



## **Appendix G2**

# **Module Handbook of Telecommunication Engineering And Management**



Module Name	Course Name	
<b>Module 1</b> <b>Mathematics &amp; Physics Science</b> <b>Fundamentals</b>	Higher Mathematics (1)	
	Higher Mathematics (2)	
	Linear Algebra	
	Probability Theory and Stochastic Process	
	College Physics (A)	
	College Physics Experiment (A)	
<b>Module 2</b> <b>Computer Fundamentals</b>	College Computer	
	C Language Programming	
	Applied Technology of Database	
<b>Module 3</b> <b>Engineering fundamentals</b>	Basics of Circuit Analysis	
	Electronic Technique Foundation	
	Signal and System	
<b>Module 4</b> <b>Engineering Practice</b>	Engineering Drawing Practice	
	Course Integrated Design of Electronic Technology	
	Electric Fitting Practice	
	Course Design of Engineering Management Information System	
<b>Module 5</b> <b>Principle of Engineering</b> <b>Technology</b>	Communication Principles	
	Experiment (Basics of Communication Technology)	
	Modern Information Network and Innovation	
	Principles of Telecommunication Transmission	
	Mobile Communication Principle and Technology	
<b>Module 6</b> <b>Engineering Construction</b>	Survey of the Telecommunication Engineering and Management	
	Engineering Drafting and CAD	
	Communication Engineering Economics and Economic Evaluation	
	Telecommunication Engineering Project Budget Application	
<b>Module 7</b> <b>Engineering Management</b>	Enterprise Management	
	Telecommunication Engineering Project Management	
	Operations Management	
	Information Resource Management	Two



Module Name	Course Name	
	Innovation & Entrepreneurship Management	choose one
Module 8 Advanced technology & Applications	Telecommunication Engineering Budding and Tendering	Two choose one
	Telecommunication Bearer Network Engineering Application	
	Telecommunication Engineering Security Management	Two choose one
	Telecom Cloud Theory and Technology	
	Telecommunication Engineering Planning and Optimization	
Module 9 Comprehensive Internship (Two choose one)	Outside Campus	Enterprise Practice
	Inside Campus	Practice of Mobile Communication
		Practice of Switching Technology
		Network and Security Technology Practice
		Practice of Wideband Access Technology
		Telecommunication Operation Management Simulation Practice
	IT Project Management Sandtable Simulation	
Module 10 Graduation project	Graduation Project (Thesis)	
Module 11 English	College English (1)	
	College English (2)	
	College English (3)	
	College English (4)	
	English for IT Professionals	
Module 12 Development of Professional Quality	Guidance for College Students' Employment and Vocational Development	
	Guidance for College Students'Mental Health	
	Key Career Abilities	
	Basics for College Students' Entrepreneurship	
	Practice for College Students' Entrepreneurship	



Module Name	Course Name	
Module 13 Management and Business	Human Resource Management	
	Financial Management	
	Strategic Management of Enterprises in the era of "Internet +"	
	Investment and Financing Management	Two choose one
	Online Advertising	
Module 14 The Practice of Moral, Intellectual, Physical and Aesthetics	Classic Speech	Two choose one
	Rhetoric and Persuasion	
	Classic Speech	Two choose one
	Rhetoric and Persuasion	
	On Justice	
	On Happiness: Positive Psychology	Three choose two
	A Brief History of Time	
	Modern Economic Geography of China	
	Ideological Education and Fundamentals of Law	
	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	
	Compendium of Modern Chinese History	
	Basic Principles of Marxism	
	Situation and Policy	
	Military Theory and Training	
	Physical Education(1)	
	Physical Education(2)	
	Physical Education(3)	
	Physical Education(4)	
	Celebrity Forum	Two choose one
	Top-teacher Class	



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<b>Module 15 Philosophy and Social Sciences .....</b>	<b>错误！未定义书签。</b>
<b>Module 16 Political Ideological and Moral Accomplishment .....</b>	<b>错误！未定义书签。</b>
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## Module 1 Mathematics & Physics Science Fundamentals

<b>Module designation</b>	Mathematics & Physics Science Fundamentals
<b>Module code</b>	<b>Module 1</b>
<b>Courses name/ Semester(s) in which the module is taught/ Credit point</b>	Higher Mathematics (1)/ 1 / 6ECTS Higher Mathematics (2)/ 2 / 4.5ECTS Linear Algebra / 2 / 3ECTS Probability Theory and Stochastic Process / 3 / 4.5ECTS College Physics (A)/ 2 / 4.5ECTS College Physics Experiment (A)/ 3 / 3ECTS
<b>Person responsible for the module(name/profession al ranks and titles)</b>	CHEN Daiguo / Associate professor
<b>Lecturer(name/profession al ranks and titles)</b>	CHEN Daiguo/Associate professor, WU Chuanzhi/Associate Professor, XIE Guoya/Associate Professor, LIAO Qili/Associate Professor, CUI Haisheng /Associate Professor, ZHANG Xueye/Lecturer, BAO Yi /Lecturer, CHEN Ling/Lecturer,YAN Chunjuan/Lecturer, XIONG Ou/Lecturer,Wu Xiaorui/ Lecturer, WANG Guangchuan/Lecturer, SONG Nana/ Lecturer,LUO Xiaoxia/ Lecturer, LUO Haozhi / Assistant, LIU Xinxin /Assistant, HE Jin/ Lecturer, GUAN Yue / Lecturer, YANG duwei/ Assistant, ZHU Xuanran/ Assistant, LI Xuefeng/ Assistant
<b>Language</b>	Chinese
<b>Curriculum attribute</b>	Higher Mathematics (1): Obligatory Higher Mathematics (2): Obligatory Linear Algebra: Obligatory Probability Theory and Stochastic Process: Obligatory College Physics(A): Obligatory College Physics Experiment: Obligatory
<b>Teaching methods</b>	Lecture/ discussion/Exercise/Self-study/presentation/Experiment
<b>Workload</b>	Higher Mathematics(1): Teaching: 180 hours Higher Mathematics(2): Teaching: 135 hours Linear Algebra: Teaching: 90 hours Probability Theory and Stochastic Process: Teaching: 135 hours College Physics(A): Teaching: 135 hours College Physics Experiment(A): Teaching: 90 hours
<b>Credit point</b>	25.5
<b>Evaluation mode</b>	Higher Mathematics (1): Homework, Performance and intermediate examination 40%; Final exam 60%. Higher Mathematics (2): Homework, Performance and intermediate examination 40%; Final exam 60%. Linear Algebra: Homework, Performance and intermediate examination 40%;



	<p>Final exam 60%.</p> <p>Probability Theory and Stochastic Process: Homework, Performance and intermediate examination 40%; Final exam 60%.</p> <p>College Physics (A): Homework, Performance and intermediate examination 40%; Final exam 60%.</p> <p>College Physics Experiment (A): Homework, Performance and intermediate examination 40%; Final exam 60%.</p>
<b>Recommended prerequisites</b>	Basic knowledge of Elementary Mathematics Physics
<b>Module objectives/intended learning outcomes</b>	<p>● <b>Module Objectives:</b></p> <p>Through the learning of each course of the higher mathematics module ,the students can learn the basic concepts of mathematics, understand its basic theory, form certain mathematical thinking ,and master a certain mathematical method. It also Trains the student to analyze and solve practical problems, develops the ability of students to build mathematical models, provides the necessary mathematical foundation for the study of specialized courses and the expansion of mathematical knowledge.</p> <p>Based on the module of learning, students will master the basic concepts, theory, methods and experimental skills, and know the development and achievement of physics and physics experiments in modern times and its application in engineering technology, developing and improving students' ability to comprehensively apply physics theory and solve problems in engineering field.</p> <p>● <b>Intended learning outcomes:</b></p> <p>Students should be able to demonstrate the following results when learning this module successfully:</p> <ol style="list-style-type: none"> <li>1. Establish a dialectical materialist world view and scientific attitude to seek truth and acquire abstract thinking ability.</li> <li>2. Provide a mathematical basis for the relevant specialized courses of the follow-up mechanism.</li> <li>3. Able to use mathematical knowledge to calculate 、 judge, and use mathematical tools to solve some problems, including calculation and reasoning.</li> <li>4. Understand the application of physics and physics experiments in natural science and engineering technology, as well as the relationship between relevant sciences.</li> <li>5. Master the representation and application of vector and calculus in physics proficiently.</li> <li>6. Learn to use the basic methods and principles of physics to analyze various practical problems and have basic physical thinking ability in engineering practice.</li> </ol>
<b>Course name / Course objectives /Key</b>	<p><b>Course Name: Higher Mathematics (1)</b></p> <p><b>Course objectives:</b></p>



<p><b>Knowledge Points:</b></p>	<p>After learning the courses, students can achieve the following learning objectives:</p> <ol style="list-style-type: none"> <li>1. Grasping the basic knowledge and theory of variable function calculus;</li> <li>2. Acquiring ability for skilled and accurate basic calculation, and strong ability for abstract thinking, logical reasoning and spatial imagination;</li> <li>3. Obtaining a certain idea of mathematical modeling, and the ability to apply this idea to the whole process of putting forward problems, analyzing problems and solving problems;</li> <li>4. Understanding the connection between advanced mathematics knowledge and professional concepts and practical skills;</li> <li>5. General ability to apply mathematical ideas, concepts, and methods to understand, summarize, abstract, and solve the related courses and engineering technical problems of the major;</li> <li>6. Being able to use mathematical thinking to solve practical problems encountered in work, enhance one's understanding and interest in mathematics, and adapt to the needs of social and economic development.</li> </ol> <p><b>Key knowledge:</b></p> <p>Chapter 1 Function, Limit and Continuity</p> <ol style="list-style-type: none"> <li>1. Set and function</li> <li>2. Elementary function</li> <li>3. Definition and property for sequence of numbers and function limit</li> <li>4. Infinite and Infinitesimal</li> <li>5. Calculation of function limit and criterion of existence of limit</li> <li>6. Two important limits</li> <li>7. Equivalent Infinitesimal</li> <li>8. Continuity of function</li> <li>9. Basic property of continuous function</li> <li>10. Function, limit and continuous exercise lessons</li> </ol> <p>Chapter 2 Differential calculus of unary function and its application</p> <ol style="list-style-type: none"> <li>1. The concept of a derivative, the derivation of a simple function, and derivable in relation to continuity</li> <li>2. The basic derivation formula of function and inverse function derivation</li> <li>3. Derivative of compound function and higher order derivative</li> <li>4. Implicit function derivation method and function derivation method determined by parameter equation</li> <li>5. Differentiation of function</li> <li>6. Differential mean value theorem</li> <li>7. Lobida's law and Taylor's mean value theorem</li> <li>8. Monotonicity and extremum of function</li> <li>9. Concavity-convexity and inflection point of curve and description of</li> </ol>
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	<p>function figure</p> <p>10. Maximum and minimum, curvature</p> <p>11. Exercises for differential calculus of unary function and its application</p> <p>Chapter 3 Integral calculus of unary function</p> <p>1. Concept and properties of indefinite integral</p> <p>2. The first kind of integral method of substitution</p> <p>3. The second kind of integral method of substitution</p> <p>4. Integration by parts</p> <p>5. Indefinite integral of some special functions</p> <p>6. Concept and property of definite integral</p> <p>7. Fundamental theorem of calculus</p> <p>8. The method of changing element and part integral of definite integral</p> <p>9. Generalized integral</p> <p>10. Exercises of Integral calculus of unary function</p> <p>11. Revision</p> <p><b>Course Name: Higher Mathematics (2)</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <p>1. Mastering the application of definite integral, basic concepts, theories and operational skills in ordinary differential equations, vector algebra, spatial analytic geometry, multivariate function calculus, infinite series, etc.</p> <p>2. Acquiring skilled and accurate basic calculation ability, good abstract thinking and logical reasoning ability and strong spatial imagination ability.</p> <p>3. Being able to use mathematical ideas, concepts, and methods to summarize the practical problems encountered in abstract engineering technology, and solve the problem.</p> <p><b>Key knowledge:</b></p> <p>Chapter 1 Geometric and physical application of definite integral</p> <p>1. Area of a planar figure</p> <p>2. Volume of space</p> <p>3. Arc length of curve</p> <p>4. The application of definite integral in Physics</p> <p>Chapter 2 Ordinary differential equations</p> <p>1. The concept of differential equation</p> <p>2. First order differential equation</p> <p>3. Second order differential equation</p> <p>Chapter 3 Vector and space analytic geometry</p> <p>1. Vector and its operation</p>
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	<p>2. Plane and its equation</p> <p>3. Straight line and its equation</p> <p>4. Surfaces and curves</p> <p>Chapter 4 Differential calculus of multivariate functions</p> <p>1. Concept of multivariate function</p> <p>2. Limit and continuity</p> <p>3. Partial derivative and total differential of multivariate function</p> <p>4. Derivative of multivariate composite function</p> <p>5. Derivation and directional derivative of implicit function</p> <p>6. The application of differential calculus of multivariate function</p> <p>Chapter 5 Multivariate function integration</p> <p>1. The concept, properties, calculation and application of double integral</p> <p>2. The concept, properties and calculation of triple integral</p> <p>Chapter 6 Infinite series</p> <p>1. The concept and properties of constant series</p> <p>2. Convergence criteria of constant series</p> <p>3. Convergence of power series and expansion of function</p> <p>4. Fourier series</p> <p><b>Course Name: Linear Algebra</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <p>1. Acquiring the basic knowledge and theory of linear algebra;</p> <p>2. Mastering the necessary mathematical operation skills and the ability to use mathematical software to carry out complex linear algebra calculations;</p> <p>3. To further cultivate, train and improve the students' ability to use mathematical methods to analyze and solve problems (including solving practical problems);</p> <p>4. Broadening the scope of mathematics knowledge, and providing the necessary mathematical foundation for students to study subsequent related professional courses and postgraduate entrance examination;</p> <p>5. Providing applicable mathematical methods and means of calculation for scientific research and practical work; To meet the basic requirements of linear algebra for the follow-up courses of communication engineering major;</p> <p>6. Mastering the method of calculating determinant and matrix rank, and judging the linear correlation of vector groups by combining the transformation of linear equations into matrix products and matrix rank.</p> <p><b>Key knowledges:</b></p> <p>Chapter 1 Determinant</p> <p>1. Permutation</p>
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	<p>2. Transposition</p> <p>3. Determinant</p> <p>4. Properties of determinants</p> <p>5. Expansion of determinant</p> <p>6. Clem's rule</p> <p>Chapter 2 Matrix</p> <p>1. Matrix and its basic operations</p> <p>2. Inverse matrix</p> <p>3. Elementary transformation of a matrix</p> <p>4. Block matrix</p> <p>5. Rank of matrix</p> <p>Chapter 3 Vector groups and their linear correlations</p> <p>1. n-dimensional vectors and their linear operations</p> <p>2. Linear correlation of vector sets</p> <p>3. Judgment theorem of linear correlation</p> <p>4. Rank of vector set</p> <p>5. Vector space</p> <p>Chapter 4 System of linear equations</p> <p>1. Homogeneous linear equations</p> <p>2. Inhomogeneous linear equations</p> <p><b>Course Name: Probability Theory and Stochastic Process</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <p>1. Understanding the basic concepts of probability theory, mastering the nature and formula of probability, and being able to calculate simple probability;</p> <p>2. Mastering the statistical description of random variables, being able to use the distribution law, probability density function and distribution function to calculate the probability of relevant events, being able to calculate the joint distribution law and edge distribution law of two-dimensional discrete random variables, knowing how to calculate the edge density function from the joint density function, and to judge whether two random variables are independent;</p> <p>3. Mastering the numerical characteristics of random variables, being able to calculate the mathematical expectation, variance, covariance and correlation coefficient of random variables, and memorizing the mathematical expectation and variance of six common distributions;</p> <p>4. Understanding Chebyshev Inequality and the Law of Large Numbers, mastering the central limit theorem, and being able to use Chebyshev</p>
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	<p>Inequality and the central limit theorem for approximate calculation;</p> <p>5. Understanding the concept and statistical description of stochastic process, being familiar with some common random process, and being able to calculate the numerical characteristics of random process;</p> <p>6. Mastering limited dimension distribution and ergodic Markov chain, being able to calculate finite dimensional distribution according to the step of homogeneous Markov chain transition probability matrix and the initial distribution, determining whether one has the idea that the ergodic discrete mathematics is the basic theory of computer science, and it plays an important role in cultivating students' logical thinking, problem-analyzing, and problem-solving ability. The teaching of discrete mathematics can not only lay a solid foundation for students' professional course learning and future software and hardware development and application research, but also cultivate their abstract thinking and strict logical reasoning ability.</p> <p><b>Key knowledge:</b></p> <p>Chapter 1 The fundamental concepts of probability theory</p> <ol style="list-style-type: none"> <li>1. Random experiment, Sample space, Random events</li> <li>2. Frequency and probability</li> <li>3. Isoprobability type</li> <li>4. Conditional probability, multiplication formula, total probability formula and Bayesian formula</li> <li>5. Independence</li> </ol> <p>Chapter 2 One dimensional random variable and its distribution</p> <ol style="list-style-type: none"> <li>1. Random variable and its distribution function</li> <li>2. Discrete random variable and its distribution law</li> <li>3. Continuous random variable and its probability density</li> <li>4. The distribution of random variable function</li> </ol> <p>Chapter 3 Multidimensional random variable and its distribution</p> <ol style="list-style-type: none"> <li>1. Two-dimensional random variable and its distribution function</li> <li>2. Marginal distribution</li> <li>3. Conditional distribution</li> <li>4. Mutually independent random variables</li> <li>5. The distribution of functions of two random variables</li> </ol> <p>Chapter 4 Numerical characteristics of random variables</p> <ol style="list-style-type: none"> <li>1. Mathematical expectation</li> <li>2. Variance</li> <li>3. Covariance and correlation coefficient</li> <li>4. Moment, covariance matrix</li> </ol> <p>Chapter 5 Law of large numbers and central limit theorem</p>
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	<p>1.Large numbers law</p> <p>2.Central limit theorem</p> <p>Chapter 6 Stochastic process and its statistical description</p> <p>1.The concept of stochastic process</p> <p>2.Statistical description of stochastic process</p> <p>3.Poisson process and Wiener process</p> <p>Chapter 7 Markov chain</p> <p>1.Markov process and its probability distribution</p> <p>2.Multistep transfer probability</p> <p>3.Finite dimensional distribution</p> <p>4.Ergodicity</p> <p><b>Course Name: College Physics (A)</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <p>1. By learning the basic knowledge of electrostatic field, students can use Gauss theorem to solve the field strength of some charged bodies with symmetrical electric field distribution, such as uniformly charged line, uniformly charged sphere, uniformly charged sphere, etc.; they can also apply the knowledge to the following professional courses of motor and drag control, power supply and distribution technology.</p> <p>2. Stable magnetic field and static electric field are fields with different properties, but they are relatively similar in research methods. Students can use analogy method to study stable magnetic field, deepen their understanding of stable magnetic field, and be able to use Ampere Loop Theorem to solve the distribution of magnetic field of current-carrying line.</p> <p>3. Through the study of electromagnetic induction, students have mastered the phenomenon of electromagnetic induction and the conditions of its generation, as well as the cause and nature of induced electromotive force. Based on this introduction of self-induction, mutual induction, eddy current, and through the combination of theory and practice, students would have a new understanding of the practical application of electromagnetic induction, such as transformer and motor should reduce eddy current, and can apply the knowledge to the future engineering experiments.</p> <p>4. Through the study of optics, students can deepen their understanding of optical interference, explain optical phenomena in daily life with relevant optical knowledge, and apply optical knowledge to engineering measurement, such as using wedge interference method to check whether the surface quality of optical components meets the technological requirements, measuring the</p>
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	<p>refractive index by using the characteristic of fringe movement in Michelson interference, and measuring the spherical radius of the plane convex lens and the wavelength of incident light by Newton's ring interferometry.</p> <p><b>Key knowledge:</b></p> <p>Chapter 1 Electrostatic Field</p> <ol style="list-style-type: none"> <li>1. Electric Charges and Coulomb's law.</li> <li>2. Electric field and its intensity.</li> <li>3. Gauss's theorem in electrostatic field.</li> <li>4. Work by the electrostatic force.</li> <li>5. Electric potential.</li> <li>6. Electric field and Gradient of potential.</li> </ol> <p>Chapter 2 Steady Magnetic Field</p> <ol style="list-style-type: none"> <li>1. Magnetic field and Magnetic induction intensity.</li> <li>2. Biot-Savart's law.</li> <li>3. Gauss's theorem and ampere loop theorem in magnetic field.</li> <li>4. Effect of the Magnetic field to the moving charges and current-carrying conductors.</li> <li>5. Magnetic medium.</li> </ol> <p>Chapter 3 Electromagnetic induction, The Electromagnetic field</p> <ol style="list-style-type: none"> <li>1. Basic laws of Electromagnetic induction.</li> <li>2. Dynamic and inductive electromotive force.</li> <li>3. Application of the Electromagnetic induction.</li> <li>4. Energy in the Electromagnetic field.</li> <li>5. Electromagnetic field and Electromagnetic wave.</li> </ol> <p>Chapter 4 Physical optics</p> <ol style="list-style-type: none"> <li>1. Light wave.</li> <li>2. Optical interference.</li> <li>3. Optical diffraction.</li> <li>4. Optical polarization</li> </ol> <p><b>Course Name: College Physics Experiment (A)</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Learning the basic knowledge measurement of error analysis and uncertainty assessment, as well as experimental data processing, and being able to choose different experimental methods to process data, such as list method, graphic method, least square method, etc.</li> <li>2. Obtaining basic training of experimental methods and skills, being able to independently complete the operation part of the experiment, and learning to</li> </ol>
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	<p>correctly record the experimental data, so as to gradually improve the hands-on operation ability and the ability to work independently combining theory with practice.</p> <p>3. Completing the writing of the experimental report, processing the experimental data and analyzing the errors, and making a careful summary, so as to acquire a preliminary scientific experiment ability.</p> <p><b>Key knowledge:</b></p> <p>Chapter1 Introduction</p> <ol style="list-style-type: none"> <li>1.The purpose, significance and requirements of physics experiment</li> <li>2. The learning method of physics experiment course.</li> </ol> <p>Chapter 2 Theory of Error Measurement and Basis of Data Processing</p> <ol style="list-style-type: none"> <li>1. Understanding theory of error measurement and knowledge of data processing</li> <li>2. The meaning of measurement uncertainty and calculation.</li> <li>3. The concept of significant numbers and the algorithm of significant numbers</li> <li>4. Basic methods of experimental data processing</li> </ol> <p>Chapter3 Basic physics experiment</p> <ol style="list-style-type: none"> <li>1.Measurement of length and density</li> <li>2.Measurement of Young's modulus of wire by tensile method</li> <li>3.Measurement of volt-ampere characteristics of electronic components</li> <li>4. Use of potentiometers</li> <li>5.Measurement of resistance of Wheatstone bridges</li> <li>6.Adjustment and use of oscilloscopes</li> <li>7 Adjustment and use of spectrometers</li> <li>8. Newton's Ring and Split Tip Interference Experiment</li> </ol> <p>Chapter 4 Modern Physics Experiment</p> <ol style="list-style-type: none"> <li>1.The adjustment and use of Michelson interferometer</li> <li>2.Determination of sound velocity in different media</li> <li>3. Measurement of Planck constant by photoelectric effect</li> </ol> <p>Chapter 5 Design of Physics Experiment</p> <ol style="list-style-type: none"> <li>1.Meter conversion and correction</li> </ol>
<b>Examination requirements and examination form</b>	<p>Higher Mathematics (1): Closed book exam</p> <p>Higher Mathematics (2): Closed book exam</p> <p>Linear Algebra: Closed book exam</p> <p>Probability Theory and Stochastic Process: Closed book exam</p> <p>College Physics(A): Closed book exam</p> <p>College Physics Experiment: Closed book exam; Students should write 15 experiment reports.</p>
<b>Teaching aid</b>	Projector /Blackboard/Electronic scripts/Showcase/ppt/laboratory



<p><b>Reading list</b></p>	<ol style="list-style-type: none"> <li>1. Tongji University, Department of Mathematics, <i>Advanced Mathematics</i> 1[M]. Beijing: Posts and Telecommunication Press, 2016.</li> <li>2. Tongji University, Department of <i>Mathematics</i>. <i>Full Explanation of Exercises in Advanced Mathematics I</i>[M].Beijing: Posts and Telecommunication Press, 2016.</li> <li>3. Huang Lihong etc. <i>Advanced Mathematics</i> 1[M].Fudan University Press, 2010.</li> <li>4. Fu Lizhen etc. <i>Tutoring Cases of Advanced Mathematics</i> [M]. Northwestern Polytechnical University Press, 2007.</li> <li>5. Tongji University, Department of Mathematics,. <i>Advanced Mathematics (second) (Sixth Edition)</i> [M]. Beijing: Higher Education Press, 2007.</li> <li>6. East China Normal University, Department of Mathematics. <i>Mathematical Analysis (Fourth Edition)</i> [M]. Beijing: Higher Education Press, 2010.</li> <li>7. Qiu Weisheng. <i>Analytic Geometry</i> [M]. Beijing: Peking University Press, 2008.</li> <li>8. Ding Tongren, Li Chengzhi. <i>Course of Ordinary Differential Equations</i> [M]. Beijing: Higher Education Press, 2004.</li> <li>9. Pan Xianbing, <i>Linear Algebra and Its Application</i> [M]. Tsinghua University Press, 2017.</li> <li>10. Tongji University, <i>Linear Algebra</i> [M]. Higher Education Press, 2007.</li> <li>11.Pan, Xianbing, Jin Yanhong, Xiong Ou. <i>Probability Theory and Mathematical Statistics</i> [M].Beijing: Tsinghua University Press, 2017.</li> <li>12.Sheng Ju, Xie Shiqian, Pan Chengyi. <i>Probability Theory and Mathematical Statistics(The fourth edition)</i>[M].Beijing: Higher Education Press, 2008.</li> <li>13.Wang Yuxiao, Liu Jinfu. <i>Probability Theory, Stochastic Process and Mathematical Statistics (The second edition)</i>[M].Beijing: Beijing University of Posts and Telecommunication Press, 2010.</li> <li>14. Ma Wenwei. <i>Physics</i>[M]. Beijing: Higher Education Press, 2009.</li> <li>15. Zhao Kaihua. <i>Electromagnetics</i>[M]. Beijing: Higher Education Press, 1986.</li> <li>16. Zhang Sanhui. <i>College Physics</i>[M]. Beijing: Tsinghua University Press, 1999.</li> <li>17. Wu Baishi. <i>Basic College Physics</i>[M]. Beijing: Science Press, 2007.</li> <li>18.Zhou Dianqing. <i>University Physics Experiment</i> [M]. Wuhan: Wuhan University Press, 2002.</li> <li>19.JIA Yurun. <i>University Physics Experiment</i> [M]. Shanghai: Fudan University Press, 1987.</li> </ol>
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## Module 2 Computer Fundamentals

<b>Module designation</b>	Computer Fundamentals
<b>Module code</b>	Module 2
<b>Courses name/ Semester(s) in which the module is taught/ Credit point</b>	College Computer / 1 / 3ECTS C Language Programming / 2 / 6ECTS Applied Technology of Database / 5 / 4.5ECTS
<b>Person responsible for the module(name/profession al ranks and titles)</b>	Shi Honglei/ Associate professor
<b>Lecturer(name/profession al ranks and titles)</b>	SHI Honglei/ Associate professor, YANG Haibo/Associate Professor, WU Yuhong/Associate Professor, TANG Wenchun/Senior Engineer, YANG Jie/Senior Engineer, LIAO Chunmei/Lecturer, Yan Pan/Lecturer, LU Xingrui/Lecturer, HUANG Haijun/Assistant, RAN Li/Assistant, ZHANG xu / Assistant, LIU Haichuan/Assistant, LIU Xia/Assistant, WANG Xiaodan/Assistant, YANG Hongzhi/Assistant
<b>Language</b>	Chinese
<b>Curriculum attribute</b>	College Computer: Obligatory C Language Programming: Obligatory Applied Technology of Database: Obligatory
<b>Teaching methods</b>	Lecture/ discussion/Exercise/Self-study/presentation/Experiment
<b>Workload</b>	College Computer: Teaching: 90 hours C Language Programming: Teaching: 180 hours Applied Technology of Database: Teaching: 135hours
<b>Credit point</b>	13.5
<b>Evaluation mode</b>	College Computer: Homework, Performance and intermediate examination 40%; Final exam 60%. C Language Programming: Homework, Performance and intermediate examination 50%; Final exam 50%. Applied Technology of Database: Homework, Performance and intermediate examination 40%; Final exam 60%.
<b>Recommended prerequisites</b>	None
<b>Module objectives/intended learning outcomes</b>	<ul style="list-style-type: none"> <li>● <b>Module Objectives:</b></li> </ul> <p>Through the study of Computer Fundamentals module, students can master the basic knowledge of Computer, have the basic skills of operating and using Computer, can use office automation software to complete the tasks related to it, and have the "Computer basic cultural awareness". In order to meet and adapt to the information society on the basic quality of college students requirements; In addition, through C language programming, students are trained to master the basic concepts and methods of programming, to be able to read the</p>



	<p>programming documents of general applications, and to have basic programming and development skills. At the same time, the students will be able to establish the basic concept of the database, and they will have a basic understanding on the basic principles of the database and basic applications .</p> <p>● <b>Intended learning outcomes:</b></p> <p>Through the study of this course, students will achieve the following goals:</p> <ol style="list-style-type: none"> <li>1. To master the basic knowledge of computer, and to have the basic skills of operation and use of computer at the same time, and they will be able to use office working software to complete related tasks. College students should have "Basic Awareness of Computer Culture " to meet the requirement of the basic quality for college students in an information society.</li> <li>2. To master the basic principles, skills, methods and development environment of C program designing, and to cultivate excellent programming style, master the methods and ideas of structured program designing, and lay a solid foundation for the subsequent study of related courses and solving practical problems with computer programs.</li> <li>3. Database theory will enable students to master the basic concepts and theories of database system, and the central content is to explain the theory and methods of relational model, SQL statement and database designing, which lays a foundation for students' further study and application of database.</li> </ol>
<p><b>Course name / Course objectives / Key knowledges</b></p>	<p><b>Course Name: College Computer Science</b></p> <p><b>Course objectives:</b></p> <p>Through the study of this course, students will achieve the following goals:</p> <ol style="list-style-type: none"> <li>1. To master the basic knowledge of computer, have the basic cultural awareness of computer, and have the basic skills of operation and use of computer;</li> <li>2. To be able to use office automation software including Word, Excel, PPT to complete related tasks;</li> <li>3. To master computer application software.</li> </ol> <p><b>Key Points:</b></p> <p>Chapter1 Basic computer knowledge</p> <ol style="list-style-type: none"> <li>1.To understand the development and application of computers</li> <li>2. Basic components of a computer system</li> <li>3. Conversion from base to base</li> <li>4. Common Computer Equipment</li> <li>5. Computer Information Security</li> </ol> <p>Chapter 2 Windows 7 Chinese operating system application</p>



	<ol style="list-style-type: none"><li>1. Basic knowledge of windows 7</li><li>2. Windows 7 files management</li><li>3. Advanced application of windows 7</li></ol> <p>Chapter 3 Word processing software Word 2010</p> <ol style="list-style-type: none"><li>1. To draft company management system</li><li>2. To prepare product specifications</li><li>3. To prepare a resume</li><li>4. To prepare a Graduation Thesis</li></ol> <p>Chapter 4 Electronic Form Software Excel 2010</p> <ol style="list-style-type: none"><li>1. To prepare the personnel information sheet</li><li>2. To optimize the personnel profile</li><li>3. Employee payroll management form</li><li>4. Data sheet management</li></ol> <p>Chapter 5 presentation software PowerPoint 2010</p> <ol style="list-style-type: none"><li>1. To make a brief introduction ppt of company</li><li>2. To make a brief introduction ppt of company products</li></ol> <p>Chapter 6 Computer Network and Internet Applications</p> <ol style="list-style-type: none"><li>1. Computer Network Basics</li><li>2. Basic Internet Operations</li><li>3. System tool software</li><li>4. Common Tools</li></ol> <p><b>Course Name: C Language Programming</b></p> <p><b>Course objectives:</b></p> <p>Through the study of this course, students will achieve the following goals</p> <ol style="list-style-type: none"><li>1. To understand the programming ideas of C language and the basic structure of C language programs.</li><li>2. Students can use C language basic data types, operators, basic statements, arrays, functions and other basic knowledge in the process of program designing, and they will initially understand pointers, structure, common body, enumeration types, files and other basic knowledge. And they will be able to skillfully use these knowledge to solve practical problems.</li><li>3. Students can design programs to solve simple practical problems with C language, and can complete program testing.</li></ol> <p><b>Key points:</b></p> <p><b>Theoretical Teaching:</b></p> <p>Chapter 1 Knowledge of computers, programs and C language</p> <ol style="list-style-type: none"><li>1. Computer and its basic structure</li><li>2. Computer programs and computer languages</li><li>3. C language introduction</li><li>4. Base conversion</li></ol>
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	<p>Chapter 2 Getting to know C source programs and their data types</p> <ol style="list-style-type: none"><li>1. To learn the components of the C source program</li><li>2. Basic data types</li><li>3. The representation of constants</li><li>4. The initialization, definition and reference of variables</li><li>5. Representation of basic data in the computer</li></ol> <p>Chapter 3 Operators and Expressions</p> <ol style="list-style-type: none"><li>1. Operators and expressions</li><li>2. Precedence and associativity of operators</li><li>3. Use of common operators</li><li>4. Data type conversion</li><li>5. Bitwise operators</li></ol> <p>Chapter 4 Program process control</p> <ol style="list-style-type: none"><li>1. C language statements and process control</li><li>2. Sequence structure</li><li>3. Selection structure</li><li>4. Conditional operators</li><li>5. Selection structure program application</li><li>6. Loop structure</li><li>7. Nested structure</li><li>8. Goto statement, Break statement and Continue statement</li></ol> <p>Chapter 5 Basic knowledge of functions</p> <ol style="list-style-type: none"><li>1. Definition of functions</li><li>2. Function Usage</li><li>3. The function declaration</li><li>4. Nested calls of functions</li><li>5. Recursive calls to functions</li></ol> <p>Chapter 6 Array</p> <ol style="list-style-type: none"><li>1. Definition of one dimension</li><li>2. One-dimensional initialization</li><li>3. One-dimensional references</li><li>4. One-dimensional application</li><li>5. Insertion and deletion of array elements</li><li>6. Finding and sorting of array elements</li><li>7. Definition of two-dimensional array</li><li>8. Two-dimensional array initialization</li><li>9. References of two-dimensional arrays</li><li>10. Application of two-dimensional array</li><li>11. The insertion and sorting of array elements</li><li>12. Finding and sorting of array elements</li></ol> <p>Chapter 7 Pointer</p> <ol style="list-style-type: none"><li>1. The concept of pointers</li><li>2. Pointer variables as function parameters</li></ol>
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	<ul style="list-style-type: none"><li>3. Pointers and functions</li><li>4. Pointers and arrays</li><li>5. Pointer array</li><li>6. Command line parameters</li><li>7. Build dynamic arrays with pointers</li><li>8. Pointers and strings</li></ul> <p>Chapter 8 String</p> <ul style="list-style-type: none"><li>1. Definition and initialization of strings</li><li>2. Handling strings with character arrays and character pointers</li><li>3. Input and output of strings</li><li>4. The use of string processing related functions</li></ul> <p>Chapter 9 Compiling of preprocessing and multi-file engineering programs</p> <ul style="list-style-type: none"><li>1. Compiling of preprocessing instructions</li><li>2. Multi-file engineering programs</li></ul> <p>Chapter 10 Structure, Union, Enumeration</p> <ul style="list-style-type: none"><li>1. Structure types and structure variables</li><li>2. Jointed types and jointed variables</li><li>3. Enumerate types and enumerate variables</li></ul> <p>Chapter 11 File</p> <ul style="list-style-type: none"><li>1. Basic concepts of files</li><li>2. Opening and closing files</li><li>3. File error checking</li><li>4. Reading and writing file data sequentially</li><li>5. Randomly reading and writing file data</li><li>6. Preprocessing commands and macro definitions</li><li>7. Enumerated type example</li><li>8. Bitwise operation example</li></ul> <p>Experimental teaching:</p> <ul style="list-style-type: none"><li>1. Initial C source program experiment</li><li>2. Program process experiment</li><li>3. Function experiment</li><li>4. Array experiment</li></ul> <p><b>Course Name: Database application technology</b></p> <p><b>Course objectives:</b></p> <p>Through the study of this course, students will achieve the following goals:</p> <ul style="list-style-type: none"><li>1. To master data model, relational model, SQL statement and normalization theory;</li><li>2. To master database designing and transaction processing technology;</li><li>3. To understand database integrity and security;</li><li>4. To master SQL Server 2008 program designing;</li></ul>
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	<p>5. To understand storing procedures and triggers.</p> <p><b>Key points:</b></p> <p><b>Theoretical Teaching:</b></p> <p>Chapter 1 Overview of MySQL Database</p> <ol style="list-style-type: none"><li>1. Database overview</li><li>2. The architecture of the database</li><li>3. E-R diagram</li><li>4. Database design</li></ol> <p>Chapter 2 Overview of MySQL</p> <ol style="list-style-type: none"><li>1. Why MySQL Database</li><li>2. MySQL Features</li><li>3. Installation and configuration of MySQL server</li></ol> <p>Chapter 3 MySQL Database Management</p> <ol style="list-style-type: none"><li>1. Create a database</li><li>2. View database</li><li>3. Select the database</li><li>4. Modify the database</li><li>5. Delete the database</li><li>6. Application of database storage engine</li></ol> <p>Chapter 4 MySQL Table Structure Management</p> <ol style="list-style-type: none"><li>1. MySQL data types</li><li>2. Create a table</li><li>3. Modify the table structure</li><li>4. delete the table</li><li>5. Set the index</li><li>6. Definition constraint</li></ol> <p>Chapter 5 Table Record Update Operation</p> <ol style="list-style-type: none"><li>1. Insert table records</li><li>2. Modify the table records</li><li>3. Delete the table record</li></ol> <p>Chapter 6 Retrieval of Table Records (Teaching hours: 7 credit hours)</p> <ol style="list-style-type: none"><li>1. Basic query</li><li>2. Single table query</li><li>3. Aggregation function query</li><li>4. Connection query</li><li>5. The subquery</li><li>6. Merging query results</li><li>7. Define table and field aliases</li><li>8. Define table and field aliases</li><li>9. Querying and using regular expressions</li></ol> <p>Chapter 7 Views</p> <ol style="list-style-type: none"><li>1. overview of Views</li><li>2. Create a view</li></ol>
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	<ul style="list-style-type: none"><li>3. View operations</li><li>Chapter 8 Triggers<ul style="list-style-type: none"><li>1. MySQL triggers</li><li>2. View triggers</li><li>3. Usage of triggers</li><li>4. Delete the trigger</li></ul></li><li>Chapter 9 Storing Procedures and Storing Functions<ul style="list-style-type: none"><li>1. To create storing procedures and storing functions</li><li>2. Storing procedure and storing function calls</li><li>3. To view storing procedures and functions</li><li>4. To modify storing procedures and functions</li><li>5. To delete storing procedures and functions</li></ul></li><li>Chapter 10 Backup and Recovery<ul style="list-style-type: none"><li>1. Data backup</li><li>2. Data recovery</li><li>3. Database migration</li><li>4. Table import and export</li></ul></li><li>Chapter 11 MySQL Performance Optimization<ul style="list-style-type: none"><li>1. Optimization Overview</li><li>2. Optimization of the query</li><li>3. Optimization of the database structure</li><li>4. Optimization of multi-table query</li></ul></li><li>Chapter 12 Transactions and Locking Mechanisms<ul style="list-style-type: none"><li>1. Transaction mechanism</li><li>2. Locking mechanism</li><li>3. The isolation level of the transaction</li></ul></li><li>Chapter 13 Comprehensive Example-Library Management System<ul style="list-style-type: none"><li>1. Development background</li><li>2. System analysis</li><li>3. JSP preliminaries</li><li>4. System design</li><li>5. System Preview</li><li>6. Database design</li><li>7. Public module design</li><li>8. Main interface design</li><li>9. Administrator module design</li><li>10. Book borrowing and returning module design</li></ul></li><li><b>Experimental teaching:</b><ul style="list-style-type: none"><li>1. Data definition and update statement practice experiment</li><li>2. Table building experiment</li><li>3. Simple query and joining experiments</li><li>4. Modifying table and deleting table experiments</li><li>5. Group query and nested query experiment</li></ul></li></ul>
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	<p>5.Group query and nested query experiment</p> <p>6. Entity integrity constraint experiment</p> <p>7. View experiment</p> <p>8. Experiment of stored procedure</p>
<b>Examination requirements and examination form</b>	<p>College Computer Science: written test</p> <p>C Language Programming: written test</p> <p>Applied Technology of Database: written test</p>
<b>Teaching aid</b>	<p>The projector/ Blackboard/ Electronic document/ Showcase/ laboratory /PPT courseware</p>
<b>Reading list</b>	<p>1. Xing-wang li. Task-based Tutorial for Computer Application [M]. Ocean University of China Press, 2019.5</p> <p>2. Kang Li, Li Kuan, Chen Guojian. C language for zero-basis learning [M]. 2012.</p> <p>3. Tan Haoqiang. C Program Design (Fourth Edition)[M]. 2016.</p> <p>4. Ding Yatao. C Program Design [M]. 2008.</p> <p>Liu Ming, Xia Qing. C Program Design (Second Edition) [M]. 2003.</p> <p>6. Baron Schwartz, Peter Zaitsev, Vadim Tkachenko, High Performance MySQL(3rd Edition)[M]. Publishing House of Electronics Industry, 2013.4.</p> <p>7. Wang Shan, Sa Shixuan, Introduction to Database Systems (5th Edition)[M]. Higher Education Press, 2014.9.</p> <p>8. Garcia Molina, Database System Implementation (2nd Edition)[M]. Machinery Industry Press, 2010.05.</p> <p>9. Zhai Zhenxing, Zhang Hengyan, Cui Chunhua, The 3rd edition of MySQL database development optimization and management maintenance[M]. People's Posts and Telecommunication Press, 2019.9.</p>





## Module 3 Engineering fundamentals

<b>Module designation</b>	Engineering fundamentals
<b>Module code</b>	Module 3
<b>Courses name/ Semester(s) in which the module is taught/ Credit point</b>	Basics of Circuit Analysis / 3 / 5ECTS Electronic Technique Foundation / 4 / 7.5ECTS Signal and System / 4 / 5.5ECTS
<b>Person responsible for the module(name/profession al ranks and titles)</b>	Zhao Ruiyu/ Associate professor
<b>Lecturer(name/profession al ranks and titles)</b>	XI Bing/Associate professor, ZHAO Ruiyu/Associate professor, YANG Xiaofei/Associate professor, LI Xingpei /Associate Professor, ZHENG Qiuju/Lecturer, CHEN Yan/Lecturer, HU Rong/Lecturer, JIANG Baoan/Lecturer, TAN Lirui/Lecturer, CHEN Xin/Lecturer, ZENG Guoqing/Lecturer, LIU Yiling/Lecturer
<b>Language</b>	Chinese
<b>Curriculum attribution</b>	Basics of Circuit Analysis: compulsory Electronic Technique Foundation: compulsory Signal and System: compulsory
<b>Teaching methods</b>	Lecture/ discussion/Exercise/Self-study/presentation/Experiment
<b>Workload</b>	Basics of Circuit Analysis:Teaching: 150 hours Electronic Technique Foundation:Teaching: 225 hours Signal and System:Teaching: 165 hours
<b>Credit point</b>	18
<b>Evaluation mode</b>	Basics of Circuit Analysis: Homework, questions and regular checks 30%,Experiment 20%, Final exam 50% Electronic Technique Foundation: Homework, questions and regular checks 30%,Experiment20%, Final exam 50% Signal and System: Homework, questions and regular checks30%, Experiment 20%, Final exam 50%.
<b>Recommended prerequisites</b>	Higher Mathematics Engineering mathematics
<b>Module objectives/intended learning outcomes</b>	<p>● <b>Module Objectives:</b></p> <p>Through the study of this course, students will understand the basic concepts of circuit analysis, master its analysis methods, theorems and laws, master the application of semiconductor devices, typical circuits and semiconductor devices in electronic information systems and be able to flexibly apply them to circuit analysis, and establish the concept of frequency domain analysis of signals and systems as well as system functions. This course will make students acquire the ability to solve the problem in the analysis and solution of the problem. And it will cultivate students' ability to analyze and solve</p>



	<p>problems, so that students have strong analytical and computational abilities. It will consolidate students' theoretical knowledge through experiments, strengthen their basic experimental skills and improve their practical ability.</p> <p>● <b>The purpose of module learning:</b></p> <p>At the end of this module, students should be able to demonstrate the following learning outcomes:</p> <ol style="list-style-type: none"> <li>1. To understand the basic concepts of circuit analysis, master its analysis methods, theorems and laws, and can flexibly apply it to circuit analysis;</li> <li>2. To master the basic theory and analysis methods of electronic technology;</li> <li>3. To master the basic concepts, theories and analysis methods of signals and systems; understand the basic contents and properties of Fourier transform, Laplace transform and Z transform; master the time-domain and transformation domain analysis methods of signals and systems (time-domain method, frequency-domain method, S-domain method and Z-domain method).</li> </ol>
<p><b>Course name / Course objectives / Key knowledges</b></p>	<p><b>Course Name: Basics of Circuit Analysis</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. To master circuit and circuit model, basic variables of circuit analysis: current, voltage and power, Kirchhoff's law, resistance elements, ideal power source, controlled source, concept and calculation of potential;</li> <li>2. To master the equivalence conditions of single port network, the two circuit models of actual power supply and their equivalent transformation, the equivalence simplification and equivalent transformation of passive and source-containing single port network; The equivalent interchange of star connection and triangle connection of resistor;</li> <li>3. To master node analysis, loop analysis, reciprocity theorem, superposition theorem, Thevenin theorem, Norton theorem, substitution theorem, duality of circuit;</li> <li>4. To understand the definition of volt-current characteristics and main performance of capacitor and inductor, master the circuit changing law and the calculation of initial value, the time-domain classical analysis of first-order DC circuits, the concepts of zero-input response, zero-state response and full response and the decomposition of full response, the three-element method for solving linear first-order DC circuits;</li> <li>5. To master the basic concepts of sinusoidal signal and its phasor representation; The phasor form and the phasor model of the resistor, inductor and capacitor elements, the phasor form of Kirchhoff's law; and to understand the concepts of impedance and admittance; to understand the concept of network under sinusoidal steady state, and the concept of complex power;</li> </ol>



	<p>Master the maximum power transmission theorem; Knowledge of three-phase sinusoidal AC circuit;</p> <p>6. To understand the basic concepts and volt-ampere characteristics of coupled inductors, the definition of the same end, and the decoupling equivalent circuit of the coupled inductor; Master the circuit model of hollow core transformer and the analysis and calculation of the primary equivalent circuit; Master the ideal transformer circuit model, voltage, current relationship and impedance transformation;</p> <p>7. To understand the definition of sinusoidal steady-state circuit network function, the concept of amplitudes-frequency characteristics and phase-frequency characteristics, and analyze the frequency characteristics of RC circuit; Understand the resonant condition, resonant characteristics, quality factor and passband concept of RLC series resonant circuit and parallel resonant circuit, and understand its frequency characteristics; Master the steady-state analysis of the circuit under the excitation of non-sinusoidal periodic signal;</p> <p>8. To master the method of applying experimental means to verify some theorems and conclusions;</p> <p>9. To properly use of common electrical meters and electronic instruments. Master basic electrical testing technology;</p> <p>10. To correctly connect the actual circuit according to the diagram, and master the method of troubleshooting the circuit faults (circuit break, short circuit, etc.).</p> <p><b>Key points:</b></p> <p><b>Theoretical Teaching:</b></p> <p>Chapter 1 The basic concepts and basic laws of the circuit</p> <ol style="list-style-type: none"> <li>1. The circuit and circuit model</li> <li>2. The basic variables of circuit analysis</li> <li>3. The Kirchhoff's law</li> <li>4. The resistive element</li> <li>5. The ideal power</li> <li>6. The controlled source</li> <li>7. The concept and calculation of potential</li> </ol> <p>Chapter 2 Equivalent transformation of a circuit</p> <ol style="list-style-type: none"> <li>1. The concept of single-port circuit equivalence</li> <li>2. Two circuit models of actual power supply and their equivalent transformation</li> <li>3. The equivalent of a single port circuit without a separate source</li> <li>4. The equivalence of a single port circuit with a single source</li> </ol>
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	<p>5. Equivalent interchange of resistance between Y - shaped connection and <math>\triangle</math>- shaped connection</p> <p>Chapter 3 The general analysis methods and network theorems for linear networks.</p> <ol style="list-style-type: none"> <li>1. The node analysis method</li> <li>2. The loop analysis method</li> <li>3. The Superposition theorem</li> <li>4. The Reciprocity Theorem</li> <li>5. The Substitution theorem</li> <li>6. The Thevenin and Norton theorems</li> <li>7. The duality of a circuit</li> </ol> <p>Chapter 4 The transient analysis of dynamic circuit</p> <ol style="list-style-type: none"> <li>1. The inductor and capacitor</li> <li>2. The law of switching and the calculation of the initial values</li> <li>3. The zero-input response of the first-order circuit</li> <li>4. The zero-state response of the first-order circuit</li> <li>5. The full response of the first-order circuit</li> <li>6. The three-element method for solving first-order circuits</li> <li>7. The step response of a first-order circuit</li> </ol> <p>Chapter 5 The Sinusoidal Steady-State circuit analysis.</p> <ol style="list-style-type: none"> <li>1. The basic concept of the sinusoidal signal</li> <li>2. The phasor representation of the sinusoidal signal</li> <li>3. The phasor form of three basic circuit components VAR</li> <li>4. The phasor form of Kirchhoff's law and The phasor model of a circuit</li> <li>5. Impedance and admittance</li> <li>6. Phasor analysis of sinusoidal steady - state circuits</li> <li>7. The power of a sinusoidal steady state circuit</li> <li>8. Three-phase circuit</li> </ol> <p>Chapter 6 The analysis with coupled inductors and ideal transformers circuit</p> <ol style="list-style-type: none"> <li>1. The coupled inductor</li> <li>2. Analysis of mutual inductance circuits</li> <li>3. The air-core transformer</li> <li>4. The ideal transformer</li> </ol> <p>Chapter 7 The Frequency-response characteristics of a linear circuit.</p> <ol style="list-style-type: none"> <li>1. Network functions and frequency characteristics</li> <li>2. Frequency characteristics of RC circuits</li> <li>3. RLC series resonance circuit</li> <li>4. Steady-state response of the circuit under non-sinusoidal periodic signal excitation</li> </ol>
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	<p><b>Experimental teaching:</b></p> <p>Experiment 1 Explanation of experimental instruments</p> <ol style="list-style-type: none"> <li>1. Understanding and mapping of commonly used electronic components, and understanding of experimental instruments</li> <li>2. Using measuring instruments to measure commonly used electronic components</li> </ol> <p>Experiment 2 Explanation of the experimental system</p> <ol style="list-style-type: none"> <li>1. Cognition of the comprehensive test platform of the experimental system</li> <li>2. Measurement of commonly used electronic components and capture and upload of measurement data</li> <li>3. Using the comprehensive test platform of the experimental system</li> </ol> <p>Experiment 3 Volt-ampere characteristic mapping of circuit elements</p> <ol style="list-style-type: none"> <li>1. Definition of volt-ampere characteristics</li> <li>2. Volt-ampere characteristic curves of linear resistors, semiconductor diodes and regulator diodes</li> <li>3. Measure the forward and reverse volt-ampere characteristics of linear resistors, semiconductor diodes, regulator diodes and light-emitting diodes</li> <li>4. Point by point test for the volt-ampere characteristics of linear and nonlinear components</li> </ol> <p>Experiment 4 Verification of Kirchhoff's law and superposition principle</p> <ol style="list-style-type: none"> <li>1. Superposition Principle, Homogeneity, Kirchhoff's Current Theorem, Kirchhoff's Voltage Electrochemistry, Current Node Analysis, Voltage Loop Analysis.</li> <li>2. Through the control of E1 and E2 power supply, the DC digital voltmeter and milliammeter are used to measure the current of each branch and the voltage at both ends of the resistance element.</li> <li>3. Verifying the correctness of linear circuit superposition principle.</li> </ol> <p>Experiment 5 Verification of Thevenin's theorem and Norton's theorem</p> <ol style="list-style-type: none"> <li>1. Thevenin's Theorem, Norton's Theorem, Equivalent Circuits;</li> <li>2. Determination of the UOC and <math>R_0</math> of Thevenin equivalent circuit;</li> <li>3. Test the external characteristics of the original circuit and simplified circuit</li> </ol> <p>Experiment 6 Experimental study of controlled source.</p> <ol style="list-style-type: none"> <li>1. Operational amplifier working circuit</li> <li>2. Four types of control</li> <li>3. Measurement of the transfer characteristics and load characteristics of the controlled source VCCS and CCVS</li> </ol> <p>Test the external characteristics and transferring parameters of the controlled source</p> <p>Experiment 7. Maximum power transmission</p>
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	<ol style="list-style-type: none"> <li>1. Impedance matching definition</li> <li>2. Transmission conditions for maximum power</li> <li>3. Designing method of actual power supply model according to external characteristics</li> </ol> <p>Experiment 8 RC first order circuit response test</p> <ol style="list-style-type: none"> <li>1. Zero input response, zero state response and full response of RC first-order circuit</li> <li>2. Circuit time constant measurement method, oscilloscope mapping graphics</li> </ol> <p><b>Course Name: Electronic Technique Foundation</b></p> <p><b>Course objectives:</b></p> <p>Through the study of this course, students will achieve the following goals:</p> <ol style="list-style-type: none"> <li>1. Master the basic concepts, theories and analysis methods of analog circuits;</li> <li>2. Master the structure and performance parameters of common semiconductor devices;</li> <li>3. Master the analysis and design of analog circuits and systems, and have a deep understanding of basic amplifying circuits, integrated operational amplifiers and common analog electronic circuits composed of them.</li> </ol> <p><b>Key knowledges:</b></p> <p>Chapter 1 semiconductor diodes and their application circuits</p> <ol style="list-style-type: none"> <li>1. The formation and unidirectional conductivity of PN junction</li> <li>2. Diode structure</li> <li>3. How it works</li> <li>4. Characteristic curve and main parameters</li> <li>5. Equivalence analysis of diodes</li> </ol> <p>Chapter 2: Analysis of triode and its amplifying circuit</p> <ol style="list-style-type: none"> <li>1. The composition and working principle of the basic amplifier circuit</li> <li>2. Composition and characteristics of common emitter amplifier circuit</li> <li>3. AC-DC analysis</li> </ol> <p>Chapter 3 Integrated Operational Amplifier Circuit and Its Application</p> <ol style="list-style-type: none"> <li>1. Manufacturing characteristics and level of integrated components</li> <li>2. Concepts of zero drift and temperature drift, differential mode signal and differential mode amplification, common mode rejection ratio, etc.</li> <li>3. Signal operation circuit in integrated motion amplifier</li> <li>4. Linear and simple nonlinear applications of integrated operational amplifiers</li> </ol> <p>Chapter 4 The application of negative feedback in amplifier</p> <ol style="list-style-type: none"> <li>1. The concept of feedback</li> <li>2. The judgment method of feedback nature</li> <li>3. The establishment of feedback concept</li> </ol>
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	<p>4. Establishment of feedback network</p> <p>5. Feedback configuration judgment.</p> <p>Chapter 5 DC stabilized power supply</p> <p>1. The working principle of DC power supply</p> <p>2. Basic circuit structure</p> <p>3. The working principle of rectifier circuit</p> <p>4. The working principle of capacitor filter</p> <p>5. The working principle of series voltage regulator circuit</p> <p>6. Integrated three-terminal voltage regulator and switching power supply working principle</p> <p>Chapter 6 The basic knowledge of digital circuit</p> <p>1. The number system commonly used in digital system and its conversion method</p> <p>2. Coding rules of commonly used codes</p> <p>3. The basic formulas, common formulas and important theorems of logical algebra</p> <p>4. Logical function and its expression method, simplification of logical function</p> <p>Chapter 7 Logic Gate Circuit</p> <p>1. Switching characteristics of various switching devices</p> <p>2. Logic function and electrical characteristics of TTL and CMOS logic gates</p> <p>Chapter 8 The Combinational Logic Circuit</p> <p>1. Types and characteristics of combinational logic circuits</p> <p>2. Analysis and design methods of combinational logic circuits</p> <p>Chapter 9 Triggers</p> <p>1. The classification and logic functions of triggers</p> <p>2. Function and application of basic flip-flop, D flip-flop and JK flip-flop</p> <p>3. Characteristics and application of edge flip-flop.</p> <p>Chapter 10. Sequential Logic Circuits</p> <p>1. Types and characteristics of sequential logic circuits</p> <p>2. Analysis and design methods of sequential logic circuits</p> <p>3. The logic function of the MSI</p> <p>4. Method of constructing an arbitrary modulus counter with MSI devices.</p> <p>Chapter 11. Generation of Pulse Waveforms by Shaping</p> <p>1. Characteristics of pulse signal and pulse circuit</p> <p>2. Circuit structure and working principle of 555 timer</p> <p>3. Method of constructing a common pulse circuit in common digital circuits with 555 timer</p> <p>Chapter 12. Semiconductor memory and programmable logic devices</p>
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	<ol style="list-style-type: none"> <li>1. Structure characteristics of semiconductor memory (SAM, RAM, ROM)</li> <li>2. The working principle and application of semiconductor memory (SAM, RAM, ROM)</li> <li>3. Connection method for expanding memory storage capacity</li> </ol> <p><b>Course Name:Signal and System</b></p> <p><b>Course objectives:</b></p> <p>Through the study of this course, students will achieve the following goals:</p> <ol style="list-style-type: none"> <li>1. To accurately describe the characteristics of signals and systems;</li> <li>2. To analyze the input-output relationship between the signal and the system through the time-domain energy;</li> <li>3. To explain of how signals work with the frequency domain and complex frequency domain;</li> <li>4. To solve simple engineering problems through frequency domain analysis.</li> </ol> <p><b>Key points:</b></p> <p><b>Theoretical Teaching:</b></p> <p>Chapter 1 Signal and System Overview</p> <ol style="list-style-type: none"> <li>1. Mathematical expressions, waveforms and characteristics of common typical signals</li> <li>2. The nature of the unit impulse signal</li> <li>3. the basic operation of the signal (especially translation, back-folding, companding and differential operations)</li> <li>4. System classification and judgment method</li> <li>5. Time domain simulation block diagram of continuous and discrete systems</li> </ol> <p>Chapter 2 Time domain analysis of LTI system</p> <ol style="list-style-type: none"> <li>1. Concepts and calculation methods of unit impulse response, unit step response, unit sequence response and unit step sequence response</li> <li>2. Calculation and properties of convolution</li> <li>3. Calculation and properties of convolution sum</li> </ol> <p>Chapter 3 Frequency domain analysis of signals and systems</p> <ol style="list-style-type: none"> <li>1. Fourier series of continuous periodic signals</li> <li>2. The spectrum of continuous periodic signals</li> <li>3. Fourier transform and its properties</li> <li>4. Frequency domain analysis of LTI continuous system</li> <li>5. Sampling theorem</li> </ol> <p>Chapter 4 Complex frequency domain analysis of continuous signals and systems</p> <ol style="list-style-type: none"> <li>1. Definition and properties of Laplace transform</li> <li>2. Use partial fraction expansion method to solve inverse Laplace transform</li> <li>3. Complex frequency domain analysis of LTI continuous systems</li> </ol>
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	<p>4. How to find the system function <math>H(s)</math></p> <p>5. Judgment method of LTI continuous system stability</p> <p>Chapter 5 Z-domain analysis of discrete signals and systems</p> <p>1. Definition and properties of Z transform</p> <p>2. Use the partial fraction expansion method to find the inverse Z transform</p> <p>3. Z-transform analysis of LTI continuous systems</p> <p>4. The solution of system function <math>H(z)</math></p> <p>5. Identification of stability of causal discrete systems</p> <p><b>Experimental teaching:</b></p> <p>Experiment 1 Design and test of common RC networks (low pass and high pass circuits)</p> <p>1. Measurement methods of amplitude-frequency and phase-frequency characteristics, and drawing characteristic curves.</p> <p>2. Deepening the understanding of amplitude-frequency characteristics and phase-frequency characteristics of common RC networks.</p> <p>3. Calculation and measurement method of upper limit frequency of low pass filter and high pass filter.</p> <p>Experiment 2 Designation and Test of Common RC Networks (Venn Bridge Circuit)</p> <p>1. The structural characteristics and application of Venn bridge circuit.</p> <p>2. Test method for measuring amplitude-frequency characteristics and phase-frequency characteristics of Venn bridge circuit.</p> <p>3. Deepening the understanding of Venn Bridge circuit.</p> <p>Experiment 3 Designation and Test of Common RC Networks (Double T Bridge Band-Resistant Circuit)</p> <p>1. Measurement methods of amplitude-frequency and phase-frequency characteristics, and drawing characteristic curves.</p> <p>2. Deepening the understanding of the amplitude-frequency characteristics, phase-frequency characteristics and circuit structure characteristics of the band-stop circuit of the double-T bridge.</p> <p>3. Cutoff frequency calculation and measurement method of band-stop filter</p> <p>Experiment 4 R, L, C series resonant circuit test.</p> <p>1. The measurement method of the lower limit frequency and upper limit frequency of R, L and C series resonant circuit, and drawing the characteristic curve.</p> <p>2. Deepening the understanding of the resonant conditions and characteristics of the circuit.</p> <p>3. The physical meaning of circuit quality factor and its measurement method.</p>
<b>Examination requirements and examination form</b>	<p>Basics of Circuit Analysis: Written test</p> <p>Electronic Technique Foundation: Written test</p> <p>Signal and System: Written test</p>



<b>Teaching aid</b>	Projector/blackboard/electronic document/display table/PPT courseware /laboratory
<b>Reading list</b>	<ol style="list-style-type: none"> <li>1. Li Shiqiu (Ed.). Fundamentals of Circuit Analysis (2nd Edition)[M]. Xi 'an: Xidian University Press, 2017.</li> <li>2. Li Hansun. Fundamentals of Circuit Analysis (4th Edition)[M]. Beijing: Higher Mathematics Press, 2011.</li> <li>3. Wu Dazheng. Circuit Basis (3rd Edition)[M]. Xi 'an: Xidian University Press, 2008.</li> <li>4. Qian Ling, Ed. Signals and Systems (5th Edition)[M]. Beijing: Publishing House of Electronics Industry, 2017.</li> <li>Zheng Junli (Ed.). Signals and Systems (3rd Edition) [M]. Beijing: Higher Education Press, 2011.</li> <li>Shen Yuanlong (Ed.). Signals and Systems (2nd Edition) [M]. Beijing: Posts and Telecommunication Press, 2011.</li> <li>7. Li Li (Ed.). Practical Electronic Technology Basic Experiment Guide [M]. Chongqing: Chongqing University Press, 2017.</li> <li>8.Zeng Jiantang (Ed.). Brief Course of Electrical and Electronic Technology [M]. Beijing: Higher Education Press, 2018.2.</li> <li>9.Zhang Liping, Ed. Practical Course of Electronic Technology Curriculum Design [M]. Beijing: Tsinghua University Press, 2014.4.</li> </ol>



## Module 4 Engineering Practice

<b>Module designation</b>	Engineering Practice
<b>Module code</b>	Module 4
<b>Courses name/ Semester(s) in which the module is taught/ Credit point</b>	Engineering Drawing Practice /2/3ECTS Course Integrated Design of Electronic Technology /4/1.5ECTS Electric Fitting Practice /5/0.5ECTS Course Design of Engineering Management Information System /6/3ECTS
<b>The teacher module(name/profession al ranks and titles)</b>	MENG Jiawen/ Senior Engineer
<b>Lecturer(name/professio nal ranks and titles)</b>	Deng Huayang /Senior Engineer, Lai Xiaolong/Associate Professor, Yang Weihua/Senior Engineer, Meng Jiawen /Senior Engineer, Guo Shuang/Associate Professor, Zheng Qiuju/Lecturer, Tan Lirui/Lecturer, Deng Juan/Lecturer, Chen Yan/Lecturer, Xian Juan/Lecturer, Chen Li/Lecturer, Wang Mingyue/Lecturer, Deng Lu/Engineer, Liu Yuecen/Assistant
<b>Language</b>	Chinese
<b>Curriculum attribute</b>	Engineering Drawing Practice: compulsory Course Integrated Design of Electronic Technology: compulsory Electric Fitting Practice: compulsory Course Design of Engineering Management Information System: compulsory
<b>Teaching methods</b>	Lecture/ Discussion/ Exercise/ Self-study/ Presentation/ Experiment
<b>Workload</b>	Engineering Drawing Practice:Teaching: 90 hours Course Integrated Design of Electronic Technology:Teaching: 45 hours Electric Fitting Practice:Teaching: 15 hours Course Design of Engineering Management Information System:Teaching: 90 hours
<b>Credit point</b>	8
<b>Evaluation mode</b>	Engineering Drawing Practice: homework, questions and attendance: 20% , Practical operation in class: 40%, assessment: 40% Course Integrated Design of Electronic Technology: homework, questions and attendance: 20%, Practical operation in class: 40%, assessment: 40% Electric Fitting Practice: homework, questions and performance: 60%; Final exam 40% Course Design of Engineering Management Information System: homework, questions and attendance 20%, class practice 40%, design report 40%
<b>Recommended prerequisites</b>	Engineering Drafting and CAD, Higher Mathematics, College Physics, Basics of Circuit Analysis,Electronic Technique Foundation, Business Management, Telecommunication Engineering Project Management
<b>Module objectives/intended learning outcomes</b>	<ul style="list-style-type: none"> <li>● <b>Module Objectives:</b></li> <li>● Curriculum design is a comprehensive ability training, through the study of this module course, students can obtain the theoretical knowledge of</li> </ul>



	<p>circuit</p> <ul style="list-style-type: none"> <li>● <b>Course Purposes:</b> The course aims equip students not only with related knowledge in the fields of circuit analysis, digital electronic technology and analog electronic technology, but also with related skills concerning the drawing for communication construction and management of engineering and information. Students are expected to manage to solve problems in specific engineering situation.</li> <li>● <b>Learning Goals:</b> <b>Students can achieve the following results:</b> <ol style="list-style-type: none"> <li>1. Absorb the know-hows of instrument usage;</li> <li>2. Master the designs of analog circuit and digital circuit;</li> <li>3. Absorb the know-hows of installation, debugging and troubleshooting for electronic circuits;</li> <li>4. Have a good understanding of common graphics related to CAD technology and communication engineering.</li> <li>5. Have a good knowledge of know-hows of production and operation management in the real situations.</li> <li>6. Have a good understanding of basic principles and skills of information resource management; Have a good knowledge of management for industry information resource and personnel.</li> </ol> </li> </ul>
<p><b>Course Name/Course Objectives/ Key Points</b></p>	<p><b>Course Name: Engineering Drawing Practice</b></p> <p><b>Course Objectives:</b> <b>Students can achieve the following results:</b></p> <ol style="list-style-type: none"> <li>1. Have a good knowledge of the purpose and skills of mapping and investigation;</li> <li>2. Master sketching techniques;</li> <li>3. Have a good knowledge of the basic operation of CAD software;</li> <li>4. Have a good understanding of related specifications of communication line drawing;</li> <li>5. Have a good understanding of related specifications of communication equipment drawing.</li> </ol> <p><b>Key Points:</b> Experiment 1 Mapping and Investigation</p> <ol style="list-style-type: none"> <li>1. Basics of communication engineering drawing</li> <li>2. Purposes &amp; Techniques</li> <li>3. Sketching Strategies</li> </ol> <p>Experiment 2: Installation and application of software</p> <ol style="list-style-type: none"> <li>1. Installation skills of CAD</li> <li>2. CAD operation interface</li> <li>3. Basic operation of CAD</li> <li>4. Specifications for communication cartography</li> </ol>



	<p>Experiment 3 Drawing Commands</p> <ol style="list-style-type: none"> <li>1. The basic graph drawing</li> <li>2. Drawing skills for legends.</li> <li>3. Know-hows of proportional drawing</li> </ol> <p>Experiment 4 Engineering Drawings</p> <ol style="list-style-type: none"> <li>1. Specifications for communication line drawing</li> <li>2. Use of blocks</li> <li>3. Dimension marking</li> </ol> <p>Experiment 5 Plane Drawings</p> <ol style="list-style-type: none"> <li>1. Specifications for communication equipment drawing</li> <li>2. Use of blocks</li> <li>3. Dimension marking</li> </ol> <p><b>Course Name: Course Design of Electronic Technology</b></p> <p><b>Course Objectives:</b></p> <p><b>Students can achieve the following results:</b></p> <ol style="list-style-type: none"> <li>1. Acquire the ability of using multimeter, AC millivoltmeter, oscilloscope and others;</li> <li>2. Have a good understanding of the working principles of bridge rectifier circuit;</li> <li>3. Have a knowledge of series voltage regulator circuit;</li> <li>4. Have a knowledge of the use of medium size integrated chips such as counter chip and shift register;</li> <li>5. Absorb the skills of designing and debugging complex electronic systems;</li> <li>6. Acquire the ability of producing standardized design reports.</li> </ol> <p><b>Key Points:</b></p> <p>Experiment 1 Topic Delivery and Explanation</p> <ol style="list-style-type: none"> <li>1. The topic of course design</li> <li>2. Design requirement analysis</li> <li>3. Rules for course design</li> </ol> <p>Experiment 2 Material exploration for the Plan Design</p> <ol style="list-style-type: none"> <li>1. Design topic requirement analysis</li> <li>2. Hardware schematic diagram drawing</li> <li>3. Functions and usages of components of each module</li> </ol> <p>Experiment 3 Design Scheme Check &amp; Design and Calculation for Functional Blocks and Unit Circuits</p> <ol style="list-style-type: none"> <li>1. Carefully consideration of the feasibility</li> <li>2. Design and calculation for the functional blocks and unit circuits</li> </ol> <p>Experiment 4 Software Simulation &amp; Debugging</p> <ol style="list-style-type: none"> <li>1. Skills of using the simulation software - Multisim</li> <li>2. Know-hows of software simulation, debugging, and error handling</li> </ol> <p>Experiment 5 Circuit installation &amp; debugging on the experimental box</p> <ol style="list-style-type: none"> <li>1. Have a good knowledge of the test box use</li> </ol>
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	<p>2. The relationship between hardware schematic diagram and actual circuit</p> <p>3. Judgment of reliable hardware connection</p> <p>Experiment 6 Acceptance Test for the Completion of the Design Report</p> <p>1. System test</p> <p>2. Report writing</p> <p><b>Course Name: Electric Fitting Practice</b></p> <p><b>Course Objectives::</b></p> <p><b>Students can achieve the following results:</b></p> <p>1. Have a knowledge of mathematics and physics basics; Acquire the ability for problem analysis with mathematical theories.</p> <p>2. Have a knowledge of basics of circuit analysis and electronic circuits; Acquire the ability to analyse the structure of circuits and the internal working principles of integrated chips by means of the above mentioned knowledge.</p> <p>Key Points:</p> <p>Experiment 1 Task Delivery</p> <p>1. The basic principles of low power small speakers</p> <p>2. Manual welding method &amp; assembly technology</p> <p>Experiment 2 Scientific Layout</p> <p>1. Component shaping</p> <p>2. Component placement based on circuit and assembly diagrams</p> <p>Experiment 3 PCB Welding</p> <p>1. Component Welding</p> <p>2. Circuit connection based on the welding diagram</p> <p>Experiment 4 Debugging and Failure Analysis</p> <p>1. Test</p> <p>2. Troubleshooting</p> <p><b>Course Name: Course Design of Engineering Management Information System</b></p> <p><b>Course Objectives:</b></p> <p><b>Students can achieve the following results:</b></p> <p>1. Have a good understanding of the basic concepts, definitions and functions of management information system;</p> <p>2. Have a good knowledge of the design process and main characteristics of structured life cycle method, prototype method and object-oriented method;</p> <p>3. Acquire the ability of conducting preliminary system analysis and design by means of tools related to management information system.</p> <p>4. Have a good understanding of the application characteristics and development trend of management information system;</p> <p>5. Integration of the computer language foundation that students have acquired and practical operation on the computer for the purpose of the</p>
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	<p>production of thinking ability, problem analysis and operation ability of students.</p> <p><b>Key Points:</b></p> <p>Experiment 1 System analysis</p> <ol style="list-style-type: none"> <li>1. System planning and feasibility analysis report</li> <li>2. Business survey</li> <li>3. Data flow</li> <li>4. Systematic analysis</li> <li>5. The management model determination</li> </ol> <p>Experiment 2 System design</p> <ol style="list-style-type: none"> <li>1. Functional structure drawing design</li> <li>2. Information system flow chart design</li> <li>3. Configuration scheme design</li> <li>4. Process flow diagram design</li> <li>5. Conceptual design of database</li> </ol> <p>Experiment 3 Implementation</p> <ol style="list-style-type: none"> <li>1. Brief introduction of technology platform</li> <li>2. Types of software components</li> <li>3. Interface design and simulation</li> <li>4. Database design</li> <li>5. Process flow chart of key business</li> </ol>
<b>Examination Requirements/ Form</b>	<p>Engineering Drawing Practice: The actual operation and comprehensive evaluation of experimental report</p> <p>Course Design of Electronic Technology: The actual operation and comprehensive evaluation of experimental report</p> <p>Electric Fitting Practice: The actual operation and comprehensive evaluation of experimental report</p> <p>Course Design of Engineering Management Information System: The actual operation and comprehensive evaluation of experimental report</p>
<b>Teaching aid</b>	Projector /Electronic document /Showcase /slides/laboratory
<b>References</b>	<ol style="list-style-type: none"> <li>1. Yu Zhengyong et al. Communication Engineering Drawing and Practical Training (Second Edition)[M]. Dalian: Dalian University of Technology Press,2016.</li> <li>2. Camel Online Classroom. Chinese version of AutoCAD 2020 practical tutorial [M]. Beijing: China Water Conservancy and Hydropower Press, 2020.</li> <li>3. Zou Hong, Ed. Digital Circuit and Logic Design [M]. Beijing: Posts and Telecommunication Press, 2017.1</li> <li>4. ZENG Jiantang, Ed. Brief Course of Electrical and Electronic Technology [M]. Beijing: Higher Education Press, 2018.2</li> <li>5. Zhang Liping, Ed. Practical Course of Electronic Technology Curriculum Design [M]. Beijing: Tsinghua University Press, 2014.4</li> </ol> <p>Chen Daqin (Ed.). Fundamentals of Analog Electronic Technology [M]. Beijing: Higher Education Press, 2000.1</p>



	<p>5. Tong Shibai (Ed.). Fundamentals of Analog Electronic Technology [M]. Beijing: Higher Education Press, 2006.</p> <p>7. Liu Ning, Ed. Creative Electronic Design and Manufacture [M]. Beijing: Ordnance University of Aeronautics and Astronautics Press, 2010.</p> <p>8. Rongqiu Chen et al. Ed. Production and Operation Management (Third Edition)[M]. Beijing: Higher Education Press, 2011.</p> <p>9. Xu Fei (Ed.). Strategic Management (4th Edition)[M]. Beijing: China Renmin University Press, 2019.</p> <p>10. Wang Xueying, Ed. Information Resource Management [M]. Dalian: Dalian University of Technology Press, 2012.</p>
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## Module 5 Principle of Engineering Technology

<b>Module designation</b>	Principle of Engineering Technology
<b>Module code</b>	Module 5
<b>Courses name/ Semester(s) in which the module is taught/ Credit point</b>	Communication Principles / 5 / 5ECTS Experiment (Basics of Communication Technology) 5 / 2ECTS Modern Information Network and Innovation / 5 / 9ECTS Principles of Telecommunication Transmission / 6 / 9ECTS Mobile Communication Principle and Technology / 6 / 9ECTS
<b>Person responsible for the module(name/profession al ranks and titles)</b>	HU Junjun/ Associate professor
<b>Lecturer(name/profession al ranks and titles)</b>	HU Qing/Professor, YI Hongwei/ Associate professor, YU Xiaomei/ Associate professor, LI Meili/Associate Professor, LAI Xiaolong/Associate Professor, YANG Weihua /Senior Engineer, ZHOU Zhonglun /Senior Engineer, WANG Weixin/Senior Engineer, LI Wenjuan/Associate Professor, HU Junjun/Associate Professor, MENG Jiawen /Senior Engineer, YU Ting/Lecturer, HUO Jialu/Lecturer,GAO Wei/Lecturer,DENG Lu/Engineer, LIU Yuecen/Assistant
<b>Language</b>	Chinese
<b>Curriculum attribute</b>	Communication Principles: Obligatory Experiment (Basics of Communication Technology) : Obligatory Modern Information Network and Innovation: Obligatory Principles of Telecommunication Transmission: Obligatory Mobile Communication Principle and Technology: Obligatory
<b>Teaching methods</b>	Lecture/ discussion/Exercise/Self-study/presentation/Experiment
<b>Workload</b>	Communication Principles: Teaching: 150 hours Experiment (Basics of Communication Technology): Teaching: 60 hours Modern Information Network and Innovation: Teaching: 270hours Principles of Telecommunication Transmission: Teaching: 270hours Mobile Communication Principle and Technology: Teaching: 270 hours
<b>Credit point</b>	34
<b>Evaluation mode</b>	Communication Principles: Homework, Performance and intermediate examination 40%; Final exam 60% Experiment (Basics of Communication Technology): Homework, Performance and intermediate examination 40%; Final exam 60% Modern Information Network and Innovation: Homework, Performance and intermediate examination 40%; Final exam 60% Principles of Telecommunication Transmission: Homework, Performance and intermediate examination 40%; Final exam 60% Mobile Communication Principle and Technology: Homework, Performance and intermediate examination 40%; Final exam 60%



<b>Recommended prerequisites</b>	Linear Algebra, Higher Mathematics, Signal and System, Probability Theory and Stochastic Process, Electronic Technique Foundation
<b>Module objectives/intended learning outcomes</b>	<p>● <b>Module Objectives:</b></p> <p>After learning this module, students not only have a solid basic quality of communication theory, but also can establish a sense of big network, global view, methodology, and have a preliminary ability of engineering practice and application innovation. Students can master the basic concepts, theories and methods of communication systems and typical communication networks, as well as the basic experimental skills and technical implementation points, including various types of communication services and terminal technology, network and switching technology, optical fiber communication, wireless communication, etc.</p> <p>● <b>Intended learning outcomes:</b></p> <p>In successfully completing this module, students should be able to demonstrate the following learning outcomes:</p> <ol style="list-style-type: none"> <li>1. Master the basic concepts of communication and communication system, be familiar with the implementation principle of each part of communication system and the basic methods of performance analysis and calculation, and be able to verify them by experiment;</li> <li>2. Master the components of the communication network and the implementation principles of various typical communication networks; master the concepts, mechanisms and mutual relations of various communication technologies from the perspective of the whole network;</li> <li>3. Master the engineering technology knowledge structure and content system with the characteristics of scientificity, practicability, integrity and advanced from the perspective of network integration;</li> <li>4. Have a systematic and clear understanding of the transmission principle and transmission characteristics of various transmission media.</li> <li>5. Master the relevant theoretical knowledge, basic implementation principles and key technologies of mobile communication, as well as the current hot mobile communication system implementation technology and its development trend.</li> </ol>
<b>Course name / Course objectives / Key knowledges</b>	<p><b>Course Name: Communication Principles</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the calculation of the average self-information amount, the calculation of the symbol rate and information rate, and the calculation of the bit error rate;</li> </ol>



	<p>2. Able to understand the characteristics and determination methods of stationary stochastic processes; There are two different ways to describe a single sign discrete channel; It calculates the channel capacity of some particular channel;</p> <p>3. Can understand several commonly used amplitude modulation and FM modulation and demodulation process, and know their characteristics and applications;</p> <p>4. According to the transmission function of the system, I can judge whether the system can eliminate inter-code crosstalk, understand several commonly used systems without inter-code crosstalk and explain the differences between them;</p> <p>5. Understand 2ASK, 2FSK, 2PSK and 2DPSK modulation principle and anti-noise performance;</p> <p>6. Understand the sampling theorem, and can code A certain value with 13 broken lines. Through comparative explanation, let students master the principle of several commonly used multiplexing technology and multiple access technology, and understand the frame structure of PCM30/32 system on this basis.</p> <p><b>Key knowledges:</b></p> <p>Chapter 1 Introduction</p> <ol style="list-style-type: none"> <li>1. Composition of the communication system</li> <li>2. The concept of information and its measurement</li> <li>3. The meaning and calculation of communication system reliability and effectiveness indicators</li> <li>4. The calculation of information quantity and entropy, and the relationship between code transmission rate and information transmission rate</li> </ol> <p>Chapter 2 Signal and noise analysis</p> <ol style="list-style-type: none"> <li>1. Digital characteristics of stochastic process</li> <li>2. Concept and characteristics of stationary stochastic process</li> <li>3. Random process is analyzed in time domain and frequency domain by linear system</li> </ol> <p>Chapter 3 Analog Modulation System</p> <ol style="list-style-type: none"> <li>1. AM, DSB, SSB and VSB system composition, modulation and demodulation principle</li> <li>2. Time domain expression, spectrum and bandwidth of various linearly modulated signals</li> <li>3. Principle of generation and demodulation of FM signal</li> <li>4. Performance comparison of linear and nonlinear modulation systems</li> </ol> <p>Chapter 4 Source Coding</p>
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	<ol style="list-style-type: none"> <li>1. Principles of sampling and quantification</li> <li>2. Digital compression and diffusion technology</li> <li>3. Law A 13 broken line coding principle</li> <li>4. Principle of time division multiplexing</li> <li>5. PCM time division multiplexing system</li> </ol> <p>Chapter 5 Digital Baseband Transmission System</p> <ol style="list-style-type: none"> <li>1. Composition of baseband transmission system</li> <li>2. Common digital baseband signal transmission code type and frequency spectrum</li> <li>3. Anti-noise performance of intercode crosstalk binary baseband system</li> <li>4. The role of eye chart in engineering</li> </ol> <p>Chapter 6 carrier transmission of digital signals</p> <ol style="list-style-type: none"> <li>1. Binary digital modulation signal generation and demodulation methods, signal waveform, spectrum</li> <li>2. Analysis method of anti-noise performance of binary digital modulation system</li> </ol> <p>Chapter 7 Channel Coding</p> <ol style="list-style-type: none"> <li>1. Concept and classification of channel coding</li> <li>2. Coding principles of linear block codes, cyclic codes and convolutional codes</li> </ol> <p><b>Course Name: Experiment (Basics of Communication Technology)</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the working principle of LC, crystal oscillator and VCO;</li> <li>2. Master the demodulation method of realizing full carrier amplitude modulation and envelope detection with integrated analog multiplier;</li> <li>3. Master the principle of varactor diode frequency modulation circuit and the working principle of orthogonal frequency discrimination;</li> <li>4. Master the basic composition and working principle of PLL;</li> <li>5. Understand the working principle of analog multiplication mixer;</li> <li>6. Master the method of generating FSK signal by keying method and the principle of non-coherent demodulation of FSK;</li> <li>7. Master the concept and principle of time division multiplexing.</li> </ol> <p><b>Key knowledges:</b></p> <p>Experiment 1 Use of experimental apparatus and chamber</p> <ol style="list-style-type: none"> <li>1. How to use digital oscilloscope</li> <li>2. How to use the function signal generator</li> <li>3. High frequency and communication principle test box using method</li> </ol>
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	<p>Experiment 2 LC, crystal oscillator and voltage controlled oscillator</p> <ol style="list-style-type: none"> <li>1. Principle of three-point LC sinusoidal oscillator and crystal oscillator</li> <li>2. Analyze and compare the frequency stability of LC oscillator and crystal oscillator</li> <li>3. Change the bias voltage of the varactor diode and observe the change of oscillator frequency</li> </ol> <p>Experiment 3 Simulated AM and demodulation</p> <ol style="list-style-type: none"> <li>1. Principle of amplitude modulation (AM) and calculation method of amplitude modulation</li> <li>2. Principle of diode envelope detection</li> <li>3. Spectrum analysis of modulation and demodulation</li> </ol> <p>Experiment 4 Analog frequency modulation (FM) and orthogonal frequency discrimination</p> <ol style="list-style-type: none"> <li>1. The working principle of varactor diode frequency modulation</li> <li>2. The working principle of orthogonal frequency discriminator circuit</li> </ol> <p>Experiment 5 Simulated a phase locked loop</p> <ol style="list-style-type: none"> <li>1. Composition and working principle of PLL</li> <li>2. The meaning and measurement method of “synchronization belt” and “capture belt”</li> </ol> <p>Experiment 6 Simulates mixing and signal spectrum shifting</p> <ol style="list-style-type: none"> <li>1. Simulate the frequency conversion process of the multiplication mixer</li> <li>2. The relationship between the output IF voltage of the multiplier mixer and the local oscillator voltage is simulated</li> <li>3. The relationship between the output IF voltage of the analog multiplication mixer and the input signal voltage</li> </ol> <p>Experiment 7 FSK modulation and demodulation</p> <ol style="list-style-type: none"> <li>1. Operating principle of FSK modulation circuit</li> <li>2. Principle and method of FSK incoherent demodulation</li> <li>3. Verification of FSK demodulation process</li> </ol> <p>Experiment 8 Time multiplexing and demultiplexing</p> <ol style="list-style-type: none"> <li>1. Concept and working principle of time division multiplexing</li> <li>2. Dissolve the working principle of time division multiplexing</li> <li>3. Working process and signal observation of 256K time division multiplexing and demultiplexing</li> </ol> <p><b>Course Name: Modern Information Network and Innovation</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the basic concept, composition and architecture of communication network;</li> </ol>
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	<p>2. Understand the basic problems to be solved in the communication network, and master the technical principles such as multiplexing technology, switching technology and routing technology commonly used in various communication networks;</p> <p>3. Familiar with the development background, design objectives, working principles, business processes, development and evolution of various communication networks such as transmission network, switching network, local area network, Internet, telephone network, mobile communication network, broadband access network and telecommunication management network;</p> <p>4. Understand the factors of the development and change of the communication network, as well as the way and direction of the development and change of the communication network in the future.</p> <p><b>Key Knowledge Points:</b></p> <p><b>Theoretical Teaching:</b></p> <p>Chapter 1 Introduction</p> <ol style="list-style-type: none"> <li>1. Course background</li> <li>2. Basic concept of communication network</li> <li>3. Switching technology of communication network</li> <li>4. Architecture of communication network</li> <li>5. Development of communication network</li> </ol> <p>Chapter 2 Transmission network</p> <ol style="list-style-type: none"> <li>1. Transmission medium</li> <li>2. Circuit-oriented transmission network</li> <li>3. Packet-oriented transmission network</li> <li>4. Intelligent automatic optical switching</li> </ol> <p>Chapter 3 Principle of Packet Switching</p> <ol style="list-style-type: none"> <li>1. Frame delimitation</li> <li>2. Flow control</li> <li>3. Error control</li> <li>4. Routing</li> </ol> <p>Chapter 4 Ethernet</p> <ol style="list-style-type: none"> <li>1. LAN</li> <li>2. Ethernet working principle</li> <li>3. Shared Ethernet</li> <li>4. Switched Ethernet</li> <li>5. High-speed Ethernet</li> </ol> <p>Chapter 5 Internet and TCP / IP Protocol</p> <ol style="list-style-type: none"> <li>1. Network layer</li> </ol>
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	<p>2. Routing protocol</p> <p>3. Transmission layer</p> <p>4. Application layer</p> <p>5. IPv6 and MPLS</p> <p>Chapter 6 Traditional Telephone Network</p> <p>1. Traditional switched telephone network</p> <p>2. No7. Signaling system</p> <p>3. Intelligent network</p> <p>Chapter 7 IP Telephone Network</p> <p>1. Overview of VoIP</p> <p>2. IP telephone network based on SIP protocol</p> <p>3. IP telephone network based on soft switch</p> <p>Chapter 8 Mobile Communication Network</p> <p>1. Network architecture of mobile communication</p> <p>2. The implementation principle of typical services in mobile communication</p> <p>Chapter 9 Broadband Access Network</p> <p>1. Basic concept of access network</p> <p>2. Broadband wired access network technology</p> <p>3. Broadband wireless access network technology</p> <p>Chapter 10 Network Management</p> <p>1. Telecommunication management network</p> <p>2. Simple network management protocol</p> <p>Chapter 11 Network Convergence and Evolution</p> <p>1. NGN</p> <p>2. IMS</p> <p><b>Experimental Teaching:</b></p> <p>Experiment 1 Program-controlled exchange experiment</p> <p>1. Digital SPC exchange for data configuration</p> <p>2. The basic principle and process of SPC call processing</p> <p>Experiment 2 IMS experiment</p> <p>1. IMS system architecture simulation, network element device configuration and connection</p> <p>2. Implementation of IMS registration, calling, called and other business processes</p> <p>3. Conduct packet capture analysis for signaling</p> <p>Experiment 3 LAN experiment</p> <p>1. Make common interfaces such as RJ-45</p> <p>2. Complete the physical connection between devices</p> <p>3. Data configuration for the second-layer switch by simulation and physical</p>
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	<p>object</p> <p>4. The division of VLAN</p> <p>Experiment 4 Data communication network experiment</p> <p>1. Use simulation software to realize the project of communication network topology construction and network planning</p> <p>1. 2. Data configuration of router or third-layer switch by simulation and physical object</p> <p>3. Realize the intercommunication between VLANs</p> <p>4. Design and apply static and dynamic routing</p> <p><b>Course Name: Principles of Telecommunication Transmission</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <p>1. Master the basic concepts and models of telecommunication transmission, and be able to calculate and analyze the main characteristics of transmission media, including attenuation and gain;</p> <p>2. Master the ability to select the appropriate analysis methods according to the type of transmission line, and be familiar with the engineering application of metal transmission line;</p> <p>3. Master the line engineering design of core network and the calculation of optical relay length;</p> <p>4. Master the analysis and calculation of the free space transmission loss model;</p> <p>5. Master the height of microwave antenna design;</p> <p>6. Master the use of T2000 network management platform, optical multimeter, optical fusion machine, optical attenuator.</p> <p><b>Key Knowledge Points:</b></p> <p>Chapter 1 Basic Concepts of Telecommunications Transmission</p> <p>1. Basic concepts and development history of communication</p> <p>2. Telecommunication transmission system model</p> <p>3. Telecommunication transmission channels and transmission media</p> <p>4. Transmission characteristics and transmission units</p> <p>Chapter 2 Metal Transmission Line Theory and Application</p> <p>1. Common metal transmission lines and applications</p> <p>2. Common analysis methods for transmission lines</p> <p>3. Transmission line equation and its solution</p> <p>4. Working status of transmission line</p> <p>Chapter 3 Optical Fiber and Optical Fiber Communication System</p> <p>1. Structure and type of optical fiber and cable</p>
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	<p>2. Fiber optic transmission principle and transmission characteristics</p> <p>3. Composition of optical fiber communication system</p> <p>4. Design of optical fiber communication system</p> <p>5. SDH / MSTP optical synchronous digital network</p> <p>6. WDM / OTN optical transmission network</p> <p>7. PTN packet transmission network</p> <p>Chapter 4 Wireless Transmission Theory</p> <p>1. Radio wave propagation characteristics</p> <p>2. Radio wave transmission loss</p> <p>3. Wireless channel noise and fading</p> <p>4. Multiple access and working mode of wireless communication</p> <p>Chapter 5 Application of Wireless Transmission</p> <p>1. Transmission characteristics of microwave channels</p> <p>2. Characteristics of mobile communication transmission channels</p> <p>3. Characteristics of satellite communication transmission lines</p> <p><b>Experimental Teaching:</b></p> <p>Experiment 1: Making and testing of standard network cable</p> <p>1. Production and test method of network cable</p> <p>2. Make and test the network cable</p> <p>Experiment 2 Fiber optic link loss test</p> <p>1. Know the optical multimeter, jumper and adapter</p> <p>2. Functions and usage of optical multimeter</p> <p>3. Fiber optic link loss test</p> <p>Experiment 3 OTDR test fiber failure points</p> <p>1. How OTDR works</p> <p>2. The parameter setting process of OTDR</p> <p>3. Make a simple analysis according to the test results and find out the location of the failure points</p> <p>Experiment 4 Performance test of optical variable attenuator</p> <p>1. Various characteristics of optical variable attenuator</p> <p>2. Application method of optical variable attenuator</p> <p>3. Estimate the attenuation range of the variable attenuator</p> <p>Experiment 5 Cutting and welding of optical fiber</p> <p>1. How to use light welding machine, cutting knife, wire stripping pliers and other tools</p> <p>2. Fiber cutting and welding steps</p> <p>Experiment 6 Basic configuration of SDH network elements</p> <p>1. Hardware composition and single board function of OPTIX 155/622H (METRO1000V3) equipment</p>
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	<p>2. How to use T2000 network management software</p> <p>3. Basic operation of SDH network element configuration</p> <p>Experiment 7 SDH chain networking configuration</p> <p>1. Basic configuration and connection of SDH chain networking</p> <p>2. Do a simple business configuration</p> <p>3. Review the alarm and perform a brief analysis of the alarm</p> <p>Experiment 8 SDH ring networking configuration</p> <p>1. Basic configuration and connection of SDH ring network</p> <p>2. Use T2000 network management platform to build a ring network</p> <p>3. Do a simple business configuration</p> <p>4. Review the alarm and perform a brief analysis of the alarm</p> <p><b>Course Name: Mobile Communication Principle and Technology</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <p>1. Understand the development process of mobile communication;</p> <p>2. Master the transmission characteristics and loss models of mobile communication waves;</p> <p>3. Master coding and modulation technology, anti-channel fading technology, networking technology;</p> <p>4. Master 2G system and understand GPRS and EDGE mobile communication systems;</p> <p>5. Master 3G mobile communication system and LTE mobile communication system;</p> <p>6. Understand the planning and optimization of mobile communication networks;</p> <p>7. Understand the progress of 5G mobile communication.</p> <p><b>Key Knowledge Points:</b></p> <p><b>Theoretical Teaching:</b></p> <p>Chapter 1 Introduction to Mobile Communication</p> <p>1. Mobile communication concept, development history, status quo and development trend</p> <p>2. Cellular mobile communication system</p> <p>3. Dedicated mobile communication system</p> <p>4. Basic technology of mobile communication</p> <p>Chapter 2 Basic Technology and Principles of Mobile Communication</p> <p>1. Basic characteristics of radio wave propagation, three basic radio wave propagation mechanisms, and characteristics of radio wave propagation in free space;</p> <p>2. Outdoor propagation model for wireless propagation, indoor propagation</p>
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	<p>model;</p> <ol style="list-style-type: none"> <li>3. FDMA, TDMA, CDMA three multiple access technologies;</li> <li>4. Basic implementation principles and characteristics of QPSK and its various practical and improved modulation technologies;</li> <li>5. Principles and characteristics of MSK, GMSK, OFDM modulation methods, multi-ary modulation technology;</li> <li>6. Anti-fading and anti-interference technology;</li> <li>7. Speech compression coding.</li> </ol> <p>Chapter 3 Digital Mobile Communication System (2G)</p> <ol style="list-style-type: none"> <li>1. The overall structure and components of the GSM network</li> <li>2. GSM area division and identification number</li> <li>3. The main business of GSM</li> <li>4. GSM system control and management</li> <li>5. IS-95 CDMA channel division and control function</li> <li>6. IS-95 CDMA system network architecture</li> </ol> <p>Chapter 4 B2G mobile communication system</p> <ol style="list-style-type: none"> <li>1. System structure and working principle of GPRS (2.5G)</li> <li>2. Key technologies of EDGE (2.75G)</li> <li>3. Technical characteristics and air interface of CDMA 2000 1X system</li> </ol> <p>Chapter 5 Third Generation Mobile Communication System (3G)</p> <ol style="list-style-type: none"> <li>1. The development history, spectrum allocation, service characteristics and classification of 3G, three major mainstream standards of 3G;</li> <li>2. WCDMA mobile communication system</li> <li>3. CDMA2000 mobile communication system</li> <li>4. 3G system security mechanism</li> </ol> <p>Chapter 6 Fourth Generation Mobile Communication System (4G)</p> <ol style="list-style-type: none"> <li>1. Development, characteristics and spectrum of 4G</li> <li>2. 4G network architecture and working principle</li> <li>3. Two standards of LTE</li> <li>4. The main business and status of 4G</li> <li>5. Key technologies of LTE / LTE-Advanced</li> <li>6. Mobility management and security mechanism of LTE / LTE-Advanced</li> <li>7. Voice solution of LTE / LTE-Advanced</li> </ol> <p>Chapter 7 Planning, Design and Optimization of Mobile Communication Networks</p> <ol style="list-style-type: none"> <li>1. Definition of mobile communication network planning, design and optimization</li> <li>2. 2G, 3G, TD-LTE mobile communication network planning process</li> <li>3. Content and process of mobile communication network optimization</li> <li>4. Optimization of LTE-RF</li> </ol> <p>Chapter 8 Overview of the Fifth Generation Mobile Communication System (5G)</p> <ol style="list-style-type: none"> <li>1. 5G network architecture</li> </ol>
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	<p>2. 5G key technologies</p> <p>3. Application scenarios and development trends of 5G</p> <p><b>Experimental Teaching:</b></p> <p>Experiment 1 TD-LTE data configuration demonstration</p> <p>1. LTE network architecture and network element composition</p> <p>2. Introduction to TD-LTE equipment</p> <p>3. Use of various equipment</p> <p>Experiment 2 TD-LTE data configuration operation</p> <p>1. Practical operation of data configuration</p> <p>2. Configure TD-LTE network data synchronization</p> <p>3. Verify the system function after data configuration for mobile phone VoIP phone verification</p> <p>Experiment 3 Hardware installation demonstration and wiring operation in TD-LTE simulation software</p> <p>1. Complete the installation of the cabinet and the equipment board card through the simulation software</p> <p>2. Complete the installation of BBU, GPS, RRU and other devices and connect the power access lines of each device</p> <p>Experiment 4 Data configuration and service verification in TD-LTE simulation software</p> <p>1. Complete the configuration of LMT</p> <p>2. Background gateway operation</p> <p>3. The PLMN configuration</p> <p>4. RRU and BBU connection configuration</p> <p>5. Configuration between BBU and core network</p>
<b>Examination requirements and examination form</b>	<p>Communication Principles: Closed book exam</p> <p>Experiment (Basics of Communication Technology): Closed book exam, laboratory report</p> <p>Modern Information Network and Innovation: Closed book exam</p> <p>Principles of Telecommunication Transmission: Closed book exam</p> <p>Mobile Communication Principle and Technology: Closed book exam</p>
<b>Teaching aid</b>	<p>Beamer /Blackboard /Electronic document/laboratory/Showcase /ppt projector</p>
<b>Reading list</b>	<p>1. Hu Qing (Ed.). Principle of Telecommunication Transmission [M]. Beijing: Publishing House of Electronics Industry, 2012.</p> <p>2. Hu Qing, et al. Optical fiber Communication System and Network [M]. Beijing: Press of Electronics Industry, 2019.</p> <p>3. Hu Qing (Ed.). Communication Optical Fiber Cable and Cable Line Engineering [M]. Beijing: People's Posts and Telecommunication Press, 2016.</p> <p>4. Edited by Shen Jianhua. Optical Fiber Communication System (3rd Edition) [M]. Beijing: China Machine Press, 2014.</p> <p>5. Guo Juan, Modern Communication Network [M]. Xi'an: Xidian University Press, 2016.3.</p>



	<p>6. Xie Xiren, (Ed.). Computer Networks [M]. Beijing: Publishing House of Electronics Industry, 2013.6.</p> <p>7. Zhang Yi, (Ed). Modern Exchange Principle[M]. Beijing: Science Press, 2012.1.</p> <p>8. Yu Xiaomei et al. Mobile Communication Principle and Technology [M]. Beijing: China Machine Press, 2017.8.</p> <p>9. Song Zheng, Mobile Communication Technology (2nd Edition) [M]. Beijing: Beijing Institute of Technology Press, 2017.2.</p> <p>10. Xiang Gang, (Ed.). Mobile Communication Principle and System (3rd Edition) [M]. Beijing: Beijing University of Posts and Telecommunication Press, 2015.2.</p> <p>11. Edited by Li Zhaoyu. Mobile Communication [M]. Beijing: Press of Electronics Industry, 2017.2.</p> <p>12. Edited by Fan Changxin. Communication Principle (7th Edition) [M]. Beijing: National Defense Industry Press, 2012.</p> <p>13. Edited by Fan Changxin. Communication Principle [M]. Beijing: Publishing House of Electronics Industry; 2005.</p> <p>14. Jiang Qing (Ed.). Learning Guide of Communication Principle [M]. Beijing: People's Posts and Telecommunication Press, 2007.</p> <p>15. Edited by Ke Hengyu. Theoretical Basis of Electromagnetic Field [M]. Beijing: People's Posts and Telecommunication Press, 2011.</p> <p>16. Jiang Qing (Ed.). Principle of Communication [M]. Beijing: Science Press, 2014.</p> <p>17. Edited by Li Weidong. Communication Electronic Circuit [M]. Xi'an: Xidian University Press, 2017.</p>
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## Module 6 Engineering Construction

<b>Module designation</b>	Engineering Construction
<b>Module code</b>	Module 6
<b>Courses name/ Semester(s) to start courses / Credit point</b>	Survey of the Telecommunication Engineering and Management / 1 / 0.5ECTS Engineering Drafting and CAD / 2/ 2ECTS Communication Engineering Economics and Economic Evaluation / 5/ 6ECTS Telecommunication Engineering Project Budget Application/ 5 / 6ECTS
<b>Person responsible for the module (name/professional ranks and titles)</b>	DENG Huayang / Senior Engineer
<b>Lecturer (name/professional ranks and titles)</b>	DENG Huayang /Senior Engineer, LAI Xiaolong/Associate Professor, YANG Weihua /Senior Engineer, ZHOU Zhonglun /Senior Engineer, WANG Weixin /Senior Engineer, WANG Mingyue/Lecturer, DENG Lu/Engineer, LIU Yuecen/Assistant
<b>Language</b>	Chinese
<b>Curriculum attribute</b>	Survey of the Telecommunication Engineering and Management: Obligatory Engineering Drafting and CAD: Obligatory Communication Engineering Economics and Economic Evaluation: Obligatory Telecommunication Engineering Project Budget Application: Obligatory
<b>Teaching methods</b>	Lecture/ discussion/Exercise/Self-study/presentation/Experiment
<b>Workload</b>	Survey of the Telecommunication Engineering and Management: Teaching: 15 hours Engineering Drafting and CAD: Teaching: 60 hours Communication Engineering Economics and Economic Evaluation: Teaching: 180 hours Telecommunication Engineering Project Budget Application: Teaching: 180 hours
<b>Credit point</b>	15
<b>Evaluation mode</b>	Survey of the Telecommunication Engineering and Management: Homework, Performance and intermediate examination 40%; Final exam 60% Engineering Drafting and CAD: Homework, Performance and intermediate examination 40%; Final exam 60% Communication Engineering Economics and Economic Evaluation: Homework, Performance and intermediate examination 40%; Final exam 60% Telecommunication Engineering Project Budget Application: Homework, Performance and intermediate examination 40%; Final exam 60%
<b>Prerequisite courses</b>	Financial Management, Human Resource Management
<b>Module targets /Module Learning Objectives</b>	<ul style="list-style-type: none"> <li>● <b>Module Targets:</b> Through the study of engineering construction, students can master the basic concepts, basic theories, basic methods, basic experimental skills of the courses in</li> </ul>



	<p>this module, and gain the ability to specialize in the basic working principles and basic skills of engineering construction. The aim is to equip students with the basic skills to work as engineering project managers after studying this module, and to train and improve students' ability to use engineering construction theories to analyze and solve problems in the engineering field.</p> <p>● <b>Module Learning Objectives:</b></p> <p>While successfully completing this module, students should be able to demonstrate the following learning outcomes:</p> <ol style="list-style-type: none"><li>1. Establish a dialectical materialist world outlook and scientific attitude to seek truth and acquire abstract thinking ability.</li><li>2. Provide a foundation for the following professional courses related to telecommunication engineering and management.</li><li>3. Master CAD technology, draw common graphics of communication engineering, and lay a foundation for practical work.</li><li>4. Master the procedures of feasibility study and value engineering analysis process, and understand the basic theories and methods of technological innovation.</li><li>5. Understand the cost quota of information and communication construction projects, master the composition and preparation of preliminary budget documents, and master the preparation and valuation of bill of quantities.</li></ol>
<b>Course name / Course objectives / Key knowledges</b>	<p><b>Course Name: Survey of the Telecommunication Engineering and Management</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"><li>1. Through the study of this course, students can plan their college study and life, understand the cultivation direction and objectives of their major, understand the learning contents and credits in the next four years, and point out the direction for their major study;</li><li>2. Through the study of this course, students are required to comprehensively and systematically master the methods of college students' career planning, master the major learning strategy, understand the discipline system, training objectives and training requirements;</li><li>3. Master the basic theories and concepts related to telecommunication engineering and management;</li><li>4. Understand the basic skills you should have after studying in this major .</li></ol> <p><b>Key knowledges:</b></p> <p>Chapter 1 College Student Career Planning</p>



	<p>1. Know yourself</p> <p>2. Professional awareness</p> <p>3. Goal setting</p> <p>4. Plan and implement</p> <p>Chapter 2 is professional interpretation</p> <p>1. Telecommunication engineering and management professional meaning</p> <p>2. School orientation</p> <p>3. Cultivation mode</p> <p>4. Cultivation objectives</p> <p>Chapter 3 Curriculum System</p> <p>1. Course composition</p> <p>Chapter 4 related theories of this major</p> <p>1. Basic concepts and theories of communication system and network</p> <p>2. Basic methods of modern communication technology and modern management</p> <p><b>Course Name: Engineering Drafting and CAD</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <p>1. Master the overall requirements and unified regulations of engineering drawing;</p> <p>2. Master the ability to customize CAD drawing environment through relevant commands;</p> <p>3. Master the ability to customize CAD operating environment through relevant commands;</p> <p>4. Master the use of various drawing commands to draw basic graphics;</p> <p>5. Master the printing function of CAD and set the printing parameters correctly;</p> <p>6. Understand the main content of construction drawing design of equipment installation engineering.</p> <p><b>Key knowledges:</b></p> <p>Chapter 1 The foundation of communication engineering drawing</p> <p>1. General requirements and uniform provisions of communication engineering drawing</p> <p>2. Common legend and its meaning in communication engineering drawing</p> <p>3. Communication engineering drawings reading</p> <p>Chapter 2 CAD software setup</p> <p>1. Software interface</p> <p>2. Execution of software commands</p> <p>3. Use of the Start dialog box</p> <p>4. File management commands</p>
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	<p>5. Customize CAD drawing environment</p> <p>6. Customize the CAD operating environment</p> <p>7. CAD coordinate system</p> <p>8. Drawing Tool and Layers Style</p> <p>Chapter 3 operation and application of CAD software</p> <p>1. Basic draw command</p> <p>2. Area filling and area drawing</p> <p>3. Draw text</p> <p>4. Block, attributes, and external references</p> <p>5. Graphic editing</p> <p>6. Dimensions</p> <p>Chapter 4 Graphic display and output printing</p> <p>1. Graphical display</p> <p>2. Drawings layout and graphics output</p> <p>Chapter 5 Survey and Drawing of Communication Engineering</p> <p>1. Foundation of communication engineering survey</p> <p>2. Communication line survey</p> <p>3. Survey of communication room</p> <p>4. Making construction drawings of communication lines</p> <p>5. Drawing construction drawings of equipment installation engineering</p> <p>6. Common problems in engineering drawing</p> <p>7. Examples of CAD drawings of typical projects</p> <p>8. Always review</p> <p><b>Course Name: Communication Engineering Economics and Economic Evaluation</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <p>1. Proficiency in basic theories of engineering economics;</p> <p>2. Master the basic methods of fund equivalent calculation, financial evaluation, national economy evaluation, and comparison and selection of multiple programs;</p> <p>3. Master the procedure of feasibility study and value engineering analysis process;</p> <p>4. Understand the basic theories and methods of technological innovation.</p> <p><b>Key knowledges:</b></p> <p><b>Theoretical Teaching:</b></p> <p>Chapter 1 Introduction</p> <p>1. The emergence and development of engineering economy</p> <p>2. Related concepts of engineering economy</p>
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	<p>3. Research objects and characteristics of engineering economics</p> <p>Chapter 2 Cash Flow and Composition</p> <p>1. The concept of cash flow</p> <p>2. Presentation of cash flow</p> <p>3. Composition of cash flow</p> <p>Chapter 3 Time Value and Equivalence Calculation of Funds</p> <p>1. The concept of time value</p> <p>2. Calculation of the fund equivalent value of one-time payment and multiple payment</p> <p>3. Nominal and real interest rates</p> <p>4. Time value of money</p> <p>5. Equivalent calculation of funds</p> <p>Chapter 4 Methods for economic evaluation of investment projects</p> <p>1. Evaluation principles of economic benefits of investment projects</p> <p>2. Basic methods of project economic benefit evaluation</p> <p>3. Static indicators of economic benefit evaluation</p> <p>4. Dynamic indicators of economic benefit evaluation</p> <p>Chapter 5 Risk and uncertainty analysis of investment projects</p> <p>1. Risk and uncertainty analysis</p> <p>2. Break-even analysis</p> <p>3. Sensitivity analysis</p> <p>4. Probability analysis</p> <p>Chapter 6 economic analysis of equipment renewal</p> <p>1. Economic life of equipment</p> <p>2. Calculation method for determining the economic life of equipment</p> <p>3. Economic analysis of equipment renewal program</p> <p>4. Economic analysis of equipment modernization modification</p> <p>5. Economic analysis of equipment leasing</p> <p>Chapter 7 Economic Evaluation of Investment Projects</p> <p>1. Contents of financial evaluation</p> <p>2. Relationship between basic financial statements and evaluation indicators</p> <p>3. Financial evaluation of new projects</p> <p>Chapter 8 Economic evaluation of public projects</p> <p>1. Cost-benefit analysis</p> <p>2. Cost effect analysis</p> <p>3. Revenue demand method</p> <p>Chapter 9 the basic theory and method of value engineering</p> <p>1. Work procedures of value engineering</p> <p>2. Life cycle and cost life cycle analysis methods of value engineering</p>
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	<p><b>Experimental teaching:</b></p> <p>Experiment 1 Data collection</p> <ol style="list-style-type: none"> <li>1. Gather information</li> <li>2. Write a research outline</li> </ol> <p>Experiment 2 Write a research outline</p> <ol style="list-style-type: none"> <li>1. Basic information of the project</li> </ol> <p>Experiment 3 Market analysis</p> <ol style="list-style-type: none"> <li>1. Analysis of current market situation</li> </ol> <p>Experiment 4 Design and selection of technical scheme</p> <ol style="list-style-type: none"> <li>1. Design at least three different solutions</li> <li>2. Programme evaluation and selection</li> </ol> <p>Experiment 5 Economic evaluation</p> <ol style="list-style-type: none"> <li>1. The time value method of funds is used to conduct financial evaluation and national economic evaluation of the project</li> <li>2. Uncertainty analysis and break-even analysis were adopted</li> </ol> <p>Experiment 6 Risk analysis</p> <ol style="list-style-type: none"> <li>1. Technical and product risks</li> <li>2. Market risk</li> <li>3. Policy risks</li> </ol> <p><b>Course Name: Telecommunication Engineering Project Budget Application</b></p> <p><b>Course objectives::</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Understand the concept and composition of the estimated budget of information and communication construction engineering, and master the composition of the estimated budget; Construction drawing design design budget composition;</li> <li>2. Master the concept of information and communication engineering construction budget quota budget; Familiar with information communication engineering construction budget quota documents; Master the characteristics of the quota;</li> <li>3. Master the workload statistics of individual projects;</li> <li>4. Master the composition and preparation methods of budget documents, and preparing complete budget documents for four major projects;</li> <li>5. Master the preparation and valuation of bill of quantities, as well as the compilation and valuation rules of four categories of projects.</li> </ol> <p><b>Key knowledges:</b></p> <p><b>Theoretical Teaching:</b></p> <p>Chapter 1 The conception and constitution of information communication</p>
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	<p>construction project estimate budget</p> <ol style="list-style-type: none"> <li>1. The concept of information and communication construction project budget</li> <li>2. Role of budget estimates and budgets</li> <li>3. Division of budget estimates in different design stages</li> <li>(4) Composition of the estimated budget for information and communication construction projects</li> <li>5. Composition of the preliminary design estimates</li> <li>6. Construction drawing design budget composition</li> </ol> <p>Chapter 2 Information and Communication Construction Project Quota and Usage Method</p> <ol style="list-style-type: none"> <li>1. The concept of fixed budget for information and communication engineering construction budget</li> <li>(2) Information and communication engineering construction budget quota document</li> <li>3. Characteristics of the quota</li> <li>4. Detailed explanation of the current quota</li> <li>5. Unit price quota of mechanical and instrument shift</li> </ol> <p>Chapter 3 Information and communication construction project cost quota</p> <ol style="list-style-type: none"> <li>1. Information and communication construction project (single item) project cost</li> <li>2. Information and communication construction project cost quota and calculation rules</li> <li>3. Calculation rules of information and communication construction project supervision cost</li> <li>4. Calculation Rules for Survey Costs of Information and Communication Construction Projects</li> </ol> <p>Chapter 4 the composition and preparation of the budget documents</p> <ol style="list-style-type: none"> <li>1. Composition and preparation of budget documents</li> <li>2. Filling methods of budget documents and forms</li> <li>3. Preparation process and filling sequence of budget documents</li> <li>4. Explaining in detail the preparation method of complete budget documents for indoor distribution of wireless signals</li> </ol> <p>Chapter 5 preparation and valuation of bill of quantities</p> <ol style="list-style-type: none"> <li>1. Compiling the bill of quantities for information and communication construction</li> <li>2. Valuation of information and communication construction quantities</li> <li>3.4 Categories of project list and valuation rules</li> </ol> <p><b>Experimental teaching:</b></p> <p>Experiment 1 The composition of the budget document</p> <ol style="list-style-type: none"> <li>1. Filling methods of budget documents and forms</li> </ol>
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	<p>2. Preparation process and filling sequence of budget documents</p> <p>Experiment 2 made Table 3</p> <p>1. Engineering quantity statistics</p> <p>2. The quota manual</p> <p>3. Statistic labor cost, auxiliary material cost and machine shift cost</p> <p>In experiment 3, table 4 was prepared</p> <p>1. Table 4 (main material, equipment) calculation basis</p> <p>2. Design Scheme</p> <p>In experiment 4, Table 5 and Table 2 were prepared</p> <p>1. Various collection rates</p>
<b>Examination requirements and examination form</b>	<p>Survey of the Telecommunication Engineering and Management:Closed book exam</p> <p>Engineering Drafting and CAD:Closed book exam</p> <p>Communication Engineering Economics and Economic Evaluation:Closed book exam</p> <p>Telecommunication Engineering Project Budget Application:Closed book exam</p>
<b>Teaching aid</b>	Beamer /Blackboard/Electronic document/Showcase/laboratory /ppt projector
<b>Reading list</b>	<p>1. Deng Huayang et al. Ed. Introduction to telecommunication engineering and management specialty [M]. Xi 'an: Xidian University Press, 2021.</p> <p>2. Yu Zhengyong et al. Communication Engineering Drawing and Practical Training (Second Edition)[M]. Dalian: Dalian University of Technology Press, 2016.</p> <p>3. Camel Online Classroom, etc. Chinese version of AutoCAD 2020 practical tutorial [M]. Beijing: China Water Conservancy and Hydropower Press, 2020.</p> <p>4. Li Nan (Ed.). Engineering Economics (5th Edition)[M]. Beijing: Science Press, 2018.</p> <p>5. Shao Yinghong. Engineering Economics [M]. Shanghai: Tongji University Press, 2013.</p> <p>6. Li Ligao, Chief Editor. Information and Communication Construction Project Budget [M]. Beijing: Beijing University of Posts and Telecommunication Press, 2018.06.</p> <p>7.YU Runwei. Estimate and Budget of Communication Construction Engineering [M]. Beijing: Chemical Industry Press, 2012.</p>



## Module 7 Engineering Management

<b>Module designation</b>	Engineering Management
<b>Module code</b>	Module 7
<b>Courses name/ Semester(s) in which the module is taught / Credit point</b>	Enterprise Management / 1/6ECTS Telecommunication Engineering Project Management / 4 /6ECTS Operations Management /7/ 6ECTS Strategic Management /7/ 6ECTS Information Resource Management /7 / 6ECTS Innovation & Entrepreneurship Management / 7 /6ECTS
<b>Person responsible for the module (name/professional ranks and titles)</b>	DENG Huayang /Senior Engineer
<b>Lecturer (name/professional ranks and titles)</b>	DENG Huayang /Senior Engineer, LAI Xiaolong/Associate Professor, YI Hongwei/Associate Professor, YANG Weihua /Senior Engineer, YU Ting/Lecturer, HE Jie/ Lecturer, CHEN Yan/ Lecturer
<b>Language</b>	Chinese
<b>Curriculum attribute</b>	Enterprise Management: Obligatory Telecommunication Engineering Project Management: Obligatory Operations Management: elective Strategic Management: elective Information Resource Management: Elective Innovation & Entrepreneurship Management: Elective
<b>Teaching methods</b>	Lecture/ discussion/Exercise/Self-study/presentation/Experiment
<b>Workload</b>	Enterprise Management: Teaching: 180 hours Telecommunication Engineering Project Management: Teaching: 180 hours Operations Management: Teaching: 180 hours Strategic Management: Teaching: 180 hours Information Resource Management: Teaching: 180 hours Innovation & Entrepreneurship Management: Teaching: 180 hours
<b>Credit point</b>	24 ECTS
<b>Evaluation mode</b>	Enterprise Management: Homework, Question Raising, and Usual Performance 40% in total; Final exam 60% Telecommunication Engineering Project Management: Homework, Question Raising, and Usual Performance 30% in total; Experiment 20%; Final exam 50% Operations Management: Homework, Question Raising, and Usual Performance 40% in total; Final exam 60% Strategic Management: Homework, Question Raising, and Usual Performance 40% in total Information Resource Management: Homework, Question Raising, and Usual Performance 40% in total; Final exam 60% Innovation & Entrepreneurship Management: Homework, Question Raising, and



	Usual Performance 40% in total; Final exam 60%
<b>Recommended prerequisites</b>	None
<b>Module objectives/intended learning outcomes</b>	<p>● <b>Module Objectives:</b></p> <p>Through the study of engineering management, students can master the basic concepts, theories and methods of management courses in the module so that they can acquire the ability to specialize in the basic working principles and skills of professional engineering management. The purpose is to equip students with the basic skills of engineering management after learning this module, and cultivate students' ability to analyze and solve engineering problems by using engineering construction theory.</p> <p>● <b>Intended learning outcomes:</b></p> <p>In successfully completing this module, students should be able to demonstrate the following learning outcomes:</p> <ol style="list-style-type: none"> <li>1. Understand the modern enterprise system, master and apply the skills of enterprise management.</li> <li>2. From the perspective of engineering practice, and taking communication engineering examples as the entry point, they can master the theory of communication engineering project management.</li> <li>3. In mastering the practical background of operation management, they can apply production and operation management methods.</li> <li>4. Master the operation objectives of the enterprise's sustainable development, and establish a dynamic balance among the enterprise's objectives, external environment and internal conditions.</li> <li>5. Understand the basic principles and basic skills of information resource management (IRM), master the operation of industry information resource management activities and the ability of management personnel.</li> <li>6. Understand the innovation consciousness and entrepreneurial preparation combined with management work, and improve the level and ability of using management principles to guide innovation and entrepreneurship practice in work.</li> </ol>
<b>Course name / Course objectives / Key knowledges</b>	<p><b>Course Name: Enterprise Management</b></p> <p><b>Course objectives:</b></p> <p>After learning the course, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master modern enterprise organization and culture;</li> <li>2. Master the basic principles of strategic management, marketing management, production management, financial management, human resource management, etc.</li> <li>3. Able to use basic theories and methods to analyze various phenomena and problems in the process of enterprise operation and growth.</li> </ol>



	<p><b>Key knowledges:</b></p> <p>Chapter 1 Introduction to Enterprise Management</p> <ol style="list-style-type: none"><li>1. School orientation and new business education philosophy</li><li>2. The concept and characteristics of the enterprise</li><li>3. Management and enterprise management</li><li>4. The development of modern business management</li><li>5. Enterprise objectives and responsibilities</li><li>6. Basic principles of enterprise management</li></ol> <p>Chapter 2 Organization and Management</p> <ol style="list-style-type: none"><li>1. The basic form of enterprise organizational structure</li><li>2. Design of organizational structure</li><li>3. Enterprise reform and development</li></ol> <p>Chapter 3 Strategic Management</p> <ol style="list-style-type: none"><li>1. Overview of strategic management</li><li>2. Strategic environment analysis</li><li>3. Strategic selection and evaluation</li><li>4. Strategy implementation and control</li></ol> <p>Chapter 4 Human Resource Management</p> <ol style="list-style-type: none"><li>1. Overview of human resource management</li><li>2. Job analysis and job design</li><li>3. Human resource recruitment and training</li><li>4. Performance appraisal and salary management</li></ol> <p>Chapter 5 Marketing Management</p> <ol style="list-style-type: none"><li>1. Overview of marketing management</li><li>2. Marketing opportunity analysis</li><li>3. Market segmentation, target market selection and market positioning</li><li>4. Marketing mix decision</li></ol> <p>Chapter 6 Production Plan</p> <ol style="list-style-type: none"><li>1. Planning and enterprise planning system</li><li>2. Production planning</li><li>3. Production operation plan</li></ol> <p>Chapter 7 Quality Control</p> <ol style="list-style-type: none"><li>1. Quality and total quality management</li><li>2. Total quality assurance system</li><li>3. Commonly used statistical control methods for quality management</li></ol> <p>Chapter 8 Entrepreneurship and Innovation</p> <ol style="list-style-type: none"><li>1. Business Start</li><li>2. Financing process of venture capital</li><li>3. Organizational system and management of the enterprise in the run-up</li></ol>
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	<p><b>Course Name: Telecommunication Engineering Project Management</b></p> <p><b>Course objectives</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the basic theoretical knowledge of communication engineering projects and the construction procedures of communication engineering;</li> <li>2. Master the basic concepts of communication project organization, familiar with the responsibility system of project manager and the quality requirements of project manager;</li> <li>3. Master the basic concepts of contract and contract management, and the process of contract management;</li> <li>4. Master the concepts, characteristics and forms of communication engineering information management, and the generation and collection of information in each stage of communication engineering and related subjects; master the responsibilities of reference personnel;</li> <li>5. Able to identify hazard sources and take preventive measures, know how to grade the accidents and how to investigate and handle production safety accidents;</li> <li>6. Familiar with the principles, processes, measures and objectives of cost control;</li> <li>7. Master the basic theories and methods of project schedule control, and control measures of different subjects in communication engineering;</li> <li>8. Master the basic theory of communication engineering project quality control, quality management and control of communication engineering project;</li> <li>9. Mastering the coordination of internal relations of engineering project organizations.</li> </ol> <p><b>Key knowledges:</b></p> <p><b>Theoretical Teaching:</b></p> <p>Chapter 1 Overview of communication engineering project management</p> <ol style="list-style-type: none"> <li>1. The concept of communication engineering project management</li> <li>2. Basic procedures for communication engineering construction</li> <li>3. Basic contents of communication engineering supervision</li> </ol> <p>Chapter 2 Organization and Management of Communication Engineering Project</p> <ol style="list-style-type: none"> <li>1. Overview of communication engineering project organization and management</li> <li>2. Organization of the project</li> <li>3. Master the responsibilities of the project manager</li> <li>4. Master the organizational requirements of communication construction project supervision</li> </ol> <p>Chapter 3 Contract Management</p> <ol style="list-style-type: none"> <li>1. Process of contract management</li> </ol>
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	<p>2. Contents of contract management</p> <p>3. Claims management</p> <p>4. Project tendering and bidding management</p> <p>Chapter 4 Information Management</p> <p>1. Project information management</p> <p>2. Communication engineering information management</p> <p>Chapter 5 Safety Management</p> <p>1. Safe production</p> <p>2. Safety management</p> <p>Chapter 6 Cost Control</p> <p>1. Content of project cost</p> <p>2. Communication construction project cost control</p> <p>3. Cost control in the design stage of communication construction project</p> <p>4. Cost control in the construction stage of communication construction project</p> <p>5. A general (preliminary) calculation of communication construction project</p> <p>Chapter 7 Schedule Control</p> <p>1. Overview of communication engineering project schedule control</p> <p>2. Schedule control of different subjects in communication engineering projects</p> <p>3. Communication engineering project network planning technology</p> <p>4. Methods for monitoring and adjusting the implementation of communication engineering schedule</p> <p>Chapter 8 Quality Control</p> <p>1. Overview of quality control of communication engineering projects</p> <p>2. Quality management and control of communication engineering projects</p> <p>3. Methods for quality control of communication engineering projects</p> <p>4. Handling of quality problems and accidents of communication engineering</p> <p><b>Experimental teaching:</b></p> <p>Experiment 1 Basic operation of MSProject</p> <p>1. Use of Project software</p> <p>2. Tool interface and working area</p> <p>Experiment 2 Create a project</p> <p>1. Create, save, and view the project</p> <p>2. Project suffix, working environment</p> <p>Experiment 3 Create a structured project schedule and WBS</p> <p>1. Gantt chart</p> <p>2. Structured project plans</p> <p>3. The WBS code</p> <p>Experiment 4 Prepare PERT Chart</p> <p>1. PERT analysis</p>
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	<p>2. Use the PERT tool to calculate the estimated construction period</p> <p>Experiment 5 Develop a resource plan</p> <ol style="list-style-type: none"> <li>1. Create a repository</li> <li>2. Allocate resources to the project</li> <li>3. Automatic allocation of resources</li> </ol> <p><b>Course Name: Operations Management</b></p> <p><b>Course objectives</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the basic concepts of operation management;</li> <li>2. Understand the relationship between operation management functions and other management functions, and grasp the status and role of operation management in general;</li> <li>3. Be able to use the knowledge of operation management to analyze the workflow;</li> <li>4. Design the operation management system; Develop operational management action plan.</li> </ol> <p><b>Key knowledges:</b></p> <p>Chapter 1 Introduction to Operation Management</p> <ol style="list-style-type: none"> <li>1. The status of operation management in enterprise management</li> <li>2. Objectives, contents and functions of operation management</li> <li>3. Development history of operation management</li> <li>4. Situation and development trend of operation management</li> </ol> <p>Chapter 2 fine management</p> <ol style="list-style-type: none"> <li>1. The connotation of fine management</li> <li>2. The organization and implementation of fine management</li> <li>3. Groundwork of fine management</li> <li>4. Common tools and means of fine management</li> </ol> <p>Chapter 3 Product and Service Design</p> <ol style="list-style-type: none"> <li>1. The development trend and external environment of new product design and development</li> <li>2. Product life cycle and new product development strategy</li> <li>3. The main stages of new product development and design</li> <li>4. Organizational mode and technical means in the process of product design</li> <li>5. Design and development of services</li> <li>6. Risk control in product development</li> </ol> <p>Chapter 4 process analysis and production capacity design</p> <ol style="list-style-type: none"> <li>1. Process analysis</li> <li>2. Process optimization</li> <li>3. Design and selection of production process</li> <li>4. Production capacity design</li> </ol>
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	<p>Chapter 5 Production Plan, Operation Plan and Customer Queuing Management</p> <ol style="list-style-type: none"> <li>1. Overview of production plan and operation plan</li> <li>2. Comprehensive production plan</li> <li>3. Short-term production plan</li> <li>4. Customer queuing management</li> </ol> <p>Chapter 6 Supply Chain Management</p> <ol style="list-style-type: none"> <li>1. Basic theory of supply chain management</li> <li>2. Supply chain strategic partnership</li> <li>3. Several common supply chain contracts</li> <li>4. Supply Chain Risk Management</li> <li>5. Closed-loop supply chain and green supply chain</li> </ol> <p>Chapter 7 Logistics Management</p> <ol style="list-style-type: none"> <li>1. Basic theory of logistics management</li> <li>2. Transportation management</li> <li>3. Warehouse management</li> <li>4. International logistics management</li> <li>5. Third-party logistics and fourth party logistics</li> </ol> <p>Chapter 8 JIT(Just in time) Mode of Production</p> <ol style="list-style-type: none"> <li>1. The development history of JIT production mode</li> <li>2. The objectives of JIT production mode</li> <li>3. The main technical means of JIT production mode</li> <li>4. The essence and DNA of JIT production mode</li> </ol> <p><b>Course Name: Strategic Management</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. to understand the concepts of strategy and strategic management;</li> <li>2. to understand the differences of theoretical systems between Chinese and Western cultural backgrounds; to improve culture confidence; to hold the belief of creating social science system with Chinese characteristics; to be familiar with the basic process of strategy analysis, strategy formulation and strategy implementation;</li> <li>3. to use strategic analysis tools to solve problems;</li> <li>4. to observe and discover new analytical ideas and methods around;</li> <li>5. to set clear goals; to take the initiative to learn; to learn from others' strong points and absorb anything and everything; to develop a holistic and dynamic view of thinking about daily problems.</li> </ol> <p><b>Key knowledges:</b></p> <p>Chapter 1 Introduction to strategic management</p> <ol style="list-style-type: none"> <li>1. Strategic concept and theoretical evolution under different backgrounds</li> <li>2. Learning methods of strategic management</li> </ol>
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	<p>3. Strategic management model</p> <p>4. Strategy, strategic management, different views on Strategic Management</p> <p>5. Different stage and different schools of theoretical development; basic logic of curriculum</p> <p>6. The realistic prospect of strategic management</p> <p>7. Speculation on traditional strategic theory</p> <p>8. The trap of realistic strategic thinking</p> <p>9. Reconstruction of strategic thinking mode</p> <p>Chater 2 External environment analysis</p> <p>1. Design of enterprise vision</p> <p>2. Establishment of enterprise mission</p> <p>3. Determination of enterprise mission</p> <p>4. Strategic objective system</p> <p>Chapter 3 Path orientation of innovation and Entrepreneurship</p> <p>1. Purpose, significance, content and level of environmental analysis</p> <p>2. PESTEL analysis method</p> <p>3. Industry environment analysis</p> <p>4. PESTEL analysis and situation analysis</p> <p>5. Competitor analysis dimension and strategic group</p> <p>Chapter 4 Internal environment analysis</p> <p>1. Enterprise resources</p> <p>2. Enterprise capability</p> <p>3. Core competitiveness</p> <p>4. Sustainable competitive advantage</p> <p>5. Value chain</p> <p>6. Radar chart analysis method</p> <p>Chapter 5 Hierarchy of strategy</p> <p>1. Corporate strategy</p> <p>2. Diversification of vertical industry</p> <p>3. Diversification strategy of Shared industry unrelated industry</p> <p>4. Business strategy</p> <p>5. Low cost strategy</p> <p>6. Differentiation strategy</p> <p>7. Centralized strategy</p> <p>8. Functional strategy</p> <p>Chapter 6 Strategy implementation and innovation</p> <p>1. Strategy implementation</p> <p>2. Corporate governance</p> <p>3. Strategic Leadership</p>
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	<p>4. Innovation strategy</p> <p>5. Leading innovation strategy</p> <p>6. Follow up innovation</p> <p>7. Strategy and dependent innovation strategy</p> <p><b>Course Name: Information Resource Management</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. to understand the generation and development of information resources;</li> <li>2. Familiar with the basic methods of information resource management;</li> <li>3. to master the methods and related technologies of information resource management system development;</li> <li>4. to acquire the ability to organize, develop and apply various information resources.</li> </ol> <p><b>Key knowledges:</b></p> <p>Chapter 1 Related concepts of information resource management</p> <ol style="list-style-type: none"> <li>1. Information, knowledge and information resources</li> <li>2. Informatization and the information industry</li> <li>3. The concepts of knowledge economy and knowledge management</li> <li>4. Measurement methods of information resources and informatization</li> <li>5. Composition of the information industry</li> </ol> <p>Chapter 2 Basic theory of information resource management</p> <ol style="list-style-type: none"> <li>1. Conceptual content of information resource management</li> <li>2. Theoretical basis</li> <li>3. The important role of organization and standardization</li> <li>4. Content and classification of information technology standardization</li> </ol> <p>Chapter 3 Process management of some information resources</p> <ol style="list-style-type: none"> <li>1. Information source analysis</li> <li>2. Information resource collection</li> <li>3. Information resource processing</li> <li>4. Information resource storage</li> <li>5. Information resource retrieval</li> <li>6. Development of information resources</li> <li>7. Information resource utilization</li> <li>8. Transfer of information resources</li> <li>9. Feedback on information resources</li> </ol> <p>Chapter 4 Information System Resource Management</p> <ol style="list-style-type: none"> <li>1. management of information system construction project</li> <li>2. Special analysis of information system software quality and management of</li> </ol>
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	<p>software quality</p> <p>3. Database security,</p> <p>4. Software security and network security</p> <p>Chapter 5 Website information resource management</p> <p>1. Website construction project management</p> <p>2. Website design</p> <p>3. Website network management</p> <p>Chapter 6 Strategic management of information resources</p> <p>1. The concept of information strategy</p> <p>2. Content of information strategy model</p> <p>3. Types of information strategy</p> <p><b>Course Name: Innovation &amp; Entrepreneurship Management</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <p>1. To master the essence and connotation, and the content system of innovation management;</p> <p>2. To master the paths and methods of management innovation, and be familiar with the development trend of management innovation;</p> <p>3. Able to make simple analysis of innovation and entrepreneurship cases, make reasonable judgments and propose solutions;</p> <p>4. Understand the basic elements of innovation management, understand the mode exploration of management innovation, understand the cultivation of innovative management talents and the shaping of innovative teams;</p> <p>5. Able to understand the requirements of entrepreneurial environment analysis and market research, understand the conditions of project teams, choose simple entrepreneurial projects, and understand the general process, operation and management skills of entrepreneurial projects.</p> <p><b>Key knowledges:</b></p> <p>Chapter 1 The essence and connotation of innovation and entrepreneurship</p> <p>1. The "three basic" concepts of innovation</p> <p>2. Domestic and international innovation environment</p> <p>3. To establish a correct concept towards innovation</p> <p>4. The combination of innovative process view and system theory, and innovation and management</p> <p>Chapter 2 Situation analysis of innovation and Entrepreneurship</p> <p>1. Innovation consciousness and the development focus of entrepreneurship in developed countries</p> <p>2. International and domestic gaps in management innovation</p>
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	<p>3. System innovation</p> <p>Chapter 3 Path orientation of innovation and entrepreneurship</p> <ol style="list-style-type: none"> <li>1. The formation process of innovative thinking</li> <li>2. Incubation process of entrepreneurial project</li> <li>3. Selection of innovation and entrepreneurship methods</li> <li>4. Path-exploring of entrepreneurship</li> <li>5. Cultivation of students' innovative thinking</li> </ol> <p>Chapter 4 Management system of innovation and entrepreneurship</p> <ol style="list-style-type: none"> <li>1. Testing the connotation and framework of innovation and entrepreneurship strategic management</li> <li>2. The innovative organizational management of the three core management functions</li> <li>3. Characteristics of innovative talents</li> <li>4. Consideration and control of entrepreneurial risks</li> <li>5. Evaluation system of incentive mechanism and its significance</li> </ol> <p>Chapter 5 The development trend of innovation and entrepreneurship</p> <ol style="list-style-type: none"> <li>1. Include social trends</li> <li>2. Standardization trends</li> <li>3. Systematic trends</li> <li>4. Informatization trends</li> <li>5. The content and connotation of globalization trends, as well as their specific forms and manifestations</li> </ol>
<b>Examination requirements and examination form</b>	<p>Enterprise Management: written test</p> <p>Telecommunication Engineering Project Management: written test, 5 experiment reports</p> <p>Operations Management: written test</p> <p>Strategic Management: written test</p> <p>Information Resource Management: written test</p> <p>Innovation &amp; Entrepreneurship Management: written test</p>
<b>Teaching aid</b>	Beamer /Blackboard/Electronic document/Showcase/laboratory /ppt projector
<b>Reading list</b>	<ol style="list-style-type: none"> <li>1. You Jianxin. <i>Introduction to Business Management</i> (6<sup>th</sup> Edition)[M]. Beijing: Higher Education Press, 2018.</li> <li>2. Deng Yan. <i>Introduction to Business Management</i> [M]. Beijing: Science Press, 2014.</li> <li>3. Liu Xiaohuan. <i>Introduction to Business Management</i> (2<sup>nd</sup> Edition)[M]. Beijing: Higher Education Press, 2018.</li> <li>4. Miao Chengdong. <i>Introduction to Modern Enterprise Management</i> [M]. Beijing: Peking University Press, 2012.</li> <li>5. Wu Qizhi, et al. <i>Operations Management</i> [M]. Beijing: China Renmin University Press, 2016.</li> </ol>





	<p>6. Xu Fei, Strategic Management (4<sup>th</sup> Edition). Beijing: China Renmin University Press, 2016.</p> <p>7. Wang Xueying, <i>Information Resource Management</i> [M]. Dalian: Dalian University of Technology Press, 2012.</p> <p>8. Zhang Kai. <i>Information Resource Management</i> [M]. Beijing: Tsinghua University Press, 2020.</p> <p>9. Wang Yanrong. <i>Innovation and Entrepreneurship Management</i> [M]. Beijing: China Machine Press, 2017.</p> <p>10. Sun Qinghua. <i>Communication Engineering Project Management and Supervision</i> [M]. Beijing: Posts and Telecommunication Press, 2013.</p> <p>11. Liang Shilian. <i>Engineering project management</i> [M]. Dalian: Northeast University of Finance and Economics Press, 2011.</p> <p>12. Turner Rodney. <i>Project organization and personnel management</i> [M]. Nanjing: Nankai University Press, 2005.</p>
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## Module 8 Advanced technology & Applications

<b>Module designation</b>	Advanced Technology & Applications
<b>Module code</b>	Module 8
<b>Courses name/ Semester(s) to start courses / Credit point</b>	<p>Telecommunication Engineering Budding and Tendering/ 4 /6ECTS</p> <p>Telecommunication Bearer Network Engineering Application/ 4 /6ECTS</p> <p>Telecommunication Engineering Security Management/ 6 /6ECTS</p> <p>Telecom Cloud Theory and Technology / 6 /6ECTS</p> <p>Telecommunication Engineering Planning and Optimization/7 /6ECTS</p>
<b>Person responsible for the module(name/profession al ranks and titles)</b>	DENG Huayang / Senior Engineer
<b>Lecturer(name/profession al ranks and titles)</b>	DENG Huayang /Senior Engineer, LAI Xiaolong/Associate Professor, YI Hongwei/Associate Professor, YANG Weihua /Senior Engineer, YU Ting/Lecturer, WANG Mingyue/Lecturer
<b>Language</b>	Chinese
<b>Curriculum attribute</b>	<p>Telecommunication Engineering Budding and Tendering: Elective</p> <p>Telecommunication Bearer Network Engineering Application: Elective</p> <p>Telecommunication Engineering Security Management: Elective</p> <p>Telecom Cloud Theory and Technology : Elective</p> <p>Telecommunication Engineering Planning and Optimization: Obligatory</p>
<b>Teaching methods</b>	Lecture/ discussion/Exercise/Self-study/presentation/Experiment
<b>Workload</b>	<p>Telecommunication Engineering Budding and Tendering: Teaching: 180 hours</p> <p>Telecommunication Bearer Network Engineering Application: Teaching: 180 hours</p>



	Telecommunication Engineering Security Management: Teaching 180 hours Telecom Cloud Theory and Technology : Teaching: 180 hours Telecommunication Engineering Planning and Optimization: Teaching: 180 hours
<b>Credit point</b>	18 ECTS
<b>Evaluation mode</b>	Telecommunication Engineering Budding and Tendering: Homework, Performance and intermediate examination 40%; Final exam 60% Telecommunication Bearer Network Engineering Application: Homework, Performance and intermediate examination 40%; Final exam 60% Telecommunication Engineering Security Management: Homework, Performance and intermediate examination 40%; Final exam 60% Telecom Cloud Theory and Technology : Homework, Performance and intermediate examination 40%; Final exam 60% Telecommunication Engineering Planning and Optimization: Homework Performance and intermediate examination 40%; Final exam 60%

<b>Recommended prerequisites</b>	Telecommunication Engineering Project Management; Engineering Drafting and CAD; Communication Engineering Economics and Economic Evaluation; and Telecommunication Engineering Project Budget Application
<b>Module objectives/intended learning outcomes</b>	<p>● <b>Module Objectives:</b> Helping students learn basic concepts, theories, and methods. Equipping students with advanced skills as engineering project managers. Cultivating and improving students' ability of technical innovation so as to comprehensively analyze and solve problems in engineering construction.</p> <p>● <b>Intended learning outcomes:</b> In order to successfully complete this module, students should be able to demonstrate the following learning outcomes:</p> <ol style="list-style-type: none"> <li>1. Establish a dialectical materialist world outlook and scientific attitude to seek truth and acquire abstract thinking ability;</li> <li>2. Provide relevant advanced skills for telecommunication engineering and management majors;</li> <li>3. Master the characteristics of communication engineering bidding laws and regulations, working process and professional activities, and be able to adapt to the bidding of communication engineering;</li> <li>4. Grasp the capacity of bearer network, and be able to conduct preliminary analysis and design of bearer network;</li> <li>5. Master the basic methods of safety management, make clear of the basic content of safety management, and establish a theoretical basis for the future safety management work;</li> <li>6. Master telecommunication cloud implementation technology, get familiar with</li> </ol>



	<p>the main products and tools of cloud computing, as well as its technical principles and application methods;</p> <p>6. Get familiar with the planning and design of telecommunication engineering project construction, so as to lay a good foundation for future study and work.</p>
<p><b>Course name / Course objectives / Key knowledges</b></p>	<p><b>Course Name: Telecommunication Engineering Budding and Tendering</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Understand the development and trend of procurement and bidding management;</li> <li>2. Master the differences, advantages and disadvantages between procurement and bidding management and other procurement methods;</li> <li>3. Master the six processes and key points of procurement and bidding;</li> <li>4. Master the ability to prepare bidding documents;</li> <li>5. Master procurement and bidding management of engineering projects, goods and services;</li> <li>6. Master the ability of bid evaluation;</li> <li>7. Develop the ability to manage bidding risks and supply risks.</li> </ol> <p><b>Key knowledges:</b></p> <p>Chapter 1 Overview of Tendering and Bidding</p> <ol style="list-style-type: none"> <li>1. Basic concepts of bidding and procurement</li> <li>2. Establishment and development of tendering and bidding system</li> <li>3. Basic characteristics of tendering and bidding</li> <li>4. Differences between tender procurement and other procurement</li> </ol> <p>Chapter 2 Laws and Regulations on Tendering and Bidding</p> <ol style="list-style-type: none"> <li>1. Composition of bidding law and regulations</li> <li>2. Major provisions of bidding law and regulations</li> <li>3. Tendering and Bidding Law</li> <li>4. Major provisions of China's law and regulations on tendering and bidding</li> </ol> <p>Chapter 3 Provisions and Procedures for Tendering and Bid</p> <ol style="list-style-type: none"> <li>1. Scope and scale of the bidding project</li> <li>2. Bidding preparation procedures and methods</li> <li>3. Formulation and preparation of tender announcement, prequalification announcement and invitation to bid</li> <li>4. The scope and scale of the project</li> </ol> <p>Chapter 4 Bidding for Communication Engineering Projects</p> <ol style="list-style-type: none"> <li>1. Characteristics of communication engineering projects and bidding activities of communication engineering</li> <li>2. Detailed requirements and specific provisions of the management measures for bidding and tendering of communication engineering construction projects</li> </ol>



	<p>3. Detailed requirements on the management measures for bidding and tendering of communication engineering construction projects</p> <p>Chapter 5 Electronic Tendering and Bidding</p> <ol style="list-style-type: none"> <li>1. Overview of electronic tendering and bidding</li> <li>2. Conditions for the development of electronic bidding and the advantages and disadvantages of electronic bidding</li> <li>3. Setting conditions for electronic tendering and bidding trading platform</li> <li>4. Solution to the problem of electronic bidding</li> </ol> <p>Chapter 6 Risk and Legal Liability of Bidding and Tendering of Communication Engineering</p> <ol style="list-style-type: none"> <li>1. Functions and risks of communication engineering tendering units</li> <li>2. Risks in bidding and preventive measures</li> <li>3. Legal liabilities of relevant parties in tendering and bidding activities</li> </ol> <p>Chapter 7 Tendering Practice</p> <ol style="list-style-type: none"> <li>1. Analysis of illegal cases in the bidding of communication construction projects</li> <li>2. Common illegal problems in the bidding of communication construction projects</li> </ol> <p><b>Course Name: Telecommunication Bearer Network Engineering Application</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students should achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the basic concepts and compositions of telecom bearer network;</li> <li>2. Master the basic problems to be solved by the telecom bearer network;</li> <li>3. Master key technologies used in telecom bearer network;</li> <li>4. Development background, design objective, working principle, development and evolution of telecom bearer network;</li> <li>5. Learn telecom bearer network planning, actual future bearer network development, and changed modes and directions.</li> </ol> <p><b>Key knowledges:</b></p> <p>Chapter 1 Introduction</p> <ol style="list-style-type: none"> <li>1. Concepts and positioning of telecom bearer network</li> <li>2. Development and evolution of telecom bearer network</li> <li>3. The bearer services of telecom bearer network and the different index requirements of different services on bearer network</li> <li>4. Objectives for the construction of comprehensive service bearer network</li> </ol> <p>Chapter 2 Transmission Medium in Bearer Network</p> <ol style="list-style-type: none"> <li>1. Common transmission media in bearer network</li> <li>2. The relationship between transmission medium and signal transmission</li> <li>3. Characteristics of signals transmitted by different transmission media</li> <li>4. Multiplexing technology</li> </ol>
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	<p>Chapter 3 IP Bearer Network Principle</p> <ol style="list-style-type: none"> <li>1. The background of IP hosting</li> <li>2. Network layering and TCP/IP protocol</li> <li>3. IP and MAC addresses</li> <li>4. The basic functions of the switch and the principles of two-layer switching</li> <li>5. Related basis of routing</li> </ol> <p>Chapter 4 Principle of OTN Bearing Network</p> <ol style="list-style-type: none"> <li>1. The background of OTN</li> <li>2. Concept and characteristics of OTN</li> <li>3. Functions and principles of OTN</li> <li>4. Practical application of OTN technology in bearer network</li> </ol> <p>Chapter 5 Principle of PTN Bearing Network</p> <ol style="list-style-type: none"> <li>1. The concepts and characteristics of PTN</li> <li>2. The functions and principles of PTN</li> <li>3. Practical application of PTN technology in bearer network</li> </ol> <p>Chapter 6 Principle of PON Bearer Network</p> <ol style="list-style-type: none"> <li>1. Concepts and characteristics of PON</li> <li>2. Functions and principles of PON</li> <li>3. Practical application of PON technology in bearer network</li> </ol> <p>Chapter 7 Planning of Telecommunication Construction Project</p> <ol style="list-style-type: none"> <li>1. Objectives, requirements and specific contents of communication network planning and design</li> <li>2. The methods of bearer network business prediction</li> <li>3. Process and key points of bearer network planning and design</li> </ol> <p>Chapter 8 Design and Implementation of Telecom Bearer Network</p> <ol style="list-style-type: none"> <li>1. Principles of network design</li> <li>2. The structural design method of telecommunication bearer network in network design</li> <li>3. Data planning of telecom bearer network</li> </ol> <p><b>Course Name: Telecommunication Engineering Security Management</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students should achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the basic concepts of enterprise management and enterprise production and operation management required by safety management, and understand the legal and regulatory environment of the enterprise;</li> <li>2. Master the basic principles and methods of safety management;</li> <li>3. Master the basic contents of accident cause theory;</li> <li>4. Master the basic contents of safety management technology, such as safety</li> </ol>
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	<p>laws and regulations, occupational health and safety management, emergency management, safety culture and safety education.</p> <p><b>Key knowledges:</b></p> <p>Chapter 1 Basic Knowledge of Safety Management</p> <ol style="list-style-type: none"> <li>1. Accident and related basic knowledge</li> <li>2. Overview of safety management</li> <li>3. The "five elements" of safe production and their relations</li> </ol> <p>Chapter 2 Safety Production Management Theory</p> <ol style="list-style-type: none"> <li>1. Management theory and its development stages</li> <li>2. Principles of safety production management</li> <li>3. The relationship between occurrence frequency and injury severity</li> <li>4. Accident causes theory</li> </ol> <p>Chapter 3 Analysis and Control of Unsafe Behavior</p> <ol style="list-style-type: none"> <li>1. Physiological factors of unsafe behaviors</li> <li>2. Psychological factors of unsafe behaviors</li> <li>3. Fundamental principles of behavioral science and unsafe behaviors of human beings</li> <li>4. Ways to control people's unsafe behaviors</li> </ol> <p>Chapter 4 Safety Technical Measures</p> <ol style="list-style-type: none"> <li>1. Safety technical measures to prevent accidents</li> <li>2. Safety technical measures to avoid and reduce accident losses</li> <li>3. Production and operation environment</li> <li>4. Operation site safety management</li> </ol> <p>Chapter 5 Safety Production Regulations and Standards</p> <ol style="list-style-type: none"> <li>1. Relevant basic legal knowledge</li> <li>2. Occupational health and safety regulatory system and relevant major regulations</li> <li>3. Introduction of occupational health and safety standard system</li> </ol> <p>Chapter 6 Safety Management System</p> <ol style="list-style-type: none"> <li>1. Overview of China's production safety management system and work pattern</li> <li>2. Basic conditions for safety production of enterprises</li> <li>3. Safety production responsibility system</li> <li>4. Safety production management system</li> </ol> <p>Chapter 7 Modern Safety Management</p> <ol style="list-style-type: none"> <li>1. Overview of modern safety management</li> <li>2. Safety objective management</li> <li>3. Construction of enterprise safety culture</li> <li>4. Management of major hazard sources</li> <li>5. Occupational Health and Safety Administration of China</li> </ol>
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	<p><b>Course Name: Telecom Cloud Theory and Technology</b></p> <p><b>Course Goals:</b></p> <p>After learning the courses, students should achieve the following objectives:</p> <ol style="list-style-type: none"><li>1. Master cloud computing architecture, cloud computing implementation route, and cloud computing architecture;</li><li>2. Master distributed file system and distributed computing programming model, and master HDFS, MapReduce and HBase of Hadoop open source project;</li><li>3. Master the structural differences of different cloud platforms, and understand the case analysis of a cloud application platform;</li><li>4. Master the installation of virtual machine and the construction of cloud platform;</li><li>5. Master the concept of security issues in cloud computing;</li><li>6. Learn how to address security issues in cloud computing.</li></ol> <p>Key knowledges:</p> <p>Chapter 1 Cloud Computing Overview</p> <ol style="list-style-type: none"><li>1. Concepts and characteristics of cloud computing</li><li>2. The development of cloud computing</li><li>3. Advantages and disadvantages of cloud computing</li></ol> <p>Chapter 2 Cloud Services</p> <ol style="list-style-type: none"><li>1. Introduction and development of cloud services</li><li>2. Infrastructure Services (IaaS)</li><li>3. Platform Services (PaaS)</li><li>4. Software as a Service (SaaS)</li></ol> <p>Chapter 3 Cloud Users</p> <ol style="list-style-type: none"><li>1. Demand of government users</li><li>2. The needs of enterprise users</li><li>3. Developers' needs</li><li>4. The needs of the public</li></ol> <p>Chapter 4 Cloud Computing Architecture and Standardization</p> <ol style="list-style-type: none"><li>1. The cloud computing reference architecture</li><li>2. Cloud computing standardization</li><li>3. Implement of cloud computing</li></ol> <p>Chapter 5 Cloud Computing Architecture and Standardization</p> <ol style="list-style-type: none"><li>1. High performance computing technology</li><li>2. Distributed data storage technology</li><li>3. User interaction technology</li><li>4. Safety management technology</li><li>5. Operational support management techniques</li></ol> <p>Chapter 6 Application of Public Cloud Platform</p>
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	<ol style="list-style-type: none"> <li>1. Application of cloud storage</li> <li>2. Application of cloud security</li> <li>3. Application of cloud office</li> <li>4. Application of cloud entertainment</li> </ol> <p>Chapter 7 Private Cloud Platform Construction</p> <ol style="list-style-type: none"> <li>1. VSphere virtualization architecture</li> <li>2. Installation and configuration of ESXi6</li> <li>3. Installation and configuration of WebSphere Client</li> <li>4. Basic operation of virtual machine</li> <li>5. Network management and external storage construction</li> </ol> <p>Chapter 8 Problems with Cloud Computing</p> <ol style="list-style-type: none"> <li>1. Security of cloud computing</li> <li>2. Standards of cloud computing</li> </ol> <p>Chapter 9 Application of Cloud Computing</p> <ol style="list-style-type: none"> <li>1. Cloud computing and mobile Internet</li> <li>2. Cloud computing and ERP</li> <li>3. Cloud computing and the Internet of Things</li> <li>4. Cloud computing and education</li> </ol> <p><b>Course Name: Telecommunication Engineering Planning and Optimization</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students should achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the basic theoretical knowledge of cellular mobile communication and related engineering parameters;</li> <li>2. Understand the basic planning and design of cellular mobile communication;</li> <li>3. Get familiar with planning and design of various telecommunication engineering;</li> <li>4. Master communication network architecture, radio wave propagation model, antenna theory, business model and other theoretical knowledge;</li> <li>5. Master specific standards, engineering parameters and examples based on engineering practice.</li> </ol> <p><b>Key knowledges:</b></p> <p>Chapter 1 Cellular Mobile Communication Network Architecture and Standards</p> <ol style="list-style-type: none"> <li>1. The development history of mobile communication</li> <li>2. Communication network standards organization</li> <li>3. Communication network protocol structure</li> <li>4. Cellular mobile communication network architecture and cellular mobile communication standards</li> </ol> <p>Chapter 2 Wireless Network Planning Overview</p>
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	<ul style="list-style-type: none"> <li>1. Definition of wireless network planning</li> <li>2. Contents and objectives of wireless network planning</li> <li>3. Basic process of wireless network planning</li> <li>4. Principles of wireless network planning</li> </ul>
	Chapter 3 Mobile Communication Wave Propagation Model and Correction
	<ul style="list-style-type: none"> <li>1. The characteristics of radio wave propagation</li> <li>2. Data processing after network test</li> <li>3. Factors of small-scale fading</li> <li>4. Multipath channel parameters</li> <li>5. Fading effect caused by multipath delay extension</li> </ul>
	Chapter 4 Antennas and Planning
	<ul style="list-style-type: none"> <li>1. The principles of the antenna</li> <li>2. Basic design methods of antenna</li> <li>3. Antenna selection and polarization mode comparison</li> </ul>
	Chapter 5 Initial Planning of Cellular Community
	<ul style="list-style-type: none"> <li>1. The planning process of cellular community</li> <li>2. Basic station design content</li> <li>3. Basic station machine room planning</li> <li>4. The design of the parameters of the cell</li> </ul>
	Chapter 6 Business Estimation and Plot Capacity Planning
	<ul style="list-style-type: none"> <li>1. The measurement of telephone traffic</li> <li>2. Voice service model and capacity</li> <li>3. Data business model and capacity</li> <li>4. Various forecasting methods of traffic forecast</li> <li>5. Simulation analysis of data service capacity</li> </ul>
	Chapter 7 Cell Coverage Planning and Link Budgeting
	<ul style="list-style-type: none"> <li>1. Communication probability setting method</li> <li>2. System capacity setting method</li> <li>3. System model and parameters of uplink budget</li> <li>4. Downlink budget</li> </ul>
	Chapter 8 Frequency Planning and Interference Control
	<ul style="list-style-type: none"> <li>1. Packet frequency multiplexing technology</li> <li>2. Several new frequency reuse technologies</li> <li>3. CDMA system capacity calculation</li> </ul>
	Chapter 9 Cellular Mobile Network Optimization
	<ul style="list-style-type: none"> <li>1. The optimization goal of wireless network</li> <li>2. Content and process of cellular mobile network optimization</li> <li>3. Optimization of cellular mobile network coverage and cellular mobile network capacity</li> </ul>



	<p>Chapter 10 Case Study</p> <ol style="list-style-type: none"> <li>1. Design process of cellular cell and base station</li> <li>2. Steps, contents and objectives of wireless network planning</li> <li>3. Optimization process of mobile network</li> </ol>
<b>Examination requirements and examination form</b>	<p>Telecommunication Engineering Budding and Tendering: Closed-book exam</p> <p>Telecommunication Bearer Network Engineering Application: Closed-book exam</p> <p>Telecommunication Engineering Security Management: Closed-book exam</p> <p>Telecom Cloud Theory and Technology: Closed-book exam</p> <p>Telecommunication Engineering Planning and Optimization: Closed-book exam</p>
<b>Teaching aid</b>	Beamer /Blackboard/Electronic document/Showcase/ppt projector/laboratory
<b>Reading list</b>	<ol style="list-style-type: none"> <li>1. Yang Yanling (Ed.). Theory and Practice of Bidding for Communication Engineering Projects [M]. Beijing: Posts and Telecommunication Press, 2018.</li> <li>2. Li Xiaolin (Ed.). Professional Practice of Bidding and Purchasing [M]. Beijing: China Planning Press, 2015.</li> <li>3. Yu Ting (Ed.). Telecom Bearer Network and Engineering Applications. Handout, 2021.</li> <li>4. Guo Juan, Modern Communication Network [M]. Xi 'an: Xidian University Press, 2016.</li> <li>5. Wan Fen (Ed.). Carrying Network in 5G Era [M]. Beijing: Posts and Telecommunication Press, 2019.</li> <li>6. Luo Fangsheng (Ed.). Communication Technology of IUV Bearing Network [M]. Beijing: Posts and Telecommunication Press, 2016.</li> <li>7. Li Jin (Ed.). Manual for Planning and Design of Integrated Service Carrying Network [M]. Beijing: Posts and Telecommunication Press, 2015.</li> <li>8. Lang D He, Ed. Cloud Computing Basis and Application [M]. Beijing: China Machine Press, 2015.</li> <li>9. Liu Peng (Ed.). Cloud Computing [M]. Beijing: Publishing House of Electronics Industry, 2015.</li> <li>10. ZENG Juling, Ed. Cellular Mobile Communication Network Planning and Optimization [M]. Beijing: Publishing House of Electronics Industry, 2017.</li> <li>11. Edited by Du Sishen. Communication Engineering Design and Case [M]. Beijing: Publishing House of Electronics Industry, 2016.</li> <li>12. Shi Yang (Ed.). Communication Engineering Design [M]. Beijing: Publishing House of Electronics Industry, 2016.</li> </ol>



## Module 9 Comprehensive Internship

<b>Module Name</b>	Comprehensive Internship
<b>Module Number</b>	Module 9
<b>Courses name/ Corresponding Semester(s) / Credits</b>	Internship in Enterprise/8/9ECTS Practice on Mobile Communication, Practice on Switching Technology, Practice on Network Security Technology, Practice on Wideband Access Technology, Simulation of Telecom Operation Management , Sand Table Simulation of IT Project Management/8/9ECTS
<b>Person Responsible (Name/Academic titles)</b>	Deng Huayang/Senior Engineer
<b>Lecturer(Name/Professional Ranks and Titles)</b>	Hu Qing/Professor, Deng Huayang /Senior Engineer, Lai Xiaolong/Associate Professor, Yi Hongwei/Associate Professor, Yang Weihua /Senior Engineer, Zhou Zhonglun /Senior Engineer, Wang Jun /Senior Engineer, Wang Weixin



	/Senior Engineer, Yu Ting/Lecturer, He Jie/Lecturer, Huo Jialu/Lecturer, Deng Lu/Engineer, Liu Yuecen/Assistant
<b>Language</b>	Chinese
<b>Curriculum Attribute</b>	Practice Session in an Enterprise: Optional Practice on Mobile Communication, Practice on Switching Technology, Network and Security Technology Practice, Practice on Wideband Access Technology, Practice on Telecommunication Operation Management Simulation, Sand Table Simulation of IT Project Management: Optional
<b>Teaching Methods</b>	Lecturing/Discussion/Exercise/Self-study/Presentation/Experiment
<b>Teaching Load</b>	Duration of the Internship in Enterprise: 270 Hours Practice on Mobile Communication, Practice on Switching Technology, Network and Security Technology Practice, Practice on Wideband Access Technology, Practice on Telecommunication Operation Management Simulation, Sand Table Simulation of IT Project Management: Teaching: 270 hours
<b>Credits</b>	9
<b>Evaluation Method</b>	Submitting internship report. Internship performance and the pass of internship defense account for 30%; internship report accounts for 70%.
<b>Qualification for Recommendation</b>	Completing all theoretical courses
<b>Teaching Objectives/ Expected Learning Outcomes</b>	<p>● <b>Teaching Objectives:</b> This module aims to improve students' comprehensive ability to apply theoretical knowledge to practice to meet the demand of future work. After the study of this module, students will obtain the professional knowledge of project management process, project operation management, networking technology, network system development and system security strategy. Students will also increase innovative thinking as well as their practical ability in network planning, network engineering project and teamwork.</p> <p><b>Expected Learning Outcomes:</b> After learning this module, students should be able to demonstrate the following learning outcomes:</p> <ol style="list-style-type: none"> <li>1. Through the internship before graduation, students' application of professional skill is to be strengthened, students' practical ability and quality as an engineer is to be improved, so as to meet the target of talent-cultivation and the needs of society.</li> <li>2. Students are to master the theoretical knowledge and apply it to practice to analyze and solve problems.</li> <li>3. Students are to increase the ability to plan and design network engineering and the ability of team cooperation and service support.</li> <li>4. Students are to be clear about the design scheme of communication technology and the configuration method of network equipment.</li> <li>5. Students are to be clear about the telecom project manager's duties, environment and operation requirements.</li> </ol>



	<p>6. Students are to be clear about and master the technology related to telecom construction.</p> <p>7. Students are to be clear about the major methods in communication management</p>
<p><b>Course name / Course Objectives / Key Knowledge</b></p>	<p><b>Course Name: Practice in Enterprise</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Get to know the general situation of the enterprise or institution;</li> <li>2. Get to know the structure, rules and regulations, and working process of the enterprise;</li> <li>3. Be clear about the work process and processing methods of specific departments and positions;</li> <li>4. Master the operation skills of specific positions;</li> <li>5. Form professional ability and primarily develop professional quality, according to the employer's requirements;</li> <li>6. Develop primary management ability.</li> </ol> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"> <li>1. The disciplines, rules and regulations of corresponding enterprise;</li> <li>2. Each step of the practice process as well as its significance</li> <li>3. Overall concept of Telecommunication engineering and management</li> <li>4. Mechanism and business management process of the enterprise</li> </ol> <p><b>Course Name: Practice of Mobile Communication</b></p> <p><b>Course Objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Understand the optimization process of network LTE-RF;</li> <li>2. Master the use of software Pioneer on Front-End and Navigator on Back-End as a tool of analysis.</li> <li>3. Be clear about the actual operation of network management configuration, the use of simulation software, and the verification methods after network management configuration.</li> </ol> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"> <li>1. Network optimization experiment of LTE on Front-End</li> <li>2. Network optimization experiment of LTE on Back-End</li> <li>3. Configuration operation of TD-LTE network management</li> <li>4. Use of TD-LTE simulation software</li> </ol>



	<p><b>Course Name: Practice on Switching Technology</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"><li>1. Understand the hardware structure and composition of SPC switches;</li><li>2. Master the hardware configuration of the SPC exchange and be familiar with the function of each single board;</li><li>3. Familiar with the setting of bureau configuration data, crown and user data of type B module of SPC exchange, and master the configuration of call data of the bureau of the exchange;</li><li>4. Mastering the whole process of basic calls from users of the Bureau.</li></ol> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"><li>1. SM module of SPC exchange hardware configuration</li><li>2. Basic call data configuration of users in this bureau</li></ol> <p><b>Course Name: Practice on Network and Security Technology</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"><li>1. Understand VLAN architecture and partition method;</li><li>2. Master VLAN equipment networking methods and making network cable methods;</li><li>3. Master the contents, methods and steps of firewall USG2200 configuration;</li><li>4. Master the method of using the GRE three-layer tunnel protocol to realize the function of interconnection;</li><li>5. Understand the processing process and location of MAC configuration, IP address binding and two-way NAT configuration in actual projects .</li></ol> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"><li>1. Configure switch VLAN aggregation</li><li>2. Configure switch QinQ experiment</li><li>3. Configure firewall Web Management</li><li>4. Configure firewall IPSec to establish SA in IKE mode</li><li>5. Configure firewall GRE tunnel</li><li>6. Configure Mac and IP address binding</li><li>7. Configure firewall bidirectional NAT</li></ol> <p><b>Course Name: Practice on Wideband Access Technology</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"><li>1. Be familiar with the specific methods and steps of setting data for the device,</li></ol>
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	<p>and the methods of using TELNET tool to conduct measurement in the later stage;</p> <ol style="list-style-type: none"><li>2. Understand the common commands and terms of devices in broadband network, and be familiar with the use of EB communication software experimental platform;</li><li>3. Understand the language of experimental equipment, manage the environment platform construction, and establish in-band network management and out-band network management;</li><li>4. Master the methods of VLAN intercommunication; Understand dial-up mode and non - dial-up mode of broadband equipment out of the data setting method.</li></ol> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"><li>1. Be familiar with basic operation, equipment and network structure</li><li>2. Common command operation configuration</li><li>3. Ma5600 management environment construction</li><li>4. VLAN interworking configuration experiment (LanSwitch mode)</li><li>5. Internet configuration training on non dialing mode</li><li>6. Internet configuration training on PPPoE dial-up mode</li></ol> <p><b>Course Name: Practice on Telecommunication Operation Management Simulation</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"><li>1. The purpose of mastering the feasibility study is to study the problem and determine whether the problem can be solved in the shortest time with the minimum cost. After a detailed investigation and study of this project, the preliminary system implementation report is prepared, and the preliminary design and reasonable arrangement of the problems to be faced in the software development and their solutions are made. Make clear the development risk and the economic benefit it brings.</li><li>2. Master the steps of analysis report preparation, and complete the compilation of the analysis report of the management information system with reference to the above materials;</li><li>3. Master the steps of compiling system design report, and complete the compilation of management information system design report with reference to the above materials;</li><li>4. Taking the management information system of the telecom operation and maintenance center as an example, the steps of preparing the design report of the system configuration scheme are explained, and the preparation of the design report of the management information system configuration scheme is completed</li></ol>
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	<p>by referring to the above materials.</p> <p>5. Understand and explain the steps of preparing the code design report of the system, and complete the compilation of the code design report of the management information system with reference to the above materials.</p> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Feasibility analysis report</li> <li>2. System analysis report</li> <li>3. System design report</li> <li>4. Database design report</li> <li>5. System configuration scheme design report</li> <li>6. System code design report</li> </ol> <p><b>Course Name:</b> Sand Table Simulation of IT Project Management</p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Know the project management sand table simulation and the concept of the project management sand table simulation;</li> <li>2. Master the control ideas of IT project management;</li> <li>3. Master the methods and control points of IT project management.</li> </ol> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"> <li>1. Project selection</li> <li>2. Project scope management</li> <li>3. Project time management</li> <li>4. Project cost and benefit management</li> <li>5. Project resource management</li> <li>6. Project risk management</li> </ol>
<b>Examination Requirements and Form</b>	<p>Investigation:</p> <p>Feedback form which includes enterprise's opinion on student's performance;</p> <p>Internship report written by students with no less than 3500 words, a clear theme and detailed content, which can explain the whole process of internship, the use of professional skills and the effect of internship</p>
<b>Teaching aid</b>	Beamer /Electronic document /Showcase /ppt projector/laboratory
<b>Reading list</b>	Experimental Instruction, Syllabus

## Module 10 Graduation Thesis

<b>Module Name</b>	Graduation Thesis
<b>Module Number</b>	Module 10
<b>Course Name/</b>	Graduation Project (Thesis)/ 8 /27ECTS





<b>Corresponding Semester(s) / Credits</b>	
<b>Person Responsible (Name/Academic titles)</b>	Deng Huayang / Senior engineer
<b>Lecturer(Name/Professional Ranks and Titles)</b>	All the Professionals in this program
<b>Language</b>	Chinese
<b>Curriculum Attribute</b>	Graduation project (Thesis): Obligatory
<b>Teaching Methods</b>	Theoretical teaching, experiment/practice teaching and computer practice are arranged by instructors on the basis of each student's specific project.
<b>Teaching Load</b>	Graduation project (Thesis): Teaching 810 hours
<b>Credits</b>	27
<b>Evaluation Method</b>	Graduation project (Thesis): Completing the project tasks (experiment, simulation, design or calculation) required by the tutor and translate professional articles; Completing thesis writing; Passing the defense.
<b>Qualification for Recommendation</b>	Completing all the courses of the program and Computer Science courses Series
<b>Teaching Objectives/ Expected Learning Outcomes</b>	<p>● <b>Module objectives:</b> To give students an opportunity to integrate the knowledge they have learned, so that they can further understand the new technology, new products and application prospects in the professional field, master the technology of network system design and network application development, and improve their ability of independent thinking and unity and cooperation. Through this teaching procedure, the students are trained in the basic skills necessary for engineering and technical personnel, so that they can be competent for technical work quickly after graduation.</p> <p>● <b>Expected learning outcomes:</b> After learning this module, students should be able to demonstrate the following learning outcomes:</p> <ol style="list-style-type: none"> <li>1. Research, literature retrieval and information retrieval capabilities;</li> <li>2. Theoretical analysis, scheme design or experimental scheme formulation, design, calculation and drawing ability;</li> <li>3. Technical and economic analysis ability;</li> <li>4. Communication technology application ability;</li> <li>5. Engineering management application ability;</li> <li>6. Engineering construction application ability;</li> <li>7. Data processing and comprehensive analysis ability;</li> <li>8. The ability to write thesis or design specification, including the ability to write</li> </ol>



	abstract in foreign language.
<b>Course name / Course Objectives / Key Knowledge</b>	<p><b>Course name: Graduation Project (Thesis)</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can achieve the following objectives:</p> <ol style="list-style-type: none"> <li>1. Understand the new technology, new products and application prospects in the field of telecommunication engineering and management, consolidate the theoretical knowledge, expand the scope of knowledge, and improve the ability to comprehensively use the knowledge and skills learned;</li> <li>2. Master correct mind-set and basic skills;</li> <li>3. Master the retrieval and search of the relevant technical data of the subject, carry out the analysis, research, experiment, simulation and debugging of the subject / project, and finally meet the requirements of the subject / project and submit the results;</li> <li>4. Master the general procedures and methods of writing scientific and technological papers, improve students' ability of independent thinking and unity and cooperation, and promote students to establish rigorous scientific attitude and work style.</li> </ol> <p><b>Key knowledge:</b></p> <p>The contents and basic requirements of graduation project:</p> <ol style="list-style-type: none"> <li>1. Content of graduation Project:             <ol style="list-style-type: none"> <li>(1) Introduction</li> <li>(2) Demand analysis</li> <li>(3) Project design</li> <li>(4) Project construction scheme</li> <li>(5) Project management plan</li> <li>(6) Test and acceptance check</li> <li>(7) Conclusion</li> <li>(8) References</li> <li>(9) ACKNOWLEDGMENTS</li> </ol> </li> <li>2. The Requirements of graduation thesis             <ol style="list-style-type: none"> <li>1. The paper template is based on the template issued by the academic affairs office, and strictly according to the format.</li> <li>2. When writing a thesis, we should integrate theory with practice, make specific analysis of practical problems, be exploratory and innovative, and provide evidence. The thesis should be written with novel and clear theme, reliable materials, thorough analysis, powerful argumentation, substantial content, rigorous structure, standard format, and fluent writing.</li> <li>3. The total number of words should not be less than 8000 words. Provide corresponding charts and instructions in the thesis, and big pages of program</li> </ol> </li> </ol>



	<p>codes is not to be attached. Appendixes can be used to demonstrate code if necessary.</p> <p>4. The repetition rate of the paper shall not exceed 20%, and the paper test report must be submitted (it is recommended to use the "CNKI paper duplicate checking and testing system" for testing).</p> <p>5. Finish the writing of the thesis within the prescribed time limit and prepare for the thesis defense.</p>
<b>Examination Requirements and Form</b>	<p>Graduation Project (Thesis):</p> <p>Thesis with no more than 30% repetition rate</p> <p>The defense result is divided into five grades: excellent, good, medium, pass and fail.</p>
<b>Teaching aids</b>	<p>One on one guidance, one on one communication using a variety of communication tools, including telephone, mobile phone, computer network tools, E-mail communication, etc.</p>
<b>Reading list</b>	<p>Thesis supervisor provide corresponding references according to the project/thesis theme.</p>



## Module 11 English

<b>Module designation</b>	English
<b>Module code</b>	Module 11
<b>Course name/ Semester(s) in which module is taught / Credit point</b>	College English (1) / 1 / 6ECTS College English (2) / 2 / 4ECTS College English (3) / 3 / 4ECTS College English (4) / 4 / 6ECTS English for IT Professionals / 6 / 4ECTS
<b>Person responsible for the module (name/professional ranks and titles)</b>	CHEN Youmei / Lecturer
<b>Lecturer (name/professional ranks and titles)</b>	CHEN Youmei / Lecturer, YANG Chengxia / Lecturer, LI Leyan / Lecturer, QU Meiyu / Lecturer, WAN Jiang / Lecturer, YUAN Yangchun / Lecturer, ZOU Jia / Assistant
<b>Language</b>	English-Chinese bilingual
<b>Curriculum attribute</b>	College English (1): Obligatory College English (2): Obligatory College English (3): Obligatory College English (4): Obligatory English for IT Professionals: Obligatory
<b>Teaching methods</b>	Lecture / discussion / practice / autonomous learning / demonstration / experiment
<b>Workload</b>	College English (1): Teaching: 180hours College English (2): Teaching: 120hours College English (3): Teaching: 120hours College English (4): Teaching: 180hours English for IT Professionals: Teaching: 120hours
<b>Credit point</b>	24
<b>Evaluation mode</b>	College English(1) (2) (3) (4): Homework, questioning 30%, half term test 10%, oral test 10%, final exam 50% IT professional English: Homework, questioning and routine examination: 40%, final exam: 60%
<b>Recommended prerequisites</b>	None
<b>Module objectives/Intended learning outcomes</b>	<p>● <b>Module objectives:</b></p> <p>Through the study of this module, students can master English language knowledge, improve language application skills, be familiar with English learning strategies and understand cross-cultural communication. The teaching content integrates five skills of listening, speaking, reading, writing and translation.</p>



	<p>Through the input of word formation, reading, grammar and other explanations, students can master the basic knowledge of English; Through the output training of oral English, writing and translation, we can cultivate students' ability to solve practical problems in English. Through the study of professional English, students can memorize and understand the professional vocabulary correctly and terms commonly used in the field of telecommunication engineering and management in English context. And finally, students have the ability to read, communicate and write technical reports related to telecommunication engineering and management, so as to meet the needs of future practical work.</p> <p>● <b>Intended learning outcomes:</b></p> <p>After successfully learning this module, students should be able to demonstrate the following learning outcomes:</p> <ol style="list-style-type: none"><li>1. Improve the four basic skills of English listening, speaking, reading and writing, improve language and cultural literacy, and acquire cross-cultural communication ability.</li><li>2. Master basic English language knowledge and skills, be familiar with a certain amount of professional vocabulary related to telecommunication engineering and management, and be able to read and translate relevant literature of telecommunication engineering and management.</li><li>3. Cultivate the reading ability of professional English, understand the characteristics of professional English, the vocabulary classification and composition method of professional English. And improve the reading quality and speed of professional English.</li></ol>
<b>Course name / Course objectives / Key knowledge points</b>	<p><b>Course name: College English(1)</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"><li>1. Listening comprehension: be able to understand simple English conversation on daily topics; Can understand the corresponding level of English courses taught in English. Be able to use limited listening skills.</li><li>2. Oral expression ability: be able to have a short conversation on daily topics in English; Be able to make a short speech on familiar topics after preparation. Be able to express the structure of language more clearly and use limited conversational skills.</li><li>3. Reading comprehension ability: be able to basically read English newspaper articles and other English materials with familiar topics and simple language difficulties; Be able to read English textbooks with the</li></ol>



	<p>help of dictionaries, master the main idea, and understand the main facts and relevant details. Ability to use limited reading skills.</p> <p>4. Ability of written expression: be able to describe personal experiences, impressions, emotions and events in simple English. Ability to use limited writing skills.</p> <p>5. Translation ability: be able to translate English and Chinese short articles with familiar subject matter, clear structure and simple language difficulty with the help of dictionary. Be able to translate the translation basically accurately, without major understanding and language expression errors. Be able to use translation skills to a limited extent.</p> <p><b>Key knowledge:</b></p> <p>Unit 1: Writing for Myself</p> <p>Unit 2: All the Cabbie Had Was a Letter</p> <p>Unit 3: Public Attitudes Toward Science</p> <p>Unit 4: Tony Trivisonno's American Dream</p> <p>Unit 5: The Company Man</p> <p>Unit 6: A Valentine Story</p> <p><b>Course name: College English (2)</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <p>1. Listening comprehension ability: be able to understand English teaching, daily English conversation and lectures on general topics, basically understand special English programs of English speaking countries, speak at about 130 words per minute, master the main idea and grasp the main points. Be able to use basic listening skills to help understand the comprehension.</p> <p>2. Oral expression ability: be able to communicate in English in the process of learning, and be able to discuss a certain topic. Be able to talk with people from English speaking countries on daily topics. Be able to make a short speech on familiar topics after preparation, with clear expression and basically correct pronunciation and intonation. Be able to use basic conversation strategies in conversation.</p> <p>3. Reading comprehension ability: be able to basically read English articles on general subjects at a reading speed of 70 words per minute. When quickly reading materials with longer length and lower difficulty, the reading speed can reach 100 words per minute. Be able to basically read domestic English newspapers and magazines, master the central idea, and understand the main facts and relevant details. Be able to read the common practical materials in work and life. Be able to use effective reading methods in reading.</p>
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	<p>4. Ability of written expression: be able to complete general writing tasks with common applied styles, describe personal experiences, events, impressions, emotions, etc., and write 120 word short essays on general topics or outlines within half an hour. The content is basically complete, the words are appropriate, and the discourse is coherent. Be able to use appropriate writing skills in general or applied writing.</p> <p>5. Translation ability: be able to translate English and Chinese articles with familiar topics with the help of dictionaries. The speed of English Chinese translation is 300 English words per hour, and the speed of Chinese English translation is 250 Chinese characters per hour. The translation is basically fluent. Be able to use appropriate translation skills in Translation.</p> <p><b>Key knowledge:</b></p> <p>Unit 1: Learning, Chinese-Style</p> <p>Unit 2: A Life Full of Riches</p> <p>Unit 4: A Virtual Life</p> <p>Unit 5: True Height</p> <p>Unit 6: A Woman Can Learn Anything a Man Can</p> <p>Unit 7: The Glorious Messiness of English</p> <p><b>Course name: College English(3)</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <p>1. Listening comprehension: be able to basically understand the conversations and lectures of people from English speaking countries, be able to understand domestic English radio or TV programs with familiar topics and medium length, and speak at about 140 words per minute. Master the main idea and grasp the key points.</p> <p>2. Oral expression ability: be able to have a relatively fluent conversation with people from English speaking countries, have a good command of conversation strategies, be able to basically express personal opinions, emotional views, etc., be able to basically state facts, events, reasons, etc., express ideas clearly, and have basically correct pronunciation and intonation.</p> <p>3. Reading comprehension ability: be able to read articles on general topics of English speaking newspapers and magazines at a speed of 70 words per minute. When reading materials with long length quickly, the reading speed can reach 110 words per minute. Be able to skim or search for reading materials. Can correctly understand the main idea, grasp the main facts and relevant details.</p> <p>4. Written expression ability: be able to write daily practical articles,</p>
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	<p>write professional related reports and papers with clear structure and rich content with the help of reference materials, describe various charts, and write 140 word essays on certain topics within half an hour, with complete content, clear organization and smooth writing.</p> <p>5. Translation ability: be able to translate articles with familiar themes in English and American newspapers with the help of dictionaries, and be able to extract and translate English popular science articles of the major. The translation speed is 330 English words per hour and 280 Chinese characters per hour. The translation is basically smooth, expressive and free from major language errors.</p> <p><b>Key knowledge:</b></p> <p>Unit 1: Mr. Doherty Builds His Dream Life</p> <p>Unit 2: The Freedom Givers</p> <p>Unit 3: The Land of The Lock</p> <p>Unit 4: Was Einstein A Space Alien?</p> <p>Unit 5: Writing Three Thank-You Letters</p> <p>Unit 6: The Last Leaf</p> <p><b>Course name: College English(4)</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <p>1. Listening comprehension ability: be able to basically understand the conversations and lectures of people from English speaking countries, basically understand and understand the domestic English radio or TV programs with familiar topics and long length, and speak at about 150 words per minute. Be able to grasp the main idea and grasp the key points and relevant details.</p> <p>2. Oral expression ability: be able to have a fluent and accurate dialogue or discussion on general or professional topics, summarize texts or speeches with long content and slightly difficult language in concise language, and participate in discussions on general topics in English.</p> <p>3. Reading comprehension: be able to basically read English articles on general subjects, with a reading speed of 90 words per minute and a correct rate of 70%. When reading materials with longer length and lower difficulty, the reading speed can reach 120 words per minute. Be able to basically read domestic English newspapers and magazines, master the central meaning, understand the main facts and relevant details. Be able to read the common practical materials in work and life. Be able to use effective reading methods in reading.</p> <p>4. Ability of written expression: be able to complete general writing</p>
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	<p>tasks, describe personal experiences, impressions, emotions and events, write common practical articles, and write short articles with more than 150 words on general topics or outlines in half an hour. The contents are basically complete, the words are appropriate, and the meaning is coherent. Be able to master basic writing skills.</p> <p>5. Translation ability: be able to translate English and Chinese articles with familiar topics with the help of dictionaries, with the speed of 350 English words per hour and 300 Chinese characters per hour. The translation is basically fluent and can use appropriate translation skills.</p> <p><b>Key knowledge:</b></p> <p>Unit 1: Fighting with the Forces of Nature</p> <p>Unit 2: Smart Cars</p> <p>Unit 3: Get the Job You Want</p> <p>Unit 4: In Search of Davao's Man</p> <p>Unit 5: A Friend in Need</p> <p>Unit 6: Old Father Time Becomes a Terror</p> <p><b>Course name: English for IT Professionals</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Be able to express their professional knowledge in English.</li> <li>2. Master the basic technical English reading skills and a certain amount of relevant professional vocabulary.</li> <li>3. Have a certain understanding of industry culture and corporate behavior, and have the basic ability to conduct business activities in an international IT company.</li> </ol> <p><b>Key knowledge:</b></p> <p>Unit 1: Overview of IT Industry</p> <p>Unit 2: History of IT Industry</p> <p>Unit 3: Milestones and Giants in IT Industry</p> <p>Unit 4: Working Process of IT Industry</p> <p>Unit 5: Features of IT Products</p> <p>Unit 6: IT Corporate Culture</p> <p>Unit 7: Communication in IT Industry</p> <p>Unit 8: Teamwork in IT Industry</p> <p>Unit 9: Time Management in IT Industry</p> <p>Unit 10: Preparing for the Interview</p>
<b>Examination requirements and examination form</b>	<p>College English (1): Closed book exam</p> <p>College English (2): Closed book exam</p> <p>College English (3): Closed book exam</p> <p>College English (4): Closed book exam</p> <p>IT professional English: Closed book exam</p>



<b>Teaching aids</b>	Projector / blackboard / electronic document / showcase / ppt / listening room
<b>Reading list</b>	<ol style="list-style-type: none"> <li>1. Chief Editor Li Yinhua, New College English (2 Second Edition) comprehensive course 1 Student Book (with online teaching resources) [M], Shanghai Foreign Language Education Press, 2015.</li> <li>2. Wang Minhua, Li Huiqin, Chen Meifang, Yu Sumei, Wei Baolin, Li Yinhua, New College English Second Edition (12th Five Year Plan): listening and speaking course volume 1 student's book (with CD) [M], Shanghai Foreign Language Education Press, 2015.</li> <li>3. Wang Xiuzhen, fan Weiwei, Wang Huoyan, Li Jiayun, Wu Fei, Guo Jingjing, New College English The Second Edition (the 12th Five Year Plan): a book for students [M], Shanghai Foreign Language Education Press, 2015.</li> <li>4. Feng Shanping, Lu Yunyun, Chen Leyi, Zhang Shanshan, Chen Xiafang, Zhu Weifu, Zhou Song, etc., New College English Second Edition (New): Comprehensive Course 1 academic test (with MP3 Download) [M], Shanghai Foreign Language Education Press, 2015.</li> <li>5. Li Yinhua, editor in chief, New College English (2 Second Edition) comprehensive course 2 books for students (with online teaching resources) [M], Shanghai Foreign Language Education Press, 2015.</li> <li>6. Wang Minhua, Li Huiqin, Chen Meifang, Yu Sumei, Wei Baolin, Li Yinhua, New College English Second Edition (12th Five Year Plan): listening and speaking course volume 2 student's book (with CD) [M], Shanghai Foreign Language Education Press, 2015.</li> <li>7. Wang Xiuzhen, fan Weiwei, Wang Huoyan, Li Jiayun, Wu Fei, Guo Jingjing, New College English Second Edition (12th Five Year Plan): reading course general edition 2 student books [M], Shanghai Foreign Language Education Press, 2015.</li> <li>8. Feng Shanping, Lu Yunyun, Chen Leyi, Zhang Shanshan, Chen Xiafang, Zhu Weifu, Zhou Song, etc., new edition of College English, 2nd Edition (New): comprehensive course, 2 academic tests (with MP3 Download) [M], Shanghai Foreign Language Education Press, 2015.</li> <li>9. Li Yinhua, chief editor in chief, new edition of College English (Second Edition) comprehensive course, 3 books for students (with online teaching resources) [M], Shanghai Foreign Language Education Press, 2015.</li> <li>10. Wang Minhua, Li Huiqin, Chen Meifang, Yu Sumei, Wei Baolin, Li Yinhua, New College English Second Edition (12th Five Year Plan): 3 books for students of listening and speaking course (with CD) [M], Shanghai Foreign Language Education Press, 2015.</li> <li>11. Wang Xiuzhen, fan Weiwei, Wang Huoyan, Li Jiayun, Wu Fei, Guo Jingjing, New College English Second Edition (12th Five Year Plan): reading course general edition 3 student books [M], Shanghai Foreign</li> </ol>



	<p>Language Education Press, 2015.</p> <p>12. Feng Shanping, Lu yunyun, Chen Leyi, Zhang Shanshan, Chen Xiafang, Zhu Weifu, Zhou Song, etc., New College English Second Edition (New): comprehensive course, 3 volumes of academic test (with MP3 Download) [M], Shanghai Foreign Language Education Press, 2015.</p> <p>13. Li Yinhua, chief editor in chief, new edition of comprehensive course of College English (Second Edition), 4 books for students (with online teaching resources) [M], Shanghai Foreign Language Education Press, 2015.</p> <p>14. Wang Minhua, Li Huiqin, Chen Meifang, Yu Sumei, Wei Baolin, Li Yinhua, New College English Second Edition (12th Five Year Plan): listening and speaking course 4 volumes of student's book (with CD) [M], Shanghai Foreign Language Education Press, 2015.</p> <p>15. Wang Xiuzhen, Fan Weiwei, Wang Huoyan, Li Jiayun, Wu Fei, Guo Jingjing, New College English Second Edition (the 12th Five Year Plan): four volumes of student's book for general reading course [M], Shanghai Foreign Language Education Press, 2015.</p> <p>16. Feng Shanping, Lu yunyun, Chen Leyi, Zhang Shanshan, Chen Xiafang, Zhu Weifu, Zhou Song, etc., New College English Second Edition (New): comprehensive course, 4 volumes of academic test (with MP3 Download) [M], Shanghai Foreign Language Education Press, 2015.</p> <p>17. Sun Jie, Li Yi, Zhan Shaobin, practical it English (2nd Edition). People's Posts and Telecommunication Press, July 2014.</p> <p>18. Anna Phillips &amp; Terry Phillips, Moving into Information Technology. Garnet Education.</p>
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## Module 12 Professional Quality Development

<b>Module designation</b>	Professional Quality Development
<b>Module code</b>	Module 12
<b>Course Name/ Semester(s) in which module is taught / Credit</b>	<p>Guidance for College Students' Mental Health / 3 / 1ECTS</p> <p>Guidance for College Students' Employment and Vocational Development / 1 / 0.5ECTS</p> <p>Key Career Abilities / 6 / 1ECTS</p> <p>Basics for College Students' Entrepreneurship / 2 / 0.5ECTS</p> <p>Practice for College Students' Entrepreneurship / 7 / 1ECTS</p>
<b>Person responsible for the Module</b>	ZENG Guoqing/ Lecturer



<b>(name/professional ranks )</b>	
<b>Lecturer (name/professional ranks )</b>	ZENG Guoqing/ Lecturer, LUO Qingming/Lecturer, WANG Xin/ Lecturer, CHEN Yifang/Lecturer
<b>Language</b>	Chinese
<b>Curriculum attribute</b>	Guidance for College Students' Mental Health: Obligatory Guidance for College Students' Employment and Vocational Development: Obligatory Key Career Abilities: Obligatory Basics for College Students' Entrepreneurship: Obligatory Practice for College Students' Entrepreneurship: Obligatory
<b>Teaching methods</b>	Lecture / discussion / practice / autonomous learning / demonstration / practice
<b>Workload</b>	Guidance for college students' mental health: Teaching: 30hours Guidance for College Students' Employment and Vocational Development: Teaching: 15hours Key Career Abilities: Teaching: 30hours Basics for College Students' Entrepreneurship: Teaching: 15hours Practice for College Students' Entrepreneurship: Teaching: 30hours
<b>Credit</b>	4
<b>Assessment method</b>	Guidance for college students' mental health: Homework, questions and routine examination: 40%, course papers: 60% Guidance for College Students' Employment and Vocational Development: Homework, questioning and routine exam: 30%, final exam: 70% Key Career Abilities: Homework, questioning and routine exam: 30%, final exam: 70% Basics for College Students' Entrepreneurship: Homework, questioning and routine exam: 30%, final exam: 70% Practice for College Students' Entrepreneurship: Homework, questioning and routine exam: 30%, final exam: 70%
<b>Prerequisite courses</b>	None
<b>Module objectives/Intended learning outcomes</b>	<ul style="list-style-type: none"> <li>● <b>Module Objectives:</b> Through the learning of this module, students can understand the relevant theories of career development and be familiar with each link of innovation and entrepreneurship, and cultivate the awareness of career entrepreneurship and improve professional quality, master the key abilities and innovative entrepreneurial skills in the workplace, learn self-awareness and career exploration methods, and make scientific career decisions.</li> <li>● <b>Intended Learning Purposes:</b> After successfully learning this module, students should be able to demonstrate the following learning outcomes: 1. Being able to understand the basic knowledge of mental health</li> </ul>



	<p>and the causes of mental problems; Master the basic concepts and scientific methods to protect mental health, have the ability to use psychological means to adjust their own learning, life, interpersonal problems and challenges.</p> <p>2. Mastering self exploration skills, information search and management skills, career decision-making skills, job-hunting skills, etc., we should also improve students' general skills, such as communication skills, problem-solving skills, self-management skills and interpersonal skills, etc.</p> <p>3. Being able to actively learn the relevant knowledge of innovation and entrepreneurship, and have the relevant ability and quality of innovation and entrepreneurship.</p> <p>4. Having the ability to communicate, cooperate and work with others.</p> <p>5. Stimulating students' entrepreneurial enthusiasm, improve their awareness of innovation and entrepreneurship by applying their knowledge to practice, and maximize their potential innovation and entrepreneurship ability.</p>
<p><b>Course name / Course objectives / Key knowledges</b></p>	<p><b>Course name: Guidance for College Students' Mental Health</b>  <b>Course objectives:</b>          After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Being able to understand the basic knowledge of mental health and the causes of mental problems;</li> <li>2. Mastering the basic concepts and scientific methods to protect mental health, and have the ability to use psychological means to adjust the problems and challenges in their study, life and interpersonal communication.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Basic theory of mental health</li> <li>2. Adaptation</li> <li>3. Interpersonal communication</li> <li>4. Emotion management</li> <li>5. Self awareness</li> <li>6. Learning psychology</li> <li>7. Love psychology</li> <li>8. Telecommunication and network trap</li> </ol> <p><b>Course name: Guidance for College Students' Employment and Vocational Development</b>  <b>Course objectives:</b>          After learning the four courses, students can obtain the following</p>



	<p>objectives:</p> <ol style="list-style-type: none"> <li>1. Mastering self exploration skills, information search and management skills, career decision-making skills, job search skills, etc,</li> <li>2. 'students' general skills, such as communication skills, problem solving skills, self-management skills and interpersonal skills.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Career and professional consciousness</li> <li>2. Career development planning</li> <li>3. Improve employability</li> <li>4. Guidance on job seeking process</li> <li>5. Career adaptation and development</li> <li>6. Entrepreneurship education</li> </ol> <p><b>Course name: Key Career Abilities</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <p>Through the study of this course, we can improve the students' ability of communication, cooperation and work with others.</p> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Information collection and processing ability</li> <li>2. Ability of project organization and planning</li> <li>3. Horizontal resource integration capability</li> <li>4. Presentation ability of summary report</li> <li>5. Upward management ability</li> <li>6. Network capability of environmental system</li> <li>7. Business trend foresight</li> </ol> <p><b>Course name: Basics for College Students' Entrepreneurship</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Being able to actively learn the relevant knowledge of innovation and entrepreneurship;</li> <li>2. Having the ability and quality of innovation and entrepreneurship.</li> </ol> <p><b>Key Points:</b></p> <ol style="list-style-type: none"> <li>1. Innovation wins the future</li> <li>2. Development of innovative thinking</li> <li>3. Entrepreneurs and entrepreneurial teams</li> <li>4. Seize the opportunity to start a business</li> <li>5. Raise venture capital</li> </ol>
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	<p>6. Start a business 7. Start up management 8. Internet and Entrepreneurship</p> <p><b>Course name: Practice for College Students' Entrepreneurship</b> <b>Course objectives:</b> After learning the four courses, students can obtain the following objectives: 1. To stimulate college students' entrepreneurial enthusiasm; 2. To improve college students' awareness of innovation and entrepreneurship by applying their knowledge to practice; 3. Stimulate students' potential innovation and entrepreneurship to the greatest extent.</p> <p><b>Key knowledges:</b> 1. Guidance on scientific and technological invention and creation 2. Guidance of papers, treatises, topics, etc 3. Various kinds of innovation and entrepreneurship competitions, science and technology competitions and skills competitions at all levels 4. Innovation and entrepreneurship training 5. Project incubation</p>
<b>Examination requirements and examination form</b>	<p>Guidance for College Students' Mental Health : Course paper Guidance for College Students' Employment and Vocational Development: Closed book exam Key Career Abilities: Closed book exam Basics for College Students' Entrepreneurship: Closed book exam Practice for College Students' Entrepreneurship: Closed book exam</p>
<b>Teaching aids</b>	<p>Projector / blackboard / electronic document / Showcase / ppt courseware / laboratory</p>
<b>References</b>	<p>1. Chen Yueping, Wu Huidong, Zhang Yanyun. <i>Mental Health Education and Development of College Students</i> [M]. Beijing: Beijing Normal University Press, 2017. 2. Zhang Jianhua, Zhang Ke. <i>Mental Health course for college Students</i> (Second Edition) [M]. Beijing: Science Press, 2014. 3. Tang Zhiwen. <i>Mental Health Education for Contemporary College Students</i> [M]. Beijing: Beijing University of post and Telecommunication Press, 2013. 4. Wang Shulan, <i>a Course of Mental Health for College Students</i> [M]. Xi'an: Shaanxi people's education press, 2014. 5. Li Ming, zhangxinmei, changshufang, Su Huijun. <i>Mental Health Education for College Students</i> [M]. Beijing: Tsinghua University Press, 2013. 6. Wang Li, caoshuchun, Li Jing. <i>Theory and Practice of Mental</i></p>



	<p><i>Health of College Students</i> [M]. Beijing: Higher Education Press, 2015.</p> <p>7. Guizhou, zhangshuqian, luoyuanhao, Wang Bing. <i>Career Development and Employment Guidance for College Students</i> (2nd Edition) [M]. Beijing: Tsinghua University Press, 2018.</p> <p>8. zhanghuadong, Cao Jaodong, Zhang Jian. <i>Guidance on Vocational Development Education and Employment of College Students</i> [M]. Beijing: Science Press, 2018.</p> <p>9. Zhang Xianglan, Chengpeiyan, Shic Hengan and Gaoping. <i>The Basis of Innovation and Entrepreneurship of College Students</i> [M]. Beijing: Tsinghua University Press, 2018.</p> <p>10. Anshi Quan. <i>Key Competence in the Workplace</i> [M]. Beijing: People's post and Telecommunication Press, 2012.</p> <p>11. luolingling. <i>The Course of Innovation Development and Training</i> [M]. Shenyang: Northeast University Press, 2013.</p>
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## Module 13 Management and Business

<b>Module designation</b>	Management and business
<b>Module code</b>	Module 13
<b>Course name/ Semester(s) in which module is taught / Credit point</b>	Human resource management / 1 / 1 ECTS Financial management / 3 / 1 ECTS Strategic Management of Enterprises in the era of “Internet +” / 4 / 1 ECTS Investment and financing management / 4 / 1 ECTS Online Advertising / 4 / 1 ECTS
<b>Person responsible for the module(name/professional ranks and titles)</b>	LI Dan/ Associate professor
<b>Lecturer(name/professional ranks and titles)</b>	LI Dan/ Associate professor,ZHAO Yan/ Associate professor,FENG Shengnan/ Lecturer,MAO Youchun/ Lecturer, WANG Chao / Lecturer,XIA Fei/ Lecturer,YANG Mengya/ Lecturer,CHENG Jiani/Aassistant,GENG Chengyang/Aassistant,PAN Yingjie/Aassistant,QIU Yuchang/Aassistant,TAO Chunlin/ Aassistant
<b>Language</b>	Chinese
<b>Curriculum attribute</b>	Human resource management: Obligatory Financial management: Obligatory Strategic Management of Enterprises in the era of “Internet +”: Obligatory Commerce: Obligatory Investment and financing management: Elective Online Advertising: Elective
<b>Teaching methods</b>	Lecture/discussion/practice/autonomous learning/demonstration
<b>Workload</b>	Human resource management: 30 hours of teaching: Financial management: Teaching: 30 hours of teaching: Strategic Management of Enterprises in the era of “Internet +”: 30 hours of teaching: Investment and financing management: 30 hours of teaching: Online Advertising: 30 hours of teaching:
<b>Credit point</b>	4
<b>Assessment method</b>	Human resource management: Homework, questioning and routine exam: 40%, final exam: 60% Financial management: Homework, questioning and routine exam: 40%, final exam: 60%



	<p>Strategic Management of Enterprises in the era of “Internet +”: Homework, questioning and routine exam: 40%, final exam: 60%</p> <p>Investment and financing management: Homework, questioning and routine exam: 40%, final exam: 60%</p> <p>Online Advertising: Homework, questioning and routine exam: 40%, final exam: 60%</p>
<b>Prerequisite courses</b>	None
<b>Module objectives/Intended learning outcomes</b>	<p>● <b>Module objectives:</b></p> <p>After the study of this module, students can master the basic theories and methods of modern enterprise management, understand the basic functions of enterprise strategic management, human resource management, marketing, financial management, and improve their ability to solve practical problems. Students are able to know how to think from the perspective of business and exercise their strategic thinking; New ideas can be built up, through learning which changes students’ attitude, and finally applied in practical work. Only in this way can students “focus on the big picture and start from the detail” in the enterprise, play a good role in management at present with gradual accumulation and be able to shoulder the leadership of middle and high-level management in the future.</p> <p>● <b>Intended learning outcomes:</b></p> <p>After successfully learning this module, students should be able to demonstrate the following learning outcomes:</p> <ol style="list-style-type: none"> <li>1. Reasonably using the relevant knowledge of management in the work, and establish a scientific management concept.</li> <li>2. Mastering methods of scientific management, market analysis methods and human resource management, etc., and be familiar with financial management knowledge.</li> <li>3. Having the basic ability of leading in management sections</li> <li>4. Mastering the general rules of management, and being able to comprehensively apply them to the analysis of practical problems, with the preliminary abilities of strategic planning, organizational behavior management, consumer psychological management, investment and financing management, and advertising planning and implementation.</li> </ol>
<b>Course name / Course objectives / Key knowledges</b>	<p><b>Course name: Human resource management</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the</p>



	<p>following objectives:</p> <ol style="list-style-type: none"> <li>1. Correctly understanding the concept of human resource management</li> <li>2. Mastering the basic principles and general methods of human resource management, and being able to comprehensively apply them to the analysis of practical problems</li> <li>3. Preliminary ability to solve general HRM problems;</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Overview of human resources and human resource management</li> <li>2. Position analysis and competency model</li> <li>3. Human resource planning</li> <li>4. Recruitment</li> <li>5. Training and development</li> <li>6. Performance management</li> <li>7. Salary management</li> <li>8. Labor relations (organizational behavior analysis, etc.)</li> </ol> <p><b>Course name: Financial management</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Correctly understanding the concept of financial management;</li> <li>2. Mastering the basic theory of financial management, and being able to use the theory to analyze relevant cases;</li> <li>3. Cultivate students' ability to use the basic methods and skills of financial management and make financial decisions.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Introduction to financial management</li> <li>2. Basic concepts of financial management (strategic perspective)</li> <li>3. Financial analysis</li> <li>4. Financing management (1)</li> <li>5. Financing management (2)</li> <li>6. Investment management</li> <li>7. Working capital management</li> <li>8. Income distribution management</li> </ol> <p><b>Course name: Strategic Management of Enterprises in the era of "Internet +"</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Mastering the basic concept and content of enterprise strategic</li> </ol>
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	<p>management;</p> <ol style="list-style-type: none"> <li>2. Being able to preliminarily use the basic ideas and methods of management to analyze and solve management problems;</li> <li>3. Mastering the basic abilities of leadership in decision-making, organization and coordination, communication, etc.</li> <li>4. Having scientific way of thinking, good logical thinking ability, strong language ability and interpersonal skills.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Strategy and strategic management</li> <li>2. Vision, mission and strategic objectives</li> <li>3. External environment analysis</li> <li>4. Analysis of internal conditions of the enterprise</li> <li>5. Corporate strategy</li> <li>6. Management strategy</li> <li>7. Functional strategy</li> <li>8. Internationalization strategy</li> <li>9. Strategy and resource allocation</li> <li>10. Strategy and corporate governance</li> <li>11. Strategy and organizational structure</li> <li>12. Implementation of diversification strategy</li> <li>13. Strategic control and evaluation</li> </ol> <p><b>Course name: Investment and financing management</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Understanding the key points of enterprise investment and financing management;</li> <li>2. Grasping the ways to expand enterprise financing channels;</li> <li>3. Learning how to effectively manage enterprise financing risks and how to conduct scientific investment management</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Investment perspective</li> <li>2. Investment products with different characteristics</li> <li>3. Perspective on investment market</li> <li>4. Investment income and investment risk</li> <li>5. Portfolio</li> <li>6. Introduction to enterprise financing</li> <li>7. Capital structure theory and optimization of enterprise capital structure</li> <li>8. Equity financing of enterprises</li> <li>9. Debt financing of the enterprise</li> <li>10. Financial leasing</li> </ol>
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	<p>11. Project financing 12. Venture capital attraction</p> <p><b>Course name: Online Advertising</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Mastering the theory of Online advertising and communication systematically;</li> <li>2. Cultivating students' strong ability in communication, organization, coordination ability and innovative thinking;</li> <li>3. Mastering the basic skills of online advertising planning, creativity, production and release.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Advertising overview</li> <li>2. Overview of online advertising</li> <li>3. General principles of online advertising</li> <li>4. Online advertising planning and copywriting</li> <li>5. Network advertisement design</li> <li>6. Online advertising production</li> <li>7. Online advertising promotion</li> <li>8. Evaluation of online advertising effect</li> <li>9. Online advertising management</li> </ol>
<b>Examination requirements and examination form</b>	<p>Human resource management: Closed book exam Financial management: Closed book exam Strategic Management of Enterprises in the era of "Internet +": Closed book exam Investment and financing management: Closed book exam Online Advertising: Closed book exam</p>
<b>Teaching aids</b>	<p>Projector / blackboard / electronic document / Showcase / ppt courseware / laboratory</p>
<b>References</b>	<ol style="list-style-type: none"> <li>1. ZHAO, Z. <i>Financial Management</i> [M]. Beijing: Science Press, 2011.</li> <li>2. WANG, H. <i>Financial Management</i> [M]. Beijing: China Renmin University Press, 2013.</li> <li>3. Hai, B &amp; Jiang, Y. <i>Financial Management</i> [M]. Shanghai: Lixin Accounting press, 2015.</li> <li>4. Kotler, P, Keller K. L., et al. Trans. Wang Y., et al. <i>Marketing Management</i> (14th Edition) [M]. Beijing: China Renmin University Press, 2012.</li> <li>5. SUN, X. <i>Marketing</i> (Second Edition) [M]. Beijing: Science</li> </ol>



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## Module 14 All-round Development of Morality, Intelligence,

### Physique and Aesthetics

<b>Module designation</b>	All-round Development of Morality, Intelligence, Physique and Aesthetics
<b>Module code</b>	Module 14
<b>Course name/ Semester(s) in which module is taught / Credit point</b>	<p>Classic speech / 3 / 1ECTS</p> <p>Rhetoric and reasoning / 3 / 1ECTS</p> <p>On Justice / 4 /1ECTS</p> <p>On Happiness: Positive Psychology / 4 /1ECTS</p> <p>A brief history of time / 4 /1ECTS</p> <p>Modern economic geography of China / 4 /1ECTS</p> <p>Ideological Education and Fundamentals of Law / 1 / 1ECTS</p> <p>Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics / 2 / 1.5ECTS</p> <p>Compendium of Modern Chinese History / 4 / 1.5ECTS</p> <p>Basic principles of Marxism / 1 / 2ECTS</p> <p>Situation and policy / 3 / 0ECTS</p> <p>Military theory and training / 1 / 1ECTS</p> <p>Physical Education(1)/ 1 / 1ECTS</p> <p>Physical Education(2)/ 2 / 1ECTS</p> <p>Physical Education(3)/ 3 / 1ECTS</p> <p>Physical Education(4)/ 4 / 1ECTS</p> <p>Celebrity Forum / 1 / 1ECTS</p> <p>Top-teacher Class / 1 / 1ECTS</p>
<b>Person responsible for the module(name/professional ranks and titles)</b>	LI Dongmei/Lecturer
<b>Lecturer(name/ professional ranks and titles)</b>	<p>ZHANG Yang/ Lecturer, CHEN Chunyan/ Lecturer, CHEN Mingbo/ Lecturer, DENG Lulu/ Lecturer, HUANG Yanguo/ Lecturer, LI Jiao/ Lecturer, LI Luling/ Lecturer, LUO Lei/ Lecturer, WANG Yan/ Lecturer, YAN Changyi/ Lecturer, YANG Qian/ Lecturer, ZHANG Aichun/ Lecturer, ZHANG Sheng/ Lecturer, CHOU Mi/ Lecturer, ZHANG Xianya/ Assistant, ZHENG Lingling/ Assistant, LI Dongmei/Lecturer, LIU Huiqin/Lecturer, CHEN Xia/Lecturer, WANG Lidi/Lecturer, FU Zonghu/ Lecturer, CUI Qiaoyu/ Lecturer, AO Hong/ Lecturer, HE Shunxiang/ Lecturer, LIU Guangye/ Lecturer, LUO Bo/ Lecturer, YANG Yong / Associate professor, CHEN Jing / Lecturer, LU Zhilong / Lecturer, SONG Shan / Lecturer</p>
<b>Language</b>	Chinese





<b>Curriculum attribute</b>	<p>Classic speech: Elective</p> <p>Rhetoric and reasoning: Elective</p> <p>On Justice:Obligatory</p> <p>On Happiness: Positive Psychology:Elective</p> <p>A brief history of time:Elective</p> <p>Modern economic geography of China:Elective</p> <p>Ideological Education and Fundamentals of Law: Obligatory</p> <p>Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics: Obligatory</p> <p>Compendium of Modern Chinese History: Obligatory</p> <p>Basic principles of Marxism: Obligatory</p> <p>Situation and policy: Obligatory</p> <p>Military theory and training:Obligatory</p> <p>Physical Education(1):Obligatory</p> <p>Physical Education(2):Obligatory</p> <p>Physical Education(3):Obligatory</p> <p>Physical Education(4):Obligatory</p> <p>Celebrity Forum:Elective</p> <p>Top-teacher Class:Elective</p>
<b>Teaching methods</b>	<p>Explain/Set an example /Exercise / Multimedia /Competition /activity/Drill/Conversation/Inductive/Practical activity /Discussion / Key and difficult points teaching/ Lecture</p>
<b>Workload</b>	<p>Classic speech:: 30 hours of teaching</p> <p>Rhetoric and reasoning: 30 hours of teaching</p> <p>On Justice:Teaching : 30 hours of teaching</p> <p>On Happiness: Positive Psychology: 30 hours of teaching</p> <p>A brief history of time: 30 hours of teaching</p> <p>Modern economic geography of China:30 hours of teaching</p> <p>Ideological Education and Fundamentals of Law: 30 hours of teaching</p> <p>Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics: 45 hours of teaching</p> <p>Compendium of Modern Chinese History:45 hours of teaching</p> <p>Basic principles of Marxism: 60 hours of teaching</p> <p>Situation and policy: Teaching : 0 hours of teaching</p> <p>Military theory and training: 30 hours of teaching</p> <p>Physical Education(1): 30 hours of teaching</p> <p>Physical Education(2): 30 hours of teaching</p> <p>Physical Education(3): 30 hours of teaching</p> <p>Physical Education(4): 30 hours of teaching</p> <p>Celebrity Forum: Teaching: 30 hours of teaching</p> <p>Top-teacher Class: Teaching: 30 hours of teaching</p>
<b>Credit</b>	16



<p><b>Assessment methods</b></p>	<p>Classic speech: Homework, usual performance: 40% , final exam: 60%</p> <p>Rhetoric and reasoning: Homework, usual performance: 40% , final exam: 60%</p> <p>The world created by Socrates and Confucius:Homework, questioning and routine examination: 40%; final exam: 60%</p> <p>Economics in Life:Homework, questioning and routine examination: 40%; final exam: 60%</p> <p>Modern Journey of European Civilization:Homework, questioning and routine examination: 40%; final exam: 60%</p> <p>On Justice:Homework, questioning and routine examination: 40%; final exam: 60%</p> <p>On Happiness: Positive Psychology:Homework, questioning and routine examination: 40%; final exam: 60%</p> <p>A brief history of time:Homework, questioning and routine examination: 40%; final exam: 60%</p> <p>Modern economic geography of China:Homework, questioning and routine examination: 40%; final exam: 60%</p> <p>Ideological Education and Fundamentals of Law: Homework, questioning and practice: 50%, final exam: 50%</p> <p>Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics: Homework, questioning and practice: 50%, final exam: 50%</p> <p>Compendium of Modern Chinese History: Homework, questioning and practice: 50%, final exam: 50%</p> <p>Basic principles of Marxism: Homework, questioning and practice: 50%, final exam: 50%</p> <p>Physical Education(1), (2), (3), (4): Performance and attendance: 20%, Ball games special technology + competition: 60%, Quality assessment 1000M: 20%</p> <p>Celebrity Forum / Top-teacher Class: Performance and attendance 40%, course paper: 60%</p>
<p><b>Prerequisite courses</b></p>	<p>None</p>
<p><b>Module objectives/Intended learning outcomes</b></p>	<p>● <b>Module objectives:</b></p> <p>After complet the study of the module, students can get all-round development in moral, intellectual, physical, aesthetic and other aspects.</p> <p>● <b>Intended learning outcomes:</b></p> <p>After successfully learning this module, students should be able to demonstrate the following learning outcomes:</p> <p>1. Improve the students' physical and military quality, make them</p>



	<p>master the basic military theory, enhance the national defense concept and national security awareness, strengthen the patriotism and collective concept awareness, strengthen the organization and discipline;</p> <p>2. Forming perfect personality and good psychological quality;</p> <p>3. Establish correct outlook on life, values, morality and legal system;</p> <p>4. Solve the practical problems encountered in the road of growth and success, and promote the all-round development of students.</p> <p>5. Establish a correct understanding of China's current social form and the realization of self value;</p> <p>6. Cultivate students with good team spirit, effective communication, coordination and cooperation ability, and promote the comprehensive quality of students.</p>
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<p><b>Course name / Course objectives / Key knowledges</b></p>	<p><b>Course name: Classic speech</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Be familiar with the basic theory and method of speech.</li> <li>2. Improve the writing ability and presentation skills of speech, and solve practical problems.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Presentation techniques</li> <li>3. Classic speech case analysis</li> <li>4. Speech practice</li> </ol> <p><b>Course name: Rhetoric and reasoning</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the basic theories and methods of rhetoric and reasoning</li> <li>2. Be able to use rhetoric theory to improve the ability of analytical expression and logical judgment, and solve practical problem.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. The establishment and development of rhetoric</li> <li>3. The establishment of thinking logic</li> <li>4. Debate skills</li> <li>5. Logic of persuasion</li> </ol>
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	<p><b>Course name: On Justice</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"><li>1. Master On Justice in western thoughts, provide ideological resources for the research and judgment of social justice, fairness and other issues.</li><li>2. Cultivate the ability of abstract thinking and critical thinking.</li></ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"><li>1. Introduction</li><li>2. Logical fallacy</li><li>3. God</li><li>4. Real</li><li>5. Sophocles and Antigone</li><li>6. Socrates and the defense</li><li>7. Plato's Republic</li><li>8. Hobbes and Leviathan</li><li>9. Locke and on Government</li><li>10. Rousseau and the theory of social contract</li><li>11. Moral theory: Utilitarianism</li><li>12. Moral theory: deontology</li><li>13. Moral theory: Virtue Ethics</li><li>14. Rawls and On Justice</li><li>15. Justice as fairness: a study of Justice</li></ol> <p><b>Course name: On Happiness: Positive Psychology</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"><li>1. Master the basic theory and application methods of On Happiness: Positive Psychology, and improve the ability to solve practical problems.</li><li>2. Develop a positive and optimistic attitude.</li></ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"><li>1. Recognize On Happiness: Positive Psychology</li><li>2. Explore happiness</li><li>3. Perfect personality</li><li>4. Be optimistic</li><li>5. Positive emotions</li><li>6. Insight into EQ</li><li>7. Inverse quotient</li><li>8. Goal setting and time management</li><li>9. Positive relationship</li></ol>
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	<p>10. Gratitude</p> <p>11. Gender and love</p> <p><b>Course name: A Brief History of Time</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Understanding the basic knowledge of physics in Hawking's a brief history of time.</li> <li>2. Understanding the singularity law, black hole radiation and boundless universe model.</li> <li>3. Cultivating students' scientific spirit and independent thinking ability.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Hawking and a brief history of time</li> <li>2. Our universe</li> <li>3. Relativity: space and time</li> <li>4. Expanding universe</li> <li>5. Big bang, black hole and universe evolution</li> <li>6. The beginning and future of the universe</li> <li>7. Time Arrow</li> <li>8. Wormhole and time travel</li> </ol> <p><b>Course name: Modern economic geography of China</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Understanding the causes, historical process and results of the changes of economic geography in modern China.</li> <li>2. Exploring the factors influencing the formation of modern economic geography in China.</li> <li>3. Cultivating students' economic thinking ability and critical thinking ability.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Development of import and export trade and domestic business</li> <li>3. The growth and spatial distribution of modern population</li> <li>4. The development and spatial pattern of modern agriculture</li> <li>5. The development and geographical distribution of modern industry and mining industry</li> <li>6. The development and spatial distribution of modern transportation</li> </ol>
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	<p>7. The spatial distribution and changes of modern financial industry</p> <p>8. The time course of modern economic changes</p> <p><b>Course name: Ideological Education and Fundamentals of Law</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Understanding university is an important period of life development, and cherishing the good time of University.</li> <li>2. Establish a correct outlooks of world, life and values.</li> <li>3. Understand the basic concepts and main provisions of China's socialist constitution and relevant laws, truly learn, understand and use the law, handle affairs according to law, safeguard the legitimate rights and interests of the state and individual citizens according to law, and earnestly fulfill legal obligations.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. The characteristics of university life, the basic concepts of morality and law, the basic content of socialist core values, and the great significance of cultivating and practicing socialist core values.</li> <li>2. The meaning and characteristics of ideals and beliefs, the significance of ideals and beliefs, and the content and meaning of the common ideal of socialism with Chinese characteristics; The relationship between ideal and reality, personal ideal and social ideal.</li> <li>3. The Chinese spirit is the unity of the national spirit and the spirit of the times, the basic content of the national spirit, patriotism and its value of the times, and the spirit of the times and its main embodiment.</li> <li>4. The main content of outlook on life, the standard and evaluation of life value, and the realization conditions of life value; Specific methods to promote the harmony of life environment.</li> <li>5. The origin and essence of morality, the function and function of morality, the historical development of morality, the contemporary value and basic spirit of Chinese traditional virtues, and the main content of Chinese revolutionary morality; The core and principle of socialist moral construction.</li> <li>6. The basic content of moral standards in public life and the moral requirements in network life; Ethics in professional life; The moral standards of love, marriage and family, the basic contents of College Students' views on love, marriage and family virtues.</li> <li>7. The etymology and meaning of law, the essence and characteristics of law, the role of socialist law, and the operation of socialist law; The basic principles and systems established by the constitution of our country include the substantive legal department</li> </ol>
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	<p>and the procedural legal department.</p> <p>8. The meaning and characteristics of legal thinking, the basic content of legal thinking; It is of great significance and basic requirement to cultivate the thinking of rule of law and respect the authority of law.</p> <p>9. The concept of legal rights and obligations, the relationship between legal rights and legal obligations; The basic rights and obligations of citizens stipulated in the constitution of our country; The procedures and requirements of exercising rights, relieving rights, respecting the rights of others and performing obligations according to law.</p> <p><b>Course name: Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"><li>1. Mastering the basic theory of Mao Zedong Thought and the theoretical system of socialism with Chinese characteristics.</li><li>2. Understanding the historical process of the Communist Party of China in integrating the basic principles of Marxism with China's reality.</li><li>3. Firming the ideal and belief of taking the road of socialism with Chinese characteristics under the leadership of the Communist Party of China.</li><li>4. Consciously adhering to the party's basic theory, line and program.</li></ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"><li>1. The historical process and scientific connotation of Sinicization of Marxism; The formation process, historical position and main content of Mao Zedong Thought; The formation process and main contents of the theoretical system of socialism with Chinese characteristics; The scientific connotation of the ideological line of seeking truth from facts.</li><li>2. The national conditions of modern China and the characteristics of the times of Chinese revolution; The road and basic experience of the new democratic revolution; The general line and basic program of new democracy; The three magic weapons of the new democratic revolution.</li><li>3. The proposal, theoretical basis and content of the general line in the transitional period; The theoretical basis for the establishment of the basic socialist system; The road and historical experience of socialist transformation suitable for Chinese characteristics.</li><li>4. The experience and lessons of the preliminary exploration of the socialist construction road; The idea of mobilizing all positive</li></ol>
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	<p>factors to serve the socialist cause; Correctly understand and deal with the socialist social contradictions.</p> <p>5. The formation, scientific meaning and main characteristics of the theory of the primary stage of socialism; The party's basic line and program in the primary stage of socialism.</p> <p>6. The essence of socialism and the proposition of “Chinese dream” ; The scientific connotation and significance of the theory of socialist essence; The fundamental task of socialism “Three step development strategy” ; The requirements of building a well-off society in an all-round way; The connotation of Chinese dream.</p> <p>7. The theoretical and practical basis of reform and opening up; The form, principle and pattern of opening to the outside world and the significance of strengthening international exchanges and cooperation; The main content, nature and purpose of the reform and the relationship among reform, development and stability.</p> <p>8. The basic economic system and distribution system in the primary stage of socialism; Socialist democratic political system with Chinese characteristics; The fundamental task of socialist culture with Chinese characteristics; The scientific meaning of building a socialist harmonious society is to strengthen the construction of ecological civilization.</p> <p>9. The formation and development process of the concept of “peaceful reunification” and “one country, two systems”; The successful practice of the concept of “one country, two systems” in Hong Kong and Macao, as well as its basic content and significance; Under the new situation, we should adhere to the principle of working with Taiwan.</p> <p>10. Mao Zedong's analysis of the international situation after World War II; Deng Xiaoping's new judgment on the theme of the times; The formation and development of an independent foreign policy of peace and its basic principles.</p> <p>11. The fundamental force of building socialism with Chinese characteristics; The modernization of national defense and the armed forces; The contents and basic tasks of the patriotic united front in the new period; The party's ethnic policy and religious policy in the new period.</p> <p>12. The nature and purpose of the Communist Party of China; The basis and method of building a learning, service and innovative Marxist ruling party.</p> <p><b>Course name: Compendium of Modern Chinese History</b></p> <p><b>Course objectivess:</b></p> <p>After learning the four courses, students can obtain the</p>
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	<p>following objectives:</p> <ol style="list-style-type: none"> <li>1. Understanding the historical process and internal laws of social and revolutionary development in modern China.</li> <li>2. Understanding that modern China is a history of heroic struggle and arduous exploration by generations of people with lofty ideals and the masses of the people to save the nation from subjugation and realize the great rejuvenation of the Chinese nation, understand the history of the people of all ethnic groups winning national independence and people's liberation through the new democratic revolution under the leadership of the Communist Party of China, and through the socialist revolution, construction and reform, The history of gradually turning an extremely poor old China into a new socialist China full of vigor and vitality.</li> </ol> <p><b>Key knowledges:</b></p> <ol style="list-style-type: none"> <li>1. Capital: the process of imperialist aggression against China.</li> <li>2. The rise and fall of peasants' struggle storm; The rise and fall of Westernization Movement; The rise and fall of the reform movement.</li> <li>3. The banner of modern national democratic revolution.</li> <li>4. The historical process of the new culture and the May 4th movement; The further spread of Marxism and the birth of the Communist Party of China; The historical conditions, characteristics and significance of the founding of the Communist Party of China; The new situation of the Chinese revolution.</li> <li>5. The arduous exploration of the new revolutionary road; The Chinese revolution has made tortuous progress in exploration; The opening up of the revolutionary road of encircling the cities from the countryside.</li> <li>6. Japan launched a war of aggression against China; The Communist Party of China became the mainstay of the Anti Japanese war; The victory of the Anti Japanese War and its reasons and significance.</li> <li>7. From striving for peace and democracy to waging a war of self-defense; The Kuomintang government was surrounded by the whole people; The cooperation between the Communist Party of China and the democratic parties; Create a new China of people's democratic dictatorship.</li> <li>8.8. The beginning of the transition from New Democracy to socialism; The socialist road is the choice of history and the people; The significance of the establishment of the basic socialist system.</li> <li>9. The good start, setbacks, and achievements of the Communist Party of China in exploring socialist construction.</li> <li>10. The new situation of reform, opening up and modernization is unfolding; The cross-century development of the cause of socialism with Chinese characteristics; Promoting socialism with Chinese characteristics at a new historical starting point; Opening up a</li> </ol>
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	<p>wider development prospect of socialism with Chinese characteristics; Unswervingly advance along the road of socialism with Chinese characteristics.</p> <p><b>Course name: Basic Principles of Marxism</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"><li>1. Master the basic viewpoints of dialectical materialism and historical materialism, and establish a correct world outlook, outlook on life and values;</li><li>2. Learn to use scientific thinking and working methods to understand and deal with various practical problems;</li><li>3. Establish the ideal and belief of building socialism with Chinese characteristics for students, consciously adhere to the party's basic theory, basic line, and basic program;</li><li>4. Cultivate a new generation with ideals, morality, culture, and discipline.</li></ol> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"><li>1. The basic connotation of Marxism; The subjective and objective conditions for the emergence of Marxism.</li><li>2. The concept, basic problems, and existing forms of matter; Materialism, idealism, knowability, and agnosticism; Consciousness; The concept and classification of connection; The concept and essence of development; The concept and relationship of qualitative change and quantitative change; The basic content of dialectical negation.</li><li>3. Basic concepts: practice, cognition, truth, value, necessity and freedom, understanding and transforming the world. The decisive role of practice in cognition; The essence of cognition and its law of development; The characteristics of truth and its test standard; The unity of truth and value; Knowing the world and transforming it.</li><li>4. Basic concepts: social existence, social consciousness, mode of material production, productive forces, relations of production, economic foundation, superstructure, state, class, and people. Historical materialism and idealism; The basic contradiction of human society and its movement law; The basic law and dynamic system of social development; The people are the creators of history and the decisive force of historical development.</li><li>5. The basic contradiction of commodity economy based on private ownership; Labor theory of value and its significance; Surplus value theory and its significance; The basic contradiction of capitalism and economic crisis; Capitalist political system and ideology.</li></ol>
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	<p>6. The formation and characteristics of private monopoly capitalism; The characteristics and essence of state monopoly capitalism; The performance and consequence of economic globalization; The historical status of capitalism and the historical inevitability of its replacement by socialism.</p> <p>7. Three stages of utopian socialism development; The basic principles of scientific socialism; The long-term and arduous nature of socialist construction.</p> <p>8. Basic concept: communism. The essential characteristics of communism, the free and all-round development of human beings, and the Communist society are the necessity of historical development.</p> <p><b>Course name: Situation and Policy</b>  <b>Course objectives:</b>          After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Help students correctly understand the country's political and economic situation, as well as the international environment and background of the national reform and development</li> <li>2. Correctly understand the party's basic line, major principles, and policies, correctly analyze the hot issues concerned by the society, stimulate students' patriotic enthusiasm, enhance their national self-confidence and sense of social responsibility, grasp the future, study hard, and serve the country.</li> </ol> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"> <li>1. Five years of hard work;</li> <li>2. New changes in the international counter-terrorism situation and their impacts;</li> <li>3. One belt, one road, and one way;</li> <li>4. Retrospect and Prospect of Hong Kong's return to China in the past 20 years.</li> </ol> <p><b>Course name: Military Theory and Training</b>  <b>Course objectives:</b>          After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Grasp the importance of national defense;</li> <li>2. Understand the law of the developing military theory and the main military thoughts of our country;</li> <li>3. Understand the security environment around China;</li> <li>4. Understand the current advanced military technology of the</li> </ol>
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	<p>international community;</p> <p>5. Understand the style of current international information warfare;</p> <p>6. Master the PLA regulations and basic skills training;</p> <p>7. Enhance the legal concept and safety awareness, and improve their legal quality and prevention ability.</p> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"> <li>1. National defense of China</li> <li>2. Military concept</li> <li>3. International strategic environment</li> <li>4. Advanced military technology</li> <li>5. Information war</li> <li>6. Ordinances education and training</li> <li>7. Comprehensive military training</li> <li>8. Prevention of electric shock and fire accidents</li> <li>9. Prevention of network fraud</li> <li>10. Proper self-defense and coping style in sexual assault</li> <li>11. Prevention of illegal pyramid selling</li> <li>12. Prevention of network crime</li> <li>13. Prevention of alcoholism, gambling, and drug-related problems</li> </ol> <p><b>Course name: Physical Education(1)(2)(3)(4)</b></p> <p><b>Course objectives:</b></p> <p>After learning the four courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. Master the basic skills of basketball, volleyball, football, 24-style Simplified Taijiquan, aerobics, swimming, and other sports;</li> <li>2. Ensure the physical quality and physical and mental health of college students;</li> <li>3. Cultivate good sports consciousness and lifelong exercise habit.</li> </ol> <p><b>Key knowledge:</b></p> <ol style="list-style-type: none"> <li>1. Swimming competition rules, techniques, tactics, and training</li> <li>2. Basketball game rules, techniques, tactics, and training</li> <li>3. Football game rules, techniques, tactics, and training</li> <li>4. Volleyball Relevant rules, techniques, tactics, and training</li> <li>5. Middle and long-distance running: 1000 / 800m</li> <li>6. Basic action essentials and training of Taijiquan</li> </ol> <p><b>Course name: Celebrity Forum / Top-teacher Class</b></p> <p><b>Course objectives:</b></p> <p>After learning the courses, students can obtain the following objectives:</p> <ol style="list-style-type: none"> <li>1. It is necessary to comprehensively improve students' awareness</li> </ol>
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	<p>of various disciplines, understand the development history, current status, and future planning of various disciplines and fields, examine their characteristics and development planning, and focus on training;</p> <p>2. Lead students to sort out, expand and extend their knowledge;</p> <p>3. Explore the law of knowledge development and transfer methods;</p> <p>4. To cultivate students' divergent thinking, ability to use interdisciplinary knowledge, and research level;</p> <p>5. Meet the diverse needs of students and cultivate innovative talents.</p>
<b>Examination requirements and examination form</b>	<p>Creative Writing: Written exam</p> <p>From Novel to Film: Written exam</p> <p>Classic Speech: Written exam</p> <p>Rhetoric and Theory: Written exam</p> <p>The World Created by Socrates and Confucius: Written exam</p> <p>Economics in Life: Written exam</p> <p>The Modern History of European Civilization: Closed-book exam</p> <p>Theory of Justice: Closed-book exam</p> <p>On Happiness: Positive Psychology: Closed-book exam</p> <p>A Brief History of Time: Closed-book exam</p> <p>The Modern Economic Geography of China: Closed book exam</p> <p>Ideological Education and Fundamentals of Law: Closed-book exam</p> <p>Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics: Closed-book exam</p> <p>Compendium of Modern Chinese History: Closed-book exam</p> <p>Basic Principles of Marxism: Closed-book exam</p> <p>Situation and Policy: Closed-book exam</p> <p>Military Theory and Training: On-site examination</p> <p>Physical Education(1)(2)(3)(4): On-site Skills evaluation</p> <p>Celebrity Forum/Top-teacher Class: Course Paper</p>
<b>Teaching aids</b>	projector /blackboard / electronic documents /display table / ppt courseware
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