment accounts for 60% of the total grade.
Reading list	1. Liu Ning, ed., Creative Electronic Design and Production, Beijing University of Aeronautics and Astronautics Press, 2010 edition.

26. Biomedical Materials

Module designation	Biomedical Materials
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Lin Xiangde
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works.
Workload	Workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours
Credit points (ECTS)	3
Recommended prerequisites	**Prerequisite for course selection** nothing
Module objectives/intended learning outcomes	Module objectives. **Knowledge:** To be able to master the basic concepts, structural composition, property characteristics, naming and categorization, testing and evaluation and device design of different biomedical materials, and to master the basic production and processing techniques of biomedical materials or medical devices. Familiar with the functions and properties of biomedical metal materials, biomedical inorganic non-metallic materials, biomedical polymer materials, biomedical composites and biomedical nanomaterials. Familiar with the clinical medical pain point needs and cutting-edge clinical application progress of different biomedical materials. **Skills:** Ability to apply the fundamentals learned (clinical medicine, medical materials and mechanical design) to research and design medical devices and medical consumables, and demonstrate a degree of innovation and inquiry. Ability to solve practical clinical and engineering problems through the application of biomedical materials and the fundamentals of design and preparation, especially key materials, high value consumables and medical devices involved in life support equipment. **Competences:** Comprehensive ability to apply clinical engineering technology and theoretical knowledge of biomedical materials in the procurement evaluation, clinical application, design development and technical maintenance of medical equipment and medical consumables. Ability to utilize basic engineering knowledge and skills to analyze and solve practical problems in a rational manner and provide valuable solutions.
Content	**Part A. Theoretical teaching (24 contact hours)** **Chapter 1 Introduction to Biomedical Materials (4 contact hours)** Overview of Biomedical Materials. Classification of biomedical materials Definition of biocompatibility and response. Biological evaluation of biomedical materials. **Chapter 2 Metallic Materials for Biomedical Applications (6 contact hours)** Definition and Characteristics of Medical Metallic Materials; Biocompatibility and corrosion resistance of medical metallic materials; Mechanical Properties of Medical Metallic Materials; Medical Stainless Steel Cobalt-based alloys for medical use; Medical Titanium and Titanium Alloys Shape memory alloys; Medical Magnesium Alloy. **Chapter 3 Inorganic Non-metallic Materials for Biomedical Applications (4 contact hours)** Definition and Classification of Biomedical Inorganic Nonmetallic Materials; Inert ceramic materials; Carbonaceous materials for medical use Bio-glass ceramics; hydroxy-apatite (phosphatic lime deposited in bone)

	Bioactive Glass; Bioactive Glass Ceramics; Biodegradable inorganic non-metallic materials. **Chapter 4 Biomedical Polymers (6 contact hours)** Overview of Polymer Materials; Structure, nomenclature, classification and synthesis of polymer materials; Properties of polymer materials; Non-degradable biomedical polymer materials; Biodegradable medical polymer materials; natural polymer Clinical applications of biomedical polymer materials. **Chapter 5 Biomedical Composites (4 contact hours)** Structure, Classification, Nomenclature and Characterization of Biomedical Composites; Molding Methods and Processes for Biomedical Composites Polymer-based biomedical composites; Inorganic non-metal-based biocomposite medical materials. **Part B. Experiment / practice teaching: (8 contact hours)** **Experimental Project 1:** Mechanical characterization of biomedical materials1 (2 contact hours) **Experimental Project 2:** Mechanical characterization of biomedical materials2 (2 contact hours) **Experimental Project 3:** Preparation of Biomedical Materials (2 contact hours) **Experimental Project 4:** Testing and Evaluation of Biomedical Materials (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Jie Lv, Jing Cheng, Xiaobei Hou, editors, Introduction to Biomedical Materials, Tongji University Press.

27. Therapeutic Equipment Technology

Module designation	**Therapeutic Equipment Technology**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Dan Lyu
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works
Workload	Workload = 135 hours Contact hours = 48 hours Self-study hours = 87 hours
Credit points (ECTS)	4.5
Recommended prerequisites	Analog Electronics, Digital Electronics, Physiology
Module objectives/intended learning outcomes	Module objectives. ● **Knowledge:** To be able to apply the scientific concept of development in order to grasp the physiological and physical bases of medical therapeutic equipment and the mechanisms of treatment. To be able to understand the main types, basic principles and general structure of medical therapeutic equipment according to the actual needs of clinical engineering positions. To be able to accumulate the basic knowledge of safety protection, routine maintenance and regular maintenance of the main medical therapeutic equipment in the context of clinical engineering. ● **Skills:** Be able to rely on specialized knowledge to interpret the safety regulatory requirements for medical therapeutic equipment from a professional perspective. Be able to skillfully apply the knowledge of the course to identify and categorize commonly used medical therapeutic equipment. On the basis of understanding the therapeutic mechanism of medical therapeutic equipment, be able to assist doctors in the use of therapeutic equipment, especially in the safety protection of both doctors and patients. ● **Competences:** Firmly establish the awareness of all-round safety responsibility for medical treatment equipment from design, manufacture, circulation, use to management. Cultivate a rigorous work attitude, meticulous work style, responsible work bearing, strict work discipline.
Content	**Part A. Theoretical teaching (40 contact hours)** **Chapter 1: Overview of Medical Therapeutic Devices (2 contact hours)Chapter 2 Pacemakers (8 contact hours)** **Chapter 3 Cardiac Defibrillators (8 contact hours)** **Chapter 4 High Frequency Surgical Equipment (6 contact hours)** **Chapter 5 Shock Wave Lithotripsy Devices (8 contact hours)** **Chapter 6 Laser Therapy Devices (8 contact hours)** **Part B. Experiment / practice teaching: (8 contact hours)** ● **Experimental Project 1:** Cardiac Defibrillator Testing and Operation (1 contact hour) ● **Experimental Project 2:** Detection and operation of high-frequency electric knife (1 contact hour) ● **Experimental Project 3:** Fabrication of a low-frequency electrotherapy machine (5 contact hours) ● **Experimental Project 4:** Recognition of Shock Wave Lithotripsy Device Structure (1 contact hour)
Study and examination	The course will be graded out of 100 points, of which 40% will be

requirements and forms of examination	assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books [1] Cheng, H. P., edited by Cheng, H. P., Medical Therapy Devices - An Introduction to Principles and Structures (2nd ed.). Shanghai Jiao Tong University Press, 2016. 2. Reference books [1] Qiao Zhiheng, Hua Guiru, editors, Physical Therapy. Huaxia Publishing House, 2005. [2] Richard C. Fries, Handbook of Medical Device Design. CRC Press. 2001.

28. Principle and Applications of Life Support Equipment

Module designation	**Principle and Applications of Life Support Equipment**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Associate Professor: Chen Zhenglong
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works
Workload	Workload = 135 hours Contact hours = 48 hours Self-study hours = 87 hours
Credit points(ECTS)	4.5
Recommended prerequisites	Normal Anatomy and Physiology, Foundation of Mechanical Designing, Analog Electronic Technology, Digital Electronic Technology, Biomedical Detection Technology
Module objectives/intended learning outcomes	Module objectives: ● Knowledge: This course aims to introduce the basic principles, composition structures, technical parameters, clinical applications, and technical maintenance methods of typical life support medical equipment such as blood purification devices, artificial heart and lung machines, ventilators, and anesthesia machines. ● Skills: Ability to analyze and resolve practical issues encountered in Clinical Engineering positions, primarily in key hospital departments such as intensive care units, dialysis rooms, and operating rooms. Proficiency in installing, debugging, operating, maintaining and repairing common life support equipment. ● Competences: Acquire comprehensive competence of applying theoretical knowledge of life support equipment to engage in purchase evaluation, clinical application, risk assessment, function development, technical maintenance, and technical training of related life support equipment.
Content	**Part A. Theoretical teaching (36 contact hours)** Principle and Applications of Life Support Equipment Chapter 1. Artificial Kidney (Hemodialysis) (12 contact hours) Chapter 2. Artificial Heart and Lung Machine(8 contact hours) Chapter 3. Ventilators (10 contact hours) Chapter 4. Anesthesia Machines (6 contact hours) **Part B. Experiment / practice teaching: (16 contact hours)** ● Experimental Project 1: Artificial kidney operation and maintenance (4 contact hours) ● Experimental Project 1: Operation and maintenance of the artificial heart-lung machine (2 contact hours) ● Experimental Project 1: Ventilator operation and maintenance (4 contact hours) ● Experimental Project 1: Operation and maintenance of the anesthesia machine (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended book [2] GE Bin，Replacement Device for Human Body Function，Science Press，2008 Edition. 2. Reference books [3] LONG Cun, LI Jingwen, GAO Guodong, Cardiopulmonary Bypass Manual of Fuwai Hosipital (Second Edition)， PEOPLE'S

	MEDICIAL PUBLISHING HOUSE, 2018. [4] ZHU Lei， Mechanical Ventilation（Fourth Edition）， Shanghai Scientific & Technical Publishers，2018.

29. Biomedical Detection Technology

Module designation	**Biomedical Detection Technology**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Xie Meihua
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	Lesson, lab works
Workload	Workload = 135 hours Contact hours = 48 hours Self-study hours = 87 hours
Credit points (ECTS)	4.5
Recommended prerequisites	Analog electronics, digital electronics
Module objectives/intended learning outcomes	Module objectives. ● **Knowledge**: To acquire specialized knowledge in solving complex engineering problems in the field of clinical engineering technology, including the basic concepts and theories of biomedical detection systems, bioelectricity and bioelectrodes, medical sensors, bioelectric signal amplification and processing. Familiarize with the measurement methods of common physiological parameters such as blood pressure, body temperature, respiratory and cardiovascular system parameters. ● **Skills**: To be able to use the basic knowledge (biomedical detection systems, detection methods) to research and design medical devices and detection methods, and to show a certain degree of innovation and inquiry. The main focus is on the detection of parameters such as respiration, blood pressure and temperature, and the selection of different biomedical sensors. ● **Competences**: Comprehensive ability to apply theoretical knowledge of clinical engineering techniques to biomedical assay design and evaluation, clinical application, risk assessment, functional development, technical maintenance and technical training. Ability to utilize knowledge of engineering background to rationally analyze and evaluate practical problems and provide valuable solutions. Ability to utilize knowledge and skills of engineering background to rationally analyze and solve practical problems and provide valuable solutions.
Content	**Part A. Theoretical teaching (40 contact hours)** Chapter 1 Basic Concepts of Biomedical Detection Systems (4 contact hours) Chapter 2 Bioelectricity and Bioelectrodes (4 contact hours) Chapter 3 Medical Sensors (8 contact hours) Chapter 4 Amplification and Processing of Bioelectric Signals (4 contact hours) Chapter 5 Measurement of Blood Pressure (6 contact hours) Chapter 6 Measurement of Blood Pressure (4 contact hours) Chapter 7 Respirometry (10 contact hours) Chapter 8 Measurement of Parameters of the Cardiovascular System (8 contact hours) **Part B. Experiment / practice teaching: (8 contact hours)** ● Experimental Project 1: Blood Pressure Measurement Practical Training (2 contact hours) ● Experimental Project 2: Electronic Spirometer to measure respiratory volume (3 contact hours) ● Experimental Project 3: Ventilator Pressure and Flow Measurement

	(3 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books [3] Liu Yang, Zhang Dongheng, Chen Zhenglong, eds. Biomedical Detection Technology, Shanghai: Tongji University Press, September 2014, 1st ed. 2. Reference books [5] Peng, Chenglin, ed. Principles of Biomedical Sensors and Their Applications, Chongqing: Chongqing University Press, 2011 edition. [6] Chen, A. Y., ed. Medical Sensors, Beijing: Science Publishing House, LLC, 2019 Edition.

30. Clinical Skills

Module designation	**Clinical Skills**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Li Jiacai
Language	Chinese
Relation to curriculum	Specialisation
Teaching methods	lab works
Workload	Workload = 120 hours Contact hours = 48 hours Self-study hours = 72 hours
Credit points	4
Recommended prerequisites	Physiology, Anatomy, Outline of Clinical Medicine
Module objectives/intended learning outcomes/	Students will be able to. **Knowledge and Understanding** ● Mastery of history taking methods and chart writing, general physical examination, and skills in the investigation of the major systems of the body. Master the basic concepts of aseptic technique and basic surgical skills. ● Familiar with common clinical injection methods and basic puncture techniques. Familiar with basic resuscitation skills such as tracheal intubation, ECG examination, cardiopulmonary resuscitation, and electric defibrillation. Familiar with the characteristics and methods of physical examination of children. ● Understand the differences between the male and female genitourinary systems and methods of catheterization. **Intellectual Skills.** ● It can link theory with practice, combine specimen with living body, structure with function, simulation with actual operation, and highlight the practical training of human body. ● Ability to analyze and solve a variety of practical problems arising in clinical engineering positions, primarily in key hospital departments such as ICU, dialysis and operating rooms. **Practical Skills.** ● Memorize the indications and contraindications for a variety of clinical skills and become proficient in the administration of first aid. ● Ability to analyze and evaluate real-world problems rationally and provide valuable solutions using knowledge of the engineering context.
Contents	1. Exercise 1: Medical examination (4 contact hours) 2. Exercise 2: Instrument Recognition, Tying (4 contact hours) 3. Exercise 3: Surgical Asepsis (4 contact hours) 4. Exercise 4: Hemostasis dressing (4 contact hours) 5. Exercise 5: Handling of patients with spinal injuries (4 contact hours) 6.Exercise 6: Surgical dressing changes (4 contact hours) 7. Exercise 7: Tracheal intubation (4 contact hours) 8. Exercise 8: Intradermal, subcutaneous, intramuscular and venipuncture and intravenous drip, lumbar puncture (4 contact hours) 9. Exercise 9: Electrocardiogram (4 contact hours) 10. Exercise10: Cardiopulmonary resuscitation and electrical defibrillation (4 contact hours) 11.Exercise 11: Catheterization (4 contact hours) 12.Exercise 12: Comprehensive hands-on clinical skills training (4 contact hours)
Study and examination requirements and forms	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of

of examination	⩾ 60 points will be considered a pass.
Reading list	1. Liu Chengyu, Shen Jianzheng, editors, Clinical Skills, 2nd edition, People's Health Publishing House, published April 2015 2. Chen Xiaoping, Editor-in-Chief, National Textbook for Higher Education: Surgery, 2nd Edition, People's Health Publishing House. 3. Wan Xuehong, Lu Xuefeng, editors, Diagnostics, 8th edition, People's Health Publishing House, March 2013 publication. 4. Ge Junbo, Xu Yongjian, Wang Chen, editors, Internal Medicine, 8th edition, People's Health Publishing Co. 5. Xie Xing, Gou Wenli, editors, Obstetrics and Gynecology, 8th edition, People's Health Publishing House, March 2013 publication.

31. Hydraulic and Pneumatic Technology

Module designation	Hydraulic and Pneumatic Technology
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Liu Yang
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson, lab works
Workload	Workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours
Credit points (ECTS)	3
Recommended prerequisites	College Physics, Fundamentals of Disease, Fundamentals of Mechanical Design, Engineering Mechanics
Module objectives/intended learning outcomes	Module objectives. ● **Knowledge**: To be able to grasp the working principle, function and characteristics of basic hydraulic and pneumatic circuits. Familiar with the structure principle of various hydraulic and pneumatic basic components. Understand the basic theories of hydraulic and pneumatic technology. ● **Skills**: Be able to apply the basic theories of hydraulic and pneumatic technology, and have the ability to find problems, analyze problems and solve problems for related hydraulic and pneumatic equipment. Be able to disassemble and assemble common hydraulic and pneumatic components; be able to build basic hydraulic and pneumatic circuits according to technical requirements; have strong self-learning ability and certain innovation ability. ● **Competences**: On the basis of mastering the basic theories of hydraulics and pneumatics technology, the students are able to analyze, summarize, judge and reason about the hydraulics and pneumatics related contents in clinical engineering equipment according to the characteristics of clinical engineering technology, so as to understand the engineering problems. Possess the flexibility to understand and apply the knowledge of hydraulic and pneumatic technology to serve the discipline and industry. Possess the ability to utilize multidisciplinary and multidisciplinary synergies and professional innovation.
Content	**Part A. Theoretical teaching (24 contact hours)** Chapter I. Introduction (2 contact hours) Chapter 2: Fundamentals of Hydraulic Fluid Mechanics (6 contact hours) Chapter 3. Power elements (6 contact hours) Chapter 4. Executing elements (2 contact hours) Chapter 5. Control elements (8 contact hours) Chapter 6: Basic hydraulic and pneumatic circuits (8 contact hours) **Part B. Experiment / practice teaching: (8 contact hours)** ● Experimental Project 1: Pump and motor assembly and disassembly experiment (2 contact hours) ● Experimental Project 2: Control element assembly and disassembly experiment (2 contact hours) ● Experimental Project 3: Basic Hydraulic Circuit Experiment (2 contact hours) ● Experimental Project 4: Pneumatic basic circuit experiment (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books [4] Zuo Jianmin, Editor-in-Chief, Hydraulic and Pneumatic Transmission, Mechanical Industry Press, July 2016, 5th ed. 2. Reference books

[7] Wang Jiwei, Zhang Hongjia, Huang Yi, editors, Hydraulic and Pneumatic Transmission, Machinery Industry Press, 2005 edition.
[8] Yanjun Liu, Editor-in-Chief, Hydraulic and Pneumatic Transmission, Mechanical Industry Press, 2012 Edition.
[9] Xu Fuling, Chen Yaoming, editors, Hydraulic and Pneumatic Transmission, Mechanical Industry Press, 2011 edition.

32. Introduction to Medical Device Regulation Science

Module designation	**Introduction to Medical Device Regulation Science**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Liu Qingfeng
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson, lab works
Workload	Workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours
Credit points (ECTS)	3
Recommended prerequisites	Principles of electric circuits, mechanical drawing
Module objectives/intended learning outcomes	**Module objectives.** ● **Knowledge: Knowledge** of the methods and techniques commonly used in the medical device regulatory process, and knowledge of the basic theoretical framework, structural system and design process inherent in the medical device regulatory process. Familiar with the background and development of medical device regulatory science, and grasp the regulatory requirements in the field of clinical engineering technology. ● **Skills:** To be able to choose the management method and design the management process for medical devices, and to be able to analyze, evaluate and take appropriate disposal means for the results of the daily management of medical devices. Ability to select the system, design the tools, modify the process and think about the mechanism to ensure the safety and efficacy of medical devices during the life cycle. Be able to develop project implementation plan, self-study, search regulations and review information according to the requirements of medical device management projects and tasks. ● **Competences:** Comprehensive ability to apply clinical engineering techniques and theoretical knowledge of medical device regulations to the regulatory assessment and management of medical device safety and effectiveness. Ability to provide valuable solutions for the clinical application of medical devices from a regulatory perspective.
Content	**Part A. Theoretical teaching (28 contact hours)** **Chapter 1 Principles of Goods Management (6 contact hours)** **Chapter 2 Principles of Public Administration (6 contact hours)** **Chapter 3 Principles of Public Goods Management (4 contact hours)** **Chapter 4 Principles of Quality Management (6 contact hours)** **Chapter 5 Principles of Regulatory Science (4 contact hours)** **Chapter 6 Social Synergy Theory (6 contact hours)** **Part B. Experiment / practice teaching: (4 contact hours)** ● **Experimental Project 1:** Construction and Application of Social Co-Governance System for Medical Devices **(2 contact hours)** ● **Experimental Project 2:** Practical Application of Medical Device Regulatory Principles and Summary **(2 contact hours)**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books

	[1] Liu QF, Mo NM, Bow CJ. Supervision and management of medical products: principles and applications. Shanghai: Published by Shanghai University of Finance and Economics Press, January 2020. 2. Reference books [1] Chen Faifu, Supervision and Management of Medical Devices, China Pharmaceutical Science and Technology Press, 2013 edition. [2] Organized by the Center for Drug Evaluation of the State Food and Drug Administration, Passive Medical Device Products and Adverse Event Surveillance, China Pharmaceutical Science and Technology Press, 2013 edition. [3] Organized by the State Food and Drug Administration, Basics of Medical Device Regulatory Technology, China Pharmaceutical Science and Technology Press, China Pharmaceutical Science and Technology Press, 2013 edition.

33. Medical Imaging Equipment

Module designation	**Medical Imaging Equipment**
Semester(s) in which the module is taught	5st semester
Person responsible for the module	Li Zhexu
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson, lab works
Workload	Workload = 90 hours Contact hours=32 hours Self-study hours = 58 hours
Credit points(ECTS)	3
Recommended prerequisites	None
Module objectives/intended learning outcomes	Module objectives: **Knowledge:** Master the working principle of medical imaging equipment and its basic knowledge and operating techniques in clinical applications. Familiar with the basic structure of medical imaging equipment. Understand the theoretical basis and development history of medical imaging equipment **Skills:** Able to proficiently and standardly operate various medical imaging equipment; Be able to proficiently adjust various imaging parameters according to the actual situation of the examinee, and obtain clear images of the examined area. **Competence:** Ability to install, operate, and debug medical imaging equipment; Capable of daily maintenance of medical imaging equipment and possessing the ability to repair common malfunctions.
Content	**Part A. Theoretical teaching (24 contact hours)** （1） Chapter 1 Overview of Medical Imaging Equipment **(2 contact hours)** （2） Chapter 2 Basic Structure and Working Principle of X-ray Machine **(6 contact hours)** （3） Chapter 3: Basic Structure and Working Principle of CT **(6 contact hours)** （4） Chapter 4 Basic Structure and Working Principle of Nuclear Magnetic Resonance **(6 contact hours)** （5） Chapter 5 Basic Structure and Working Principle of Ultrasonic Equipment **(2 contact hours)** （6） Chapter 6 Basic Structure and Working Principle of Nuclear Medicine Imaging Equipment **(2 contact hours)** **Part B. Experiment / practice teaching: (8 contact hours)** ● **Experimental Project 1:** Basic Structure of X-ray Machine (2 contact hours) ● **Experimental Project 2:** CT Basic Structure (2 contact hours) ● **Experimental Project 3:** Basic Structure, Settings, and Operation of Portable Ultrasound (2 contact hours) ● **Experimental Project 4:** Basic Structure, Settings, and Operations of Ultrasound (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ≥ 60 points will be considered a pass.
Reading list	1. Recommended books [1] Han Fengtan, Editor in Chief, Medical Imaging Equipment Science, People's Health Publishing House, 2022 edition 5th edition [2] Yu Guanghao, edited by Li Zhexu, Medical Imaging Equipment Experiment, published by People's Health Press in 2021

34. Advanced Clinical Engineering

Module designation	**Advanced Clinical Engineering**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Associate Professor: Chen Zhenglong
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson, lab works
Workload	Workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours
Credit points(ECTS)	3
Recommended prerequisites	Clinical Engineering Introduction, Normal Anatomy and Physiology, Engineering Mechanics
Module objectives/intended learning outcomes	Module objectives: ● **Knowledge:** Students will learn the basic forms and biological effects of the interaction between light and biological tissues, the common indicators of respiratory mechanics monitoring, relevant standards for ventilator testing. They are also required to master the naming, classification, property characteristics, and processing methods of cutting-edge medical materials involved in clinical medical equipment and instruments. This course also covers the basic theories and applications of hydrostatics and fluid dynamics. ● **Skills:** Capable of analyzing the structure and principles of common biomedical optical instruments. Be able to interpret common respiratory mechanics monitoring indicators, use P-V loops to assess patients' clinical conditions, and set appropriate end expiratory positive pressure and inspiratory pressure. Ability to correctly select common clinical medical materials based on their properties and characteristics. Be able to use the basic theories of fluid mechanics to analyze fluid mechanics problems related to typical life support equipment such as ventilators and artificial heart lung machines. ● **Competences:** Acquire comprehensive competence of applying theoretical knowledge of life support equipment to engage in purchase evaluation, clinical application, risk assessment, function development, technical maintenance, and technical training of related life support equipment.
Content	**Part A. Theoretical teaching (24 contact hours)** **Advanced Clinical Engineering** **Chapter 1. Theory and Frontiers of Biomedical Photonics (6 contact hours)** **Chapter 2. Respiratory Mechanics Monitoring and Ventilator Testing Standards (6 contact hours)** **Chapter 3. Frontiers of Clinical Medical Materials** **(6 contact hours)** **Chapter 4. Basic Theory and Latest Progress of Hemodynamics (6 contact hours)** **Part B. Experiment / practice teaching: (8 contact hours)** ● **Experimental Project 1:** Literature Research and Report on Femtosecond Laser Ophthalmic Surgery (2 contact hours) ● **Experimental Project 2:** Literature reading and report on mechanical ventilation therapy technology (2 contact hours) ● **Experimental Project 3:** Clinical Application Design and Case Analysis of Biomedical Materials (2 contact hours) ● **Experimental Project 4:** Literature reading and report on hemodynamic in vitro simulation technology (2 contact hours)

Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended book [1] Clinical Engineering Technology Teaching and Research Office, Advanced Clinical Engineering. Self-complied textbook of Shanghai University of Medicine and Health Sciences, 2023 Edition. 2. Reference books [1] LV Jie, CHENG Jing, HOU Xiaobei, Tongji University Press, 2016 Edition. [2] ZHU Lei, Mechanical Ventilation（Fourth Edition）, Shanghai Scientific & Technical Publishers, 2018 Edition.[3] [3] LUO Qingming, ZHANG Zhenxi, Biomedical Photonics, PEOPLE'S MEDICAL PUBLISHING HOUSE, 2018 Edition.

35. Biomedical Optics

Module designation	**Biomedical Optics**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Guo Shijun
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson, lab works
Workload	Workload = 60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points (ECTS)	2
Recommended prerequisites	College Physics A, Normal Human Body D
Module objectives/intended learning outcomes	Module objectives. ● **Knowledge**. Master the basic concepts of biomedical optics, light-tissue interactions and their biological effects, optical micro-imaging techniques and their applications in biomedicine, medical spectroscopy techniques, and laser medicine. Understand the latest applications of photonics in bio-detection, medical diagnosis, and medical therapy. ● **Skills**. Ability to expand professional knowledge, keep abreast of trends in biomedical optics-related fields, accumulate knowledge and conduct more in-depth studies. To lay a solid foundation for designing biomedical optics detection/treatment instruments and engaging in related biomedical optics research and applications. ● **Competences**. Comprehensive ability to apply clinical engineering technology and theoretical knowledge of biomedical optics to engage in procurement evaluation, clinical application, design development and technical maintenance of imaging and ophthalmic and laser related medical equipment and medical consumables. Ability to utilize basic engineering knowledge and skills to rationally analyze and solve practical problems and provide valuable solutions.
Content	**Part A. Theoretical teaching (24 contact hours)** **Chapter 1 Introduction (2 contact hours)** **Chapter 2 Fundamentals of Optics and Photonics (6 contact hours)** **Chapter 3 Biosystem Luminescence (2 contact hours)** **Chapter 4 Biomedical Polymers (4 contact hours)** **Chapter 6 Medical Spectroscopy (2 contact hours)** **Chapter 7 Bioimaging Principles and Techniques (6 contact hours)** **Chapter 8 Principles of Optical Coherence Tomography (OCT) (2 contact hours)** **Part B. Experiment / practice teaching: (8 contact hours)** ● **Experimental Project 1:** Laser Medicine and Laser Safety (2 contact hours) ● **Experimental Project 2:** Integral sphere photoelectric color detection system (2 contact hours)

	● **Experimental Project 3:** Human Optical Endoscopic Imaging Simulation (2 contact hours) ● **Experimental Project 4:** Creative Design of Biomedical Optical Instruments - Component Testing (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books [5] Wang, C.. Biomedical Optics. Nanjing: Southeast University Press, 2017. 2. Reference books [10] Luo QM, Zhang ZX. Biomedical Photonics. Beijing: People's Health Publishing House, 2018. [11] Zhang, Zhenxi. Biomedical photonics: diagnosis, therapy and monitoring. Xi'an: Xi'an Jiaotong University Press, 2017.

36. Principles of Medical Imaging

Module designation	**Principles of Medical Imaging**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Xi Zeng
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson, lab works
Workload	Workload = 60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points (ECTS)	2
Recommended prerequisites	University Physics, Advanced Mathematics
Module objectives/intended learning outcomes	● **Knowledge:** To be able to grasp the basic principles and theories of modern medical imaging, to be familiar with the theories and methods of image quality evaluation, and to understand the conditions for obtaining quality images. ● **Skills:** Ability to apply the basic principles and theories of modern medical imaging to specialized knowledge, perform basic image quality evaluation, and possess computer simulation skills for scientific selection of medical imaging conditions. ● **Competences:** Comprehensive ability to apply knowledge of biomedical imaging principles to the use, design development and technical maintenance of medical testing equipment. Ability to utilize basic engineering knowledge and skills to analyze and solve practical problems in a rational manner and provide valuable solutions.
Content	**Part A. Theoretical teaching (24 contact hours)** **Chapter 1 Introduction to Medical Imaging (2 contact hours)** Knowledge of Advances in Medical Imaging Technology. **Chapter 2 X-ray production and material action (4 contact hours)** Master of X-ray generation and attenuation. **Chapter 3 Radiography (4 contact hours)** Master of X-ray Imaging and evaluation metrics. **Chapter 4 X-ray Computed Tomography (16 contact hours)** Master of the principles of X-CT imaging, scanning methods, data acquisition, reconstruction, post-processing and image quality evaluation metrics. **Chapter 5 Nuclear Medicine Imaging and Magnetic Resonance Imaging (4 contact hours)** Master of the principle of Nuclear and Magnetic Resonance Imaging. **Part B. Experiment / practice teaching: (8 contact hours)** **Experimental Project 1:** Radon and FT transform experiments (4 contact hours) **Experimental Project 2:** Mechanical Properties of Biomedical Materials 2 Inverse Projection Experiment (4 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of $\geqslant$ 60 points will be considered a pass.
Reading list	Wan Suiren, Editor-in-Chief, Principles of Medical Imaging, Science Publishing House, 2012 Edition. Li-Yu Huang, Editor-in-Chief, Digital Processing of Medical Images, Electronic Industry Press, 2012 Edition.

37. Mathematical Modeling

Module designation	**Mathematical Modeling**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Min Jianzhong
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson, lab works
Workload	Workload = 60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points(ECTS)	2
Recommended prerequisites	Advanced Mathematics, Linear Algebra
Module objectives/intended learning outcomes	● **Knowledge:** Able to master the basic steps, core ideas, and fundamental methods of mathematical modeling. An elementary modeling method that can use elementary functions to perform simple quantitative analysis of the relationship between changes in practical problems. Can implement simple optimization models on appropriate mathematical software. Master the basic programming and drawing methods of MATLAB, as well as the basic methods of curve fitting and interpolation, and learn how to use interpolation and fitting to process data. Master numerical solutions for differential and difference equations, as well as software solutions for planning models and statistical analysis models. ● **Skills:** By learning from rich typical cases and practicing self modeling, students can improve their ability to apply mathematical knowledge and computer tools to solve practical problems, ultimately achieving the goal of enhancing their mathematical literacy and comprehensive abilities. ● **Competence:** It enables students to flexibly and appropriately apply mathematical knowledge, analyze professional or practical problems using computer software, and creatively solve problems.
Content	**Part A. Theoretical teaching (16 contact hours)** **Chapter 1 Overview of Mathematical Modeling (2 contact hours)** **Chapter 2 Elementary Models (2 contact hours)** **Chapter 3**: **Simple Optimization Model (2 contact hours)** **Chapter 4: Differential Equation Models (2 contact hours)** **Chapter 5 Algebraic Equation Models and Difference Equation Models (2 contact hours)** **Chapter 6 Evaluation and Decision Model (2 contact hours)** **Chapter 7 Planning Model (2 contact hours)** **Chapter 8 Probability and Statistical Models (2 contact hours)** **Part B. Experiment / practice teaching: (16 contact hours)** **Experimental Project 1:** Introduction to MATLAB (2 contact hours) **Experimental Project 2:** MATLAB Drawing (2 contact hours) **Experimental Project 3:** MATLAB Difference and Fitting (2 contact hours) **Experimental Project 4:** MATLAB for solving numerical solutions of differential equations (2 contact hours) **Experimental Project 5:** Solving Planning Models with MATLAB or LINGO (4 contact hours) **Experimental Project 6:** Using MATLAB to Solve Regression Models (4 contact hours)
Study and examination requirements and	The course will be graded out of 100 points, of which 50% will be assigned to the regular grade and 50% to the final exam, and a total of ≥ 60 points

forms of examination	will be considered a pass.
Reading list	Edited by Jiang Qiyuan, Mathematical Models (5th edition), Beijing: Higher Education Press, 2019. Zhao Jing, edited by Dan Qi, "Mathematical Modeling and Mathematical Experiments" (5th edition), Beijing: Higher Education Press, 2020.

38. Fundamentals and Applications of MATLAB

Module designation	Fundamentals and Applications of MATLAB
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Gu Xuelin
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson, lab works
Workload	Workload = 60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points (ECTS)	2
Recommended prerequisites	Advanced Mathematics, College Physics, Engineering Mechanics, Signals and Systems
Module objectives/intended learning outcomes	● **Knowledge:** Students will master the basic concepts and operations of Matlab, including programming fundamentals, data types, matrix operations, function and scripting, and data visualization techniques. Students will learn how to use Matlab for numerical computation, symbolic operations, and algorithm development, and understand the application of the software in solving engineering and scientific problems. In addition, the course emphasizes the importance of mathematical modeling and develops a mindset of using mathematical tools to solve real-world problems, laying the foundation for further study in advanced mathematics and engineering courses. ● **Skills:** Committed to developing students' practical skills, including proficient Matlab programming skills, efficient data processing and analysis abilities, accurate mathematical modeling and algorithm implementation, and strong problem solving and creative thinking. Students will learn how to debug and optimize code to improve programming efficiency, and enhance their ability of scientific inquiry and engineering practice through experimental design and result analysis. In addition, the course focuses on enhancing students' technical report writing and teamwork skills, laying a solid foundation for future work and research in the professional field. ● **Competences:** Aims to develop students' overall competence, including the ability to think independently and solve problems creatively, as well as the practical ability to apply theoretical knowledge to real-world engineering problems. Students will learn how to use Matlab in an integrated manner for data analysis, model building and simulation experiments, and develop critical thinking and decision making skills. In addition, the course emphasizes teamwork and project management skills to ensure that students are able to communicate and collaborate effectively in a multidisciplinary environment, demonstrating professional-level engineering practice and technical leadership.
Content	**Part A. Theoretical teaching (16 contact hours)** **Chapter 1 MATLAB Overview (4 contact hours)** **CHAPTER 2 MATLAB DATA AND NUMERICAL CALCULATIONS (6 contact hours)** **Chapter 3 MATLAB Programming (4 contact hours)** **Chapter 4 MATLAB Plotting and Simulink Fundamentals (4 contact hours)** **Part B. Experiment / practice teaching: (16 contact hours)** **Experimental Project 1: MATLAB Software and Basic Syntax Lab** (2 contact hours)

	Experimental Project 2: Utilization of MATLAB Numerical Arrays and their Matrix Operations (6 contact hours) **Experimental Project 3: MATLAB Programming Lab** (4 contact hours) **Experimental Project 4: MATLAB Plotting Experiment and Simulink Toolbox Utilization** (4 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Xue-Min Zhang, MATLAB Fundamentals and Applications, China Electric Power Press, 2012, 2nd ed. Li-Mei Cai and Li-Juan Wang, Digital Image Processing - Analysis and Implementation Using MATLAB, Tsinghua University Press, 2019, First Edition.

39. Technical English for Clinical Engineering

Module designation	**Technical English for Clinical Engineering**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Dan Lyu
Language	English
Relation to curriculum	Elective
Teaching methods	Lesson
Workload	Workload = 60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points(ECTS)	2
Recommended prerequisites	College English
Module objectives/intended learning outcomes	● **Knowledge:** Be able to use the scientific outlook on development to establish a knowledge map of the connotation and extension of clinical engineering. Be able to fully understand the professional English vocabulary and application points related to human body structure, the heart and its circulatory system, physiological pressure and cardiovascular measurement systems and equipment, the respiratory system and its measurement equipment, respiratory therapy equipment, intensive care units and cardiovascular disease monitoring rooms, operating rooms and medical testing equipment, etc., in response to the actual needs of clinical engineering positions. **Skills:** Able to rely on professional knowledge to complete barrier-free reading and accurate translation of literature related to clinical engineering technology, proficiently use course knowledge to complete the standardized writing of scientific papers and comprehensively use the knowledge learned to conduct international communication. **Competences:** Cultivate cross-cultural communication and international cooperation skills, and master professional knowledge and skills related to clinical engineering technology in interdisciplinary and cutting-edge fields. Able to keep up with the development trends in related fields of expertise and achieve further self-development.
Content	**Part A. Theoretical teaching (32 contact hours)** **CHAPTER 1 A Brief Introduction to Clinical Engineering (2 contact hours)** Understand the history, development, functions, roles, responsibilities, and distinctions of clinical engineers. **CHAPTER 2 Clinical Simulation Forum (2 contact hours)** Understand hospital equipment and systems, and know the contents of hospital engineering. **CHAPTER 3 The Human Body: An Overview (2 contact hours)** Describe the major human body systems, their functions, regulatory mechanisms, and interrelationships. **CHAPTER 4 The Heart and Circulatory System (4 contact hours)** Understand the biological principles, anatomy, blood flow dynamics, bioelectric potentials, and conduction system of the human cardiovascular system. **CHAPTER 5 Electrode, Sensors, and Transducers (6 contact hours)** Identify challenges in biopotential acquisition, types of electrodes used, and describe transducers for measuring physiological parameters. **CHAPTER 6 Physiological Pressure and Other Cardiovascular Measurements and Devices (6 contact hours)** Explain pressure measurement, cardiac output computers, pacemakers, defibrillators, cardioverters, and heart-lung machines. **CHAPTER 7 The Human Respiratory System and Its Measurement**

	(4 contact hours) Understand the biological principles of the respiratory system. **CHAPTER 8 Respiratory Therapy Equipment (2 contact hours)** Understand the physiological need for respiratory therapy, medical gas safety systems, oxygen therapy equipment, IPPB therapy, mechanical ventilation, accessory devices, sterilization protocols, and common ventilator troubleshooting/maintenance. **CHAPTER 9 Intensive and Coronary Care Units (4 contact hours)** Understand the role of ICU, instrumentation systems, and how to identify/troubleshoot common equipment issues.
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Azzam Taktak, Paul Ganney, David Long, Axell Richard. Clinical Engineering: A Handbook for Clinical and Biomedical Engineers (2nd ed), Elsevier Science & Technology, 2019.

40. Medical Ethics

Module designation	**Medical Ethics**
Semester(s) in which the module is taught	1th semester
Person responsible for the module	Li Jiuhui
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson and practicing teaching
Workload	Workload = 60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points(ECTS)	2
Recommended prerequisites	None
Module objectives/intended learning outcomes	● **Knowledge objectives** 1. Master the basic knowledge, basic theories and basic methods of medical ethics. 2. Familiarity with ethical issues in medical practice and medical science. 3. Understand the analysis, decision-making and evaluation of medical ethics examples. ● **Capability objectives** 1. Ability to apply theoretical knowledge to medical practice and medical science. 2. Be able to consciously abide by and standardize medical behaviors. 3. Cultivate and improve the ability to analyze and solve problems in medical practice from an ethical perspective. 4. Able to adapt to the needs of modern medical work and development. ● **Quality objectives** 1. Establish correct ideological and moral qualities and practice the core values of socialism. 2. Have a good medical ethics and abide by medical professional ethics. 3. Have the humanistic spirit and literacy of medicine, and be able to communicate well with patients. 4. Medical practices reflect humanistic care and respect and safeguard the rights of patients.
Content	**Part A. Theoretical teaching (16 contact hours)** **Chapter 1**. Prolegomenon (1 contact hour) **Chapter 2**. The development of medical ethics thought (1 contact hour) **Chapter 3**. Basic Theories of Medical Ethics (1 contact hour) **Chapter 4**. A normative system of medical ethics (2 contact hours) **Chapter 5**. Ethics in the doctor-patient relationship (2 contact hours) **Chapter 6**. Ethics in clinical and medical technology work (4 contact hours) **Chapter 7**. Ethics in medical research (1 contact hour) **Chapter 8**. Assisted reproduction and the ethics of end-of-life care (2 contact hours) **Chapter 9**. Ethics of cutting-edge medical technology (2 contact hours) **Part B. Experiment / practice teaching: (16 contact hours)** **Practice teaching 1:** Prolegomenon (1 contact hour) **Practice teaching 2:** The development of medical ethics thought (1 contact hour) **Practice teaching 3:** Basic Theories of Medical Ethics (1 contact hour) **Practice teaching 4:** A normative system of medical ethics (2 contact

	hours) **Practice teaching 5:** Ethics in the doctor-patient relationship (2 contact hours) **Practice teaching 6:** Ethics in clinical and medical technology work (2 contact hours) **Practice teaching 7:** Ethics in medical research (1 contact hour) **Practice teaching 8:** Assisted reproduction and the ethics of end-of-life care (2 contact hours) **Practice teaching 9:** Ethics of cutting-edge medical technology (2 contact hours) **Practice teaching 10**: 2 hours experiment for medical ethics (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 50% will be assigned to the regular grade and 50% to the final exam, and a total of ≥ 60 points will be considered a pass.
Reading list	Bao Yuying, Wang Germany, Nie Ye, Medical Ethics, Peking Union Medical College Press, January 2019, 1st edition. Cao Kaibin, Qiu Shichang, Fan Minsheng (eds.), Medical Ethics Course (3rd Edition), Fudan University Press, August 2004.

41. Introduction to Big Data

Module designation	**Introduction to Big Data**
Semester(s) in which the module is taught	3th semester
Person responsible for the module	Liu Qiaohong
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson and lab works
Workload	Workload = 60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points (ECTS)	2
Recommended prerequisites	not have
Module objectives/intended learning outcomes	● **Knowledge**: Familiar with basic big data collection techniques, big data storage techniques, big data analysis techniques, data mining techniques, machine learning algorithms under big data, and big data visualization techniques. Understand the application of big data in the industry, focusing on the application of big data in the field of healthcare. ● **Skills**: Ability to perform basic data searching, processing, handling and analysis, and to apply big data techniques to solve simple problems at the intersection of big data and the profession. ● **Competences**: Ability to analyze and solve real-world problems rationally using basic knowledge and skills in big data technologies to provide valuable solutions.
Content	**Part A. Theoretical teaching (16 contact hours)** Chapter 1 Overview of Big Data (4 contact hours) ● Definition and Development of Big Data ● Big data applications in various industries ● Cloud Computing and Big Data Architecture Relationship ● The Relationship Between IoT, Big Data and Cloud Computing Chapter 2 Big Data Technologies (4 contact hours) ● Data Acquisition and Preprocessing ● Big Data Computing Platform ● data visualization ● Data security and privacy protection Chapter 3 Big Data Analytics (4 contact hours) ● Concepts and main tasks of machine learning ● classification algorithm ● clustering algorithm ● meta-analysis Chapter 4 Big Data and Artificial Intelligence (4 contact hours) ● Concept and history of artificial intelligence ● The Relationship Between Big Data and Artificial Intelligence ● Development of Deep Learning Technologies for Artificial Intelligence ● Convolutional Neural Networks and Image Processing Techniques **Part B. Experiment / practice teaching: (16 contact hours)** Experimental Project 1: Basic use of the data analysis tool Weka (4 contact hours) Experimental Project 2: Pre-processing of the data analysis tool Weka (4 contact hours) Experimental Project 3: Classification of the data analysis tool Weka (4 contact hours) Experimental Project 4: Integrated application of the data analysis tool

	Weka (4 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Ning Zhaolong et al, editors, Introduction to Big Data, Science Press, May 2017, 1st ed. By Casey Stella, translated by Jinchuan Tang, Introduction to Data Science and Big Data Technology, Mechanical Industry Press, 2018 edition.

42. Intelligent Medical Robot

Module designation	**Intelligent Medical Robot**
Semester(s) in which the module is taught	7 th semester
Person responsible for the module	Li-ping Sun
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson and lab works
Workload	Workload = 60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points (ECTS)	2
Recommended prerequisites	C language, circuits, microcontroller, mechanical design, automatic control principles
Module objectives/intended learning outcomes	● **Knowledge:** To be able to master the basic concepts, structural composition, application status and development prospects of intelligent medical robots. Master the function, composition and working principle of orthopedic surgical robot, and understand the parameters, interfaces and development platform. Master the function, composition, working principle of the robot for drug delivery rounds, the acquisition, fusion and storage methods of input data, including video, audio, sensors; master the basic control methods of the robot, including movement, sound and so on. Master endoscopic surgery robot function, composition, working principle, understand the parameters and indicators, interface mode, development platform. ● **Skills:** Ability to apply basic knowledge (mechanics, circuits, microcontrollers, C language, automation, etc.) to system design of intelligent medical robots and demonstrate a degree of innovation and inquiry. Have the ability to develop and test the system of intelligent medical robots. ● **Competences:** Possess interdisciplinary and comprehensive qualities related to intelligent medical robotics; be able to broadly apply the expertise learned to solve engineering problems in clinical practice.
Content	**Part A. Theoretical teaching (24 contact hours)** **Chapter 1 Overview of Intelligent Medical Robotics (2 contact hours)** Understand intelligent medical robots' concepts, development, applications, research trends, and supporting technologies. **Chapter 2 Orthopedic Surgical Robotics (8 contact hours)** Understand the features, components, operation, and control of orthopedic surgical robots. **Chapter 3 Medication Delivery Robot (8 contact hours)** Understand the functions, components, operation, control, and human-machine interaction (HMI) of medication delivery robots. **Chapter 4 Endoscopic Surgical Robotics (6 contact hours)** Understand the features, components, operation, and control of endoscopic surgical robots. **Part B. Experiment / practice teaching: (8 contact hours)** **Experimental Project 1:** Intelligent Medical Robot Cognition (2 contact hours) **Experimental Project 2:** Orthopedic Surgical Robotics (4 contact hours) **Experimental Project 3:** Medicine Delivery Robot Experiment (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Medical Robotics, Gang Jiang, Yongde Zhang, published by Chemical

	Industry Press, October 2019 Medical Surgical Robotics, Tianmiao Wang, Da Liu, Lei Hu, Science Publishing House, December 2013

43. Internet and Information Security

Module designation	Internet and Information Security
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Lin Xiangde
Language	Chinese
Relation to curriculum	Elective
Teaching methods	Lesson and lab works
Workload	Workload = 60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points (ECTS)	2
Recommended prerequisites	Fundamentals of Computer Systems
Module objectives/intended learning outcomes	● **Knowledge:** To be able to understand the current status of information security, information security threats, basic concepts of information security, major technologies, and the direction of information security development. ● **Skills:** Ability to apply the fundamentals learned to recognize the manifestations of common network and information security attacks. Ability to troubleshoot and remove security problems using virus and Trojan virus checker software. ● **Competences:** Comprehensive ability to apply theoretical knowledge of network and information security to engage in security prevention and information protection of medical devices.
Content	**Part A. Theoretical teaching (24 contact hours)** **Chapter 1 Overview of Network and Information Security (4 contact hours)** Knowledge of the process of the emergence and development of cybersecurity issues, the common types of major security threats and hazards, and main preventive techniques. **Chapter 2: Fundamentals of Network Information Security (14 contact hours)** ● Firewall concepts ● Concepts and hazards of viral Trojans ● TCP/IP protocol and IPSEC ● Principles of cryptography and encryption and decryption ● electronic signature ● Wireless Security Certification ● MAC address spoofing **Chapter 3 System Security (14 contact hours)** ● Vulnerabilities and patches ● domain management ● User and group management ● UAC ● Administrator rights and system security ● File systems and permissions ● Deletion and recovery of documents ● Disk encryption and more

	Part B. Experiment / practice teaching: (8 contact hours) **Experimental Project 1:** Common Network Commands (4 contact hours) **Experimental Project 2:** Firewall (4 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	Li Jian, "Computer Network Security", Beijing, Machinery Industry Press, 2022 edition. Mali et al, Computer Network Security (3rd Edition), Beijing, Tsinghua University Press, 2022 edition.

44. Career Planning and Employment Guidance

Module designation	**Career Planning and Employment Guidance**
Semester(s) in which the module is taught	3th, 4th, 5th, 6th semester
Person responsible for the module	Li Xi
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson, lab works
Workload	Workload = 30 hours Contact hours = 16 hours Self-study hours = 14 hours
Credit points(ECTS)	1
Recommended prerequisites	None
Module objectives/intended learning outcomes	Module objectives: ● **Knowledge:** Understand the basic theories and significance of career planning; Master relevant knowledge such as personality, values, and skill exploration, and have a clear understanding of oneself; Understand the characteristics of the profession and the employment environment; Understand the latest employment situation and employment related policies and regulations; Familiar with the job search process and preparation work. ● **Skills:** Possess self exploration skills; Have information search and management skills; Having career decision-making skills; Have systematic career planning skills and be able to write career planning documents; Having various general skills such as job seeking skills, self-management skills, and interpersonal communication skills. ● **Competences:** Integrating rich ideological and political education resources into the curriculum, enhancing students' career awareness, and establishing a lifelong development oriented outlook on life. To shape students' excellent spiritual qualities, improve their humanistic and professional qualities.
Content	**Part A. Theoretical teaching (8 contact hours)** **Chapter 1: Comprehensive Understanding of Career Planning (2 contact hours)** **Chapter 2: Self exploration of Personality and Skills (2 contact hours)** ● **Chapter 3**: **Exploration of Values** and the **Work World (2 contact hours)** ● **Chapter 4: Decision making and Job Seeking Actions (2 contact hours)** **Part B. Experiment / practice teaching: (8 contact hours)** ● **Experimental Project 1:** Appreciation of Career Films and TV Shows (2 contact hours) ● **Experimental Project 2:** Company Visit and Career Interview (2 contact hours) ● **Experimental Project 3:** Writing and Sharing a Career Plan (2 contact hours) ● **Experimental Project 4:** Creating a Personal Resume and Simulating Recruitment (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a

	pass.
Reading list	1. Recommended books [1]Edited by Zhong Gulan and Yang Kai, Career Development and Planning for College Students, East China Normal University Press, 2nd edition, 2016. 2. Reference books [2]Edited by Yuan Min, Career Planning for College Students (Professional Literacy and Abilities), published by Beijing Institute of Technology Press in 2020.

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

Module designation	**Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics**
Semester(s) in which the module is taught	4st semester
Person responsible for the module	Ma Xiaohong
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	lesson, lab works
Workload	Workload = 60 hours Contact hours = 48 hours Self-study hours = 12 hours
Credit points(ECTS)	1
Recommended prerequisites	**Prerequisite for course selection** None
Module objectives/intended learning outcomes	**Learning Objectives** （1） Knowledge objectives 1. Master the formation process, main content, spiritual essence, historical status, and guiding significance of the theoretical achievements of Marxism in China and the times, and deeply understand the theoretical qualities of Marxism in China and the times that are both inherited and keep pace with the times. 2. Be familiar with the diachronic process and basic experience of the CPC in constantly promoting the combination of the basic principles of Marxism with China's specific reality and with China's excellent traditional culture. 3. Understanding the achievements of the sinicization and modernization of Marxism is the fundamental guidance for China's revolution, construction and reform. It has promoted earth shaking changes in China, made the Chinese nation usher in a great leap from standing up, getting rich to becoming strong, completely changed the historical destiny of the Chinese people and the Chinese nation, and fully demonstrated the scientificity of the theoretical achievements of the sinicization and modernization of Marxism. （2） Ability goals Enable students to systematically grasp the Marxist stance, viewpoints, and methods contained in the theoretical achievements of the sinicization and modernization of Marxism, and strengthen their confidence in the path, theory, system, and culture of socialism with Chinese characteristics. （3） Quality objectives It helps students establish a correct view of history and values, improve their ideological and theoretical level, and enhance their ability to analyze and solve problems.
Content	**content of courses** （1） Introduction to the Historical Process and Theoretical Achievements of Marxism's Sinicization and Modernization (4 contact hours)

	（2） Chapter 1: Mao Zedong Thought and Its Historical Status (6 contact hours) （3） Chapter 2: Theory of New Democratic Revolution (6 contact hours) （4） Chapter 3: Theory of Socialist Transformation (4 contact hours) （5） Chapter 4 Theoretical Achievements of Preliminary Exploration of Socialist Construction Road (4 contact hours) （6） Chapter 5: Formation and Development of the Theoretical System of Socialism with Chinese Characteristics (2 contact hours) （7） Chapter 6 Deng Xiaoping Theory (6 credit hours) （8） Chapter 7: Important Thought of the Three Represents (4 contact hours) （9） Chapter 8 Scientific Outlook on Development (4 contact hours) **Extracurricular Practice "Searching** for **Revolutionary Footprints": 8 hours.**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	**Textbooks and reference books** 1. Mao Zedong: Selected Works of Mao Zedong, People's Publishing House, August 1991 edition. 2. Deng Xiaoping: Selected Works of Deng Xiaoping, People's Publishing House, October 1994, 2nd edition.

46. Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era

Module designation	**Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era**
Semester(s) in which the module is taught	4th semesters
Person responsible for the module	Professor Luo Huide
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	lesson, lab works
Workload	Workload = 45 hours Contact hours = 32 hours Self-study hours = 13 hours
Credit points(ECTS)	1.5
Recommended prerequisites	nothing
Module objectives/intended learning outcomes	1. At the knowledge level, enable students to deeply learn and master the core essence, spiritual essence, rich connotation, and practical requirements of the socialist ideology with Chinese characteristics in the new era, and grasp the historical, theoretical, and practical significance of this ideology. 2. At the level of ability, enable students to learn how to apply Marxist perspectives and methods to observe and analyze problems, strengthen their belief in Marxism, socialism with Chinese characteristics, and the confidence in the great rejuvenation of the Chinese nation and the Chinese Dream. 3. At the value level, students should firmly establish the "four consciousnesses", strengthen the "four confidences", consciously practice the "two safeguards", unleash their youthful dreams in the vivid practice of realizing the Chinese Dream, and write a brilliant chapter in their life through unremitting struggle for the interests of the people.
Content	Introduction; 1 Adhere to and develop socialism with Chinese characteristics in the new era 2 Promote the great rejuvenation of the Chinese nation in an all-round way with Chinese path to modernization 3 Adhere to the comprehensive leadership of the Party 4 Adhere to putting the people at the center 5 Comprehensively deepen reform and opening up 6 Promote high-quality development 7 Education, Science and Technology, and Talent Strategy for Socialist Modernization Construction 8 Developing the entire process of people's democracy 9 A comprehensive framework for promoting the rule of law 10 Building a socialist cultural power 11 Strengthening social construction with a focus on ensuring and improving people's livelihoods 12 Building a socialist ecological civilization 13 Maintain and shape national security 14 Building and Consolidating a Strong People's Army

	for National Defense 15 Adhere to the principle of 'One Country, Two Systems' and promote the complete reunification of the motherland 16 China's distinctive diplomacy as a major country and promoting the construction of a community with a shared future for mankind **17** Seeing Party self-governance exercised fully and with rigor.
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1 teaching material Compiling group: Introduction to Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era, Higher Education Press, People's Publishing House, 2023. 2. Reference books [1] Xi Jinping on Governance, Volume I, II, III and IV, Foreign Language Press, 2018, 2017, 2020 and 2022.

47. Mental Health Education for University Students

Module designation	Mental Health Education for University Students
Semester(s) in which the module is taught	2th semester
Person responsible for the module	Wang Yemei
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson, lab works
Workload	Workload = 45 hours Contact hours = 32 hours Self-study hours = 13 hours
Credit points(ECTS)	1.5
Recommended prerequisites	None
Module objectives/intended learning outcomes	Module objectives: ● **Knowledge:** Master the connotation and significance of mental health education; Familiar with the evaluation criteria for mental health; Understand the main psychological problems faced by college students; Master the obstacles and reasons of interpersonal communication; Understand how to love and master correct sexual knowledge. ● **Skills:** the ability to recognize oneself at a higher level; Ability to regulate one's general psychological issues; Being able to recognize emotions, have a correct understanding of emotions, and effectively manage emotions; Learn to use social support systems for self-help; Capable of self adjustment. ● **Competences:** Establish a correct concept of mental health, have a correct understanding of the meaning and value of life, establish a correct outlook on life, and use it to undertake social responsibility. Improve one's ability to cope with setbacks and pressure, and be brave enough to face setbacks and pressure in life.
Content	**Part A. Theoretical teaching (16 contact hours)** **Chapter 1 Introduction to College Students' Mental Health (2 contact hours)** **Chapter 2: College Students' Self awareness (2 contact hours)** **Chapter 3**: **Personality Development** of **College Students (2 contact hours)** **Chapter 4: Emotional Management of College Students (2 contact hours)** **Chapter 5: Interpersonal Communication among College Students (2 contact hours)** **Chapter 6: Love and Sexual Psychology of College Students (2 contact hours)** **Chapter 7: Stress Management and Setback Coping for College Students (2 contact hours)** **Chapter 8: Life Education for College Students (2 contact hours)** **Part B. Experiment / practice teaching: (16 contact hours)** ● **Experimental Project 1:** Positive Psychological Experience (2 contact hours) ● **Experimental Project 2:** Self exploration journey (2 contact hours) ● **Experimental Project 3:** Campus Psychological

	Scene Drama Performance (Part 1) (2 contact hours) ● **Experimental Project 4:** Positive Psychological Group Growth Training (2 contact hours) ● **Experimental Project 5:** Group sandbox game experience (2 contact hours) ● **Experimental Project 6:** Joyful Reading of Psychological Books (2 contact hours) ● **Experimental Project 7:** Campus Psychological Scene Drama Performance (2 contact hours) ● **Experimental Project 8:** Review and test (2 contact hours)
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books [1] Sang Biao College students' mental health Shanghai: Shanghai Education Press, published in 2014. 2. Reference books [1] Zhu Jing Psychological health education Beijing: Higher Education Press, published in 2018.

48. Ethics and Rule of Law

Module designation	Ethics and Rule of Law
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	Fu Zhuojing
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lecture
Workload	Workload = 60 hours Contact hours=48 hours Self-study hours = 12 hours
Credit points(ECTS)	2
Recommended prerequisites	**Prerequisite for course selection** None
Module objectives/intended learning outcomes	**Learning Objectives** 1. Knowledge objectives (1) Through teaching, students can recognize the characteristics of university life, understand the connotation, features, and development trends of university education, and clarify the nature and purpose of courses. Establish and strengthen ideals and beliefs, combine lofty ideals with a high sense of responsibility and mission towards the motherland, and be a steadfast patriot in the new era. (2) By systematically studying the theories of life philosophy and values, students are able to deeply contemplate basic questions about what life is and what its meaning is, comprehend the true meaning of life, establish correct life philosophy and values, actively engage in life practice, and create a valuable life. (3) Students should understand the basic theories of socialist morality, the fine moral traditions of the Chinese nation, the socialist concept of honor and disgrace, and the moral and legal norms in public life. (4) Students should understand the meaning and cultivation of professional ethics, as well as the future development trends of their careers. They should master the methods of career selection and entrepreneurship, and clarify the rights and avenues for workers to protect their rights in accordance with the law. (5) Students should understand the basic principles and systems established by the Constitution of our country, develop socialist legal thinking habits, and be able to think, analyze, and solve legal problems from a legal perspective in daily life, becoming qualified citizens who understand, abide by the law, and understand the law. 2. Ability objectives (1) On the basis of understanding the characteristics of university life, the current situation and trends of China's development, we can deeply understand the historical mission of college students and cultivate their ability to plan and design their learning and career paths. (2) On the basis of clarifying the responsibilities that individuals should bear towards nature, society, others, and themselves, they can improve their abilities in learning, communication, and self psychological regulation, and cultivate the ability to adapt to reasonable survival and career positions. (3) Being able to internalize the relevant theories of morality into conscious awareness, personal habits, and autonomous demands, becoming the main body of campus moral life, and enhancing the

	awareness and ability of moral norms in professional practice. (4) On the basis of familiarizing oneself with professional qualities, career ideals and choices, career regulations, and other content and requirements, one can cultivate awareness and ability for successful employment and independent entrepreneurship. (5) Be able to apply legal knowledge closely related to people's lives, consciously abide by legal norms in social life, analyze and solve practical legal problems in areas such as family life, professional life, and social life. 3. Quality objectives By incorporating knowledge and ability goals into teaching, the following quality objectives can be achieved: (1) Improving the psychological quality of college students (2) Improving the ideological and moral qualities of college students (3) Improving the Legal Literacy of College Students (4) Improving and perfecting the personality of college students
Content	**Teaching content (written in Chinese, you can refer to the content in the original teaching syllabus)** **Chapter 1: Understanding the True Meaning of Life and Grasping the Direction of Life** **Chapter 2: Pursuing lofty ideals and strengthening lofty beliefs** **Chapter 3: Inheriting Good Traditions and Promoting the Chinese Spirit** **Chapter 4: Clarify Value Requirements and Practice Value Standards** **Chapter 5: Adhering to Moral Norms and Refining Moral Character** **Chapter 6: Learning Legal Ideology and Enhancing Legal Literacy**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	**Textbooks and reference books (written in Chinese, you can refer to the content in the original teaching syllabus)** 1. Recommended book Ideology, Morality, and Rule of Law ", Higher Education Press, 2023 edition.

49. Outline of Modern Chinese History

Module designation	Outline of Modern Chinese History
Semester(s) in which the module is taught	1st semester
Person responsible for the module	Shi Jingyan
Relation to curriculum	Compulsory
Teaching methods	Lesson, lab works
Workload	Workload =60 hours Contact hours=48 hours Self-study hours = 12 hours
Credit points(ECTS)	2
Recommended prerequisites	None
Module objectives/intended learning outcomes	**Learning Objectives** Module objectives: **Knowledge:** 1. Master the basic development of China's history since the Opium War. 2. Be familiar with the experience of the Chinese people in resisting foreign aggression and exploring the country's way out. 3. Master the founding of the CPC and its great historical significance. 4. Understand that the CPC is the mainstay of the Chinese nation's anti Japanese war 5. Understand the historical process and great significance of the founding of New China 6. Master the reasons and basic experience of the victory of the Chinese revolution 7. Master the significant achievements made in China's socialist construction 8. Understand the beginning of reform and opening up and the creation of socialism with Chinese characteristics 9. Understand the various undertakings for achieving the great victory of socialism with Chinese characteristics in the new era **Skills:** 1. Enhance the ability to apply the historical perspective and methodology of science to analyze and solve historical problems. 2. Clarify the main line, mainstream essence, vigilance, and opposition to historical nihilism in modern Chinese history. ● **Competences:** 1. Cultivate students' sense of social responsibility, patriotism, and national spirit, and consciously safeguard the interests of their own nation. Support the leadership of the CPC and love the socialist motherland. 2. Cultivate scientific and innovative spirit, comprehensively enhance students' comprehensive literacy and social practice ability. 3. Strengthen students' confidence in the path of socialism with Chinese characteristics. ●
Content	**Teaching content (written in Chinese, you can refer to the content in the original teaching syllabus)** **Part A. Theoretical teaching (42 contact hours)** **（1） Introduction (2 credit hours)** **[Teaching Requirements]** **（2） Chapter 1: The Hardships and Struggles of the Chinese Nation after Entering Modern Times (4 credit hours)** **（3） Chapter 2: Early Exploration of the Way Out for the Nation by Different Social Forces (4 credit hours)** **（4） Chapter 3: The Hai Revolution and the End of Monarchical**

	Dictatorship (4 credit hours) **（5） Chapter IV: The founding of the CPC and the new situation of the Chinese revolution (4 class hours)** **（6） Chapter 5: The New Path of the Chinese Revolution (4 credit hours)** **（7） Chapter 6: The Chinese Nation's War of Resistance Against Japan (6 credit hours)** **（8） Chapter 7: Striving for the Establishment of New China (4 credit hours)** **（9） Chapter 8: The Establishment of the People's Republic of China and the Exploration of the Path of Socialist Construction in China (6 credit hours)** **（10） Chapter 9: Reform and Opening up and the Creation and Development of Socialism with Chinese Characteristics (2 credit hours)** **（11） Chapter 10: Socialism with Chinese Characteristics Enters a New Era (2 credit hours)** **Part B. Experiment / practice teaching: 6 hours.**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	**Textbooks and reference books (written in Chinese, you can refer to the content in the original teaching syllabus)** Outline of Modern and Contemporary Chinese History, Higher Education Press, revised edition in 2023.

50. Basic Principles of Marxism

Module designation	**Basic Principles of Marxism**
Semester(s) in which the module is taught	3th Semester
Person responsible for the module	Associate Professor: Li Liuyi
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lecture
Workload	Workload =60 hours Contact hours=48 hours Self-study hours = 12 hours
Credit points(ECTS)	2
Recommended prerequisites	**Prerequisite for course selection** nothing
Module objectives/intended learning outcomes	**Learning Objectives** Understand and grasp the basic connotation of Marxism, firmly stand firm on the basic position of Marxism, master the basic viewpoints of Marxism, learn the basic methods of Marxism, deeply understand the contemporary value of Marxism, establish a scientific view of Marxism, and enhance the consciousness of learning and applying Marxism.
Content	**Teaching content (written in Chinese, you can refer to the content in the original teaching syllabus)** The course of "Basic Principles of Marxism" mainly teaches the basic principles, viewpoints, and methods of Marxism, and is the main channel for college students to learn and master the basic principles of Marxism. The main content of this course includes Marxist political economy, dialectical materialism, historical materialism, and scientific socialism, which have important guiding roles in improving the ideological realm of college students and establishing firm communist ideals. Through the teaching of this course, students will have a comprehensive understanding of the basic principles of Marxism, fully comprehend dialectical materialism and historical materialism, accurately grasp the laws of human social development, the essence and development laws of capitalist society, and the essence and development laws of socialism, become familiar with the development of the international communist movement, and be proficient in using Marxist methodological principles for learning and living, thus laying a good foundation for students to devote themselves to the cause of socialism with Chinese characteristics in the new era.
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ≥ 60 points will be considered a pass.
Reading list	**Textbooks and reference books (written in Chinese, you can refer to the content in the original teaching syllabus)** Basic Principles of Marxism (2023 edition)

51. Medicine and Humanity

Module designation	**Medicine and Humanity**
Semester(s) in which the module is taught	5th Semester
Person responsible for the module	Lu Liyuan
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	lecture
Workload	Workload = 45 hours Contact hours = 32 hours Self-study hours = 13 hours
Credit points(ECTS)	1.5
Recommended prerequisites	None
Module objectives/intended learning outcomes	Module objectives: ● **Knowledge:** This course aims to introduce the basic knowledge and concepts of medicine and humanities, including medicine, humanities, health, life and death, narrative medicine, etc ● **Skills:** Understand knowledge and concepts related to medicine and humanities, learn to listen, read, search and organize information, and be able to analyze, interpret and evaluate different texts, events and viewpoints. ● **Competencies:** Communication skills, able to effectively communicate with patients and their families, and establish good doctor-patient relationships; Critical thinking ability, interdisciplinary thinking ability, able to critically analyze medical humanities cases and propose solutions; Self reflection ability, reflecting on one's own medical behavior, and continuously improving professional competence.
Content	**Part A. Theoretical teaching (16 contact hours)** **Medicine and Humanities** **Introduction to Medical Humanities (2 contact hours)** ● Medicine, Humanities, and Medical Humanities ● The Rise of Medical Humanities ● Basic demands of medical humanities ● Theoretical basis of medical humanities **Lecture 2: Humanistic Interrogation in Modern Medicine (2 contact hours)** ● The humanistic value of medical technology ● The Medical Landscape of the Consumer Era ● The Dimensions of Modern Medicine ● Doctor patient aphasia and the disappearance of "people" **What kind of health do we need (2 contact hours)** ● Analysis of Health Concept ● Modern Health Concept ● Who will take the lead in health ● Health and Healthism **Lesson 4: Understanding Life and Death (4 contact hours)** ● Medical and philosophical narratives of death ● The Evolution of Modern Aging and Death Consciousness ● Euthanasia and dignified death ● Death Relief and Modernization of Medicine* **Lecture 5: Osler's Proposition and Its Contemporary Value (2 contact hours)** ● Osler's people and their affairs ● The proposal of Osler's proposition

	● The philosophical connotation of Osler's proposition ● 4、 Osler's proposition and the COVID-19 epidemic **Lecture 6: Narrative Medicine (2 contact hours)** ● The Rise of Narrative Medicine ● Describe the relevant concepts of medicine ● The clinical application of narrative medicine ● Cancer Narration and Reflection **Lecture 7: The Modern Path of Traditional Medicine (2 contact hours)** ● Medicine in the 20th century ● May Fourth Movement and Traditional Chinese Medicine ● The Characteristics, Types, and Significance of Traditional Chinese Medicine ● The Modern Significance of Traditional Chinese Medicine **Part B. Experiment/practice teaching: (16 contact hours)**
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ≥ 60 points will be considered a pass.
Reading list	1. It is recommended to use textbooks [1] Edited by Wang Yifang, Fifteen Lectures on Medical Humanities (Second Edition), Peking University Press, 2020 edition 2. Main reference materials [1] Edited by Hu Peicheng, Essentials of Medical Humanities, People's Health Publishing House, 2018 edition [2] Edited by Zhang Daqing, Introduction to Medical Humanities, Science Press, 2018 edition

52. Physical Education

Module designation	Physical Education
Semester(s) in which the module is taught	1st, 2nd,3th, 4th, 5th, 7th semester
Person responsible for the module	Associate Professor: Wei Jiao
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson, lab works
Workload	Workload = 150 hours Contact hours =144 hours Self-study hours = 6 hours
Credit points(ECTS)	5
Recommended prerequisites	nothing
Module objectives/intended learning outcomes	Module objectives: ● **Knowledge:** Establish the guiding ideology of "health first", impart basic cultural knowledge, sports skills and methods of sports and health, cultivate students' healthy personality, enhance physical fitness, improve comprehensive professional abilities through scientific guidance and arrangement of sports exercise process, cultivate the awareness, ability and habit of lifelong physical exercise, improve the quality of life, and serve the comprehensive promotion of students' physical health, psychological health and social adaptability. **Skills:** (1) Have a passion for sports, actively participate in various sports, develop a lifelong awareness and habit of sports, be able to test and evaluate one's physical health status, develop feasible personal exercise plans, and have a certain ability to appreciate sports culture. (2) Proficient in mastering the basic methods and skills of 1-2 fitness exercises, and able to scientifically engage in physical exercise. (3) Comprehensively developing various physical fitness related to health and improving exercise ability: proficiently mastering one or two traditional Chinese health preservation methods, being able to choose healthy and nutritious foods that the human body needs, and forming healthy behavioral habits. (4) Set sports learning goals based on one's own abilities, consciously improve psychological state through sports activities, establish good interpersonal relationships, cultivate a positive and optimistic attitude towards life, and use appropriate methods to regulate one's emotions: experience the joy and sense of success in sports, demonstrate good sports ethics and cooperation spirit. **Competencies:** Participate in collective sports activities, learn to get along harmoniously with peers, cultivate good interpersonal relationships and cooperation spirit. Being able to actively care for and help peers, jointly completing the process of physical exercise, cultivating the spirit of "competition, unity, friendship, and cooperation", and improving social responsibility and coordination communication skills. Based on the characteristics of future career work, learn health-related knowledge related to the profession, improve awareness and ability to prevent occupational diseases, and choose sports methods that are helpful in preventing and treating occupational diseases for exercise. Learn sports related to career development, recognize the value of sports in improving employment and entrepreneurial abilities, and enhance one's overall professional

	qualities.
Content	Offering physical education theory courses, specialized physical education courses, training courses, health classes, extracurricular activity classes, and morning exercises. 1. Physical Education Theory Course (1) Cultivation of lifelong sports awareness (2) The purpose and task of school sports (3) The Position and Role of Sports in School Teaching (4) The relationship between sports and moral, intellectual, and aesthetic education (5) Factors affecting health - the relationship between sports and health 2. Master the methods of physical exercise and engage in reasonable physical exercise (1) Common knowledge of physical exercise (2) Principles, Content, and Methods of Physical Exercise (3) Develop physical exercise plans and exercise prescriptions 3. Health knowledge (1) Common knowledge of daily life (2) Prevention and treatment of sports injuries (3) Self supervision of physical exercise 4. Physical education theory courses for various specialized courses (1) Project Overview, Exercise Value and Significance (2) Basic skills, tactical theory, project competition rules, and judging methods 5. Supplement textbooks (1) Sports healthcare knowledge and rehabilitation sports therapy (2) Knowledge related to the development of sports (3) Basic knowledge of martial arts, etc (4) Methods for self-study, self entertainment, self training, and tutoring others after entering society (5) Knowledge of relevant laws and regulations, how to abide by laws and regulations, and safeguard one's own sports rights and interests Structure of Physical Education Curriculum 1. Specialized course projects Basketball, volleyball, table tennis, tennis, sports dance, ballroom dancing, body building, guided fitness, ultimate frisbee, bodybuilding, aerobics, darts, sports health, football, badminton, artistic gymnastics, Tai Chi, self-defense, taekwondo, cricket, yoga ball, soft volleyball, American football. 2. Health classes An adaptive physical education course that focuses on guiding rehabilitation and health care for students with physical abnormalities, special types, diseases, disabilities, frailty, and certain elderly special groups. Students need to be recognized as qualified by the school hospital and receive credits after passing the course selection.

	3. Sports training classes Training course for the school representative team, limited to 4 years of undergraduate studies.
Study and examination requirements and forms of examination	Physical Education Theory Course (20%): Written Test, Online Answering. Sports specific courses (60%): Specialized theoretical courses (10%), oral exams, and drawing questions from the question bank. Specialized practical courses (30%), including technical evaluation, learning attitude, and progress rate. Extracurricular activity class situation (20%).
Reading list	National Physical Education Curriculum Teaching Guidance Plan for Ordinary Higher Education Institutions

53. Situation and Policy

Module designation	Situation and Policy
Semester(s) in which the module is taught	1st, 2nd, 3rd semester
Person responsible for the module	Dong Mingjie
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Lesson, lab works
Workload	Workload = 45 hours Contact hours = 32 hours Self-study hours = 13 hours
Credit points(ECTS)	1.5
Recommended prerequisites	None
Module objectives/intended learning outcomes	Module objectives: **Knowledge:** 1. Master the situation and tasks faced by the Party and the country. 2. Familiar with the Party's line, principles, and policies. 3. Understand the current hot and difficult issues. **Skills:** 1. Able to analyze the situation and tasks faced by the Party and the country. 2. Able to correctly abide by the Party's line, principles, and policies. 3. Possess profound insight and keen understanding. **Competences:** 1. Enhance students' confidence, belief, sense of historical responsibility, and national perspective in revitalizing China and realizing the great rejuvenation of the Chinese nation. 2. Guide students to enhance their "four consciousnesses", strengthen their "four confidences", and achieve "two safeguards" in their ideological and political education We have maintained a high degree of consistency with the CPC Central Committee with Comrade Xi Jinping at the core in governance actions.
Content	**Part A. Theoretical teaching (16 contact hours)** ● The first topic, political aspect: in-depth study of the spirit of the 19th National Congress of the Communist Party of China, important speeches by the central leadership, and new concepts, ideas, and strategies for governing the country; Magnificent 70 years, striving for a new era. ● The second topic, in terms of party building: a profound understanding of the deployment of party building topics; ● The third topic, cultural aspect: in-depth educational activities on topics such as ideological and political work in universities under the new situation, cultivation and promotion of socialist core values, etc; ● The fourth topic, economic aspect: accurately explain the current economic situation and development prospects; Comprehensive well-off society "and" poverty alleviation " ● The fifth topic is major country relations and China's

	distinctive major country diplomacy. **Part B. Experiment / practice teaching: (16 contact hours)** Through practical training in the form of student speeches, students are required to have a global perspective, sharp judgment on domestic and international situations, and good communication skills.
Study and examination requirements and forms of examination	The course will be graded out of 100 points, of which 40% will be assigned to the regular grade and 60% to the final exam, and a total of ⩾ 60 points will be considered a pass.
Reading list	1. Recommended books [1] Editor in Chief of the Current Affairs Report Editing Department, "Current Affairs Report: College Student Edition" 2. Reference books [1] Xi Jinping Learning Outline of Socialism with Chinese Characteristics for a New Era, Publicity Department of the CPC Central Committee, Learning Press, June 2019.

54. Bachelor Thesis

COURSE NAME	**Bachelor Thesis**
DATE	June 2024
CREDITS/WEEKS	16
SEMESTER	8th semester
COURSE CONTENTS	Graduation Internship and Graduation Design is a graduation practice course for clinical engineering technology majors, which is an important practical teaching link for realizing the cultivation goal of undergraduates, an educational process for cultivating students' ability to solve comprehensive problems by applying what they have learned, and also a comprehensive summary and integrated training of what students have learned before graduation. Through completing and writing the thesis, students can consolidate and deepen the specialized theoretical and practical knowledge they have learned, master the basic methods of literature search and data inquiry, and comprehensively apply the knowledge they have learned. In addition, students can establish the correct thesis (design) ideas in the process of practice, familiarize with the general procedures and methods of the graduation design experiment, and solve the key problems in the design, production, clinical operation, use, maintenance and management of medical devices, especially typical clinical life support equipment and devices (such as respiratory machines, anesthesia machines, artificial heart-lung machines, hemodialysis machines, pacemakers, defibrillators, infusion pumps, gastric lavage machines, and vascular stents, etc.) and clinical diagnostic medical instruments. Critical issues in the design, production, clinical operation and maintenance of medical clinical diagnostic instruments. This course provides students with the basic skills necessary for clinical engineers and technicians, and enables students to understand the scientific research and technical management of medical device-related industries before graduation.
LAB WORKS	Under the guidance of the supervisor, we will complete the process of topic selection, topic opening, mid-term inspection, topic research, thesis writing and graduation defense. Firstly, select topics reasonably around medical devices, clinical engineering technology, medical and health products, medical equipment maintenance management and other related topics to ensure the difficulty, specialization, feasibility and innovation of the selected topics, and conduct the opening defense. Second, conduct research on the topic, literature search and data collection under the guidance of the tutor, and formally implement the topic research by utilizing the theoretical and practical foundation of the learned specialty. Third, summarize and analyze the experimental or design data, complete the writing and revision of the thesis (design), and conduct the graduation defense.
PREREQUISTES	All Clinical Engineering Technology Programs
GRADING	Tutor's assessment: 40%; Thesis review: 30%; Defense: 30%
BIBLIOGRAPHIES	It will be assigned by each instructor according to the actual requirements of the final design topic.

55. Medical Internship

Module designation	Medical Internship
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Associate Professor: Chen Zhenglong
Language	Chinese
Relation to curriculum	Compulsory
Teaching methods	Internship
Workload	Workload = 90 hours Contact hours = 64 hours Self-study hours = 26 hours
Credit points	3
Recommended prerequisites	Principle and Applications of Life Support Equipment; Therapeutic Equipment Technology; Medical Electrical Safety Engineering
Module objectives/intended learning outcomes/	**Knowledge and Understanding:** ● To master the basic principles, operation and maintenance methods of monitors, ventilators, hemodialysis machines, artificial heart and lung machines, infusion pumps, suction devices, high-frequency electrosurgical knife, defibrillators, etc. ● Be familiar with the basic principles of hemodialysis, extracorporeal circulation, and mechanical ventilation, as well as the operation and maintenance of related equipment. ● Be familiar with the technical management of hospital equipment, including equipment procurement, evaluation, bidding, cost accounting, and equipment scrapping process ● To understand the layout of ICU wards, including central monitoring, wired/wireless monitoring, network layout, power and gas supply systems. ● To understand the disinfection and isolation system of ICU wards and related medical nursing routines. **Practical Skills:** ● Capable of operating typical life support medical equipment such as blood purification devices, artificial heart and lung machines, ventilators, and anesthesia machines, as well as typical medical treatment equipment such as high-frequency electrosurgical knives and defibrillators, and correctly setting their various technical parameters. ● Capable of connecting pipelines and conducting performance tests on typical life support medical equipment such as blood purification devices, artificial heart and lung machines, ventilators, and anesthesia machines. Able to diagnose and troubleshoot simple malfunctions related to the aforementioned equipment. ● Be able to carry out management work related to the entire lifecycle of medical equipment under the guidance of clinical engineers in hospitals. ● Be able to coordinate the design of clinical facilities where medical technology is used, e.g., operating rooms (ORs), intensive care units, etc.
Content	**1. Hemodialysis room (16 contact hours):** Startup and shutdown of dialysis machine, safe operation, performance maintenance, and function settings of dialysis machine; Typical fault diagnosis and troubleshooting. **2. Operation room (16 contact hours):** Startup, shutdown, function setting, performance maintenance, fault diagnosis, and troubleshooting of artificial heart and lung machines; Safe operation, performance maintenance, fault diagnosis and troubleshooting of other

	commonly used equipment in the operating room. **3. ICU (16 contact hours):** Startup, shutdown, function setting, alarm handling, and performance maintenance of ventilators and anesthesia machines; Handling common malfunctions of monitors and high-frequency electric knives, and resolving alarms. **4. Equipment Department (16 contact hours):** Emergency deployment of life support equipment or other important medical devices; Implement full lifecycle asset management and quality management for medical equipment, and establish and manage medical equipment archives.
Study and examination requirements and forms of examination	Process assessment accounts for 40% of the total score, including daily attendance (15%) and discussion status (25%). The final assessment accounts for 60% of the total score, mainly for the completion of the internship report.
Reading list	[1] ZHU Lei, Mechanical Ventilation （Fourth Edition）, Shanghai Scientific & Technical Publishers, 2018. [2] CHENG Haiping, Medical Therapeutic Equipment-Introduction to Principles and Structure, Shanghai Jiao Tong University Press, 2016 Edition.