Module Descriptions for Electronic Information Engineering

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09 Module Descriptions

Psychological Health Education for College Students

Module designation	psychological health education for College Students
Semester(s) in which the module is taught	1th semester
Person responsible for the module	Mr. Zhang Jinming
Language	Chinese
Relation to curriculum	《Mental Health Education for College Students》 is a public compulsory course for all students in the school, which integrates knowledge transfer, psychologicaSl experience and behavior training. The course aims to enable students to clarify the standards and significance of mental health, enhance their awareness of self-mental health care, master and apply mental health knowledge, cultivate self-cognitive ability, interpersonal communication ability, self-regulation ability, effectively improve psychological quality, and promote students ' all-round development.
Teaching methods	1.Lecture method ; 2. Case law ; 3.Discussion method ; 4. Blended teaching method ; 5.Psychological training.
Workload (incl.contact hours，self-study hours)	Total workload = 60 hours Contact hours = 32hours Self-study hours = 28 hours
Credit points（ECTS）	ECTS Credit=2.0
Required and recommended prerequisites for joining the module	Nil.
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** Through the teaching of this course, students can understand the relevant theories and basic concepts of psychology, clarify the standards and significance of mental health, understand the psychological development characteristics and abnormal performance of college students, and master the basic knowledge of self-adjustment. ● **Skill：** Through the teaching of this course, students can master self-exploration skills, psychological adjustment skills and psychological development skills. Such as learning development skills, environmental adaptation skills, stress management skills, communication skills, problem solving skills, self-management skills, interpersonal skills and so on.

	● **Competence：** Through the teaching of this course, students can establish the independent consciousness of mental health development, understand their own psychological characteristics and personality characteristics, objectively evaluate their physical conditions, psychological conditions and behavioral abilities, correctly understand themselves and accept themselves. When they encounter psychological problems, they can adjust themselves or seek help, and actively explore suitable for themselves and adapt to the living conditions of society.
Content	**Part A.Theoretical teaching(32 contact hours; 28 self-study hours)** **Chapter 1 Overview of mental health** **(4 contact hours; 4 self-study hours)** ● An overview of mental health ● College students' mental health status and the existence of psychological barriers ● Factors Affecting College Students' Mental Health **Chapter 2** Psychological Adaptation and Counseling of College Students **(4 contact hours; 6 self-study hours)** ●Overview of College Students' Psychological Adaptation ●The main problems of college students' psychological adaptation ●The causes of college students' psychological adaptation problems ●Psychological Adaptation Counseling for College Students **Chapter 3** College Students ' Cognitive Psychology and Counseling **(4 contact hours; 6 self-study hours)** ●Cognitive overview ●The Characteristics of College Students' Cognitive Psychology ●The Main Bad Cognition of College Students ●College Students' Cognitive Psychological Counseling **Chapter 4** College Students' Emotional Psychology and Counseling **(4 contact hours; 6 self-study hours)** ●Emotional overview ●The Characteristics of College Students ' Emotional Psychology ●The Main Bad Mood of College Students ●College Students ' Emotional Psychological Counseling **Chapter 5** College Students ' Personality Psychology and Counseling **(4 contact hours; 6 self-study hours)** ●Psychological Interpretation of Personality ●Ability, temperament, character ●College Students' Bad Personality and Its Adjustment ●College Students' Personality Psychological Counseling ●Typical character personality psychological analysis classroom sharing report **Chapter 6** College Students' Learning Psychology and Counseling **(4 contact hours; 8 self-study hours)**

	●Overview of learning ●Characteristics of College Students' Learning ●The psychological problems of college students in learning. ●College Students' Learning Psychological Counseling **Chapter 7** College Students ' Interpersonal Psychology and Counseling **(4 contact hours;8 self-study hours)** ●An overview of interpersonal communication ●Characteristics of College Students' Interpersonal Communication ●Factors Affecting College Students' Interpersonal Communication ●College Students Interpersonal Psychological Counseling **Chapter 8** College Students' Love Psychology and Counseling **(4 contact hours; 8 self-study hours)** ●Overview of love : the Characteristics of College Students' Love Psychology ●Analysis of College Students' Love Psychological Phenomenon ●College Students' Love Psychological Counseling **Chapter 9** College students' life education and psychological crisis response **(4 contact hours; 6 self-study hours)** ●Cognition of human life ●The Manifestation of College Students' Psychological Crisis ●The prevention and intervention of college students' psychological crisis **Part B.Exercise teaching(3 self-study hours)**
Examination forms	Open a written test.
Study and examination Requirements	●Students should complete their homework independently. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include two parts : the usual assessment and the final assessment. Among them : ●The usual performance accounts for 60 %, which is composed of five parts: classroom psychological sitcom, psychological operation training, interpersonal relationship group training, usual homework and mid-term examination. ●The final examination results accounted for 40 %, and the final examination method was open-book examination.
Reading list	[1]Zhang Jinming, Pu Wenhui, College Students ' Mental Health Education Tutorial, Beijing University of Posts and Telecommunications Press, 2015.4. [2]Written by Wu Yiling, Mental Health Education Course, Beijing Normal University Press, July 2010. [3]Lei Wuming, Psychology of College Students ' Mental Health, Renmin University of China Press, June 2010.
Data of last mendment	June 29, 2025

Ideological and Moral Education and the Rule of Law

Module designation	Ideological Morality and the Rule of Law
Semester(s) in which the module is taught	1st semester
Person responsible for the module	Qi Bei
Language	Chinese
Relation to curriculum	This course is a university-wide ideological and political theory course, a compulsory course for all majors, and a required course for freshman of all disciplines across the university. College students are required to recognize that only by striving to master the basic theories of Marxism, cultivating good ideological and moral qualities and legal literacy, integrating their personal life ideals into the cause of the country and the nation, establishing the resolve and confidence to strive for the Chinese Dream of the great rejuvenation of the Chinese nation, and courageously being forerunners ahead of the times can they ultimately achieve great accomplishments. Addressing the ideological, moral and legal issues encountered by college students in their growth process, the course effectively carries out education on the Marxist world outlook, outlook on life, values, moral values and legal outlook. It comprehensively applies knowledge from relevant disciplines and, in accordance with the basic laws of college students' growth, educates and guides them to strengthen their own ideological and moral cultivation, and enhance their legal concepts and awareness.
Teaching methods	1. Lecture method； 2. Case method； 3. Discussion method； 4. Practical teaching。
Workload (incl.contact hours，self-study hours)	Total workload = 90 hours Contact hours = 48 hours Self-study hours = 42 hours
Credit points	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Outline of Modern and Contemporary Chinese History、 Basic Principles of Marxism
Module objectives/ intended learning outcomes	**Course Objective 1** Rationally apply knowledge from relevant disciplines, educate and guide college students to strengthen their ideological and moral cultivation, enhance their legal concepts and awareness, and establish core socialist values in accordance with the basic laws of college students' growth. Help students foster correct

	ideals, beliefs, world outlook and outlook on life, and improve their humanistic quality. **Course Objective 2** Achieve the unity of knowledge and practice. Integrate theory with practice, analyze and solve practical problems with the theories learned, and guide daily life and practice.
Content	**Part A. Theoretical teaching** **(36 contact hours; 34 self-study hours)** **Chapter 1 Introduction** **(6 contact hours; 4 self-study hours)** ● We are in a new era of socialism with Chinese characteristics ● The new era calls for new-era talents who undertake the great mission of national rejuvenation ● Continuously improve ideological and moral standards as well as legal literacy **Chapter 2 Understand Life Essence, Hold Life Direction** **(4 contact hours; 4 self-study hours)** ● Outlook on life is the general view of life ● A correct outlook on life ● Create a meaningful life **Chapter 3** Pursue lofty ideals and uphold noble beliefs **(6 contact hours; 4 self-study hours)** ● The connotation and significance of ideals and beliefs ● Strengthen faith, conviction and confidence ● Let youth dreams soar in the practice of realizing the Chinese Dream **Chapter 4 Carry forward the fine traditions and promote the Chinese spirit** **(4 contact hours; 4 self-study hours)** ● The Chinese spirit is the soul of rejuvenating and strengthening the nation. ● Be a loyal patriot in the new era ● Let reform and innovation become the driving force for youth to voyage far **Chapter 5 Clarify value requirements and practice value standards** **(4 contact hour; 4 self-study hours)** ● The common value pursuit of all the people ● The distinctive features of the Core Socialist Values ● Actively practice the Core Socialist Values **Chapter 6 Abide by moral norms and cultivate moral character** **(4 contact hours; 4 self-study hours)** ● The core and principles of socialist morality ● Absorb and draw on excellent moral achievements

	● Devote oneself to moral practices that uphold virtue and pursue goodness **Chapter 7 Learn the Thought on the Rule of Law and Improve Legal Literacy** **(8 contact hours;10 self-study hours)** ● The features and operation of socialist law ● Uphold law-based governance in all respects ● Safeguard the authority of the Constitution ● Consciously respect, study, abide by and apply the law **Part B. Practical teaching (8 self-study hours; 4 self-study hours)** **Part C. Exam (4 contact hours; 4 self-study hours)**
Examination forms	Open-book written examination
Study and examination Requirements	The assessment methods of this course consist of two parts: daily assessment and final assessment. Among them: ● The daily grade accounts for 30%, including the midterm examination (20%), assignments (10%) and practical teaching (30%). ● The final grade accounts for 70%.
Reading list	[1] The Writing Group for Key Textbooks of the Project of Research and Construction of Marxist Theory. *Ideals, Morality and the Rule of Law*. Beijing: Higher Education Press, August 2021 (Revised Edition 2021). [2] Liu Shulin. *Teacher's Reference Book for Ideals, Morality and the Rule of Law* (Supplementary Book for Key Textbooks of the Project of Research and Construction of Marxist Theory). Beijing: Higher Education Press (Revised Edition). [3] Department of Social Sciences, Ministry of Education. *Teaching Cases for the Course of Ideals, Morality and the Rule of Law*. Beijing: Higher Education Press, 1st Edition, July 2010.
Data of last mendment	June 29, 2025

Conspectus of Chinese Modern History

Module designation	Conspectus of Chinese Modern History
Semester(s) in which the module is taught	First second semester
Person responsible for the module	college of marxism
Language	Chinese
Relation to curriculum	The Outline of Modern Chinese History is a compulsory public ideological and political theory course for college students in China. Through teaching, students can have a basic understanding of modern Chinese history at a macro level, guide students to understand and grasp the historical process and internal laws of social development, revolution, construction and reform in modern China, deeply understand how history and people choose Marxism, the Communist Party of China, the socialist road and the reform and opening up, deeply understand why the Communist Party of China can, why Marxism can be carried out, why socialism with Chinese characteristics is good, and more firmly strive for the great rejuvenation of the Chinese nation under the strong leadership of the Communist Party of China.
Teaching methods	1. Lecture method； 2. Case law； 3. Discussion method； 4. blended teaching methods 5. mixed teaching method；
Workload (incl.contact hours，self-study hours)	Total workload = 90 hours Contact hours = 48 hours Self-study hours = 42 hours
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** 1.Understand the Western powers and China 's feudal forces to the Chinese people and the Chinese nation brought about by the deep suffering, understand the Chinese people in modern times to fight for national independence, people 's liberation and the realization of national prosperity, people 's happiness of the two major historical tasks to continue the struggle of history. 2.To understand the great process and significance of creating and developing socialism with Chinese characteristics, and to understand the great achievements and greater significance of socialism with

	Chinese characteristics in the new era ; 3.Understand the historical process of Marxism in China, Deeply understand the great significance of comprehensively implementing the socialist ideology with Chinese characteristics in the new era ; ● **Skill：** 1.Understand the historical inevitability of the new democratic revolution replacing the old democratic revolution and the people 's Republic replacing the bourgeois republic, understand the historical inevitability of the Communist Party of China leading the Chinese people to embark on the socialist road, and deeply understand that there is no new China without the Communist Party of China, and only socialism can save China. 2.We should strengthen the belief that only socialism with Chinese characteristics can develop China, and only upholding and developing socialism with Chinese characteristics can realize the great rejuvenation of the Chinese nation, and enhance the road confidence, theoretical confidence, institutional confidence and cultural confidence of socialism with Chinese characteristics ; 3.Consciously arming the mind with the innovative theory of the Communist Party of China ; it can firmly establish historical materialism and improve the ability to analyze and solve problems by using scientific historical methodology. ● **Competence：** 1.Be able to establish a correct outlook on life and world outlook, with good knowledge of humanities and moral cultivation ; Understand the national conditions, understand the socialist core values, and have a sense of social responsibility.
Content	**Part A.Theoretical teaching(48 contact hours; 42 self-study hours)** **Chapter 1 The hardships and struggles of the Chinese nation after entering modern times** **(4 contact hours; 4 self-study hours)** ●Understand the development of world capitalism and colonial expansion and the decline of Chinese feudal society ; ●The semi-colonial and semi-feudal nature of modern Chinese society, the main contradictions and historical tasks ; ●To understand the Western powers of China 's military aggression, economic plunder, political control and cultural slavery ; ●Understand the struggle of the Chinese people for national independence. ●To grasp the reasons for the failure of the Chinese people 's struggle against aggression and the awakening of national consciousness. **Chapter 2** The early exploration of different social forces on the way out of the country **(4 contact hours; 4 self-study hours)**

	●The ups and downs of the Taiping Heavenly Kingdom movement ; ●The rise and fall of the Westernization Movement ; ●The rise and fall of the Reform Movement. **Chapter 3** Xinhai Revolution and the end of autocratic monarchy system **(4 contact hours; 4 self-study hours)** ●To understand the process of the Xinhai Revolution ; understanding the great significance and failure lessons of the Xinhai Revolution ; ●Grasp the historical inevitability of the old democratic revolution giving way to the new democratic revolution. **Chapter 4** The founding of the Communist Party of China and the new situation of Chinese revolution **(4 contact hours; 4 self-study hours)** ●To understand the inevitability of the New Culture Movement and the May Fourth Movement and their historical role and significance in modern Chinese history, and to understand the profound relationship between the May Fourth Movement and the Communist Party of China and the Chinese revolutionary movement ; ●Understand the various social trends of thought during the May Fourth Movement and the influence of the spread of Marxism on the Chinese revolution ; ●Understand the original intention and mission of the Communist Party of China and the historical inevitability and significance of the founding of the Communist Party of China ; ●To grasp the rise of the first Kuomintang-Communist cooperation and the national revolution and the reasons for its failure. **Chapter 5** new path of chinese revolution **(4 contact hours; 2 self-study hours)** ●Understand the arduous process of the Chinese Communists exploring the new road of the Chinese revolution ; ●The theory of understanding the new path of the Chinese revolution ; ●To understand the historical significance of the armed struggle and agrarian revolution carried out by the Communist Party of China ; ●It is extremely important to master the combination of the basic principles of Marxism and the concrete practice of the Chinese revolution. **Chapter 6 The Anti-Japanese War of the Chinese nation** **(4 contact hours; 2 self-study hours))** ●To understand the ambition of Japanese militarism to invade China and its crimes ; ●To understand the situation of the Anti-Japanese War in the front battlefield of the Kuomintang ; ●Understanding that the Communist Party of China is the mainstay of the Anti-Japanese War ;

	●Grasp the reasons and great significance of the victory of the Anti-Japanese War. **Chapter 7** Struggle for the establishment of new China **(2 contact hours; 2 self-study hours)** ●Understand the struggle of the Communist Party of China for peace and democracy ; ●Understand the Kuomintang reactionaries in the military, political, economic failure and the reasons ; ●Understand the process of the liberation war led by the Communist Party of China and the historical significance of its great victory ; ●Grasp the significance and basic experience of the victory of the Chinese revolution. **Chapter 8** The founding of the People 's Republic of China and the exploration of China 's socialist construction road **(4 contact hours; 2 self-study hours)** ●Understand the situation and tasks in the early days of the founding of New China ; ●Understand the background of the preliminary exploration of the socialist road ; ●Understand the party 's general line and socialist transformation in the transitional period ; ●It is the choice of history and people to master the transformation of our country from new democracy to socialism and take the socialist road. ●Grasp the experience and lessons of the first generation of leaders of the Communist Party of China in exploring the road of socialist construction. **Chapter 9** Reform and opening up and the creation and development of socialism with Chinese characteristics **(4 contact hours; 4 self-study hours)** ●Understand the historical process of reform and opening up and socialist modernization ; ●Understand the basic theory, basic line, basic program and basic experience of the Communist Party of China in the primary stage of socialism ; ●Master the historical process and theoretical achievements of Marxism in China in the new period. **Chapter 10** socialism with chinese characteristics entering a new era **(6 contact hours; 6 self-study hours)** ●Understand the historical achievements and historical changes of the party and the state since the 18 th National Congress ; ●Understand the goal of building a well-off society in an all-round way, the Chinese dream of national rejuvenation, the overall layout of the " five in one " and the " four comprehensive " strategic layout ;

	●Grasp the main content and historical status of the thought of socialism with Chinese characteristics in the new era of president xi jinping; ●To understand the overall victory of poverty alleviation and the realization of the goal of building a well-off society in an all-round way ; ●Understand the new development stage, new development concept and new development pattern. **Part B.Exercise teaching(4 contact hours; 4 self-study hours)** **Part C. Experiment teaching(4 contact hours; 4 self-study hours)**
Examination forms	Open-book written examination
Study and examination Requirements	●Students should complete their homework and practice independently. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include two parts : usual assessment and final assessment. Among them : ●The usual results accounted for 30 %, including 20 % of performance, 20 % of homework, 30 % of practice, and 30 % of mid-term examination. ●The final grade accounted for 70 %.
Reading list	1.Compilation Group of this book, Outline of Modern and Contemporary Chinese History (Revised Edition 2021). Beijing : Higher Education Press, 2021.8. 2.This book writing group, a brief history of the Communist Party of China. Beijing : People 's Publishing House, 2021.2 3.The CPC Central Committee Party History Research Office, the Communist Party of China for 90 years. Beijing : History of the Communist Party of China Press, 2016. 6 4.Institute of Contemporary China, 70 years of new China. Beijing : Contemporary China Press, 2019.12 5. Zhang Qizhi 's work, volume of late Qing Dynasty and the Republic of China in Chinese history. Beijing : Higher Education Press, 2001.7
Data of last mendment	June 29, 2025

Basic Principles of Marxism

Module designation	Basic Principles of Marxism
Semester(s) in which the module is taught	3th semester
Person responsible for the module	Mr. Jian He
Language	Chinese
Relation to curriculum	This course is the ideological and political theory course of the whole school, and it is a compulsory course for all majors. The main purpose of setting up this course is to educate students on the basic principles of Marxism, help students master the world outlook and methodology of Marxism, establish a scientific outlook on life and values, learn to observe and analyze problems with the world outlook and methodology of Marxism, and establish the ideals and beliefs of socialism with Chinese characteristics for students. Consciously adhere to the party 's basic theory, basic line and basic program to lay a solid theoretical foundation.
Teaching methods	1. lecture method； 2.case law； 3. discussion method； 4.practice teaching
Workload (incl.contact hours，self-study hours)	Total workload = 90 hours Contact hours = 40 hours Self-study hours = 42 hours
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Morality and Legal System, Outline of Modern Chinese History
Module objectives/ intended learning outcomes	**Objectives 1** Help students master the basic viewpoints of dialectical materialism and historical materialism, establish a correct world outlook, outlook on life and values, and learn to use Marxist positions, viewpoints and methods to analyze and solve practical problems. **Objectives 2** To establish the ideals and beliefs of socialism with Chinese characteristics for students, consciously adhere to the party 's basic theory, basic line and basic program, comprehensively improve their own quality, and become qualified builders and successors of the cause of socialism with Chinese characteristics.
Content	**Part A. Theoretical teaching (36 contact hours)** **Chapter 1 Introduction** **(4 contact hours，4 self-study hours)** ●What is Marxism ; ●the establishment and development of Marxism ; ●The distinctive features of Marxism ; ●The contemporary value of Marxism ;

	●consciously learning and applying Marxism ; **Chapter 2** The materiality and development law of the world **(8 contact hour，8 self-study hours)** ●World diversity and material unity ; ●The universal connection and change development of things ; ●Materialist dialectics is the fundamental method to understand and transform the world. **Chapter 3** Practice and Cognition and Its Development Law **(6 contact hours，4 self-study hours)** ●Practice and cognition ; ●Truth and value ; ●Understanding the world and transforming the world ; **Chapter 4** Human society and its law of development **(6 contact hours，4 self-study hours)** ●the existence and development of human society ; ●The driving force of social and historical development ; ●The role of the people in the development of history ; **Chapter 5** The essence and law of capitalism **(4 contact hour，4 self-study hours)** ●Commodity economy and law of value ; ●Capitalist economic system ; ●Capitalist superstructure ; **Chapter 6** The development and trend of capitalism **(4 contact hours，4 self-study hours)** ●The formation and development of monopoly capitalism ; ●Correctly understand the new changes of contemporary capitalism ; ●The historical status and development trend of capitalism ; **Chapter 7 The development of socialism and its law** **(2 contact hours，2 self-study hours)** ●The historical process of five hundred years of socialism ; ●The basic principles of scientific socialism ; ●Explore the law of development of socialism in practice ; **Chapter 8** The lofty project of communism and its final realization **(2 contact hours，2 self-study hours)** ●Looking forward to the future of a new communist society ; ●To realize the inevitable trend of communist historical development ; ●The lofty ideal of communism and the common ideal of socialism with Chinese characteristics ; **Part B. Practical teaching (2 self-study hours)** **Part C. Exam (4 contact hours)**
Examination forms	Open-book written test.

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Study and examination Requirements	The assessment methods of this course include two parts : the usual assessment and the final assessment. Among them : ●The usual grades accounted for 50 %, including mid-term exams (40 %), homework (20 %) and practical teaching (40 %). ●Final results accounted for 50 %.
Reading list	[1] This book writing group. 'Basic Principles of Marxism ' (2021 Edition) [M].Beijing : Higher Education Press, 2021. [2] This book writing group. Introduction to the Basic Principles of Marxism Guidance Book (2020 Edition) [M].Beijing : Higher Education Press, 2020.
Data of last mendment	June 29, 2025

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

Module designation	An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics
Semester(s) in which the module is taught	Fourth semester
Person responsible for the module	wangqing
Language	Chinese
Relation to curriculum	'An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics ' is a compulsory ideological and political theory course for undergraduate and junior college students in China. Through the study of this course, students can systematically master the formation and development, main content and spiritual essence of the modernization of Marxism in China, and constantly enhance their road self-confidence, theoretical self-confidence, institutional self-confidence and cultural self-confidence, and strengthen the ideals and beliefs of socialism with Chinese characteristics. This course focuses on the explanation of the party 's basic theory, basic line and basic strategy, and enhances students ' understanding and recognition of the party 's line, principles and policies.
Teaching methods	1.lecture method；2. case law；3. discussion method；4. mixed teaching method.
Workload (incl.contact hours，self-study hours)	Total workload = 90 hours Contact hours = 48 hours Self-study hours = 42 hours
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Ideological Morality and Rule of Law, Outline of Modern Chinese History, Introduction to the Basic Principles of Marxism
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** It enables students to more accurately grasp the theoretical results formed in the process of sinicization and modernization of Marxism. ● **Skill：** It makes students more deeply understand the historical process, historical changes and historical achievements of the revolution, construction and reform led by the Communist Party of China, and more thoroughly understand the basic theory, basic line and basic strategy of the Communist Party of China in the new era. ● **Competence：** To cultivate students ' habit of theoretical thinking, help students more effectively improve the ability to use Marxist standpoints,

	viewpoints and methods to understand problems, analyze problems and solve problems.
Content	**Part A.Theoretical teaching(48 contact hours，42 self-study hours)** **Chapter 1 Introduction** **(6 contact hours；4 self-study hours)** The historical process and theoretical achievements of the sinicization and modernization of Marxism in China **Chapter 2** mao tse-tung thought **(22 contact hours； 20 self-study hours)** ●Mao Zedong Thought and Its Historical Position ●new democratic revolution theory ●socialism transforming theory ●The theoretical results of the preliminary exploration of the road of socialist construction **Chapter 3** theoretical system of socialism with chinese characteristics **(20 contact hours；10 self-study hours)** ●The formation and development of the theoretical system of socialism with Chinese characteristics ●deng xiao ping theory ●the important thought of "three represents" ●scientific developing sight **Part B.Exercise teaching(8 self-study hours)** It consists of making PPT, mind map, campus practice, reading (watching) after feeling and other links. The specific implementation is arranged by the teachers according to the actual situation.
Examination forms	Open-book written test.
Study and examination Requirements	●Students should complete homework and extracurricular practice report independently. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include two parts : the usual assessment and the final assessment. Among them : ●The usual performance accounted for 50 %, including homework (20 %), mid-term test (40 %) and extracurricular practice (40 %). Among them, the comprehensive evaluation includes : attendance, homework, classroom discussion, in-class test and paper performance assessed by the learning platform. ●Final results accounted for 50 %.

Reading list	[1] This book writing group. An Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics (2023 Edition). Beijing : Higher Education Press, 2023 [2] Selected Works of Mao Zedong (Volume 1-4). Beijing : People 's Publishing House, 1991 [3] Selected Works of Deng Xiaoping (Volume 1-3). Beijing : People 's Publishing House, 1994 [4] Selected Works of Jiang Zemin (Volume 1-3). Beijing : People 's Publishing House, 2006 [5] Selected Works of Hu Jintao (Volume 1-3). Beijing : People 's Publishing House, 2016 [6] Document drafting group. " Resolution of the Central Committee of the Communist Party of China on the major achievements and historical experience of the Party 's centennial struggle " tutorial. Beijing : People 's Publishing House, 2021 [7] National Development and Reform Commission. " Outline of the 14th Five-Year Plan for National Economic and Social Development of the People 's Republic of China and Vision 2035 " tutorial. Beijing : People 's Publishing House, 2021 [8] Propaganda Department of the CPC Central Committee. Beijing : People 's Publishing House, 2023 [9] Tutored reading of the party 's 20th congress report. Beijing : People 's Publishing House, 2022
Data of last mendment	June 29, 2025

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

Module designation	An Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era
Semester(s) in which the module is taught	Fifth semester
Person responsible for the module	wangqing
Language	Chinese
Relation to curriculum	So that students can have a more accurate understanding of the party's major theoretical innovation in the process of building socialism with Chinese characteristics in the new era. Continuously enhance students ' understanding and recognition of the party 's line, principles and policies, strengthen road self-confidence, theoretical self-confidence, institutional self-confidence, cultural self-confidence, strengthen the ideals and beliefs of socialism with Chinese characteristics, consciously devote themselves to the great practice of socialism with Chinese characteristics, and make due contributions to the great rejuvenation of the Chinese nation.
Teaching methods	1. lecture method；2. case law；3. discussion method；4. mixed teaching method
Workload (incl.contact hours，self-study hours)	Total workload = 90 hours Contact hours = 48 hours Self-study hours = 42 hours
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Ideology and Morality and Rule of Law, Outline of Modern Chinese History, Introduction to the Basic Principles of Marxism, Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** It enables students to systematically master the main content and scientific system of the thought of socialism with Chinese characteristics in the new era of president xi jinping. ● **Skill：** So that students can have a more accurate understanding of the party 's major theoretical innovation in the process of building socialism with Chinese characteristics in the new era. ● **Competence：** Cultivate the world outlook, methodology and standpoints and methods that run through this idea, and help students more effectively improve the ability to use Marxist standpoints, viewpoints and methods to understand problems, analyze problems and solve problems.

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Content	**Part A.Theoretical teaching(40 contact hours)** **Chapter 1 Introduction** **(2 contact hours；0 self-study hours)** A new leap in the era of Marxism in China **Chapter 2** Adhering to and developing socialism with Chinese characteristics in the new era **(2contact hours；2 self-study hours)** **Chapter 3** Adhering to the overall leadership of the party **(2 contact hours；2 self-study hours)** **Chapter 4** keeping in mind the people-centered concept **(2 contact hours；0 self-study hours)** **Chapter5** comprehensively deepening reform and opening up **(2 contact hours；0 self-study hours)** **Chapter6** Promote high-quality development **(2 contact hours；2 self-study hours)** **Chapter7** The education, science and technology, talent strategy of socialist modernization construction **(2 contact hours；0 self-study hours)** **Chapter 8** Develop the whole process of people 's democracy **(2 contact hours；2 self-study hours)** **Chapter 9** comprehensively implement the rule of law **(2 contact hours；2 self-study hours)** **Chapter 10** construction of socialist culture power **(2 contact hours；0 self-study hours)** **Chapter 11** Strengthen social construction with the focus on ensuring and improving people 's livelihood. **(2 contact hours；2 self-study hours)** **Chapter 12** constructing of socialism ecological civilization **(2 contact hours；0 self-study hours)** **Chapter 13** Maintain and shape national security **(2 contact hours；0 self-study hours)** **Chapter 14** Build and consolidate national defense and a strong people 's army **(2 contact hours；2 self-study hours)** **Chapter 15** Adhering to ' one country, two systems ' and promoting the reunification of the motherland **(2 contact hours；2 self-study hours)** **Chapter 16** Major-country diplomacy with Chinese characteristics and the promotion of building a community of shared future for mankind **(2 contact hours；2 self-study hours)** **Chapter 17** comprehensively strengthen party discipline **(2 contact hours；2 self-study hours)** **Part B.Exercise teaching(8 self-study hours)** It consists of making PPT, mind map, campus practice, reading

	(watching) after feeling and other links. The specific implementation is arranged by the teachers according to the actual situation.
Examination forms	Open-book written examination
Study and examination Requirements	●Students should complete homework and extracurricular practice report independently. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include two parts : the usual assessment and the final assessment. Among them : ●The usual performance accounted for 50 %, including homework (20 %), mid-term test (40 %) and extracurricular practice (40 %). Among them, the comprehensive evaluation includes : attendance, homework, classroom discussion, in-class test and paper performance assessed by the learning platform. ●Final results accounted for 50 %.
Reading list	[1]Xi jinping on Governing the Country (Volume I). Beijing : People 's Publishing House, 2018 [2]Xi jinping on Governing the Country (Vol.2). Beijing : People 's Publishing House, 2017 [3] Xi jinping On Governing the Country (Volume III). Beijing : People 's Publishing House, 2020 [4] Xi jinping On Governing the Country (Vol. 4). Beijing : People 's Publishing House, 2022 [5] Selected Readings of Xi jinping (Vol.1). Beijing : People 's Publishing House, 2023 [6] Selected Readings of Xi jinping (Vol.2). Beijing : People 's Publishing House, 2023 [7] Propaganda Department of the CPC Central Committee. Beijing : People 's Publishing House, 2023 [8] Tutored reading of the party 's 20th congress report. Beijing : People 's Publishing House, 2022 [9] Document drafting group. The ' Resolution of the Central Committee of the Communist Party of China on the Major Achievements of the Party 's Hundred Years of Struggle and Historical Experience ' tutorial. Beijing : People 's Publishing House, 2021 [10] National Development and Reform Commission. " Outline of the 14th Five-Year Plan for National Economic and Social Development of the People 's Republic of China and Vision 2035 " tutorial. Beijing : People 's Publishing House, 2021
Data of last mendment	June 29, 2025

Situation and Policy

Module designation	Situation and Policy
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Ms. Gao Xiao Fei
Language	Chinese
Relation to curriculum	The course of " Situation and Policy " is a compulsory course in the series of ideological and political theory courses in colleges and universities based on the training objectives of colleges and universities. It shoulders an important mission in the ideological and political education of college students. This course mainly takes the current major problems at home and abroad as an opportunity to educate college students on the situation and policy, help college students understand the international and domestic situation, and understand the major strategic principles and policies of the party and the country. This course focuses on the education of college students on the situation, tasks and achievements of socialist construction with Chinese characteristics in the new era ; the education of major strategic policies, major activities and major reform measures of the party and the state. Through the timely and scientific education of students on the basic knowledge of domestic situation policies, world political economy and international relations, we can help students broaden their horizons, understand and correctly treat major current events at home and abroad in a timely manner, stimulate college students ' patriotism, enhance national self-esteem and social responsibility, and improve political sensitivity and policy discrimination. Guide young college students to establish a correct view of history, nationality, country and culture, and cultivate a new generation of qualified builders and reliable successors of socialism with Chinese characteristics.
Teaching methods	1.lecture method； 2.case law； 3.discussion method； 4.mixed teaching method；
Workload (incl.contact hours，self-study hours)	Total workload =8 hours Contact hours = 8 hours
Credit points（ECTS）	ECTS Credit=2.0
Required and recommended prerequisites for joining the module	The basic principles of Marxism, the outline of modern history, the introduction of Mao Zedong Thought and the theoretical system of socialism with Chinese characteristics, and the introduction of Xi jinping new era of socialism with Chinese characteristics.
Module objectives/ intended learning	**Learning outcomes:** ● **Knowledge：**

outcomes	1.Take the current major hot issues at home and abroad as an opportunity to educate college students on the situation, tasks and achievements of socialist construction with Chinese characteristics in the new era. 2.It enables students to understand the major strategic principles and policies, major activities and major reform measures of the party and the state, and grasp the development of social reform and development. ● **Competence：** 1.To cultivate students' keen insight and policy discrimination in observing social situation problems ; 2.Cultivate students' ability to analyze, deal with and deal with complex social problems, and improve students ' comprehensive quality.
Content	**Part A.Theoretical teaching(8 contact hours;)** **Chapter 1** Speed up the construction of socialist cultural power **(2 contact hours;)** ●Strengthen the soul of the country to take on the historical mission； ●Extraordinary achievements highlight the great power of practice ; ●Firm confidence opens the chapter of the times ; **Chapter 2** Supporting Chinese-style modernization with high-quality population development **(2 contact hours;)** ●Population development is facing a new situation ; ●A comprehensive dialectical view of population issues ; ●Promote high-quality population development ; **Chapter 3** To explore the correct way of getting along between China and the United States in the new period **(2 contact hours;)** ●Sino-US relations have experienced ups and downs ; ●The influence of Trump 's re-ruling ; ●Solve the necessary questions of Sino-US relations ; **Chapter 4** China 's economy is stable and far-reaching **(2 contact hours;)** ●Where does development confidence come from ; ●What to rely on in the face of difficulties ; ●How to work hard ;
Examination forms	Open the paper, learn online exam.
Study and examination Requirements	●Students should complete homework independently. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include two parts : usual assessment and final assessment. Among them : ●The usual performance accounts for 50 %, which is composed of

	homework evaluation (50 %). ●The final grade accounts for 50 %, which is composed of learning online examination.
Reading list	[1] 'People 's Daily ', ' Reference News ', ' Global Times ' and other important newspapers. [2] 'Half Monthly Talks ', ' Outlook ', ' World Knowledge ' and other related magazines. [3] 'current affairs report ' audio-visual version and other related audio-visual materials. [4] Important documents of the Central Committee of the Communist Party of China and the spirit of the central leaders ' important speech. [5] The Ministry of Education and other relevant departments from time to time issued the situation education graphics, audio and video materials.
Data of last mendment	June 29, 2025

Advanced Mathematics

Module designation	Advanced Mathematics
Semester(s) in which the module is taught	1th and 2th semester
Person responsible for the module	Ding Dali
Language	Chinese
Relation to curriculum	'Higher Mathematics' is an important basic subject in science and engineering colleges, and it is also a compulsory mathematics course for students majoring in science and engineering. As a basic science, higher mathematics has its inherent characteristics, which are high abstraction, strict logic and wide application. Abstractness and computability are the most basic and significant characteristics of mathematics. With a high degree of abstraction and unity, we can reveal its essential laws in depth and make it more widely used. Rigorous logic means that in the induction and collation of mathematical theory, whether it is concepts and expressions, or judgment and reasoning, we must use the rules of logic and follow the laws of thinking. Therefore, mathematics is also a way of thinking. The process of learning mathematics is the process of thinking training.
Teaching methods	1.lecture method； 2.discussion method； 3. mixed teaching method。
Workload (incl.contact hours，self-study hours)	Total workload = 300 hours Contact hours = 160 hours Self-study hours = 140 hours
Credit points（ECTS）	ECTS Credit=10.0
Required and recommended prerequisites for joining the module	
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** Some properties and conclusions of limit and continuity of function, calculation and application of differential calculus of univariate function, calculation and application of integral calculus of univariate function, some types and solutions of ordinary differential equations, application of space analytic geometry and vector algebra, calculation and application of differential calculus of multivariate function, calculation and application of integral calculus of multivariate function, calculation and application of infinite series. ● **Skill：** 1. Through the study of this course, students can master the basic knowledge, basic theory and basic methods of higher mathematics,

	and provide effective mathematical tools for students to solve practical problems. 2. It provides essential basic knowledge of mathematics for the follow-up courses, cultivates students ' computing ability and logical thinking ability, and can comprehensively use the knowledge learned to analyze problems and solve related problems. ● **Competence：** It has the natural science knowledge and engineering basic knowledge of mathematics, physics, mechanics, electricity and other natural science knowledge and engineering basic knowledge needed by the energy and power engineering specialty, and can be used to describe complex engineering problems in this field.
Content	**Part B.Theoretical teaching(80 contact hours; 0 self-study hours)** **Chapter 1 Function, Limit and Continuity** **(16 contact hours; 10 self-study hours)** （1）Variables and functions （2）limit of number sequence （3）limit of function （4）Infinite Mass and Infinite Small Quantity （5）limit algorithm （6）Existence criterion of limit and two important limits （7）comparison of infinitesimal （8）the continuity **Chapter 2 One-variable function differential calculus** **(10 contact hours; 10self-study hours)** （1）the concept of derivative （2）derivation rule （3）higher derivative （4）differential function **Chapter 3 Application of One-variable Function Differential Calculus (10 contact hours; 10 self-study hours)** （1）differential mean value theorem （2）robida principle （3）Monotonicity and extremum of function （4）The maximum and minimum value of function and its application（5）Concavity and convexity of the curve, inflection point （6）The asymptote of the curve, the description of the function graph （7）Examples of other applications **Chapter 4 One-variable function integrals** **(20 contact hours; 20 self-study hours)** （1）the concept of definite integrals （2）Primitive function and basic theorem of calculus （3）Indefinite integral and primitive function method （4）The use of integral table

	（5）the evaluation of definite integral （6）improper integral **Chapter 5 Application of one-variable function integral** **(6 contact hours; 10 self-study hours)** （1）Differential element method （2）area of the planar figure （3）The volume of geometry （4）The arc length of the curve and the side area of the rotating body （5）The application of definite integral in physics （6）Examples of the application of definite integral in economics **Chapter 6 ordinary differential equation** **(18 contact hours; 10 self-study hours)** (1) Basic concepts of ordinary differential equations (2) First-order differential equation and its solution (3) Reduced-order method of differential equations (4) The structure of solutions of linear differential equations (5) Second-order linear differential equations with constant coefficients **Chapter 7 Vector algebra and space analytic geometry** **(12 contact hours; 10 self-study hours)** (1) Vector and its linear operation (2) Quantity product, vector product (3) Plane and its equations (4) Space straight line and its equation (5) Surface and its equations (6) Space curve and its equation **Chapter 8** Multivariate function differential method and its application **(18 contact hours; 16 self-study hours)** (1) Basic concepts of multivariate functions (2) Partial derivative (3) Total differential (4) Derivation rule of multivariate composite function (5) Derivation formula of implicit function (6) Geometric application of multivariate function differential calculus (7) Directional derivative and gradient (8) The extreme value of multivariate function and its solution **Chapter 9** Multivariate function integral and its application **(28 contact hours; 24 self-study hours)** (1) The concept and properties of double integral ; (2) Calculation method of double integral (3) Triple integral (4) Application of multiple integrals (5) Curve integral for arc length (6) Curve integral of coordinates

	(7) Green 's formula and its application (8) Surface integral for area (9) Surface integral of coordinates (10) Gauss formula, flux and divergence (11) Stokes formula, circulation and curl **Chapter 10** infinite series **(22 contact hours; 20 self-study hours)** (1) The concept and properties of constant series (2) The convergence method of constant series (3) Power series (4) The function is expanded into a power series (5) Application of power series expansion of function (6) Fourier series (7) Fourier series of general periodic function
Examination forms	Closed-book written exam.
Study and examination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include two parts : usual assessment and final assessment. Among them : ●The usual performance accounted for 30 %, including comprehensive evaluation (70 %) and stage assessment (30 %). Among them, the comprehensive evaluation includes : attendance, homework, classroom discussion, and in-class test results assessed by the learning platform. ●The final grade accounted for 70 %.
Reading list	[1]. Editor-in-chief, Department of Applied Mathematics, Tongji University. 'Higher Mathematics ' (7th Edition). Beijing : Higher Education Press, 2018 [2]. Editor-in-chief, Department of Applied Mathematics, Tongji University. 'Higher Mathematics ' (6th Edition). Beijing : Higher Education Press, 2009 [3]. Editor-in-chief, Department of Applied Mathematics, Tongji University. ' Calculus ' (Second Edition). Beijing : Higher Education Press, 2003 [4]. Editor-in-chief, Department of Applied Mathematics, Tongji University. 'calculus ' (first edition). Beijing : Higher Education Press, 1999 [5]. Huang Lihong edited ' Advanced Mathematics '.Beijing : Peking University Press, 2018
Data of last mendment	June 29, 2025

Linear Algebra II

Module designation	Linear algebra II
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Xing Feng
Language	Chinese
Relation to curriculum	'Linear algebra ' is an important basic course of natural science. The problems it studies widely exist in various fields of technical science, and the methods it introduces are widely used in various disciplines. It is a compulsory basic course for students of science and engineering in the whole college. Through the study of this course, students can master the basic knowledge, basic theory and basic methods of 'linear algebra ', and lay a good mathematical foundation for students to apply the knowledge of 'linear algebra 'in natural science and engineering technology. The main task of this course is to train students to master the basic knowledge of ' linear algebra ', to further cultivate students ' logical thinking ability, the ability to analyze and solve problems, to expand students ' horizons, and to train students to apply the knowledge of ' linear algebra ' in natural science and engineering technology. Through the study of this course, students can obtain the methods commonly used in applied science, improve the ability to solve practical problems, so as to lay the necessary mathematical foundation for students to learn follow-up courses and further improve.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method
Workload (incl. contact hours, self-study hours)	Total workload = 75 hours Contact hours = 40 hours Self-study hours =35 hours Total workload = 75, of which : contact hours = 40, self-study hours = 35
Credit points （ECTS）	ECTS Credit=2.5
Required and recommended prerequisites for joining the module	higher mathematics
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** 1.the concept and properties of determinant ; the concept and properties of matrix and matrix rank ; elementary transformation of matrix and

	elementary square matrix ; the concept, nature and judgment of linear correlation of vector group ; the concept of vector space, the structure of the solution of linear equations ; the concept and properties of eigenvalues and eigenvectors of square matrix. 2. Determinant calculation ; matrix operation and operation rules, matrix rank calculation and application ; the application of elementary transformation of matrix ; the calculation and application of linear correlation and linear representation of vector groups ; the general solution of the equations is solved by using the structure of the solution of the linear equations. Calculate the eigenvalues and eigenvectors of the square matrix. **●Skill：** Master the basic concepts, basic theories and basic principles of linear algebra, so that students have a certain ability to abstract and summarize problems and logical reasoning ability. To cultivate students ' unique engineering mathematical thinking mode and logical reasoning ability, and lay a solid mathematical foundation for further study of follow-up courses and modern science and technology. 2.Mastering the mathematical operation skills of linear algebra, using the basic knowledge and basic theory of engineering mathematics to analyze and solve problems, the ability to further cultivate, train and improve, and provide the necessary basis for students to learn subsequent courses and mathematical knowledge. It provides students with applicable mathematical methods and calculation methods for scientific research and practical work. **● Competence：** 1.Get the methods commonly used in applied science, improve the ability to solve practical problems, so as to lay the necessary mathematical foundation for students to learn follow-up courses and further improve. The language tools of mathematics, natural science and engineering science can be used to express the complex engineering problems of electronic information.
Content	**Theoretical teaching(40 contact hours; 35 self-study hours)** **Chapter 1 Determinants (8 contact hours; 7 self-study hours)** Second-order and third-order determinants ; full arrangement and exchange ; the definition of n-order determinant ; the properties of determinant ; the determinant is expanded by rows (columns). **Chapter 2 Matrix and Its Operation (8 contact hours; 7 self-study hours)** Linear equations and matrices ; matrix operation ; inverse matrix ; cramer 's law ; matrix block method. **Chapter 3 Elementary transformation of matrix and linear equations (8 contact hours; 7 self-study hours)** Elementary transformation of matrix ; the rank of matrix ; the solution of linear equations. **Chapter 4 Linear Correlation of Vector Groups (8 contact hours; 7 self-study hours)** Vector group and its linear combination ; linear correlation has nothing to

	do with linearity ; the discriminant theorem of linear correlation ; the rank of the vector group ; the structure of the solution of linear equations ; vector space. **Chapter 5 Similar matrix and quadratic form** **(8 contact hours; 7 self-study hours)** The inner product of vector ; eigenvalues and eigenvectors of square matrix.
Examination forms	The closed-book written examination method is adopted
Study and examination Requirements	1. Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2. This course is evaluated by the combination of usual scores, experimental scores and final exam scores, and comprehensively evaluates students ' learning situation, ability to analyze and solve complex engineering problems. 3. The usual performance evaluation standard is 30 %, including homework (60 %) and stage assessment (40 %) ; the final examination accounted for 70 %. 4. All scores were evaluated by the percentage system, and 60 was the passing score of this course.
Reading list	Required books 1.Xie Junlai editor. 'Linear Algebra ' (First Edition).Beijing : Science Press, 2015 2.Editor-in-chief, Department of Mathematics, Tongji University. 'Linear Algebra ' (6th Edition).Beijing : Higher Education Press, 2014 3.Juyu horse. 'Linear Algebra ' (Second Edition). Beijing : Tsinghua University Press, 2020
Data of last mendment	September 23, 2025

College English

Module designation	**College English 1　　College English 2**
Semester(s) in which the module is taught	1st semester; 2ndsemester
Person responsible for the module	Hongwu Liu
Language	Chinese
Relation to curriculum	College English is a compulsory foundational course in applied undergraduate education at our institution, embodying both instrumental and humanistic dimensions.In terms of its instrumental nature, firstly, the College English course builds upon and extends English instruction from the basic education stage. Its aim is to further enhance students' abilities in listening, speaking, reading, writing, and translation on the basis of senior high school English teaching. It enables students to master essential English knowledge and practical skills, while strengthening their capacities for autonomous learning, critical thinking, and innovation. This equips them to effectively communicate orally and in writing in English in future work and social interactions, meeting the needs of social development and economic construction for applied undergraduate talents. Secondly, through English for Specific Purposes (ESP) instruction, the College English course allows students to learn academic or professional English related to their fields, thereby acquiring relevant competencies for international communication in academic or professional contexts.Regarding its humanistic nature, firstly, one of the important tasks of the College English course is to provide cross-cultural education. Beyond learning and exchanging advanced scientific knowledge and professional information, students who learn and master English as a communication tool also need to understand foreign societies and cultures, enhance their comprehension of different cultures, raise awareness of similarities and differences between Chinese and foreign cultures, and develop intercultural communicative competence. Secondly, the College English course can cultivate students' ability to understand and interpret Chinese culture, thereby contributing to the global dissemination of Chinese culture. The core of humanistic education is people-oriented, promoting human values and emphasizing the cultivation of comprehensive qualities and holistic development. Integrating course content, socialist core values are organically incorporated into the teaching materials of College English. Therefore, it is essential to explore the rich humanistic connotations of the College English course and achieve an organic unity of its instrumental and humanistic dimensions.

09 Module Descriptions

Teaching methods	Target students: Power Engineering major students Type of teaching: Theoretical teaching and experimental teaching Contact hour: 180 periods Including Theoretical teaching: 180 periods Computer practice: 0 periods Size of class: 40-80persons
Workload (incl.contact hours，self-study hours)	Total workload = 240 hours Contact hours = 128 hours Self-study hours=112 hours
Credit points（ECTS）	ECTS Credit=8.0
Required and recommended prerequisites for joining the module	English of Senior High School, English Listening for Beginners
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** **Listening：** 1. Be able to understand English-medium instruction, familiar short English conversations, and lectures or reports on familiar topics. 2. Be able to comprehend slower-paced English programs, grasp the general idea and main points, and effectively employ listening strategies to aid comprehension. 3.Be able to understand English courses taught in English at a corresponding level; can understand common instructions, product descriptions, or operational manuals related to their job positions. **Speaking:** 1. Consolidate, reinforce, and deepen previously learned phonetic knowledge; gain a preliminary understanding of reading-aloud techniques and rules of phonetic changes in connected speech, such as liaison, loss of plosive, and assimilation; achieve basically correct pronunciation and intonation. 2. Practice intonation in declarative, interrogative, and imperative sentences; can answer classroom questions using simple English; can conduct basic multi-turn conversations on everyday topics. 3. Use corresponding learning materials to express personal opinions, feelings, and viewpoints. 4. Focus on training students to discuss topics related to their studies or future work. **Reading：** 1. Be able to read and comprehend general-topic English passages with the aid of a dictionary. 2. Be able to employ fast reading skills with materials of appropriate length and moderate difficulty.

	3. Be able to basically read English newspapers and magazines from China and abroad, grasp the central idea, and understand the main content and relevant information. 4. Be able to read common practical writing styles encountered in daily life, learn reading techniques, and acquire proficient reading skills. **Writing:** 1. Master writing techniques for general genres such as narratives, argumentative essays, and expository writing. 2. Master commonly used vocabulary and sentence patterns for practical writing styles. 3. Be able to take notes, answer questions, and write outlines and summaries based on written materials of similar difficulty to the course texts. 4. Be able to write a short essay of 120-150 words within half an hour on a given topic, based on an outline, table, or diagram. 5. Be able to write everyday practical writings (e.g., letters, resumes). **Translation:** 1. Master commonly used translation techniques. 2. Can perform English-Chinese and Chinese-English translation of texts on familiar topics with the aid of a dictionary. The translation should be basically fluent and employ appropriate translation techniques. ● **Skill：** Listening: Can understand general everyday English conversations;can basically comprehend slower-paced audio and video materials as well as lectures on familiar topics, grasping the main idea and key points. Can understand English courses taught in English at a corresponding level; can understand common instructions, product descriptions, or operational manuals related to their job positions. Can employ listening strategies effectively. Speaking: Can conduct brief,multi-turn conversations in English on everyday topics; can provide simple narration or description of general events and objects; can basically express personal opinions, feelings, and viewpoints; can engage in simple discussions on topics related to studies or future work. Language expression is relatively clear in structure; pronunciation, intonation, and grammar generally conform to communicative norms. Can employ oral communication strategies effectively. Reading: Can read English newspaper articles and other English materials on familiar topics with moderate linguistic difficulty;can read English textbooks and common practical writings or simple professional materials encountered in future work and daily life with the aid of a

	dictionary, understanding the main facts and relevant details. Can employ reading strategies effectively to comprehend the author's viewpoint, grasp the central idea, and predict, analyze, infer, judge, and synthesize the content of a text. Can appropriately adjust reading speed and methods according to different reading purposes and the difficulty of the material. Can read review literature related to their major or materials such as manuals and operational handbooks related to future work. Writing: Can master writing techniques for general genres such as narratives,argumentative essays, and expository writing; can master commonly used vocabulary and sentence patterns for practical writing styles. Can take notes, answer questions, and write outlines and summaries based on written materials of similar difficulty to course texts. Can write a short essay of 120-150 words within half an hour on a given topic, based on an outline, table, or diagram. Can complete everyday practical writings (e.g., letters, resumes). Writing is generally relevant to the topic, with complete content, clear logic, coherent organization, smooth sentences, and relatively cohesive discourse featuring varied sentence patterns. Can employ common written expression and communication strategies effectively. Translation: With the aid of a dictionary, translating between English and Chinese texts on familiar topics, with clear structure and general linguistic difficulty. The translation is relatively accurate, without major errors in understanding or expression. Can extract and translate materials of familiar genres or those related to their major or future job positions, with general linguistic difficulty. Can effectively employ translation techniques. ● **Competence：** To cultivating students' ability to understand and interpret Chinese culture, thereby contributing to the global dissemination of Chinese culture. The core of humanistic education is people-oriented, promoting human values and emphasizing the cultivation of comprehensive qualities and holistic development. Integrating course content, socialist core values are organically incorporated into the teaching materials of College English. Therefore, it is essential to explore the rich humanistic connotations of the College English course and achieve an organic unity of its instrumental and humanistic dimensions.

09 Module Descriptions

Content	**A.Theoretical teaching(42 contact hours)** **theory teaching（42 class hours）** Unit 1 The Pursuit of Dreams 1.1 Opener 1.2 Reading & Interacting 1.3 Language Focus 1.4 Viewing & Listening 1.5 Speaking 1.6 Writing：Text Writing & CET-4 Writing Unit 2 Freshman Year 2.1 Opener 2.2 Reading & Interacting 2.3 Language Focus 2.4 Viewing & Listening 2.5 Speaking 2.6 Writing：Text Writing & CET-4 Writing Unit 3 True Stories of Nazi Germany 3.1 Opener 3.2 Reading & Interacting 3.3 Language Focus 3.4 Viewing & Listening 3.5 Speaking 3.6 Writing：Text Writing & CET-4 Writing Unit 5 The Water Problem 5.1 Opener 5.2 Reading & Interacting 5.3 Language Focus 5.4 Viewing & Listening 5.5 Speaking 5.6 Writing：Text Writing & CET-4 Writing Unit 6 Going offline 6.1 Opener 6.2 Reading & Interacting 6.3 Language Focus 6.4 Viewing & Listening 6.5 Speaking 6.6 Writing：Text Writing & CET-4 Writing Unit 1 Youth on the rise 1.Video: The Chinese Dream: A path to national rejuvenation 2.Text:The future is in your hands 3. Skill: Delivering a speech on the Chinese dream Unit 2 Planting seeds, harvesting the future Video: Innovation and equality in basic education 2. Text: Where knowledge meets craft

	3. Skill: Delivering an oral report on China's education **Part B. Motivate teaching(6 contact hours)** Periodical exams for listening and speaking; reading; writing and translating, two hours for illustration and simulating test for Band-4 examination.
Examination forms	Closed-book written exam
Study and examination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. ●The usual score of 100 points, accounting for 50 % of the total score ; it is composed of assignments and periodic examinations, which are as follows : 1) 20 points for listening, 2) 10 points for speaking, 3) 30 points for reading, 4) 20 points for writing, 5) 20 points for translation. The average score of homework is 45 points, and the total number of homework is not less than 8 times (online or offline). The assessment contents and scores are as follows : (1) 10 points for listening, (2) 5 points for speaking, (3) 10 points for reading, (4) 10 points for writing, (5) 10 points for translation The total number of tests is not less than 6 times (completed online or offline). The assessment contents and scores are as follows : (1) 10 points for listening, (2) 5 points for speaking, (3) 20 points for reading, (4) 10 points for writing, (5) 10 points for translation. The average score accounts for 50 %, and the final score (closed-book written test) accounts for 50 %. Total score (100 points) = usual score 100 points (50 %) + final score 100 points (50 %).
Reading list	1. Required books [1] Menghua Li, Chief editor, New Progressive Integrated College English.1-2 Shanghai Foreign Languages Education Press, 1st edition, June，2023. [2] Shouren Wang, Chief editor, New College English Viewing and Speaking, 1-2 Foreign Language Teaching and Research Press,1st edition, July，2022. [3] Reference Committee of Higher Institution of Educational Ministry, Guidance of College English Teaching 2020, Higher Educational Press, Oct. 2020. 2.Reference books [1] Ministry of Education, Guidance Outline of Subject's Critical Thinking Construction of Higher Education May, 2024. [2] Youshan Sun, Chief Editor, Understanding Contemporary China Integrated Course of College English (Book I), Foreign Language Teaching and Research Press ,1st edition,2025
Data of last mendment	June 29, 2025

Introduction to Environmental Science

Module designation	introduction to environmental science
Semester(s) in which the module is taught	Semester 1
Person responsible for the module	Chen Songyue
Language	Chinese
Relation to curriculum	Introduction to Environmental Science is one of the compulsory courses of natural science in electronic information engineering. It is to understand and evaluate the influence of professional engineering practice on the sustainable development of environment and society by using the relevant knowledge of environmental protection and sustainable development. The course mainly focuses on China 's environmental protection policy and sustainable development strategic thinking ; water, soil, noise and air pollution and control ; treatment and utilization of solid waste ; environmental quality assessment and environmental monitoring.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method.
Workload (incl. contact hours, self-study hours)	Total workload = 30 where : contact hours = 16, self-study hours = 14
Credit points （ECTS）	ECTS Credit=1.0
Required and recommended prerequisites for joining the module	Higher Mathematics I
Module objectives/ intended learning outcomes	Course objective 1 : to consider environmental factors in the design. Course Objective 2 : Be familiar with the environmental protection norms, standards and laws and regulations related to electronic information engineering, and be able to identify and analyze the potential impact of the application of materials, technologies and processes related to electronic information engineering on society, health, safety, law and culture. Course objective 3 : to be familiar with the significance of environmental protection and social sustainable development, and to understand the impact of engineering design and construction on environmental and social sustainable development. The knowledge of environmental protection and sustainable development can be used to evaluate the impact of engineering practice on the sustainable development of environment and society.
Content	(1) Introduction 1) Environmental overview ; 2) Sustainable development and environment ; 3) Ecosystem and

	environment ; 4) Environmental protection. (2 hours ; 1 self-study) (2) Air pollution and control 1) Overview ; 2) The diffusion of air pollutants ; 3) Air pollution control project ; 4) Global atmospheric environmental problems. (2 hours ; 2 self-study hours) (3) Water pollution and control 1) Overview ; 2) physical treatment method ; 3) Biological treatment ; 4) physical chemistry and chemical treatment ; 5) Water treatment system. (4 hours ; 3 self-study hours) (4) Noise pollution and control 1) Noise and hazards ; 2) Noise measurement and standard ; 3) Noise control method. (2 hours ; 2 self-study hours) (5) Soil pollution and control 1) Overview of soil environment ; 2) Soil pollution ; 3) China 's soil pollution prevention and management laws and regulations ; 4) Soil pollution remediation technology. (2 hours ; 2 self-study hours) (6) Treatment and utilization of solid waste 1) Overview ; 2) Principles of solid waste management ; 3) Solid waste treatment technology. (2 hours ; 2 self-study hours) (7) Environmental quality assessment and environmental monitoring 1) Environmental quality management ; 2) Environmental quality assessment ; 3) Environmental monitoring. (2 hours ; 2 self-study hours)
Examination forms	Open-book written examination is adopted
Study and examination Requirements	1.Students should independently complete the homework after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance and final exam results, comprehensively assessing students ' learning situation, ability to analyze and solve engineering problems related to the environment. The usual performance evaluation standard is 20 %, including homework (8 %) and attendance (12 %) ; the final examination accounted for 80 %. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	Required reading list [1] Yang et al., Introduction to Environmental Science [M].Higher Education Press, 2010 ; [2] Zhu et al., Introduction to Environmental Engineering [M].Science Press, 2016 ; [3] Liu et al., Introduction to Environmental Protection [M].Chemical Industry Press, 2010 ; [4] Lin Zhaoxin et al. Introduction to Environmental Protection [M]. Higher Education Press, 2006.
Data of last mendment	January 7, 2026

Engineering Drawing

Module designation	engineering drawing
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Chen Guang
Language	Chinese
Relation to curriculum	'Engineering Drawing ' is a compulsory subject basic course for non-mechanical undergraduate majors to cultivate advanced engineering and technical applied talents. The main contents of this course are the basic knowledge, skills and orthographic projection basis (including national standards, graphic drawing, orthographic projection basis), projection (including basic three-dimensional projection, combined three-dimensional view), machine expression method (including view, section view, section view) and electrical drawing. The course is closely related to engineering practice. It is a basic course of engineering graphics technology to cultivate students ' image thinking and spatial thinking ability, master scientific thinking methods, and master the use of modern drawing tools and methods. This course is the basic platform for students to learn about follow-up courses.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method
Workload (incl. contact hours, self-study hours)	Total workload = 105, of which : contact hours = 40, self-study hours = 65
Credit points （ECTS）	ECTS Credit= 3.5
Required and recommended prerequisites for joining the module	Nil
Module objectives/ intended learning outcomes	**learning outcome** **●knowledge：** 1.Understand the national standards and norms of engineering drawing ; 2.master the basic knowledge and skills of mapping, including projection principle, view expression method, dimensioning ; 3.master the drawing and reading of professional maps. **●skill：** 1. be able to skillfully use the basic methods of drawing and reading engineering drawings ; 2.Have the ability to accurately express the engineering professional

	drawings ; 3.Possess space imagination ability, image thinking ability and innovation ability. **●capacity：** 1.Combined with the characteristics of engineering drawing knowledge, under the main line of carrying out the national drawing standards and following the projection principle, we should constantly guide students to draw carefully and strictly, establish the idea of being responsible for production, and cultivate a good working style ; 2.Cultivate students to have rigorous scientific thinking and meticulous, realistic and pragmatic craftsman spirit ; 3.Have the feelings of home and country, professional quality and professional ethics.
Content	**1.Basic knowledge and skills, orthographic projection basis (contact hours : 10 ; self-study hours 16)** The basic provisions of the national standard of drawing ; drawing tools and their use ; geometric drawing ; the analysis and drawing of plane graphics ; basic training assignments ; overview of projection method ; the formation and projection law of three views ; projection of point, line and plane. **2.Projection map (contact hours : 22 ; self-study hours 36)** The projection of the basic body ; plane and three-dimensional intersection ; three-dimensional and three-dimensional intersection ; the basic concept of axonometric drawing ; positive isometric side diagram ; oblique two-axis mapping ; axonometric drawing large operation ; the composition and shape analysis of the combination ; the drawing of the three views of the combination ; the reading of the combination view ; combination of large operations. **3.Machine expression method and electrical diagram (contact hours : 8 ; self-study hours 13)** view ; cutaway view ; sectional diagram ; the basic concept of electrical engineering drawing, simple electrical graphics.
Examination forms	The closed-book written examination method is adopted.
Study and examination Requirements	1.Students should independently complete the homework after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance and final exam results, comprehensively assessing students ' learning situation, ability to analyze and solve complex engineering problems. The usual performance evaluation standard is 30 % ; the final examination accounted for 70 %. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	Required reading list 1.Using textbooks : edited by Chen Guang. 'Engineering drawing '. Beijing : China Electric Power Publishing House, 2019.8 2.Reference materials : Dong Xiangguo, Li Shilan and other editors. 'Basic of Engineering Drawing ' (Fourth Edition). Beijing : Higher Education Press, 2019.12 3.Reference book : issued by the National Development and Reform

	Commission of the People 's Republic of China. 'Engineering drawing standard '. Beijing : Engineering Industry Press, 2008
Data of last mendment	2026.02.06

Probability Theory and Mathematical Statistics I

Module designation	Probability Theory and Mathematical Statistics
Semester(s) in which the module is taught	1th semester
Person responsible for the module	Zhang Lulu
Language	Chinese
Relation to curriculum	Probability Theory and Mathematical Statistics is an important basic course of natural science. The problems it studies widely exist in various fields of technical science, and the methods it introduces are widely used in various disciplines. It is a compulsory basic course for students of science and engineering in the whole college. Through the study of this course, students can master the basic knowledge, basic theory and basic methods of ' probability theory and mathematical statistics ', and lay a good mathematical foundation for students to apply the knowledge of ' probability theory and mathematical statistics ' in natural science and engineering technology.
Teaching methods	1.Lecture method ; 2. Case law ; 3.Discussion method ; 4. Blended teaching method ;
Workload (incl.contact hours，self-study hours)	Total workload = 90 hours Contact hours = 48 hours Self-study hours = 42hours
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	**higher mathematics**
Module objectives/ intended learning outcomes	**Learning outcomes:** **● Knowledge：** 1.random events, the definition and properties of probability, the basic probability model ; the concept and properties of one-dimensional two-dimensional random variables, the concept and properties of random variable distribution function and the calculation method ; 3. 3.The concept and properties of digital features ; law of large numbers and central limit theorem ; 4. Basic concepts of mathematical statistics ; the basic principle of parameter estimation ; the basic principle of hypothesis testing ; **● Skill：** 1.Master the relationship and operation of random events ; the calculation method of the probability of random events ; 2.master the distribution of random variables, the distribution of random variable function calculation method ; 3.Calculation of digital features ; the application of law of large

	numbers and central limit theorem ; 4.calculation of parameter estimation ; application of hypothesis testing. ● **Competence：** 1.Possess the ability to abstractly summarize the problem ; 2.Logical reasoning ability ; 3.have the ability to use basic knowledge and basic theory to analyze and solve problems.
Content	**Part A.Theoretical teaching(48 contact hours; 42 self-study hours)** **Chapter 1 Random events and probabilities** **(8 contact hours; 6 self-study hours)** ●Randomized trials, sample space, random events, frequency and probability ; ●Equal-possibility probability (classical probability) ; ●conditional probability ; ●Independence ; **Chapter 2 One-dimensional random variable and its probability distribution** **(8 contact hours; 6 self-study hours)** ●The definition of random variables, the probability distribution of discrete random variables ; ●Continuous random variables ; ●The distribution function of random variables ; ●The distribution of random variable function ; **Chapter 3 Multidimensional random variable and its probability distribution** **(8 contact hours; 8 self-study hours)** ●Two-dimensional random variables ; ●Edge distribution and independence of random variables ; ●The distribution of two random variable functions ; ●n-dimensional random variable **Chapter 4** digital characteristic **(8 contact hours; 6 self-study hours)** ●mathematical expectation ; ●Variance ; ●Covariance and correlation coefficient ; ●Moment and covariance matrix ; **Chapter 5 Law of Large Numbers and Central Limit Theorem** **(2 contact hours; 2self-study hours)** ●Law of large numbers, central limit theorem ; **Chapter 6 Sample and sampling distribution** **(4 contact hours; 4 self-study hours)** ●Random samples, sampling distribution ; ●Frequency distribution histogram and empirical distribution function ;

	Chapter 7 parameter estimation **(6 contact hours; 6 self-study hours)** ●The evaluation criteria of point estimation and estimator ; ●Interval estimation, interval estimation of normal population mean and variance ; ●Unilateral confidence interval ; **Chapter 8 hypothesis testing** **(4 contact hours; 4 self-study hours)** ●Hypothesis testing principle and steps, single normal population hypothesis testing ; ●Hypothesis testing of two normal populations ;
Examination forms	Closed-book written exam.
Study and examination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include two parts : usual assessment and final assessment. Among them : ●The usual performance accounted for 30 %, including comprehensive evaluation (60 %) and stage assessment (40 %). The comprehensive evaluation includes : attendance, homework, classroom discussion and in-class test using the learning platform. ●The final grade accounted for 70 %.
Reading list	[1] Wang valuable editor. 'Probabilistic and Mathematical Statistics ' (First Edition). Beijing : Science Press, 2015. [2] Sheng Jue, editor-in-chief of Zhejiang University. ' Probability Theory and Mathematical Statistics ' (Fifth Edition). Beijing : Higher Education Press, 2019. [3] Wang Diankun editor. ' Probability Theory and Mathematical Statistics ' (First Edition). Beijing : Science Press, 2021.
Data of last mendment	June 29, 2025

College Physics Experiments II

Module designation	college physics experiment Ⅱ
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Xu Jing
Language	Chinese
Relation to curriculum	Physics is an experimental science. The establishment of the basic concepts of physics, the discovery of basic laws, and the formation of basic theories are all based on strict physical experiments. College physics experiment course is an independent and compulsory basic course for students majoring in smart grid information engineering to carry out scientific experiment training. It is the beginning of students ' systematic experimental methods and experimental skills training after entering the university. It is an important means for students to carry out scientific experiment training. Through the teaching of this course, students are trained to master the basic theories and methods of experiments. To cultivate students with strong scientific experiment ability and practical ability ; cultivate students ' rigorous thinking ability and innovative spirit, especially the comprehensive ability to adapt to the development of modern science and technology ; consolidate and deepen the understanding of the basic concepts and theories of physics ; through the application of theory and the analysis of physical phenomena, students ' ability to analyze and solve problems is fully improved. It lays a good scientific experimental foundation for future study and work.
Teaching methods	Classroom teaching ; heuristic ; discussion style
Workload (incl. contact hours, self-study hours)	Total workload =60 hours Contact hours = 32 hours Self-study hours = 28 hours
Credit points （ECTS）	ECTS Credit=2.0
Required and recommended prerequisites for joining the module	higher mathematics
Module objectives/ intended learning outcomes	Curriculum objectives : Objective 1 : Through the study of basic knowledge, basic methods, basic skills, error theory and data processing methods of scientific experiments, it has the ability to preliminarily process scientific experiments. Objective 2 : To cultivate students ' scientific experimental ability and innovative consciousness through standardized experimental instrument

	operation, measurement data acquisition and processing, experimental error analysis, and independent completion of simple design experimental projects. Graduation Requirements Indicators : The experimental system can be constructed according to the experimental scheme of electronic circuit or electronic information system, and the experiment can be carried out safely and the experimental data can be collected correctly.
Content	Introduction Basic theory of measurement error Modification and calibration of electric meter ; the adjustment and use of Michelson interferometer ; determination of photoelectric effect and Planck constant ; the magnetic field is measured by the Hall effect method and the conductivity of the sample is measured ; measurement of acoustic velocity ; the elastic modulus of metal wire was measured by static tensile method. The curvature radius of the lens is measured by equal thickness interference method. Design experiment.
Examination forms	The assessment of the course is to check the students ' mastery and ability of each knowledge point, including the usual assessment and the experimental report assessment. The usual assessment includes attendance and experimental operation standardization ; the experimental report examines the standardization of the experimental report. The total score of the course is composed of two parts : the usual assessment score and the experimental report assessment score.
Study and examination Requirements	Average score of 100 points : (1) The usual performance consists of three parts : attendance, stage test and experimental operation. (2) Attendance accounted for 50 %, stage test accounted for 50 %. (3) The usual score multiplied by its proportion in the total score of 0.2 included in the total score of the course. Experimental report part 100 points : (1) The experimental report consists of experimental process and experimental data processing. (2) The score of the experimental report is 100 points, and the scores of the corresponding course objectives 1 and 2 are 20 points and 80 points respectively. The report score multiplied by its proportion in the total score of 0.8 was included in the total score of the course. (3) Experimental reports include : 7 conventional experimental reports (mechanics, heat, electromagnetics, modern physics experiments, etc.), 1 design experimental report. According to the teaching objectives of the course and the requirements of knowledge points and ability points, the writing of the experimental report is standardized, and the experiment should be comprehensively summarized. The experimental report includes : 1) experimental purpose ; 2) Experimental instruments ; 3) Experimental principle ; 4) Experimental steps ; 5) original data record ; 6) Experimental data processing and conclusions. While writing the report, students need to master the knowledge points and ability points of the relevant chapters of

	the textbook, and use the theoretical knowledge of the experiment to solve the complex problems in electronic information engineering.
Reading list	Jiang Yi and other editors. 'University Physics Experiment '. Science Press, 2018. Li Xuehui and other editors. 'University Physics Experiment '. Higher Education Press, 2018. Xu Jianqiang and other editors. 'College Physics Experiment Tutorial '. Science Press, 2019
Data of last mendment	June 29, 2025

College Physics I

Module designation	College Physics Ⅰ
Semester(s) in which the module is taught	2nd and 3rd semester
Person responsible for the module	Yu Yue
Language	Chinese
Relation to curriculum	This course is a public basic course of electronic specialty. Physics is a subject that studies the basic structure, interaction and the most basic and common form of motion of matter and its mutual transformation law. The research object of physics is of great universality. Its basic theory permeates all fields of natural science and is widely used in various departments of production technology. It is the foundation of natural science and engineering technology, and also the source and forerunner of many high-tech development. Therefore, ' College Physics ' course is an important compulsory basic course for students of science and engineering. Through the teaching of this course, students can master the basic knowledge of physics more systematically, learn scientific thinking methods and research methods, improve students ' ability to analyze and solve problems by applying the knowledge they have learned, enhance students ' innovative consciousness and innovative ability, cultivate students ' scientific world outlook, improve students ' scientific quality, and strive to achieve the coordinated development of knowledge, ability and quality. It also lays the necessary physical foundation for the study of subsequent professional foundation and professional courses and further acquisition of relevant knowledge.
Teaching methods	1.Lecture method ; 2. Method of discussion ; 3. Blended teaching method.
Workload (incl.contact hours，self-study hours)	Total workload =180 hours Contact hours = 96 hours Self-study hours = 84 hours
Credit points（ECTS）	ECTS Credit=6.0
Required and recommended prerequisites for joining the module	higher mathematics
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** 1.Kinematics and dynamics of particle, kinematics and dynamics basic knowledge and basic theorem law of rigid body fixed axis rotation ; basic knowledge and basic laws of mechanical vibration and mechanical wave ; gas kinetic theory and basic knowledge of thermodynamics ; the basic properties and basic laws of electromagnetic field ; theoretical

	basis of wave optics. 2.Comprehensive use of Newton 's law of motion and conservation law to solve the problem of complex mechanical system ; according to the known conditions, the mathematical expressions of the vibration model and the wave model are determined, and the practical significance of the vibration and wave synthesis decomposition is understood. To understand and master the quantitative relationship between macro-physical quantities and micro-physical quantities ; according to the basic law of thermodynamics, the thermodynamic process is analyzed, and the thermal power conversion efficiency of the quasi-static cycle process is quantitatively calculated. The field strength and potential are calculated by using the theorem and law of electrostatic field. Using the theorem and law of steady magnetic field to solve the general problem of magnetic field ; master Faraday 's law of electromagnetic induction ; to understand the nature of motional electromotive force and induced electromotive force ; solve the interference and diffraction problems in wave optics. ● **Skill：** 1.Be able to systematically understand and understand the basic knowledge, basic theory, physical concepts and physical laws in the course. 2.Be able to understand and master the basic physical laws, to use physical language and basic mathematical knowledge to solve practical physical problems. ● **Competence：** 1.Through the study of college physics courses, we can fully and systematically understand the basic knowledge, basic theory and basic methods in the course, and can correctly explain the physical concepts and physical laws in the course. 2.According to the physical theory and research methods, we can accurately use the physical language and basic mathematical knowledge to describe, analyze, study and solve practical physical problems, and provide basic ability training for professional problem processing.
Content	**2nd Semester. Theoretical teaching (48 contact hours; 42self-study hours)** **Chapter 1 particle mechanics** **(14 contact hours; 12self-study hours)** ●Description of particle motion ; **●Description of curvilinear motion, circular motion ;** ●Two kinds of problems in kinematics ; **●The application of Newton 's law of motion and Newton 's law of motion ;** ●The momentum theorem and the law of conservation of momentum of particle and particle system ;

	●Dynamic energy theorem, conservative force work, potential energy, functional principle, the law of conservation of mechanical energy. ●exercise class **Chapter 2 Foundations of rigid body mechanics** **(12 contact hours; 10 self-study hours)** ●The description, moment, moment of inertia and rotation law of rigid body fixed axis rotation ; ●The application of rotational inertia and rotational law ; ●The angular momentum of the particle and the angular momentum of the rigid body, the angular momentum theorem and the conservation law of the rigid body rotating around the fixed axis ; ●The theorem of dynamic energy and the law of conservation of mechanical energy of moment work, rigid body rotation around the fixed axis. ●exercise class ●quizzes **Chapter 3 vibration and waves** **(12 contact hours; 10 self-study hours)** ●The amplitude, period, frequency and phase of simple harmonic vibration and simple harmonic vibration ; ●Rotation vector representation ; ●The energy of simple harmonic vibration, the synthesis of simple harmonic vibration ; ●The formation of mechanical wave, wavelength, period and wave velocity, wave function of plane simple harmonic wave ; ●Wave energy, Huygens principle, wave superposition and interference. ●exercise class **Chapter 4 thermology (10 contact hours; 10 self-study hours)** ● The ideal gas state equation, the statistical interpretation of the pressure and temperature of the ideal gas, the energy equalization theorem, the internal energy of the ideal gas ; ●Quasi-static process ; work, heat, internal energy, the first law of thermodynamics ; ●Gas molar heat capacity ; isothermal process, adiabatic process ; ●Cycle process, Carnot cycle. ●exercise class **3rd Semester. Theoretical teaching (48 contact hours; 42 self-study hours)** **Chapter 5 electromagnetism (32 contact hours; 28 self-study hours)** ●Quantization of charge and conservation law, Coulomb 's law, electric field, electric field intensity ●Electric field intensity flux, Gauss theorem and its application ●The work of electric field force, the loop theorem of electrostatic field, potential energy and potential

	●conductor in electrostatic field ●Dielectric in electrostatic field ●Capacitor, capacitance, energy of electrostatic field, energy density of electric field ●exercise class ●Magnetic field, magnetic induction intensity, Biot-Savart law and its application ●The magnetic flux, the Gauss theorem of magnetic field, the Ampere loop theorem and its application ●The current-carrying wire is stressed in the magnetic field ●The effect of magnetic field on current carrying coil, the movement of charged particles in electric field and magnetic field ●exercise class ●quizzes ●Electromagnetic induction phenomenon, electromagnetic induction law, Lenz 's law ●Motional electromotive force, induced electromotive force ●Self-inductance and mutual inductance, magnetic field energy, magnetic field energy density **Chapter 6 wave optics (12 contact hours; 10self-study hours)** ●Coherent light, double-slit interference, optical path ●Thin film interference, wedge interference ●Diffraction of light, single slit diffraction ●Circular hole diffraction, optical instrument resolution ability ●Grating diffraction ●Polarization of light, acquisition and test of polarized light, polarization in reflection and refraction **Chapter 7 modern physical (4 contact hours; 4 self-study hours)** ●Special theory of relativity, space-time view, ●The basis of quantum mechanics.
Examination forms	Closed-book written exam.
Study and examination Requirements	●Students should complete their homework independently. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include two parts : the usual assessment and the final assessment. Among them : ●The usual performance accounts for 30 %, including homework (70 %), stage test (20 %), and other links (10 % in-class practice, topic discussion, etc.). ●The final grade accounted for 70 %.
Reading list	[1].Zhao Jinfang editor. 'University Physics ' (4th Edition). Beijing University of Posts and Telecommunications Press, 2014.11 [2]. Edited by Ma Wenwei. 'Physics ' (6th Edition). Higher Education Press, 2014.08 [3].Editor Zhang Sanhui. ' University Physics ' (4th Edition). Tsinghua

	University Press, 2018.12 [4].Editor-in-chief Cheng Shouzhu. 'General Physics ' (7th Edition), Higher Education Press, 2016.05
Data of last mendment	June 29, 2025

09 Module Descriptions

complex variable function

Module designation	complex variable function
Semester(s) in which the module is taught	Semester 3
Person responsible for the module	Gu zhaosheng
Language	Chinese
Relation to curriculum	'Complex variable function ' is a mathematics subject that studies the analysis process of complex value function of complex independent variables. It is a basic course to cultivate students ' basic analysis ability and a compulsory course for electrical and control majors. The contents of this course mainly include : complex variable function, analytic function, integral of complex variable function, series representation of analytic function, Fourier transform and Laplace transform. Through the study of this course, students can master the basic concepts, theories and methods of complex variable function, and can reasonably describe and simplify practical engineering problems by using the analysis characteristics of complex variable function theory. It provides the necessary theoretical analysis tools for the study of follow-up professional courses, and lays a good mathematical foundation for further engineering and scientific research work.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method
Workload (incl. contact hours, self-study hours)	Total workload = 75 hours Contact hours = 40 hours Self-study hours =35 hours Total workload = 75, of which : contact hours = 40, self-study hours = 35
Credit points （ECTS）	ECTS Credit=2.5
Required and recommended prerequisites for joining the module	higher mathematics
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** 1.Complex number and complex function, analytic function. 2.Integral and series of complex variable function. 3.Integral transform and its application. ●**Skill：** It can carry out the basic operation of complex numbers, the description of curves and regions in the complex plane, and the derivation operation of

	complex variable functions. It has the ability to judge the existence, continuity, derivation and analysis of the limit of complex variable functions, so that students have certain knowledge transfer ability, abstract generalization ability and logical reasoning ability. It has the ability to expand the analytic function into Taylor series and expand the simpler function into Lorentz series in different ring domains, so that students can realize the unique thinking mode of complex variable function in dealing with problems, and promote the further improvement of students ' logical reasoning ability, and provide the necessary basis for students to learn subsequent courses and mathematical knowledge. ● **Competence：** 1.Fourier transform and Laplace transform that can calculate typical functions, have the ability to skillfully apply Laplace transform to solve differential equations, further train and improve students ' ability to analyze and solve problems, lay a solid mathematical foundation for further study of follow-up courses and modern science and technology, and provide students with applicable mathematical methods and calculation methods for scientific research and practical work. The language tools of mathematics, natural science and engineering science can be used to express the complex engineering problems of electronic information.
Content	**Theoretical teaching(40 contact hours; 35 self-study hours)** **Chapter 1 Complex number and complex variable function (8 contact hours; 7 self-study hours)** Complex number and its algebraic operation, the geometric representation of complex number ; the power and root of the complex number ; region, complex variable function, the limit and continuity of complex variable function. **Chapter 2 Analytic Functions (6 contact hours; 5 self-study hours)** Main teaching contents : derivative and differential of complex variable function ; the definition of analytic function, the necessary and sufficient conditions of function analysis ; the definition, analytic properties and operational properties of elementary functions (exponential function, logarithm, power function, trigonometric function, inverse trigonometric function). **Chapter 3 Integral of complex function (8 contact hours; 7 self-study hours)** The definition, properties and calculation of integral ; cauchy-Gusa basic theorem, compound closed circuit theorem, Cauchy integral formula, higher order derivative of analytic function ; the relationship between analytic function and harmonic function. **Chapter 4 Series Representation of Analytic Functions** **(8 contact hours; 7 self-study hours)** The concept of complex term series, the concept of power series ; the convergence radius and convergence circle of the power series, and the properties of the power series in the convergence circle ; taylor series ; laurent series. **Chapter 5 Integral Transformation (10 contact hours; 9 self-study hours)**

	Understand the concept of Fourier transform and its inverse transform, master the Fourier transform of some functions ; understand the concept of Laplace transform, pay attention to the difference and connection between it and Fourier transform ; master the method of pulling transformation ; to understand the properties of Laplace transform ; understand the method of using pull-type inverse transformation ; can skillfully apply Laplace transform to solve differential equations.
Examination forms	The closed-book written examination method is adopted
Study and examination Requirements	1.Students should independently complete the homework after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance, experimental performance and final exam results, and comprehensively evaluates students ' learning situation, ability to analyze and solve complex engineering problems. The usual performance evaluation standard is 30 %, including homework (60 %) and stage assessment (40 %) ; the final examination accounted for 70 %. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	Required books 1. Gao Zongsheng editor in chief. 'Complex Functions and Integral Transforms ' (Second Edition). Beijing : Beijing University of Aeronautics and Astronautics Press, 2016 2.Li Hong editor. ' Complex Functions and Integral Transformations ' (Fifth Edition). Beijing : Higher Education Press, 2018 3.Maberlin editor. 'Complex Functions and Integral Transforms ' (First Edition). Beijing : Peking University Press, 2019 4.Baoge Jun editor-in-chief. 'Complex Functions and Integral Transforms ' (First Edition). Beijing : Science Press, 2021 5.Zhong Yuquan editor. 'The Theory of Complex Variable Functions ' (5th Edition). Beijing : Higher Education Press, 2021
Data of last mendment	September 23, 2025

Fundamentals of College Computer

Module designation	Fundamentals of College Computer
Semester(s) in which the module is taught	1th semester
Person responsible for the module	Liu Chao
Language	Chinese
Relation to curriculum	'University Computer Foundation ' is a public basic course of electronic information specialty. It is also a public basic course of computer in ordinary colleges and universities. The training goal of ' emphasizing application and emphasizing practice ' is emphasized. The course content mainly includes the first knowledge of computer, operating system Windows 7, document processing Word 2010, database basic knowledge and Access database, multimedia technology and computer network.
Teaching methods	1.Lecture method ; 2. Case law ; 3.Discussion method ; 4. Blended teaching method ; 5. Experimental method.
Workload (incl.contact hours，self-study hours)	Total workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours Total workload = 90, of which : theoretical hours = 32, self-study hours = 58
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	No
Module objectives/ intended learning outcomes	**1.curriculum goals** This course aims to help non-computer majors systematically master basic computer knowledge and basic operating skills, understand the role of information technology in modern society, cultivate computational thinking and information literacy, and lay a solid foundation for subsequent professional learning and digital life. **2. Expected learning outcomes** ● Proficiency in operating mainstream operating systems (such as Windows) for file management, system settings and routine maintenance. ● Using office automation software (Word, Excel, PowerPoint) to efficiently complete document editing, data analysis and demonstration production.

	● Understand the basic concepts of multimedia technology, can use common tools to process image, audio or video material. ● Master the basic principles of database, can use Access or similar tools to create a simple database and perform query operations. ● Learn the basics of computer networks and the Internet, including IP addresses, browser usage, network security, and information ethics.
Content	**A.Theoretical teaching(20 contact hours; 46 self-study hours)** **theory teaching（16 class hours ; 32 self-study hours）** The first part : Basic knowledge of computer (1) Information technology and computer (2 hours ; 2 self-study hours) (2) Hardware system (2 hours ; 4 self-study hours) (3) Operating system principle and application (2 hours ; 4 self-study hours) The second part : Office office software, multimedia technology (1) office office software (2 hours ; 6 self-study hours) (2) Multimedia technology (2 hours ; 4 self-study hours) The third part : database principle and application, program design basis. (1) Database principle, Access database application software 1 (2 hours ; 4 self-study hours) (2) database principle, Access database application software 2 (2 hours ; 4 self-study hours) Part IV : Computer networks, information retrieval and information security Computer network foundation, information retrieval and information security (2 hours ; 4 self-study hours) **Part B. Experiment teaching(16 contact hours; 22 self-study hours)** In order to help students better understand the basic operation of office and database, we will arrange the following eight typical experimental projects : Experiment 1 : Operating system experiment (2 hours ; 2 self-study hours) Experiment 2 : office experiment 1 (2 hours ; 4 self-study hours) Experiment 3 : office experiment 2 (2 hours ; 4 self-study hours) Experiment 4 : multimedia experiment (2 hours ; 4 self-study hours) Experiment 5 : Access database experiment 1 (2 hours ; 2 self-study hours) Experiment 6 : Access database experiment 2 (2 hours ; 2 self-study hours) Experiment 7 : Network Experiment 1 (2 hours ; 2 self-study hours) Experiment 8 : network experiment 2 (2 hours ; 2 self-study hours)
Examination forms	Closed-book written exam

Study and xamination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. ●The usual performance evaluation standard is 50 %, including homework (20 %), experiment (20 %) and stage assessment (10 %). The average score accounted for 50 %, and the final examination (closed-book written examination) accounted for 50 %.
Reading list	[1] Liu Chao and so on. University Computer Basic Tutorial People 's Post and Telecommunications Press 2024 [2] Zhao Liying et al. University Computer Basic Experiment Tutorial People 's Post and Telecommunications Press 2024
Data of last mendment	June 29, 2025

Basic Computer Programming (C Language)

Module designation	Basic Computer Programming (C Language)
Semester(s) in which the module is taught	2th semester
Person responsible for the module	Ms. Liu Chao
Language	Chinese
Relation to curriculum	'Computer Programming Foundation (C language) ' is a compulsory public basic course for students after the ' University Computer Foundation ' course. This course involves three basic structures of structured program design, basic data types and construction data types, functions, pointer types, etc. Through the study of this course, students can master the basic knowledge and programming skills of computer programming, cultivate students ' thinking methods and basic abilities to solve and deal with practical problems by computer, and lay a foundation for further development of application programs to solve professional problems.
Teaching methods	1.Lecture method ; 2.Case law ; 3.Discussion method ; 4.Blended teaching method ; 5.Experimental method.
Workload (incl.contact hours，self-study hours)	Total workload = 120 hours Contact hours =48 hours Self-study hours = 72 hours
Credit points（ECTS）	ECTS Credit= 4.0
Required and recommended prerequisites for joining the module	university computer foundation
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** 1. the representation of basic data types, operators and expressions that can describe the C language ; 2.Be able to describe the three basic structures of structured program design ; 3.Know the establishment and application of one-dimensional array, two-dimensional array and character array ; 4.Know the definition and call of the function, the transfer of function parameters and the application of the function. 5.Understand the definition and reference of pointer variables, pointer operations, pointers and arrays. ● **Skill：** 1.Able to apply the basic theory of C language and programming

	thinking programming to solve practical problems ; 2.Visual C + +, Dev-C + + and other software tools can be used to solve exercises and common algorithms ; 3.According to the experimental requirements, we can independently complete the in-class experiment, and analyze the experimental results to get the correct conclusion. ● **Competence：** 4.Have the ability of engineering calculation ; 5.Programming ability based on C language ; 6.Have the ability to integrate theory with practice, analyze and solve practical engineering problems.
Content	**Part A.Theoretical teaching(24 contact hours; 38 self-study hours)** **Chapter 1** Basic knowledge of C language **(4 contact hours; 4 self-study hours)** ●The development process of C language program ; simple C language program ; ●Data type ; basic operators and expressions ; **Chapter 2** Sequential structure program design **(2 contact hours; 4 self-study hours)** ●Data input and output ; ●Sequential structure ; **Chapter 3** Select Structure Program Design **(2 contact hours; 2 self-study hours)** ●Three structures of if statement, if statement nesting ; ●switch statement ; **Chapter 4** Loop structure program design **(4 contact hours; 8 self-study hours)** ●while, do while loop ; ●for loop statement ; ●continue and break statements ; ●Loop nesting ; **Chapter 5** array **(6 contact hours; 8 self-study hours)** ●One-dimensional array ; ●Two-dimensional array ; ●String and character array applications ; **Chapter 6** function **(2 contact hours; 6 self-study hours)** ●The definition and call of function ; transfer of parameters ; ●Local variables and global variables ; ●The storage category of variables ; **Chapter 7** pointer **(2 contact hours; 8 self-study hours)** ●The basic concept of pointer ;

	●Pointers and arrays ; **Part B.Exercise teaching(6 self-study hours)** **Part C. Experiment teaching(24 contact hours; 28 self-study hours)** Experiment 1 : Familiar with VC + + 6.0 programming environment. **(2 contact hours; 4 self-study hours)** Experiment 2 : Sequential structure programming **(2 contact hours; 4 self-study hours)** Experiment 3 : Selection of structural programming **(2 contact hours; 4 self-study hours)** Experiment 4-5 : Loop Structure Programming **(4 contact hours; 4 self-study hours)** Experiment 6-8 : Array programming **(6 contact hours; 6 self-study hours)** Experiment 9-10 : Function programming **(4 contact hours; 6 self-study hours)** Experiment 11-12 : Pointer **(4 contact hours; 6 self-study hours)**
Examination forms	Closed-book examination
Study and examination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include three parts : usual assessment, final assessment and experimental assessment. Among them : ●The usual performance accounted for 20 %, including comprehensive evaluation (10 %) and stage assessment (10 %). Among them, the comprehensive evaluation includes : attendance, homework, classroom discussion, and in-class test results assessed by the learning platform. ●The experimental results accounted for 20 %. ●The final grade accounted for 60 %.
Reading list	[1] Su Xiaohong. Basics of programming (C language) (MOOC version) (2 nd edition) [M]. Beijing : People 's Post and Telecommunications Publishing House, 2025. [2] Cao Liying. C Language Programming (Digital Textbook) [M]. Beijing : Higher Education Press, 2025.
Data of last mendment	June 29, 2025

C++ Programming

Module designation	C++ Programming
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	Fu Haohai
Language	Chinese
Relation to curriculum	This course is the core professional basic course of electronic information engineering, and it is the key link between computer basic and high-level professional courses. Advanced course : higher mathematics provides the basis of mathematical logic and data processing ; computer basics make students familiar with the operating system and basic programming logic ; the digital logic foundation lays the hardware cognitive foundation for understanding the software and hardware interaction and bit operation in C + +. Follow-up courses : provide necessary programming ability support for embedded system development, single-chip microcomputer principle, digital signal processing, data acquisition technology and other courses. C + + object-oriented thinking and hardware interactive programming can be directly applied to embedded drive development, signal algorithm implementation and other links of follow-up courses.
Teaching methods	Teacher-Centered Methods: Lecture Method, Questioning Method, Discussion Method, Laboratory Method Target Students: Electronic Information Engineering Teaching Type: Practical Teaching
Workload (incl. contact hours, self-study hours)	Total workload = 75 hours Contact hours = 32 hours Self-study hours = 43hours
Credit points （ECTS）	ECTS Credit=2.5
Required and recommended prerequisites for joining the module	Fundamentals of Computer Science for College Students, C Programming, Fundamentals of Digital Logic
Module objectives/ intended learning outcomes	**Learning outcomes** 1. knowledge layer Master the C + + core syntax, including data types, operators, process control, arrays, strings, functions, pointers and references ; understand the basic idea of object-oriented programming (OOP) (encapsulation, inheritance, polymorphism) and the implementation

	mechanism of classes and objects ; master C + + memory management (new / delete) and basic engineering programming specifications ; understand the application scenarios of C + + in electronic information engineering (embedded development, data acquisition, signal processing). 2. the level of skill capacity It can independently write, compile, debug and optimize C + + programs to solve simple data processing and logic control problems. Can use pointer, reference, dynamic memory efficient processing of variable length data (such as sensor signal sequence) ; can design and implement classes to encapsulate hardware modules (such as sensors, LED), complete object-oriented programming ; the basic signal processing algorithm can be realized by using C + + to simulate simple hardware interaction. 3.Competence Have engineering programming thinking, can disassemble professional problems, design modular code solutions ; have code specification awareness and fault-tolerant programming habits, adapt to the high reliability development requirements of electronic information engineering ; have the ability of autonomous learning and problem solving, and can quickly master C + + to expand knowledge to adapt to subsequent professional courses ;
Content	**Part A Theory teaching : (16 face-to-face teaching, 43 self-study)** Module 1 : C + + Foundation and Development Environment 1.Overview of C + + (characteristics, differences from C, applications in the field of electronic information) ; 2.Development environment construction (VS Code / CLion configuration, engineering creation) ; the basic structure of the program (header file, main function, namespace) ; 4.Basic data type and bit operation (electronic information core). Module 2 : Process control and basic algorithm 1.Branch control (if-else, switch-case, adaptive sensor threshold judgment) ; 2.Cyclic control (for, while, adapt to continuous data acquisition) ; 3.Jump statement (break, continue) ; 4.Simple algorithm implementation (data sorting, filtering). Module 3 : Arrays, Strings and Functions 1.one-dimensional / two-dimensional array (signal sequence storage) ; 2.C style string and string class (serial data parsing) ; 3.Function definition, declaration and parameter transfer (value transfer, address transfer) ; 4.Function overload and default parameters. Module 4 : Pointer, Reference and Dynamic Memory 1.Pointer concept and operation (memory addressing) ; 2. Pointers and arrays / strings (efficient data access) ; 3.Applications in references and function parameters ; 4.Dynamic memory allocation (new / delete) and memory leak prevention. Module 5 : Object-Oriented Programming (OOP) 1.OOP core idea (encapsulation) ; 2.Class and object definition, access control (public / private) ; 3.Constructor and destructor (hardware

	module resource management) ; 4.Hardware module packaging practice ; 5.Inheritance (base class and derived class, sensor class code reuse) ; 6. Polymorphism (virtual function, hardware unified interface). **Part B Practice teaching (16 face-to-face teaching)** Experiment 1 : C + + environment and basic program 1.Build the development environment, compile the first C + + program ; 2.Implement variable definition, input and output, simple bit operation (analog hardware register operation). Experiment 2 : Process control and data processing 1.Write a branch program to determine the sensor data threshold ; 2.Realize the loop program to collect and display the simulation data ; 3.Complete simple data filtering. Experiment 3 : Array, String and Function Practice 1.Storing and traversing the sensor signal sequence with an array ; 2.Use string class to parse serial format string ; 3.Packaging data processing functions to achieve parameter transfer. Experiment 4 : Pointer, Reference and Dynamic Memory 1.Realizing array data sorting with pointers ; 2.Optimize data access with reference ; 3.Dynamic allocation of memory storage variable length acquisition data and secure release. Experiment 5 : Class encapsulation of hardware modules 1.Define the LED control class (package switch, brightness adjustment function) ; 2.Define the temperature sensor class (encapsulated data reading, calibration function) ; 3.Create objects and invoke module functions. Experiment 6 : OOP synthesis and hardware simulation 1.Implement the general sensor base class, and derive the humidity / pressure sensor subclass (inheritance) ; 2.Using polymorphism to realize the unified call of different sensors ; 3.Simulate multi-hardware module collaborative control and add exception handling.
Examination forms	The closed-book written examination method is adopted.
Study and examination Requirements	**1. Formative evaluation (40 %)** Homework and self-study tasks (15 %) : homework after class, covering core knowledge points, scoring according to code correctness, standardization, and professional application suitability ; experimental report and performance (20 %) : 6 experimental reports (including code, running results, error analysis), according to the task completion, debugging ability, report normative score ; classroom participation and attendance (5 %) : based on interactive Q & A, group discussion performance and attendance records. 2. Final evaluations (60 per cent) Final examination (60 %) : closed-book written examination, including multiple choice questions, code reading questions, programming questions ; focus on core knowledge and professional application ability, covering the whole module content.
Reading list	1.Required books [1]Qian Neng. C++ Programming Tutorial (3rd Edition). Tsinghua University Press, 2021. [2]Bjarne Stroustrup. *C++ Programming Language* (4th Edition). Pearson,

	2013. 2.Reference books [1]C++ Primer Plus (6th Edition), Stephen Prata. [2]Embedded C++ Programming Practice, Electronic Industry Press. [3]Online resources: cppreference.com teaching-material： [1] Money can. 'C + + Programming Tutorial (3rd Edition) '.Tsinghua University Press, 2021. [2] Bjarne Stroustrup. ' C + + programming language (4th edition) '. Pearson Press, 2013. References : [1] ' C + + Primer Plus (6th edition) ', by Stephen Prata ; [2] ' Embedded C + + programming practice ', Electronic Industry Press ; [3] Online resources : cppreference.com.
Data of last mendment	September 23, 2025

Electromagnetic Field and Electromagnetic Wave

Module designation	**Electromagnetic Field and Electromagnetic Wave**
Semester(s) in which the module is taught	4rd semester
Person responsible for the module	Liu Zhiming
Language	Chinese
Relation to curriculum	'Electromagnetic field and electromagnetic wave ' is a theoretical basic course in the transition from classical electromagnetic field theory to engineering application. It plays a very important and even decisive role in the advancement of related majors. According to the talent training plan of our school, in order to enable students to receive professional theoretical training and guidance, so that those who can get further basic training, this course is set up. This course is a theoretical course based on Maxwell 's classical electromagnetic theory, which can be set up as an important professional basic course for undergraduate related majors. Through the study of this course, we can achieve a deep understanding of the physical meaning of Maxwell 's equations, which is beneficial to the study of other related professional courses, and play the role of the course in engineering practice and future learning and research.
Teaching methods	1.Lecture method ; 2. Method of discussion ; 3. Blended teaching method.
Workload (incl.contact hours，self-study hours)	Total workload =90 hours Contact hours = 32 hours Self-study hours = 58 hours
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Higher Mathematics College Physics
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** The concept of vector field and scalar field ; the gradient of scalar field, the divergence and curl of vector field and their physical meanings. Helmholtz theorem of source component analysis of vector field. The superposition method of electrostatic field and electrostatic potential ; the active and irrotational nature of the electrostatic field ; the basic equations of the electrostatic field : the active equation and the spinless equation and the Poisson equation ; the standardization of dielectric processing. The steady current is described, and the vacuum magnetic field is calculated according to the law of current magnetic

	effect. The passivity and rotation of the magnetic field are analyzed, and the magnetic vector potential is introduced. The magnetic field of the medium is analyzed by magnetic dipole model and magnetic vector potential. Uniqueness theorem of constant field ; mirror method ; separation of variables method ; finite linear difference method. The law of electromagnetic induction, the introduction of displacement current, the establishment of Maxwell 's equations, the introduction of Maxwell 's equations of treatment principles and scope of application, to understand the electromagnetic excitation. ● **Skill：** The language tools of mathematics, natural science and engineering science can be used to express the complex engineering problems of smart grid information. The engineering foundation, professional knowledge and mathematical model method can be used to deduce and analyze the information engineering problems of smart grid. ● **Competence：** 1.We can master the basic laws and processing methods of vector field and scalar field, and understand the profound meaning of divergence theorem, Stokes theorem and Helmholtz theorem. The basic properties of vacuum electrostatic field and dielectric electrostatic field can be analyzed and studied by using the basic theory of abstract field, and the electrostatic field and electrostatic potential can be calculated. The basic properties of vacuum steady magnetic field and medium magnetic field can be analyzed and studied by using the basic theory of abstract field, and the magnetic induction intensity and magnetic vector potential can be calculated. 4.Be able to master and understand the processing method of steady-state field equations, understand the spirit of separation of variables, and have basic numerical calculation ability. 5.To master the basic law of time-varying field and understand the basic principle of electromagnetic excitation. Understand the basic phenomena and theories of electromagnetic waves and planar electromagnetic waves.
Content	**Chapter 1 Abstract field theory** **(6 contact hours; 10 self-study hours)** ●vector algebra ; ●vector analysis operation ; ●vector identity ; ●helmholtz theorem **Chapter 2 Static field theory** **(14 contact hours; 22 self-study hours)** ● The characteristic equation of the electrostatic field (active,

	non-rotational) ; ● poisson equation ; ● dielectric electrostatic field ; ● interface field characteristics ; ●Current and current density vector ; ●ohm 's law ; ●the charge conservation equation ; ●steady current field characteristic equation ; ●the analogy between the steady current field and the electrostatic field ; ●the basic equations and boundary conditions of steady magnetic field ; ●the physical nature of magnetization ; ●magnetic dipole and vector magnetic potential ; ●magnetic interface field **Chapter 3 boundary value problem** **(6 contact hours; 12 self-study hours)** ●The basic principle and basic calculation of the variable separation method ; ●the physical essence and calculation method of electric image method ; ●difference method **Chapter 4 time-variable field** **(4 contact hours; 10 self-study hours)** ●Maxwell 's equations ; ●boundary conditions ; ●fluctuation equation **Chapter 5 electromagnetic wave** **(2 contact hours; 4 self-study hours)** ●Electromagnetic excitation and electromagnetic wave
Examination forms	Closed-book written exam.
Study and examination Requirements	●Students should complete their homework independently. Late arrivals, early departures or unauthorized absences are not permitted. The assessment methods of this course include two parts : the usual assessment and the final assessment. Among them : ●The usual performance is composed of 30 % of the homework. ●The final grade accounted for 70 %.
Reading list	1. Feng Cizhang. 'electromagnetic field '. People 's Education Publishing House 2.Xie Shuyi. 'Vector analysis and field theory '. Higher Education Publishing House 3.Thanks prescription, Rao Kejing. " Electromagnetic Fields and Waves. " Higher Education Publishing House 4.Guo Huiping and Liu Xueguan. " Electromagnetic Fields and Waves. "

	Xi 'an University of Electronic Science and Technology Press 5.Wang Jiali, Zhu Manzuo, Lu Hongmin. " Electromagnetic Fields and Waves. " Xi 'an University of Electronic Science and Technology Press
Data of last mendment	June 29, 2025

Data Structures and Algorithms

Module designation	Data Structures and Algorithms
Semester(s) in which the module is taught	3th semester
Person responsible for the module	LiuChao
Language	Chinese
Relation to curriculum	'Data Structure ' is a professional basic course of electronic information specialty. It mainly introduces how to organize data reasonably, store and process data effectively, design algorithm correctly and analyze and evaluate the algorithm. Through the study of this course, students can deeply understand the logical structure and physical structure of data, master relevant algorithms, and cultivate basic and good programming ability. They can use the theory, method and technology of data structure to solve corresponding practical problems, effectively improve students ' programming ability, and lay a solid foundation for the future application of computer to solve professional problems.
Teaching methods	Target students : students majoring in electronic information engineering Teaching types : theoretical teaching and experimental teaching Contact class hours : 32 hours, including : Theoretical teaching : 20 hours Experimental teaching : 12 hours Class size : 70-80 people
Workload (incl.contact hours，self-study hours)	Total workload = 90 hours Contact hours = 32 hours Self-study hours = 58 hours Total workload = 90, of which : contact hours = 32, self-study hours = 58
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	University computer foundation, computer programming foundation (C language)
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** 1.Understand the abstract data types, storage structures and basic operations of various data structures, master the evaluation methods of algorithms, and select appropriate data structures, storage structures and corresponding algorithms according to specific problems.

	Master the ability to analyze, design and implement basic algorithm problems, and be able to design efficient algorithms and program them. ● **Skill：** 1.Familiar with the application fields and algorithm implementation of different data structures. 2.Able to apply reasonable data organization to solve practical problems. ● **Competence：** 1.Let students deeply understand the national science and technology strategy and promote the innovative development of computer technology. Secondly, we should build a digital economy with data as the core element, use data to promote the modernization of national governance, use data to promote the protection and improvement of people 's livelihood, and effectively build a national data security defense line.
Content	**A.Theoretical teaching(20 contact hours; 46 self-study hours)** **Theoretical teaching (20 hours ; 40 self-study hours)** **Chapter 1 Introduction** **(2 contact hours; 4 self-study hours)** **Chapter 1 Introduction (2 hours ; 4 self-study hours)** ●The basic concept of data structure ; ●Algorithm and algorithm analysis **Chapter 2 Linear list** **(4 contact hours; 8 self-study hours)** Chapter 2 Linear Tables (4 hours ; 8 self-study hours) ●The logical structure of linear table ; ●Sequence table storage structure and implementation ; ●Link storage structure and implementation **Chapter 3 Stacks and Queues** **(2 contact hours; 4 self-study hours)** ●The logical structure, storage structure and basic operation of the stack ●The logical structure, storage structure and basic operation of the queue **Chapter 4 Trees and Binary Trees** **(4 contact hours; 8 self-study hours)** ●The logical structure and storage structure of the tree ●The logical structure and storage structure of binary tree ●traversing binary tree ●Trees and forests **Chapter 5 Search** **(2 contact hours; 4 self-study hours)**

	Chapter 5 Find (2 hours ; 4 self-study hours) ●The search technology of linear table ●binary sort tree **Chapter 6 Sort** **(6 contact hours; 12 self-study hours)** ●Overview of sorting technology ●insertion sort ●exchange sorting ●simple selection sort ●heap sort ●order by merging ●Comparison of various sorting methods **Part B. Experiment teaching(12 contact hours; 18 self-study hours)** In order to help students better understand the principle of data structure, master the way of data organization and improve practical skills, we will arrange the following six typical experimental projects : Experiment 1 : The realization of the basic operation of linear table (2 hours ; 2 self-study hours) Experiment 2 : Implementation of the basic operations of stack and queue (2 hours ; 4 self-study hours) Experiment 3 : Binary tree traversal and application algorithm implementation (2 hours ; 4 self-study hours) Experiment 4 : Implementation of the search algorithm (2 hours ; 4 self-study hours) Experiment 5-6 : Implementation of sorting algorithm (4 hours ; 4 self-study hours)
Examination forms	Closed-book written exam
Study and xamination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. ●The usual performance evaluation standard is 40 %, including homework (10 %), experiment (20 %) and stage assessment (10 %). The usual results accounted for 40 %, and the final examination (closed-book examination) accounted for 60 %.
Reading list	Required books [1] Yu Yong, Zhang Ming, Chen Yue, Han Wentao. Data structure [M]. Beijing : Higher Education Press, 2025. (Chinese) Reference books References [1] Li Gang, Liu Wanhui. data structure (C language version) [M]. 2nd edition. Higher Education Press, 2023. [1] Wang Hongmei. Data structure (from concept to C implementation) [M]. 2nd edition. Tsinghua University Press, 2023.
Data of last mendment	June 29, 2025

Analog Electronic Technology

Module designation	Analog Electronic Technology
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Li Yu
Language	Chinese
Relation to curriculum	The course of ' Analog Electronic Technology ' belongs to the basic engineering course of electronic information engineering. The task is to enable students to master the performance of common semiconductor devices and the functions of typical analog electronic unit circuits through the study of this course, analyze the functions of system circuits composed of unit circuits, enable students to obtain basic theories, basic knowledge and basic skills in analog electronic technology, and cultivate the ability to analyze and solve problems, so as to lay a good foundation for the follow-up courses of this major and the application of electronic technology in this major. The main contents of this course include : common semiconductor devices, basic amplifier circuit, multi-stage amplifier circuit, integrated operational amplifier circuit, feedback in amplifier circuit, signal operation and processing, waveform generation and signal conversion, power amplifier circuit, DC power supply and analog electronic circuit reading.
Teaching methods	Teacher-centered methods: Lecture method, questioning method, discussion method Target students : electronic information engineering Teaching types : theoretical teaching and experimental teaching
Workload (incl.contact hours，self-study hours)	Total workload = 150 hours Contact hours = 56 hours Self-study hours =94 hours Total workload = 150, of which : contact hours = 56, self-study hours = 94
Credit points（ECTS）	ECTS Credit=5.0
Required and recommended prerequisites for joining the module	Higher mathematics, circuit theory
Module objectives/ intended learning outcomes	**Course Objectives and Competencies to Be Achieved Through This Course:** Objective 1 : To be able to use the structure and principle of PN junction to analyze the performance and parameters of semiconductor devices ; the technical indexes of the amplifier can be analyzed by using the estimation method of static operating point, graphic analysis method and micro-variable equivalent circuit analysis method. It can use the different coupling modes of the amplifier to connect the amplifier circuit ; the integrated operational amplifier can be used to

	comprehensively process the electrical signals. Objective 2 : To be able to correctly judge the feedback in the circuit and introduce appropriate feedback in the amplifier circuit as needed ; by using the composition principle of power amplifier circuit, the characteristics of power amplifier circuit can be analyzed. It can use the working principle of DC regulated power supply to estimate parameters and design simple power supply circuit. Objective 3 : To review the relevant theories of analog circuit experiments by scientific methods, select the research route, and design a feasible experimental scheme. Objective 4 : To correctly regulate the use of experimental instruments, select experimental devices to build experimental systems, safely carry out scientific experiments, and obtain experimental data. Objective 5 : to correctly screen and process experimental data, standardize the writing of experimental reports, through comprehensive analysis of information, draw reasonable and effective conclusions, and improve the solution of circuit problems.
Content	**A.Theoretical teaching(46contact hours)** **Chapter 1 Common Semiconductor Devices (8contact hours)** ●Basic knowledge of semiconductor ; ●semiconductor diode ; ●crystal triode ; ●field effect tube ; ●components in integrated circuits **Chapter 2 Basic Amplifier Circuits (6 contact hours)** ●The concept of amplification and the main performance indicators of the amplification circuit ; ●the working principle of the basic common-emitter amplifier circuit ; ●analysis method of amplifying circuit ; ●the stability of the static operating point of the amplifier circuit ●Three basic connection methods of transistor single-tube amplifier circuit **Chapter 3 Integrated Operational Amplifier Circuits (6 contact hours)** ●General problems of multi-stage amplifier circuit ; ●overview of integrated operational amplifier circuit ; ●unit circuit in integrated operational amplifier ; ●introduction of integrated operational amplifier circuit **Chapter 4 Feedback in Amplifier Circuits (6 contact hours)** ●The basic concepts and judgment methods of feedback ; ●four basic configurations of negative feedback amplifier circuit ; ●block diagram and general expression of negative feedback amplifier circuit ; ●analysis of the magnification of the deep negative feedback amplifier circuit ; ●the influence of negative feedback on the performance of amplifier circuit

	Chapter5 Signal Operation and Processing (6 contact hours) ●Basic operation circuit ; ●analog multiplier and its application in operation circuit ; ●active filter circuit **Chapter 6 Waveform Generation and Signal Conversion (4 contact hours)** ●Sine wave oscillation circuit ; ●voltage comparator ; ●non-sinusoidal wave generating circuit **Chapter 7 Power Amplifier Circuits (4 contact hours)** ●Overview of power amplifier circuit ; ●complementary power amplifier circuit ; ●the safe operation of the power amplifier circuit ; **Chapter 8 DC Power Supplies (4 contact hours)** ●The composition of the DC power supply and the role of each part ; ●rectifier circuit ; ●filtering circuit ; ●regulator tube voltage regulator circuit ; ●series voltage stabilizing circuit ; ●switch type voltage stabilizing circuit **Part B. Experiment teaching(10 contact hours)** In order to help students better use scientific methods to review the relevant theories of analog circuit experiments, select research routes, design feasible experimental schemes, correctly standardize the use of experimental instruments, correctly screen and process experimental data, standardize the writing of experimental reports, and improve the solution of circuit problems, we will arrange the following five typical experimental projects : Experiment 1 : Commonly used instruments (2 hours) Experiment 2 : Single-stage amplifier circuit (2 hours) Experiment 3 : Negative feedback amplifier circuit (2 hours) Experiment 4 : Proportional summation circuit (2 hours) Experiment 5 : Waveform generation circuit (2 hours)
Examination forms	Closed-book written exam
Study and examination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. ●The usual performance evaluation standard is 40 %, including homework (16 %), experiment (20 %) and stage assessment (4 %). The usual results accounted for 40 %, and the final examination (closed-book examination) accounted for 60 %.
Reading list	Recommended Textbooks and Reference Books [1] Tong Shibai, Hua Chengying editor-in-chief. Analog electronic technology foundation. Beijing : Higher Education Press, 2015.7 [2] Kang Huaguang, edited by Zhang Lin. Fundamentals of Electronic Technology (Simulation). Beijing : Higher Education Press, 2021.6

	[3] Wang Zhongxun, Sun Yuanping editor. Analog electronic technology foundation. Xi 'an : Xi 'an University of Electronic Science and Technology Press, 2017.8 [4] Wen Changze editor-in-chief. Basic experiment of electronic technology. Beijing : Chemical Industry Press, 2021.5
Data of last mendment	December 20, 2025

Digital Electronic Technology

Module designation	Digital Electronic Technology
Semester(s) in which the module is taught	5th semester
Person responsible for the module	ZHang Jinghui
Language	Chinese
Relation to curriculum	'Digital Electronic Technology ' is a basic course of electrical engineering and automation, which is a very close combination of theory and practice.
Teaching methods	Teacher-centered methods: Lecture method, questioning method, discussion method Target students : electronic information engineering Teaching types : theoretical teaching and experimental teaching
Workload (incl.contact hours，self-study hours)	Total workload = 120hours Contact hours = 48 hours Self-study hours = 72 hours Total workload = 48, of which : contact hours = 48, self-study hours = 72
Credit points（ECTS）	ECTS Credit=4.0
Required and recommended prerequisites for joining the module	Circuit Theory, Analog Electronic Technology
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** 1.Understand the basic knowledge of logical algebra 2.master the logic circuit analysis, design process and the logic function of common devices. ● **Skill：** 1.Be able to correctly select and use integrated components. Establish a scientific and systematic analysis method for digital logic circuits, and cultivate the ability to analyze and solve problems. ● **Competence：** It plays a very important role in training electrical and electronic technology talents to cultivate hands-on operation ability, knowledge application ability and design innovation ability, and to apply the theoretical knowledge of digital electronic technology to practice flexibly.
Content	**A.Theoretical teaching(32 contact hours; 28 self-study hours)** **Chapter 1 Code system and number system** **(2contact hours; 0self-study hours)** ●Common number system ;

	●conversion of different number systems ; ●binary arithmetic operation ; ●several commonly used coding ; **Chapter 2 Fundamentals of Logical Algebra** **(4 contact hours; 0 self-study hours)** ●Basic operations of logic algebra ; ●the basic formulas and common formulas of logical algebra ; ●the basic theorem of logical algebra ; ●logic function and its representation method ●Simplification method of logic function **Chapter 3 Gate Circuit (2 contact hours; 0 self-study hours)** ●Semiconductor diode gate circuit ●CMOS Gate Circuits **Chapter 4Image Gray-level Transformation and Spatial Filtering** **(10 contact hours ； 0 self-study hours)** ●Analysis and Design of Combinatorial Logic Circuit ●Several commonly used combinational logic circuits **Chapter 5 Toggle flip-flop(6 contact hours； 0 self-study hours)** ●SR latch ●Level-triggered flip-flop ●Pulse-triggered trigger ●Triggered triggers on edges ●The logic function of trigger and its description method **Chapter 6 Sequential logic circuit (10 contact hours； 0 self-study hours)** ●The analysis method of sequential logic circuit ●Some commonly used sequential logic circuits ●The design method of sequential logic circuit **Chapter 10 Generation and Shaping of Pulse Waveforms** **(4 contact hours； 0 self-study hours)** ●Schmidt trigger ●Monostable circuit ●Multivibrator ●555 time base circuit principle and application **Chapter 11 Digital to analog and analog-to-digital conversion** **(2contact hours； 0 self-study hours)** A / D converter D / A converter **Part B. Experiment teaching(8 contact hours)** In order to help students better understand the principles of logical algebra, master the analysis methods of logical circuits, and improve practical skills, we will arrange the following four typical experimental projects : Experiment 1 : Functional test of combinational logic circuit (2 hours)

	Experiment 2 : Encoder and decoder function test (2 hours) Experiment 3 : Trigger function test and application (2 hours) Experiment 4 : Counting and decoding display circuit (2 hours)
Examination forms	Closed-book written exam
Study and examination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. ●The usual performance evaluation standard is 40 %, including homework (20 %) and experiment (20 %). The usual results accounted for 40 %, and the final examination (closed-book examination) accounted for 60 %.
Reading list	1. Required books 1.Yan Shi editor-in-chief.Basic of digital electronic technology. Sixth Edition Higher Education Press. 2020 2.Kang Huaguang Editor-in-Chief.Basic of Electronic Technology (Digital Part). Higher Education Press.2018 3.Digital part of electronic technology foundation (Part 4) Teacher 's Manual.Higher Education Press.2019 2.Reference books [1] Digital part of Electronic Technology Foundation (Part 4) Teacher 's Manual.High Education Press.2019
Data of last mendment	June 29, 2025

Circuit Theory

Module designation	Circuit Theory
Semester(s) in which the module is taught	3th Semester
Person responsible for the module	Xu hang
Language	Chinese
Relation to curriculum	'Circuit Theory ' is a course with strict theory, strong logic and broad engineering background. It is an important professional basic course for electronic information engineering. Studying the circuit course plays an important role in cultivating students ' scientific thinking ability and improving students ' ability to analyze and solve problems. Through the study of this course, students should master the basic knowledge of modern circuit theory, learn the basic analysis and calculation methods of general circuits, train preliminary experimental skills, and lay the foundation for learning follow-up courses and engaging in engineering and technical work.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method, experimental class Target Students: Electronic Information Engineering
Workload (incl. contact hours, self-study hours)	Total workload = 165 hours Contact hours = 64 hours Self-study hours = 101hours Total workload = 165, of which : contact hours = 64, self-study hours = 101
Credit points （ECTS）	ECTS Credit=5.5
Required and recommended prerequisites for joining the module	Advanced Mathematics, College Physics
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** Master the basic concepts of the circuit : voltage, current, power, reference direction, etc. 2.Understand the basic laws : Ohm 's law, Kirchhoff 's law (KCL, KVL). 3.Familiar with the characteristics of circuit components : resistance, inductance, capacitance, independent power supply and controlled source. 4.master the analysis method : node method, branch method, loop method, superposition principle, Thevenin 's theorem, etc. ●**Skill：** 1.master the identification and selection of common components, master the use of common electrical tools and instruments. 2.Have the ability to read, wire and debug the circuit diagram, and cultivate

	common sense of safe electricity use and standardized operation habits. 3.Ability to build simulation models, set simulation parameters, analyze simulation results, and optimize circuit design based on the results. ● **Competence：** 1.Cultivate the ability to discover and analyze problems, and improve the ability to use theoretical knowledge to solve practical problems. 2.Cultivate the ability to access information and use literature, and develop the habit of autonomous learning and lifelong learning. Through the course project to cultivate team cooperation ability, improve communication and coordination ability.
Content	**A.Theoretical teaching(54 contact hours; 79 self-study hours)** **Chapter 1 Circuit model and circuit law** **(4 contact hours; 8 self-study hours)** 1) The basic concept of the circuit and the function and composition of the circuit ; the basic physical quantities of the circuit ; the reference direction of current and voltage ; characteristics and volt-ampere relationship of resistance element. 2) Independent voltage source, current source and controlled power supply model and characteristics ; kirchhoff 's law. **Chapter 2 Basic Analysis of Resistor Circuit** **(14 contact hours; 16self-study hours)** 1) the concept of equivalence ; the series, parallel and mixed series of resistance elements and the calculation of equivalent resistance ; equivalent exchange of star and triangle connections of resistors. 2) series and parallel connection of voltage source and current source ; two models of actual power supply and their equivalent transformation ; input resistance. 3) The basic knowledge of network graph theory ; the number of independent equations of KCL and KVL ; the branch current method. 4) Mesh analysis method ; loop analysis method. 5) Node analysis method. 6) The superposition theorem ; substitution theorem. 7) Thevenin theorem and Norton theorem ; maximum power transmission theorem. **Chapter 3 Analysis of Dynamic Circuits** **(12 contact hours; 16 self-study hours)** 1) Energy storage element. 2) The equation of dynamic circuit and its initial conditions ; response analysis of first-order circuit. 3) Response analysis of second-order circuit 4) The definition and basic properties of Laplace transform ; the inverse Laplace transform is obtained by the partial fraction method. 5) Operational circuit ; the linear circuit is analyzed by Laplace transform method. **Chapter 4 Analysis of AC steady-state circuit** **(24 contact hours; 40 self-study hours)** 1) the basic concept and three elements of sinusoidal alternating current ; the basis of phasor analysis method of sine quantity ; the phasor form of circuit law. 2) Impedance and admittance ; phasor diagram of circuit. 3) Analysis of sinusoidal steady-state circuit ; power and maximum power transmission in sinusoidal AC circuits. 4) mutual inductance ; analysis and calculation of circuits with mutual inductance ; the power of the coupled inductor. 5) Transformer principle ; ideal transformer. 6) Frequency response of the circuit. 7) symmetrical three-phase voltage and current ; the relationship between line voltage and phase voltage, line current and phase current in symmetrical three-phase circuit ; calculation of symmetrical three-phase circuit ; the concept and calculation of asymmetric

	three-phase circuit ; calculation and measurement of three-phase power. **B. Experiment Teaching(10 contact hours; 21 self-study hours)** 1) Thevenin 's theorem-determination of equivalent parameters of active two-terminal network (2 hours ; 4 self-study hours) ; 2) Research on the transient process of first-order circuit (2 hours ; 4 self-study hours) ; 3) fluorescent lamp circuit and power factor improvement (2 hours ; 4 self-study hours) ; 4) Measurement of three-phase circuit voltage and current (2 hours ; 4 self-study hours) ; 5) Design and implementation of phase sequence indicator circuit (2 hours ; 5 self-study hours) ;.
Examination forms	Closed-book written examination
Study and examination Requirements	1.Students should independently complete the homework after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance, experimental performance and final exam results, and comprehensively evaluates students ' learning situation, ability to analyze and solve complex engineering problems. The usual performance evaluation standard is 20 % and the experimental performance evaluation standard is 20 % ; the final examination accounted for 60 %. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	1.Required books [1] Qiu Guanyuan editor. Circuit (5th edition). Beijing : Higher Education Press, 2012 [2] Zhang Jianhong, He Lin editor-in-chief. Circuit Experiment and Computer Simulation (1st Edition). Beijing : China Electric Power Press, 2018 [3] Li Hansun editor. Fundamentals of Circuit Analysis (4th Edition). Beijing : Higher Education Press, 2012 2.Reference books [1] Liu Chongxin, Luo Xianjue editor. Circuit (5th edition) learning guidance and exercise analysis. Beijing : Higher Education Press, 2012 [2] Edited by Li Hansun. Basics of circuit analysis (4th edition) learning guide. Beijing : Higher Education Press, 2012.
Data of last mendment	September 23, 2025

Signals and Systems

Module designation	signals and systems
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	Ni Hongxia
Language	Chinese
Relation to curriculum	'Signals and Systems ' is a compulsory engineering basic course for electronic information engineering. It mainly studies the characteristics of deterministic signals and linear time-invariant systems and the basic analysis methods of signals passing through linear systems. The course theory is rigorous and logical. It is the basis for further in-depth study and research to solve various complex practical information processing engineering problems. The task of this course is to study the basic theory and basic analysis methods of signals and linear time-invariant systems, and to study the general rules of signal transmission or processing through the system, so that students can master and use the system 's point of view to model and analyze engineering problems in information processing, and establish the engineering point of view of integrating theory with practice, so as to improve students ' ability to analyze and solve problems.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method, experimental class
Workload (incl. contact hours, self-study hours)	Total workload = 120 hours Contact hours = 48 hours Self-study hours = 72hours Total workload = 120, of which : contact hours = 48, self-study hours = 72
Credit points （ECTS）	ECTS Credit=4.0
Required and recommended prerequisites for joining the module	Circuit theory, higher mathematics, engineering mathematics
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** 1.Understand the basic content and engineering application of signal Fourier transform, Laplace transform and z transform ; the basic theory and method of time domain, frequency domain and complex frequency domain analysis of the system are described. The basic model of system function is established, and the analysis method of LTI system characteristics is explained. ●**Skill：** According to the existing experimental conditions or experimental devices, the research route of sensor characteristics and its engineering application

	can be selected, the experimental scheme can be designed, and the experimental system can be constructed. The technical performance and parameters of the sensor can be observed and tested by using the instruments and equipment in the experiment, and the experimental data can be collected correctly. The error analysis, calculation and interpretation of the experimental data of sensor technology can be carried out, and the reasonable and effective conclusions can be drawn through the comprehensive analysis of information, which has the ability to write technical summary and experimental test report. ● **Competence：** The basic signal processing system can be simulated by MATLAB software ; 2.Ability to model, analyze, design and evaluate signal processing engineering problems. The ability to learn independently and solve complex engineering problems.
Content	**A.Theoretical teaching(48 contact hours; 72 self-study hours)** **Chapter 1 Introduction to Signal and System Analysis** **(4 contact hours; 6 self-study hours)** 1)Basic characteristic signal description and classification ; 2) System description and characteristic analysis ; 3) Overview of signal and system analysis. **Chapter 2 Time domain analysis of signal** **(6contact hours; 10 self-study hours)** 1) Basic signals and their characteristics ; 2) the basic operation of the signal ; 3) Signal decomposition and time domain representation. **Chapter 3 Time domain analysis of LTI system** **(6 contact hours; 10 self-study hours)** 1) LTI system mathematical model ; 2) Response of LTI system ; 3) Impulse response and step response ; 3) The definition and properties of convolution integral ; 4) unit sequence response and step response ; 5) Convolution and its applications ; **Chapter 4 Frequency domain analysis of signal** **(6 contact hours; 6 self-study hours)** 1) Fourier series of periodic signal ; 2) The definition and properties of Fourier transform ; 3) The application of Fourier transform in communication system. **Chapter 5 Frequency-domain analysis of LTI continuous-time systems** **(6 contact hours; 10 self-study hours)** 1) Frequency domain analysis of LTI continuous-time system ; 2) The application of Fourier transform in communication system. **Chapter 6 Complex frequency domain analysis of continuous-time signals and systems (6 contact hours; 10 self-study hours)** 1) The definition and properties of Laplace transform ; 2) Using Laplace transform method for system analysis ; 3) The stability of the system function and its linear system. **Chapter 7 Complex frequency domain analysis of discrete-time signals and systems (8 contact hours; 10 self-study hours)** 1) The definition and properties of Z-transform for discrete-time systems ; 2) Using Z transform to solve the response of discrete-time system ; 3) The response of discrete-time system is solved by Z transform. **Part B. Experiment Teaching(6 contact hours; 10 self-study hours)**

	1) Zero input response, zero state response and full response experiments of first-order circuits (2 hours ; 3 self-study) ; 2) Signal synthesis and decomposition of square wave (2 hours ; 3 self-study) ; 3) Sampling theorem (2 hours ; 4 self-study).
Examination forms	The use of written examination or design class big job
Study and examination Requirements	1.Students should independently complete the homework after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance, experimental performance and final exam results, and comprehensively evaluates students ' learning situation, ability to analyze and solve complex engineering problems. The usual performance evaluation standard is 50 %, including the unit work (30 %) and the experimental performance evaluation standard is 20 % ; the final examination accounted for 50 %. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	1.Required books [1] Chen Houjin editor-in-chief. Signals and Systems (4th Edition). Beijing. Higher Education Press. May, 2025. 2.Reference books References [1] Wu Dazheng editor-in-chief. Signal and linear system analysis (4th edition). Beijing. Higher Education Press. December, 2015. [2] Omhaiben editor-in-chief. Signals and Systems. (Second Edition) Electronics Industry Press. January 2013.
Data of last mendment	September 23, 2025

High-Frequency Electronic Circuits

Module designation	high frequency electronic circuits
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Jiang Hang
Language	Chinese
Relation to curriculum	specialized course
Teaching methods	Teacher-centered teaching method : teaching method, problem-oriented teaching method, case teaching method, experimental teaching method, project-driven teaching method, virtual simulation teaching method. Self-study : assignments, exercises, experimental assignments
Workload (incl. contact hours, self-study hours)	Total workload = 120, of which : theoretical hours = 48, self-study hours = 72
Credit points（ECTS）	ECTS Credit=4.0
Required and recommended prerequisites for joining the module	Circuit Theory, Analog Electronics, Signals and Systems
Module objectives/ intended learning outcomes	**Learning outcomes :** **●knowledge：** 1.Master the principle, composition and parameter analysis and calculation of each functional circuit in high frequency circuit. 2.Grasp the classification, method, mathematical model, circuit structure and parameter calculation of analog modulation and demodulation. 3.To master the method of selecting experimental circuit and system composition according to the requirements of design experiment. 4.master the use of high frequency experimental box and its various measuring instruments, and can measure the experimental data. 5.master the method of analyzing and summarizing the experimental data. **●skill：** The research route can be selected according to the requirements of high frequency electronic circuit experiment, and a feasible experimental scheme can be designed. 2.Can correctly use the circuit module and the corresponding experimental equipment, build the experimental circuit, and obtain the experimental data. 3.Can correctly screen and process the experimental data, and analyze the data to draw reasonable experimental conclusions. **● ability：**

	1.Ability to analyze and calculate each link circuit of high frequency electronic circuit. The accurate mathematical model description of analog modulation can be carried out, and the preliminary design of analog modulation circuit can be carried out according to the requirements.
Content	Theoretical teaching (38 hours ; 56 self-study hours) **Chapter 1 Frequency Selection Network** (4 hours ; 6 self-study hours) ●The composition of the frequency selection network and the basic properties of the frequency selection network ; ●the transformation and function of frequency selection network ; ●parameter calculation of frequency selection network. **Chapter 2 High frequency small signal tuning amplifier** (2 hours ; 4 self-study hours) ●The composition of the tuning amplifier ; ●dynamic analysis of the tuning amplifier ; ●stability analysis of the tuning amplifier. **Chapter 3 Sine Wave Oscillator (4 hours ; 6 self-study hours)** ●The working principle, start-up condition, balance condition and stability condition of sine wave oscillator ; ●the circuit forms, characteristics and uses of various oscillation circuits. **Chapter 4 Frequency conversion circuit** (2 hours ; 4 self-study hours) ●The basic composition and analysis method of frequency conversion circuit ; ●the influence of various circuits and analysis methods on frequency conversion. **Chapter 5 Spectrum Linear Transfer** (8 hours ; 10 self-study hours) ●Three basic types of amplitude modulation (AM, DSB, SSB) ●The demodulation method corresponding to different amplitude modulation types ; ●master the working principle and function of the mixing circuit. **Chapter 6 Spectrum nonlinear transfer** (6 hours ; 10 self-study hours) ●The basic concepts (FM, PM), basic principles and implementation methods of angle modulation ; ●the demodulation principle and implementation method of angle modulation. **Chapter 7 Power amplifier circuit** (8 hours ; 10 self-study hours) ●The characteristics, analysis method, dynamic characteristics and load characteristics of high frequency power amplifier ; ●the characteristics of under-voltage, critical and over-voltage three working states of high-frequency power amplifier ; ●calculation of power and efficiency of high frequency power amplifier. **Chapter 8 Feedback control circuit** (4 hours ; 6 self-study hours) ●The basic principle of feedback control circuit and the difference between the controlled parameters of various feedback control circuits ;

	●the analysis of various feedback control circuits and the use of various circuits. **B. experimental teaching** **(10 hours ; 16 hours self-study)** Experiment 1 : High-frequency single-tuned loop amplifier (2 hours ; 2 self-study hours) Experiment 2 : High frequency class C amplifier (2 hours ; 2 self-study hours) Experiment 3 : Capacitive feedback LC oscillator (1 hour ; 2 self-study hours) Experiment 4 : Quartz crystal oscillator (1 class hour ; 2 self-study hours) Experiment 5 : Simple transmitter (2 hours ; 4 self-study hours) Experiment 6 : Simple receiver (2 hours ; 4 self-study hours)
Examination forms	Closed-book written examination
Study and examination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. ●The usual performance evaluation standard is 30 %, including homework (20 %) and experiment (10 %). The usual results accounted for 30 %, and the final examination (closed-book examination) accounted for 70 %.
Reading list	**1. a list of required reading** [1] Wang Weidong, ' High Frequency Electronic Circuits (Third Edition) ', Electronic Industry Press, 2020.4. [2] Liu Caixia, ' High Frequency Electronic Circuit ', Higher Education Press, 2020.11. [3] Yu Hongzhen, ' Communication Electronic Circuits (3rd Edition) ', Tsinghua University Press, 2016. **2. reference** [1] Zhang Cheng, ' High Frequency Electronic Circuit (2nd Edition) ', People 's Post and Telecommunication Press, July, 2014. [2] Xing Hongyan, ' High Frequency Electronic Circuit ', Electronic Industry Press, 2021.9. [3] Liao Xichun, ' High Frequency Electronic Circuit ', People 's Post and Telecommunication Press, 2022.6.
Data of last mendment	June 29, 2025

Digital Signal Processing

Module designation	Digital Signal Processing
Semester(s) in which the module is taught	5th Semester
Person responsible for the module	Lv Xiaoli
Language	Chinese
Relation to curriculum	"Digital Signal Processing" is a foundational course in the Electronic Information Engineering major. It primarily studies the fundamental principles and methods for analyzing, processing, and designing discrete-time signals and systems. This course aims to cultivate students' abilities to analyze the characteristics of discrete-time signals and systems, as well as to design relevant solutions.
Teaching methods	Teacher-centered approach: Lecture method, questioning method, discussion method, computer demonstration
Workload (incl. contact hours, self-study hours)	Total workload = 105 hours Contact hours = 40 hours Self-study hours = 65hours
Credit points （ECTS）	ECTS Credit=3.5
Required and recommended prerequisites for joining the module	Complex Functions Circuit Theory Signals and System
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** 1.Master the time-domain, frequency-domain (Fourier transform), and complex-frequency-domain (Z-transform) analysis methods for discrete-time signals and systems, and understand their time-domain and frequency-domain characteristics and interrelationships. 2.Master the definition and properties of the Discrete Fourier Transform (DFT) and the basic principles of its fast algorithm (FFT), and understand its applications in signal spectrum analysis and linear convolution computation. 3.Master the design principles and methods of IIR digital filters (impulse invariance method, bilinear transform method), and understand the design ideas based on analog filters. 4.Master the conditions and characteristics of linear-phase FIR digital filters, and master the methods and steps for designing FIR digital filters using the window function method. 5.Master the basic flow and core functions of using simulation tools such as MATLAB for signal analysis, DFT/FFT computation, filter design, and system simulation. ●**Skill：**

	1.Be able to use tools such as MATLAB to generate, operate on, transform (Fourier transform, Z-transform), and visually analyze discrete-time signals. 2.Be able to use the FFT algorithm for signal spectrum analysis and interpret the frequency-domain characteristics of signals based on the analysis results. 3.Be able to select appropriate IIR or FIR design methods according to given specifications (such as passband/stopband cutoff frequencies, attenuation, etc.), and complete the design, simulation, and performance verification of digital filters. 4.Be able to write standardized experimental reports, including clearly stating the experimental purpose and principles, accurately recording the experimental process, program code, and simulation results (graphs/data), and conducting reasonable analysis and summary of the results. ● **Competence：** 1.Be able to apply the basic theories of digital signal processing to analyze and model the characteristics of linear time-invariant (LTI) discrete-time systems. 2.Be able to construct digital signal processing solutions for simple engineering problems (such as signal denoising, feature extraction) and implement and verify them using simulation tools. 3.Possess the initial ability to analyze and solve problems related to digital signal processing through literature search, independent learning, and practical exploration. 4.Be able to demonstrate a rigorous and realistic scientific attitude, systematic engineering thinking, and a sense of teamwork in experimental or project tasks.
Content	**A.Theoretical teaching(40 contact hours; 65 self-study hours)** **Chapter 1 Analysis of Discrete-Time Signals and Systems (8 class hours; 12 self-study hours)** (1) Overview of digital signal processing, current development status, and typical applications; (2) Representation, basic operations, and typical sequences of discrete-time signals (sequences); (3) Time-domain description and characteristics (linearity, time-invariance, causality, stability) of linear time-invariant (LTI) discrete-time systems, and convolution sum analysis; (4) Frequency-domain analysis (Discrete-Time Fourier Transform, DTFT) and complex-frequency-domain analysis (Z-transform) of discrete-time signals and systems; **(5)** Time-domain sampling theorem and its significance, basic concepts of signal reconstruction. **Chapter 2 Discrete Fourier Transform (DFT) and Its Applications (8 class hours; 13 self-study hours)** (1) Definition, physical meaning, and basic properties of the DFT (linearity, circular shift, circular convolution, etc.); (2) Principles and methods of computing linear convolution using the DFT; (3) Process, parameter selection, and error analysis (picket-fence effect, spectral leakage, etc.) of using the DFT for spectrum analysis of continuous-time signals; **(4)** Frequency-domain sampling theorem. **Chapter 3 Fast Fourier Transform (FFT) (4 class hours; 10 self-study hours)**

	(1) Computational complexity problem of direct DFT computation and approaches for improvement; (2) Basic principles, butterfly operations, and flow-graph representation of the radix-2 Decimation-In-Time (DIT-FFT) algorithm; (3) Brief introduction to the radix-2 Decimation-In-Frequency (DIF-FFT) algorithm; **(4)** Application advantages of the FFT algorithm. **Chapter 4 Design of Infinite Impulse Response (IIR) Digital Filters (8 class hours; 10 self-study hours)** (1) Basic concepts, classification, and specifications of digital filters; (2) Brief introduction to the design principles and methods of analog filters (Butterworth, Chebyshev); (3) Principles, steps, advantages, and disadvantages of designing IIR digital filters using the impulse invariance method; (4) Principles, steps, frequency pre-warping, advantages, and disadvantages of designing IIR digital filters using the bilinear transform method; (5) Basic network structures of IIR digital filters (direct form, cascade form, parallel form). **Chapter 5 Design of Finite Impulse Response (FIR) Digital Filters (6 class hours; 10 self-study hours)** (1) Conditions, types, and frequency characteristics of linear-phase FIR digital filters; (2) Principles and steps of designing FIR filters using the window function method (types, characteristics, and selection of window functions); (3) Brief introduction to the frequency sampling method for FIR filter design; (4) Basic network structures of FIR digital filters (direct form, cascade form, linear-phase form); (5) Comparison between IIR and FIR digital filters. **Experimental Teaching (6 class hours; 10 self-study hours)** **Experiment 1:** Fast Fourier Transform (FFT) **(2 class hours; 2 self-study hour)** (1) Objectives: Master the method of spectrum analysis using the Fast Fourier Transform (FFT); understand phenomena such as spectral resolution, picket-fence effect, and spectral leakage; learn to improve spectrum analysis results by windowing. (2) Main content: Perform FFT on single-tone, multi-tone sinusoidal signals, and square-wave signals, observe and analyze their spectral characteristics; change the number of FFT points and observe the change in spectral resolution; apply windowing (rectangular window, Hann window, etc.) to the signals and compare the suppression effect on spectral leakage before and after windowing. **Experiment 2: Design of IIR Digital Filters (2 class hours; 2 self-study hour)** (1) Objectives: Master the complete process of designing IIR digital filters (low-pass, high-pass, band-pass, etc.) based on the bilinear transform method; learn to use MATLAB tools for design, simulation, and performance verification. **(2)** Main content: According to given filter specifications (such as passband/stopband cutoff frequencies, attenuation, etc.), design a Butterworth or Chebyshev IIR digital filter using the bilinear transform

	method; plot and analyze the magnitude and phase response curves of the designed filter; use the filter to process a noisy composite signal, compare the time-domain waveforms and spectra before and after filtering, and verify the filtering effect. **Experiment 3: Generation, Detection, and Recognition of Dual-Tone Multi-Frequency (DTMF) Signals (2 class hours; 6 self-study hours)** (1) Objectives: Comprehensively apply digital signal processing knowledge to implement a complete DTMF signal processing system; master FFT-based spectral detection and simple pattern recognition methods. **(2)** Main content: Write a program to generate DTMF signals corresponding to telephone keypad digits (superposition of two specific frequency sinusoids); perform FFT spectrum analysis on the generated DTMF signals and extract their two peak frequencies; decode the detected frequency pairs into corresponding digits according to the standard frequency table; implement a complete simulation flow from any input digit sequence to signal generation, automatic recognition, and output of the digits.
Examination forms	Using a closed-book written examination method
Study and examination Requirements	I. Learning Discipline To ensure the course learning effect and cultivate students' rigorous and punctual study style, the following classroom and experimental discipline requirements are formulated: (1) Classroom Discipline: Students should attend classes on time and must not be late or leave early. Absence due to special reasons must be requested in advance and approved in accordance with school regulations; otherwise, it will be treated as unexcused absence. (2) Homework Requirements: Students should independently and timely complete and submit the homework assigned for each chapter. Homework should be neatly written, with clear steps and accurate calculations. Plagiarized or identical homework will be given a zero score. (3) Experiment Requirements: Students must carefully preview the experiment and complete the preview report before the experiment; during the experiment, they must strictly abide by the laboratory rules and regulations and complete the experimental operations, data recording, and analysis independently or as required by the group; after the experiment, they must submit a standardized experimental report on time. (4) Academic Integrity: In homework, experiments, and examinations, students must uphold academic integrity and refrain from any form of cheating or plagiarism. Violators will be dealt with seriously in accordance with school regulations. II. Assessment Methods and Grade Composition This course adopts a combination of formative assessment and summative assessment. The final grade consists of two parts: regular performance and final examination results, with the following proportions: (1) Regular Performance: 30% of the final grade, including homework and quizzes, etc. It assesses students' understanding, mastery, and application ability of the knowledge points in each chapter. (2) Experiments: 10% of the final grade, assessing students' comprehensive practical ability to use tools such as MATLAB for

	simulation, design, and analysis. There are 3 experiments in total, which are comprehensively scored based on preview, operation process, and report quality. (3) Final Examination (Closed-book Written Examination): 60% of the final grade. The examination comprehensively covers all theoretical chapters of the course, focusing on assessing students' ability to understand basic concepts, core principles, analysis and calculation, and comprehensive application. The question types may include multiple-choice questions, fill-in-the-blank questions, short-answer questions, analysis and calculation questions, and comprehensive design questions.
Reading list	**Required books** [1] Cheng Peiqing, Digital Signal Processing Tutorial (5th Edition), Tsinghua University Press, 2017. [2] Gao Xiquan, Ding Yumei, Digital Signal Processing (5th Edition), Xidian University Press, 2022. [3] Chen Houjin, Digital Signal Processing (4th Edition), Higher Education Press, 2024. **Main References** [1] Oppenheim, A. V., et al., Discrete-Time Signal Processing (3rd Edition), translated by Liu Shutang, Publishing House of Electronics Industry, 2015. [2] Hu Guangshu, Digital Signal Processing: Theory, Algorithms, and Implementation (3rd Edition), Tsinghua University Press, 2012. [3] Yu Bianzhang, Digital Signal Processing (2nd Edition), Northwestern Polytechnical University Press, 2002. [4] Sanjit K. Mitra, Digital Signal Processing: A Computer-Based Approach (4th Edition), McGraw-Hill, 2011. [5] China University MOOC Platform: National Excellent Online Open Course "Digital Signal Processing" (shared by multiple universities).
Data of last mendment	June 29, 2025

Information Theory&Coding

Module designation	Information Theory&Coding
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	Zhong Fei
Language	Chinese
Relation to curriculum	'Information Theory and Coding ' is one of the compulsory professional courses of electronic information engineering. Through the study of this course, students should understand the essence of information and learn to use information science methodology to solve practical problems. Master the ability to comprehensively solve problems from the perspective of macro-understanding of scientific methods and overall optimization. Through the connection between the basic theory of information and related disciplines, it guides students to ' lateral thinking ', and then cultivates students ' divergent thinking ability and comprehensive learning ability.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method, computer demonstration Target Students: Electronic Information Engineering
Workload (incl. contact hours, self-study hours)	Total workload = 75 hours Contact hours = 32 hours Self-study hours = 43hours Total workload = 75, of which : contact hours = 32, self-study hours = 43
Credit points （ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Advanced Mathematics, Digital Electronic Technology, Signals and Systems
Module objectives/ intended learning outcomes	Learning outcomes ● Knowledge： 1.Grasp the concepts of source entropy, self-information, mutual information and related properties and theorems. 2.master the channel capacity, information measurement theory, information rate distortion function and related properties and theorems, and data compression principle. 3.To master the significance of source coding and channel coding, and the relationship between them and the basic concepts of information theory. ●Skill：

	1.Core concepts such as information entropy, mutual information, and channel capacity can be used to abstractly describe practical engineering problems, establish corresponding mathematical models, and analyze the information transmission efficiency and reliability of the system. Based on the principle of information rate distortion function, source coding and channel coding, the information system can be deduced and analyzed, and the system model can be dynamically adjusted according to the actual engineering requirements, and the optimization scheme can be proposed. ● Competence： 1.The basic concepts and theorems that can be applied to this information properly describe the problem of information. To understand the status quo of China 's information technology development. These theories and coding theorems can be used to deduce and analyze the information system, and the results can be given physical explanation and physical meaning. 3.According to the discussion of coding principle, the mathematical model of complex engineering problems of electronic information can be established, and dynamic analysis and feedback can be carried out. Cultivate students ' ability to adjust the model according to the actual requirements of the project.
Content	**A.Theoretical teaching(32 contact hours; 43 self-study hours)** **Chapter 1 Introduction(2 contact hours; 3 self-study hours)** 1) the general concept of information ; 2) Classification of information ; 3) The origin, development and research content of information theory. **Chapter 2 information source entropy (10 contact hours; 12 self-study hours)** 1) Review of probability theory ; 2) Source classification ; 3) self-information and mutual information ; 4) Discrete source entropy ; 5) Source redundancy. **Chapter 3 channel capacity (6 contact hours; 8 self-study hours)** 1) Basic knowledge of channel capacity ; 2) Discrete channel capacity ; 3) Channel capacity of several special discrete channels ; 4) General calculation method of discrete channel capacity. **Chapter 4 information rate distortional function (4 contact hours; 6 self-study hours)** 1) Basic concepts ; 2) Discrete source information rate distortion function ; 3) Rate distortion function of continuous source information ; 4) Limited distortion source coding theorem. **Chapter 5 source coding (6 contact hours; 8 self-study hours)** 1) The basic concept of source coding ; 2) Shannon coding ; 3) Fano coding ; 4) Huffman coding. **Chapter 6 channel coding (4 contact hours; 6 self-study hours)** 1) The basic concept of channel coding ; 2) Error detection code ; 3) Error-correcting codes ; 4) Linear code ; 5) Cyclic code ; 6) Linear block code.
Examination forms	The usual assessment results : accounting for 40 % of the total score of the course (a total of 40 points), composed of course learning performance,

	homework, large homework / group discussion / PPT / questionnaire and test. 2.Final exam results : accounting for 60 % of the total score of the course, the use of closed-book written examination.
Study and examination Requirements	1.Students should independently complete the homework after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance and final exam results, comprehensively assessing students ' learning situation, ability to analyze and solve complex engineering problems. The usual performance evaluation standard is 40 %, including 30 % of course learning performance, 40 % of homework, 10 % of large homework / group discussion / PPT / questionnaire and 20 % of test ; the final examination accounted for 60 %. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	1.Required books [1] Chen Yun et al. Information Theory and Coding (3rd Edition). Electronics Industry Press, 2015.12 [2] Jiang et al. Information Theory and Coding Theory (Second Edition). Tsinghua University Press, 2021.5 [3] Zhao Shengmei.Basis and Application of Information Theory.Tsinghua University Press, 2017.7 [4] Fu Zuyun. Information Theory and Coding (Second Edition). Electronic Industry Press, 2014.4. [5] Zhu Chunhua.Information Theory and Coding Technology.Tsinghua University Press, 2020.6
Data of last mendment	September 23, 2025

Principles of Automatic Control

Module designation	Principles of Automatic Control
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	An Yinping
Language	Chinese
Relation to curriculum	The "Principles of Automatic Control" course is an engineering foundation course for the Electronic Information Engineering major. This course mainly elaborates on the classical control theory and analysis methods for linear, time-invariant single-input single-output negative feedback control systems. It covers the establishment of mathematical models for systems in the time domain, complex domain, and frequency domain, as well as the analysis of stability, steady-state performance, and dynamic performance. Through the study of this course, students will acquire certain abilities in analyzing and designing automatic control systems, and will have the ability to solve complex engineering problems in the related fields of electronic information engineering.
Teaching methods	Teacher-centered approach: Lecture method, questioning method, discussion method, computer demonstration Target Students: Electronic Information Engineering
Workload (incl. contact hours, self-study hours)	Total workload = 90 hours Contact hours = 32 hours Self-study hours = 58hours
Credit points （ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Advanced Mathematics, Complex Variable Functions, Circuit Theory
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** 1.Basic Theory: Basic principles, classification, and requirements of automatic control; the principle of feedback control and its role in systems. 2.Mathematical Modeling: Laplace transform and its theorems; definitions and properties of time-domain models (differential equations) and complex-domain models (transfer functions); basic concepts of block diagrams and signal flow graphs. 3.System Analysis Theory: Time-Domain: Step response characteristics of first-order and second-order

	systems; definition of stability; definition and calculation principles of steady-state error. Root Locus: Basic concepts of root loci and plotting rules. Frequency-Domain: Basic concepts of frequency characteristics; frequency characteristics of typical links; frequency-domain stability criteria (Nyquist criterion) and the concept of stability margins. 4.System Correction Theory: Basic concepts of system design and correction; common compensators (lead, lag, etc.) and their characteristics; basic control laws. **●Skill：** 1.Modeling Skills: Ability to establish differential equations for physical systems and convert them into transfer functions; ability to simplify system block diagrams using equivalent transformation rules or Mason's Gain Formula to find closed-loop transfer functions. 2.Calculation and Plotting Skills: Proficiency in calculating dynamic performance indices (e.g., overshoot, settling time) for underdamped second-order systems. Ability to judge system stability using the Routh-Hurwitz criterion and calculate steady-state errors. Ability to skillfully plot root loci, Polar Plots (Nyquist plots), and Bode Plots. 3.Simulation and Design Skills: Ability to use MATLAB software for modeling and simulation of control systems; ability to design series compensators using the desired characteristic method. **● Competence：** 1.Engineering Problem Formulation Ability: Ability to use the language and tools of automatic control theory to identify and formulate key links and problems in complex automatic control systems within the field of electronic information engineering. 2.System Analysis and Evaluation Ability: Ability to comprehensively analyze, evaluate, and compare the stability, steady-state performance, and dynamic performance of control systems using time-domain, root locus, and frequency-domain methods. 3.System Synthesis and Improvement Ability: Ability to propose solutions to improve system performance based on given specifications and solve engineering problems where system performance is unsatisfactory through correction design. 4.Innovation and Practical Ability: Cultivating the practical ability to transform theoretical knowledge into solutions for complex engineering problems through comprehensive assignments.
Content	**A.Theoretical teaching(32 contact hours; 32 self-study hours)** **Chapter 1 Introduction** **Chapter 1 Introduction to Control Systems (2 contact hours; 2 self-study hours)** 1) Basic Principles of Automatic Control;2) Classification and Basic Requirements of Automatic Control Systems

	Chapter 2 Mathematical Model of The Control System (6 contact hours; 6 self-study hours) 1) Laplace transform, time-domain mathematical model of control system;2) Complex-domain mathematical model of control system;3) Block diagram and signal flow diagram of control system **Chapter 3 Time-domain Analysis Method of Linear Systems(6 contact hours; 6 self-study hours)** 1)System time-domain performance indicators, first-order system time-domain analysis;2) Second-order system time-domain analysis;3) Stability analysis of linear systems;4) Calculation of steady-state error for linear systems **Chapter 4 Root Locus Method for Linear Systems(4 contact hours; 4 self-study hours)** 1) The basic concept of root locus method;2) The rule for drawing root locus;3) Generalized root locus and system performance analysis **Chapter 5 Frequency Domain Analysis Method for Linear Systems (8 contact hours; 8 self-study hours)** 1) Basic concepts of frequency characteristics, frequency characteristics of typical components;2) Drawing of the frequency characteristic curve of the open-loop system;3) Frequency domain stability criteria;4) Frequency domain stability margin, frequency domain performance indicators of the closed-loop system **Chapter6 The Correction Method for Linear Ssystems(4 contact hours; 4 self-study hours)** 1) Issues related to system design and calibration, common calibration devices and their characteristics;2) Series calibration
Examination forms	Using a closed-book written examination method
Study and examination Requirements	1. The regular grades consist of three parts: homework, comprehensive major assignment and tests. 2. The final assessment is conducted through a closed-book examination, covering all the course objectives. 3. The regular performance, final grade and overall assessment grade are all on a 100-point scale. In the overall assessment grade, the weights of regular performance and final grade are 0.3 and 0.7 respectively. The scores and proportions of each assessment link can also be adjusted according to teaching needs. Those who are absent from classes for more than one-third of the course will have their regular grades recorded as 0 points.
Reading list	Required books 1. Hu Shousong (Editor). Fundamentals of Automatic Control Principles (4th Edition). Beijing: Science Press, 2017 2. Wang Huaizhi, Yang Xixia. Automatic Control Principles (3rd Edition). Beijing: Defense Industry Press, 2017 3. Wang Jianhui, Gu Shusheng. Automatic Control Principles (2nd Edition). Beijing: Tsinghua University Press, 2014
Data of last mendment	September 23, 2025

EDA Technology and Application

Module designation	EDA Technology and Application
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	Lin Haibo
Language	Chinese
Relation to curriculum	'EDA Technology and Application ' is one of the required professional courses in electronic information engineering. It is a course that studies programmable logic device (PLD) and VHDL digital system design. The main contents of the course include the basic knowledge, basic theory and basic method of EDA technology design digital system, hardware description language (VHDL) program design basis and description statement. Through the basic ability training of VHDL digital system design and experiment, it lays the necessary foundation for the development and design of programmable logic device (CPLD / FPGA) or digital system in the future.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method, experimental class Target Students: Electronic Information Engineering
Workload (incl. contact hours, self-study hours	Total workload = 120 hours Contact hours = 48 hours Self-study hours = 72hours Total workload = 120, of which : contact hours = 48, self-study hours = 72
Credit points （ECTS）	ECTS Credit= 4.0
Required and recommended prerequisites for joining the module	Analog electronic technology, digital electronic technology
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** 1.Familiar with the main content of EDA technology and engineering design process ; understand the composition structure, logic implementation principle and application characteristics of FPGA / CPLD. 2.To master the basic knowledge and basic design methods of hardware description language (VHDL) program design, and to master the application characteristics of various description statements. 3.master the digital circuit or digital system VHDL design and analysis comparison method. 4.Master project design, compilation, test simulation, download verification

	and other engineering applications based on EDA tool software. **●Skill：** 1.Able to apply the basic theory of FPGA and VHDL program design knowledge analysis to describe the digital circuit or digital system, and can put forward the optimization scheme ; 2.We can use EDA tool software to design, compile, test and simulate, download and verify digital circuits or digital systems based on FPGA / CPLD devices, and analyze the simulation results to get the correct conclusions. **● Competence：** 1.Be able to objectively understand the development process and reality of China 's EDA technology and integrated circuit industry ; according to the structure and application characteristics of FPGA / CPLD, the target device can be selected appropriately. 2.Flexible use of VHDL program design basic knowledge and basic design methods, can correctly analyze the application of VHDL design in all kinds of description statements. 3.Able to digital circuit or digital system VHDL design and analysis and comparison, can solve the digital system VHDL design complex engineering problems.
Content	**A.Theoretical teaching(32 contact hours; 48 self-study hours)** **Chapter 1 Introduction** **Chapter 1 Introduction / Introduction (2 contact hours; 2 self-study hours)** 1) The meaning of EDA technology and its development process ; 2) The development process and reality of China 's integrated circuit industry ; 3) The main content of EDA technology ; 4) EDA engineering design process ; 5) Design of digital system. **Chapter 2 scale programmable logic device** **(4 contact hours; 4 self-study hours)** 1) Overview of programmable logic devices ; 2) CPLD structure, principle and application ; 3) FPGA structure, principle and application ; 4) CPLD and FPGA programming and configuration. **Chapter 3 VHDL program design basis** **(8 contact hours; 12 self-study hours)** 1) VHDL overview and application ; 2) The basic structure of VHDL programming, including entity, structure, library, package and configuration ; 3) VHDL language elements. **Chapter 4 VHDL Description Statement (16 contact hours; 24 self-study hours)** 1) sequential description statement ; 2) Parallel description statement ; 3) VHDL subroutine ; 4) VHDL description style. **Chapter 5 VHDL digital circuit design (2 contact hours; 6 self-study hours)** 1) Basic logic gate circuit design ; 2) Combinational logic circuit design ; 3) Timing logic circuit design ; 4) Commonly used digital chip circuit design. **Part B. Experiment Teaching(16 contact hours; 24 self-study hours)** **Chapter 6 EDA Tools Software (16 contact hours; 24 self-study hours)** 1) 3-8 decoder (or counter) VHDL design simulation (4 hours ; 6 self-study hours) ; 2) VHDL design and simulation of digital clock (8 hours ; 12 self-study

	hours) ; 3) Color lamp controller VHDL design simulation (4 hours ; 6 self-study hours).
Examination forms	The closed-book written examination method is adopted
Study and examination Requirements	1.Students should independently complete the homework after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance, experimental performance and final exam results, and comprehensively evaluates students ' learning situation, ability to analyze and solve complex engineering problems. The usual performance evaluation standard is 25 %, including homework (10 %), design major homework (5 %) and stage assessment (10 %) ; the evaluation standard of experimental results was 15 %. The final examination accounted for 60 %. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	1.Required books [1] Tan Huisheng, Zhang Changfan. EDA technology and application (fourth edition) [M]. Xi 'an : Xi 'an University of Electronic Science and Technology Press, 2022,2 ; lin Qian et al. [2]. Practical Course and Curriculum Design of EDA Technology [M]. University of Electronic Science and Technology Press, 2024.1. 2.Reference books [1] Ding Hong, edited by Zheng Di. EDA Technology Application Project Tutorial [M].Electronic Industry Press, 2016. [2] Zhang Pinghua, Tan Lixin. EDA technology and application project tutorial : Verilog HDL version. Shanghai Jiao Tong University Press, 2023. [3] Pan Song, Huang Jiye. EDA Technology Practical Tutorial (Sixth Edition) [M].Beijing : Science Press, 2018,6.
Data of last mendment	September 23, 2025

Principles of Communications

Module designation	communication theory
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Zhang Xuemin
Language	Chinese
Relation to curriculum	basic course
Teaching methods	Teacher-centered teaching method : teaching method, problem-oriented teaching method, case teaching method, experimental teaching method Self-study : assignments, exercises, experimental assignments Target Students: Electronic Information Engineering
Workload (incl. contact hours, self-study hours)	Total workload = 120, of which : theoretical hours = 48, self-study hours = 72
Credit points（ECTS）	ECTS Credit=4.0
Required and recommended prerequisites for joining the module	Linear Algebra, Signals and Systems
Module objectives/ intended learning outcomes	**learning outcome:** **●knowledge：** 1.Grasp the distribution function and digital characteristics of random process, the autocorrelation function and power spectral density of stationary random process, the properties of Gaussian random process, the analysis and calculation of narrowband random process. 2.master 2ASK, 2FSK, 2PSK modulation and demodulation method, mathematical model, circuit structure and calculation. 3.master PCM pulse code modulation and anti-noise performance. 4.master the communication principle experiment box and the use of various measuring instruments, and can measure the experimental data 5.master the method of analyzing and summarizing the experimental data. **●skill：** The module can be selected according to the original experimental requirements of communication, and a feasible experimental scheme can be designed. 2.Can correctly use the circuit module and the corresponding experimental equipment, build the experimental circuit, and obtain the experimental data. The experimental data can be correctly screened and processed, and

	the data can be analyzed to obtain a reasonable experimental conclusion. **●ability：** 1.Able to analyze and calculate the digital modulation system. It can accurately analyze and describe the digital transmission of analog signals, and can expand the design of PCM according to requirements.
Content	**Theoretical teaching (48 hours ; 48 self-study hours)** **Chapter 1 Introduction (4 hours ; 8 self-study hours)** ●Basic concepts of communication systems ●The composition of communication system ●Classification and communication mode of communication system ●Information and its measurement ●The main performance indexes of communication system **Chapter 3 Random process (18 hours ; 8 self-study hours)** ●The basic concept of stochastic process ; the ergodicity of stationary stochastic processes ; autocorrelation function of stationary random process ; power spectral density of stationary random process ; ●the nature of the Gaussian process, Gaussian random variables ; ●the stationary random process passes through a linear system ; the concept of narrow-band stochastic process ; ●statistical characteristics of in-phase and orthogonal components ; ●statistical characteristics of envelope and phase ; ●sine wave plus narrowband Gaussian process ; ●gaussian white noise and band-limited white noise. **Chapter 6 Digital baseband transmission (12 hours ; 8 self-study hours)** ●Digital baseband signal ; pattern design principles ; ●common code types of digital baseband ; ●spectrum characteristics of digital baseband signal ; ●anti-noise performance of baseband transmission system ; eye diagram. **Chapter 7 Digital frequency band transmission (4 hours ; 8 self-study hours)** ●Binary digital modulation principle ; ●anti-noise performance of binary digital modulation ; **Chapter 10 Digital Transmission of Analog Signals (4 hours ; 8 self-study hours)** ●Sampling of analog signals ; analog pulse modulation ; ●quantization of sampling signal ; pulse coded modulation. **B. experimental teaching** **(10 hours ; 24 hours self-study)** In order to help students better understand the basic theory of communication principle and the basic composition of communication system, and improve their practical skills, the following six typical

	experimental projects are arranged : Experiment 1 : Common code types of digital baseband signal (1 class hour ; 4 self-study hours) Experiment 2 : baseband signal code conversion (2 hours ; 4 self-study hours) Experiment 3 : Inter-symbol crosstalk and eye diagram (1 class hour ; 4 self-study hours) Experiment 4 : 2ASK digital modulation and demodulation (2 hours ; 5 self-study hours) Experiment 5 : 2FSK digital modulation and demodulation (2 hours ; 5 self-study hours) Experiment 6 : 2PSK digital modulation and demodulation (2 hours ; 4 self-study hours)
Examination forms	Closed-book written examination
Study and examination Requirements	●Students should complete the homework independently after each class. Late arrivals, early departures or unauthorized absences are not permitted. ●The usual performance evaluation standard was 15 %, the experiment (20 %), and the final examination (closed-book examination) accounted for 65 %.
Reading list	**1. a list of required reading** [1] Fan Changxin editor in chief. Communication principle. Beijing : National Defense Industry Press, 2020 [2] Zhang Huisheng editor-in-chief. Communication principle. Beijing : Higher Education Press, 2021 [3] Leonw. Couch. Digital and analog communication systems. Beijing : Electronic Industry Press, 2022 **2. reference** [1] Li Xiaofeng editor in chief. Communication principle. Beijing : Tsinghua University Press, 2022 [2] Shen Yuehong editor. Communication principle. Beijing : Mechanical Industry Press, 2021
Data of last mendment	June 25, 2025

Principles and Applications of Single-Chip Microcomputers

Module designation	principles and applications of single-chip microcomputer
Semester(s) in which the module is taught	5th Semester
Person responsible for the module	Jiang Hang
Language	Chinese
Relation to curriculum	specialized course
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method, computer demonstration, experimental class. Self-study : assignments, exercises, experimental assignments
Workload (incl. contact hours, self-study hours)	Total workload = 120 hours Contact hours = 48 hours Self-study hours = 72hours Total workload = 120, of which : contact hours = 48, self-study hours = 72
Credit points （ECTS）	ECTS Credit=4.0
Required and recommended prerequisites for joining the module	Analog electronic technology, digital electronic technology
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** Master the core architecture and hardware foundation of 51 single-chip microcomputer : understand the characteristics of CPU, storage organization and I / O port, identify the minimum system composition, and clarify the working principle of power supply, clock and reset circuit. 2.Proficient in 51 single-chip instruction system and assembly basis : master instruction classification and addressing methods, can write a simple assembly program, with basic program debugging capabilities. Master the application of interrupt system and timer : understand the principle and priority of interrupt, configure interrupt and timer mode skillfully, and realize timing counting function. 4.Skilled use of parallel I / O port and peripheral interface : to achieve LED, keys, digital tube circuit design and programming, understand the I / O port expansion ideas. 5.Understand the principle and application of serial communication : master the principle of UART, frame format and baud rate calculation, can configure the serial port and realize data transceiver. ● **Competence：**

09 Module Descriptions

	Objective 1 : To be able to use the knowledge of single-chip microcomputer system to analyze and understand the common single-chip microcomputer system, and to design the single-chip microcomputer hardware unit according to the demand. Objective 2 : To be able to use C51 to program and debug the single-chip microcomputer system according to the requirements. Objective 3 : To be able to analyze and understand the application case of single-chip microcomputer, to put forward the key technology of the case, and to compare the advantages and disadvantages of various solutions. Goal 4 : According to the technical requirements, through the use of single chip microcomputer course and other course knowledge, literature review and other methods, the design scheme is put forward, and the detailed design is generated, including schematic diagram, program control flow, experimental test method and so on. Objective 5 : To be able to use virtual simulation technology to complete the single-chip microcomputer experiment, to debug and troubleshoot the problems, and to design and verify the engineering problems.
Content	The course of " Principle and Application of Single Chip Microcomputer " is a professional basic course of electronic information engineering. Through the study of this course, students can master the working principle of single-chip microcomputer, single-chip microcomputer interface technology, understand assembly language programming and its application and other related theoretical and practical knowledge. This course is a course that combines theory with practice closely. In terms of theoretical teaching, it focuses on the explanation of basic theories and basic design methods ; in the aspect of cultivating practical application ability, it focuses on enabling students to establish engineering views, combined with practical teaching methods such as experiments and curriculum design, so that students have the ability to analyze and solve complex engineering problems related to single-chip microcomputer control systems in the field of electronic engineering. **A.Theoretical teaching(36 contact hours; 48 self-study hours)** **Chapter 1 Introduction / Introduction (2 contact hours; 2 self-study hours)** The history and development of single-chip microcomputer ; the development trend of single chip microcomputer ; the characteristics and application fields of single-chip microcomputer ; typical model series single chip microcomputer. **Chapter 2 The hardware structure of single chip microcomputer (4 contact hours; 4 self-study hours)** The internal structure of the microcontroller ; the chip pin function of single chip microcomputer ; central processor ; memory structure ; parallel input / output ports ; clock circuit ; reset circuit. **Chapter 3 Single chip microcomputer instruction system (8 contact hours; 12 self-study hours)** Master the addressing method of the single-chip microcomputer instruction system ; master the five categories of single-chip instruction system ; master the writing format of assembly instructions and the specific functions of each instruction and its preliminary application in the program.

	Chapter 4 (14 contact hours; 24 self-study hours) The format of program design using assembly and C51 language is introduced. Assembly language pseudo-instruction ; assembly language programming. Master the writing format of single chip microcomputer assembly language program ; master the specific use of pseudo-instructions applied in assembly language programs ; skilled use of single-chip assembly language for program design. **Chapter 5 Interrupt and Timing of Single Chip Microcomputer** **(2 contact hours; 6 self-study hours)** Interrupt system of single chip microcomputer ; timer / counter of single chip microcomputer. Understand the interrupt system of single chip microcomputer, master the use method of single chip microcomputer interrupt system ; master the use of single-chip timer / counter. **Chapter 6 The serial port of single chip microcomputer** **(2 contact hours; 6 self-study hours)** The basic concept of serial communication ; the structure and working mode of serial port ; typical application of serial port. Knowledge point : master the basic concept of serial communication ; understand the working principle, structure and working mode of single chip microcomputer serial port ; understand and master the typical application and program design of serial port. **Chapter 7 Application examples of single chip microcomputer in production and life (2 contact hours; 6 self-study hours)** Household appliances control system based on single chip microcomputer. To understand the universality of single-chip microcomputer as the main means of intelligent control in modern household appliances ; it can understand and select the single chip microcomputer control system according to the principle and demand of household appliances. **Chapter 8** Application examples of single chip microcomputer in production and life **(2 contact hours; 6 self-study hours)** Based on the data acquisition system of single chip microcomputer, the application of single chip microcomputer in automobile understands what is the data acquisition system, the types of data acquisition system and the design method of data acquisition system. Understand the important role of single-chip microcomputer in modern automobiles. **Part B. Experiment Teaching(16 contact hours; 24 self-study hours)** **Chapter 9 experiment (12 contact hours; 24 self-study hours)** 1 Instruction system and programming exercises 2.Proteus simulation software learning and application 3 Timer experiment 4 External interrupt experiment 5 LCD display experiment 6AGV car experiment (comprehensive experimental project)
Examination forms	The usual assessment results : accounting for 15 % of the total score of the course (a total of 15 points), composed of attendance, unit work, design work, mid-term test. 2.Experimental results : a total of 6 experiments, accounting for 15 % of the total score of the course. 3.Final exam results : accounting for 70 % of the total score of the course,

	the use of closed-book written examination.
Study and examination Requirements	1.Students should independently complete the homework after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance, experimental performance and final exam results, and comprehensively evaluates students ' learning situation, ability to analyze and solve complex engineering problems. The usual performance accounts for 30 % of the total score, and the final assessment accounts for 70 % of the total score. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	Required books 1.Principle and Application of MCS-51 Series Single Chip Microcomputer (2017 Revision). Beijing : Electric Power Press, 2017 2.Zhang Yigang. Principle and Application of Single Chip Microcomputer (3rd Edition). Beijing : Higher Education Press, 2016 3.Zhang Renyan. Principle and application of single chip microcomputer. Beijing : Mechanical Industry Press, 2016 4.Li Guangdi. Basics of Single Chip Microcomputer (3rd Edition). Beijing : Beijing University of Aeronautics and Astronautics Press, 2007 5.Xu Aijun. Single Chip Microcomputer Principle Practical Tutorial-Based on Proteus Virtual Simulation (3rd Edition). Beijing : Electronic Industry Press, 2014 6.Cai Meiqin. MCS-51 series single-chip microcomputer system and its application (2nd edition). Beijing : Higher Education Press, 2004 7.Lihua.MCS-51 series single-chip practical interface technology. Beijing : Beijing University of Aeronautics and Astronautics Press, 2011 8. Guo Tianxiang. New concept 51 single chip microcomputer C language tutorial : introduction, improvement, development, expansion of the whole strategy. Beijing : Electronics Industry Press, 2009
Data of last mendment	September 23, 2025

Electronic Technology Practice

Module designation	**Electronic Technology Practice**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Lin He
Language	Chinese
Relation to curriculum	Electronic Technology Practice is an important practical teaching link for the major of Electrical Engineering and Automation. It enables students to initially get in touch with the reality of electronic product design and production, acquire basic knowledge and operational skills in electronic product manufacturing, cultivate students' work styles of abiding by labor discipline, emphasizing safe production, integrating theory with practice, and being scientific and rigorous, and improve their ability to analyze and solve problems, thus laying a good foundation for their future work and study.
Teaching methods	1.Lecture Method 2.Case Method 3.Discussion Method 4.Blended Teaching Method 5.Experimental Method
Workload (incl.contact hours，self-study hours)	Total workload = 90 hours Contact hours = 40 hours Self-study hours =50 hours
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Circuit Theory、Analog Electronic Technology
Module objectives/ intended learning outcomes	Learning outcomes: ● Knowledge: 1. Understand the principles of electronic circuit design and PCB layout. 2. Master the characteristics and testing methods of common electronic components. ● Skill: 1. Able to use common electronic instruments and equipment proficiently. 2. Able to solder, assemble, and debug simple electronic products. 3. Able to design and fabricate simple printed circuit boards. 4.Be capable of completing the installation, debugging and performance index testing of simple electronic products.

	● Competence: 1. Cultivate a rigorous, safety-conscious, and cooperative work attitude. 2. Develop the ability to write standardized technical practice reports. 3. Enhance awareness of national manufacturing strategies and engineering responsibility.
Content	Practical Training (40 contact hours; 50 self-study hours) 1. Electronic Instrument Operation and Component Identification (4 contact hours, 6 self-study hours) 2. Printed Circuit Board (PCB) Design and Fabrication (4 contact hours, 6 self-study hours) 3. Welding Technology and Process Standards (4 contact hours, 6 self-study hours) 4. Installation, Fabrication and Debugging of Multivibrators (8 contact hours, 8 self-study hours) 5. Installation, Fabrication and Debugging of Voltage Comparators (8 contact hours, 8 self-study hours) 6. Installation, Fabrication and Debugging of FM Radios (8 contact hours, 8 self-study hours) 7. Internship Report Writing (4 contact hours, 8 self-study hours)
Examination forms	Practical assessment + Report submission
Study and examination Requirements	● Attendance is mandatory. Absences without approval will affect the final grade. ● The final grade consists of practical performance (80%) and practice report (20%). ● Grading scale: Excellent (90–100), Good (80–89), Satisfactory (70–79), Pass (60–69), Fail (below 60).
Reading list	1. Zhou, W. (2011). Electronic Circuit Design and Practice. National Defense Industry Press. 2. Lin, H. (2010). Fundamentals of Electronic Process Training. China Electric Power Press. 3. Shu, Y., & Wen, C. (2015). Electronic Technology and Product Manufacturing. China Water & Power Press. 4. Tong, S., & Hua, C. (2012). Fundamentals of Analog Electronics. Higher Education Press.
Data of last mendment	June 29, 2025

Cortex-M3 Development and Practice

Module designation	Cortex-M3 Development and Practice
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	Liu Hongxi
Language	Chinese
Relation to curriculum	The ' Cortex-M3 development technology and practice ' course is the core professional course of electronic information engineering, which lays the foundation for students to follow-up study professional courses and engage in professional work in the future. This course takes students to master the functional characteristics, working principle, hardware resources and software development methods of STM32 processor as the primary goal, so that students can understand and master the theory and knowledge involved in ARM embedded system, and on this basis, they can skillfully use the software development environment and program debugging method of STM32 processor, and put forward the application system solution as the high-level goal, so as to cultivate the electronic information application talents with the ability of STM32 embedded system development, scientific research training, science and technology competition and product development in the future.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method, experimental class Target Students: Electronic Information Engineering
Workload (incl. contact hours, self-study hours)	Total workload = 105, of which : contact hours = 40, self-study hours = 65
Credit points（ECTS）	ECTS Credit=3.5
Required and recommended prerequisites for joining the module	C language, single chip microcomputer principle and application
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** Master the classification and core characteristics of Cortex series kernels, understand the naming rules, basic composition and core characteristics of firmware library, and clarify the corresponding relationship between Cortex-M3 and STM32F10x kernel. 2.Understand the STM32F10x system hardware and software design principles, the basic working mechanism of the peripherals, familiar with the electronic information system engineering design methods and various key factors affecting the design goals. Familiar with the functional module characteristics of Cortex-M3 experimental equipment, the basic use principle of oscilloscope and multimeter, and master the core workflow of MDK integrated

	development environment. **●Skill：** With the help of literature research methods, we can analyze the problems in the design process of STM32F10x hardware and software, and use a variety of technical methods to develop solutions. It can be combined with the design requirements of embedded system, using STM32F10x firmware library to write the program, through the MDK integrated development environment to complete the design, debugging and optimization of the program. It can correctly select the Cortex-M3 experimental equipment function module to build the hardware platform, use MDK, oscilloscope, multimeter and other tools to test and analyze the experimental results, optimize the experimental scheme and draw effective conclusions. **●Competence：** It can flexibly use the relevant knowledge of Cortex-M3 and STM32F10x to independently complete the hardware and software co-design of embedded systems, and has the ability to analyze and solve complex design problems. It can standardize the whole process of design, implementation, testing and optimization of embedded experiments, form rigorous engineering thinking, and improve the practical ability of electronic information system engineering. The software and hardware resources and test instruments can be reasonably selected according to the design requirements, and the in-depth analysis ability of the experimental results and the iterative optimization ability of the experimental scheme are possessed.
Content	**A.Theoretical teaching(28 contact hours; 45 self-study hours)** **Chapter 1 Introduction (2contact hours; 7 self-study hours)** 1) Introduction of ARM system ; 2) The classification and characteristics of Cortex kernel ; 3) CM3 supports instruction set ; 4) STM32 series MCU classification ; 5) STM32F10x resources ; 6) STM32 firmware library structure and naming rules ; 7) Comparison of directly operating registers and calling the firmware library to write programs ; 8) Software installation **Chapter 2 STM32F10x kernel architecture (4 contact hours; 8self-study hours)** **1**）1) The relationship between CM3 core and STM32F10x architecture ; 2) CM3 memory and STM32F07 memory image ; 3) CM3 register grouping and special function register ; 4) The stack of CM3 ; 5) STM32F10x power management ; 6) Reset and start configuration ; 7) STM32F10x clock. **Chapter 3 GPIO and AFIO(4 contact hours; 6self-study hours)** 1) General IO and multiplexing functions ; 2) IO remapping of multiplexing function ; 3) GPIO programming examples ; 4) GPIO library function. **Chapter 4 NVIC and EXTI (4 contact hours; 6 self-study hours)**

	1) CM3 anomaly and interrupt system ; 2) Interrupted vector ; 3) NVIC library function configuration ; 4) External interrupt / event controller ; 5) EXTI library function configuration ; 6) Interrupt application examples **Chapter 5 timer TIM (6contact hours; 6 self-study hours)** STM32F10x timer overview ; 2) Advanced and universal timer TIMx ; 3) Counting mode ; 4) Capture / comparison channel ; 5) Output mode ; 6) Input mode. **Chapter 6 Universal Synchronous Asynchronous Transceiver USART (4 contact hours ; 6 self-study hours)** 1) USART function description ; 2) USART asynchronous mode ; 3) USART synchronization mode ; 4) USART programming example. **Chapter7** ADC and DAC **(4 contact hours; 6 self-study hours)** 1) analog / digital conversion (ADC) ; 2) ADC working mode ; 3) ADC programming examples ; 4) digital / analog conversion (DAC) ; 5) DAC output mode ; 6) DAC programming examples. **Part B. Experiment Teaching(12 contact hours; 20 self-study hours)** 1)STM32 development environment building experiment (2 contact hours ; 5 self-study hours) ; 2) General IO experiment (2 contact hours ; 3 self-study hours) ; 3) Interruption experiment (2 contact hours ; 3 self-study hours) ; 4) Timer experiment (2contact hours ; 3 self-study hours) ; 5) Serial port experiment (2 contact hours ; 3self-study hours) ; 6) AD conversion experiment (2 contact hours ; 3 self-study hours).
Examination forms	The closed-book written examination method is adopted.
Study and examination Requirements	1.Students should complete their homework independently. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance, experimental performance and final exam results, and comprehensively evaluates students ' learning situation, ability to analyze and solve complex engineering problems. The usual performance evaluation standard is 20 %, including homework (10 %), stage assessment (10 %) ; the evaluation standard of experimental results was 20 %. The final examination accounted for 60 %. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	Required books [1] Qingdao Donghe Information Technology Co., Ltd. Cortex-M3 development technology and practice. Shaanxi : Xi 'an University of Electronic Science and Technology Press, 2021.3 Feng Zhanrong et al. The principle and application of STM32 single-chip microcomputer-virtual simulation based on Proteus M]. Huazhong University of Science and Technology Press, 2021.1. Reference books [1] Liu Huoliang, Yang Sen.STM32 Library Development Practice Guide

	(2nd Edition). Beijing : Mechanical Industry Press, 2025 [2] Feng Xinyu.ARM Cortex-M3 embedded system principle and application. Beijing : Tsinghua University Press, 2020
Data of last mendment	September 23, 2025

Course Design on EDA Technology and Its Applications

Module designation	Course Design on EDA Technology and Its Applications
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	Lin Haibo
Language	Chinese
Relation to curriculum	This course is a compulsory centralized practical teaching project for electronic information engineering major. It is an important part of students ' ability to solve practical engineering problems by using the knowledge of hardware description language. By analyzing and demonstrating the implementation scheme of digital system based on FPGA device, the VHDL program design of digital system is completed, and the tasks of editing, compiling, simulating, downloading, verifying, system debugging and writing design report of EDA tool software are further familiarized, so that students can master the steps and methods of FPGA system design, improve the ability of comprehensive analysis and solving complex engineering problems, and help students to further understand and master the theoretical knowledge of " EDA Technology and Application " course.
Teaching methods	Teaching methods : teaching method, discussion method, guiding and answering questions, computer operation, students ' self-study, completion of the report Target students : students majoring in electronic information engineering Teaching type : practical teaching
Workload (incl. contact hours, self-study hours)	Total workload = 90, of which : contact hours = 32, self-study hours = 58
Credit points （ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Analog electronic technology, digital electronic technology
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** 1.Further understand and master the digital system VHDL program design structure, design process and design method ; to master the basic operation and design method of editing, compiling, simulation, download verification and system debugging of EDA tool software QUARTUS II. ●**Skill：** It can use EDA tool software to complete project design, compilation, test

	simulation, download verification and other engineering applications. 2.Ability to analyze FPGA design problems through EDA tool software, continuously improve and perfect system solutions, and understand their limitations. ● **Competence：** The system design scheme can be proposed, and VHDL or Verilog HDL is used to complete the design of each circuit function module of the digital system. 2.According to the existing circuit function modules, complete the digital system design tasks and functions, and be able to innovate. 3.Able to digital circuit or digital system VHDL design and analysis and comparison, can solve the digital system VHDL design complex engineering problems.
Content	**1. system design plan（4 contact hours; 6 self-study hours）** According to the basic theoretical knowledge of FPGA, hardware description language and electronic technology, by consulting relevant Chinese and foreign materials, starting from the FPGA system design requirements, two or more system design schemes are proposed, and the system scheme block diagram is given. Through comparison, analysis and demonstration, the scheme is selected and determined. **2. system programming（10 contact hours; 20 self-study hours）** VHDL or Verilog HDL can be used to develop and design circuit modules and systems, and hierarchical or modular design methods can be used to achieve the functions required by the course design tasks. **3. EDA software simulation debugging（10 contact hours; 20 self-study hours）** Using EDA software to simulate and verify the designed circuit or digital system, it is required to simulate the design requirements of the subject. **4. Curriculum design report（4 contact hours; 12 self-study hours）** Submit the course design report, write the course design report to be clear, drawing requirements graphics, symbols, lines and so on in line with national standards. The course design report includes the following parts : cover ; design task book ; directory ; the text includes the purpose and significance of the project design, system design and determination, system hardware design, system software design, simulation download and debugging, etc. The content and order of each chapter can be set by themselves. Summary ; references ; appendix, including software program list and system circuit schematic diagram. **5. Reply to course design（4 contact hours）** The whole process of curriculum design, including system design, system software and hardware design and simulation debugging and download verification and other aspects of the defense.
Examination forms	Process assessment, results assessment and defense assessment
Study and examination Requirements	1.Students should independently complete the project design content, do not allow late, early leave or unauthorized absence. The project assessment includes three parts : process assessment, result assessment and defense assessment, with weights of 30 %, 30 % and 40 % respectively. 3.Each achievement is evaluated by the percentage system, and 60 is the

	passing score of this course.
Reading list	Required books [1] Ding Hong, edited by Zheng Di. EDA Technology Application Project Tutorial [M].Electronic Industry Press, 2016. Lin Qian et al. [2].Practical Course and Curriculum Design of EDA Technology [M]. University of Electronic Science and Technology Press, 2024.1. Reference books [1] Tan Huisheng, Zhang Changfan. EDA technology and application (fourth edition) [M]. Xi 'an : Xi 'an University of Electronic Science and Technology Press, 2022,2 ; [2] Zhang Pinghua, Tan Lixin. EDA technology and application project tutorial : Verilog HDL version. Shanghai Jiao Tong University Press, 2023. [3] Wang Jianfei, Lei Bin. Hello FPGA.Electronic Industry Press.2016,8 [4] Liao Yuping, Lu Ruiqiang. Logic circuit design DE2-115 practical treasure. China Taiwan Youjing Technology Publishing.2012.2
Data of last mendment	September 23, 2025

Basic MATLAB and Its Application Training

Module designation	MATLAB basic and application training
Semester(s) in which the module is taught	3th semester
Person responsible for the module	Zhang Xuemin
Language	Chinese
Relation to curriculum	Professional compulsory practice course
Teaching methods	Teacher-centered method : teaching method, problem-oriented teaching method Self-study : practice, experimental report Target Students: Electronic Information Engineering
Workload (incl. contact hours, self-study hours	Total workload = 45, of which : contact hours = 20, self-study hours = 25
Credit points（ECTS）	ECTS Credit=1.5
Required and recommended prerequisites for joining the module	Linear algebra, C language
Module objectives/ intended learning outcomes	**Learning outcomes :** **●knowledge：** 1.MATLAB 's matrix and array operations, numerical calculations, symbol operations, graphics processing functions, graphical user interface and M file editing and debugging. 2.SIMULLINK dynamic simulation and MATLAB application. **●skill：** 1.Will use the MATLAB working environment, skillfully create arrays and matrices, complete the four arithmetic operations of arrays and matrices, power operation ; will use a variety of two-dimensional, three-dimensional drawing commands to complete the drawing of plane and three-dimensional graphics ; it can edit and debug M files. It will correctly and skillfully use the SIMULINK module to create a dynamic simulation system, which lays the foundation for the simulation of the relevant content of the subsequent professional basic courses and professional courses. **●capacity：** It can skillfully apply the basic functions and commands of MATLAB to realize the simulation verification of the theoretical knowledge of professional courses and apply MATLAB / SIMULINK to complete the construction and simulation of the model.
Content	**Practical training teaching (45 class hours in 1 week ; 25 self-study hours)**

	Training tasks **1.Task 1 (5 hours, self-study 6 hours)** The working environment of MATLAB 3.MATLAB matrix and array operations, numerical calculations 4. Symbol operation of MATLAB Task 2 (5 hours, self-study 8 hours) 1.Two-dimensional graphics processing function of MATLAB The three-dimensional graphics processing function of MATLAB 3.Graphic user interface Task three (5 hours, self-study 5 hours) Editing and Debugging of M File Task four (5 hours, self-study 6 hours) Dynamic Simulation of SIMULINK After 1 week of training, the training report is submitted according to the requirements of the task content.
Examination forms	Closed-book written examination
Study and examination Requirements	●Students should independently complete the daily training tasks. Late arrivals, early departures or unauthorized absences are not permitted. ●The assessment includes three parts : process assessment, result assessment and computer assessment. The weights are 0.4,0.2 and 0.4 respectively.
Reading list	**a list of required reading** [1] Zhang Xuemin, editor-in-chief. Basics and Applications of MATLAB (Fourth Edition). Beijing : China Electric Power Publishing House, 2025 [2] Edited by Zheng Aqi. MATLAB Practical Tutorial (Fifth Edition). Beijing : Electronic Industry Press, 2021 **reference** [1] Wen Zheng editor-in-chief. MATLAB scientific calculation. Beijing : Tsinghua University Press, 2023 [2] Wang Hongyuan editor-in-chief. MATLAB language and its application in electronic information engineering. Beijing : Tsinghua University Press, 2021
Data of last mendment	June 25, 2025

Graduation Design

Module designation	graduation project
Semester(s) in which the module is taught	8th semester
Person responsible for the module	Lin Haibo
Language	Chinese
Relation to curriculum	Graduation design is an important compulsory practical teaching link for talent training. It is a comprehensive summary of students ' professional knowledge learning, research, design and practical results. It is a comprehensive test of the training effect of students ' comprehensive quality and engineering practice ability. It has a profound impact on students ' work attitude, work style, lifelong learning and independent work ability. Through graduation design, students ' ability to develop and design, innovate and solve complex engineering problems of electronic information engineering is cultivated, and their professional quality is further improved while considering various constraints. With the help of literature research or related methods, students ' ability to investigate and analyze solutions to complex engineering problems of electronic information is cultivated, and students ' international vision in the professional field is broadened. Exercise and cultivate students ' ability to write technical reports on the development and design content of electronic information engineering, and exercise and cultivate students ' ability to express, communicate and communicate ; enable students to initially have the decision-making ability of economic cost analysis, and cultivate students ' self-learning ability and lifelong learning awareness in a subtle way. The topics of graduation design mainly include wireless communication application system design, intelligent electronic product or device design, signal and information processing hardware and software algorithm research, embedded intelligent control system hardware and software design, and other topics related to electronic information engineering.
Teaching methods	Teaching methods : teaching method, discussion method, guidance and question answering, students ' autonomous learning, completion of report teaching object : electronic information engineering students teaching type : practical teaching
Workload (incl. contact hours, self-study hours	Total workload = 675, of which : contact hours = 240, self-study hours = 435
Credit points（ECTS）	ECTS Credit=22.5
Required and recommended	Take the complete course

prerequisites for joining the module	
Module objectives/ intended learning outcomes	Learning outcomes: ● Knowledge： The system integrates the core knowledge system of electronic information engineering, master the key theories of core courses such as signal and system, digital signal processing, single-chip microcomputer principle and interface technology, communication principle, digital circuit design, etc., and clarify the relationship and application logic of each knowledge module in engineering practice. Master the technical architecture and implementation principles of typical application scenarios in the field of electronic information (such as intelligent control, Internet of Things terminals, communication equipment, signal acquisition and processing systems, etc.), and understand the design basis and applicable conditions of the industry 's mainstream technical solutions. 3.Understand the technical standards, industry norms and engineering ethics requirements related to graduation design, be familiar with the document specifications (such as design specifications, technical manuals, test reports, etc.) in the R & D process of electronic information products, and clarify the importance of intellectual property rights in engineering design. Follow up the development of cutting-edge application technologies in the field of electronic information (such as embedded AI, low-power communication, industrial Internet of Things, etc.), master the basic application knowledge of related new technologies and new devices, and provide support for the optimization and innovation of design schemes. ● Skill： It has the core skills to independently complete the electronic information engineering design project, and can carry out the scheme demonstration, system architecture design, core component selection according to the design requirements, and complete the key links such as circuit schematic drawing, PCB design, embedded program development and so on. 2.Skillfully use professional tools to carry out design and testing work, including EDA design software (such as Altium Designer, Keil, MATLAB, etc.), basic measuring instruments (oscilloscope, multimeter, signal generator, etc.), to complete system function debugging, performance testing and troubleshooting. With standardized engineering document writing skills, can clearly and accurately write the graduation design specification, complete presentation of design ideas, theoretical analysis, implementation process, test results and improvement programs, and have the ability

	to draw professional charts such as system block diagrams and circuit schematics. With technical data retrieval and screening skills, through academic databases, industry manuals, technical forums and other channels, accurate access to the design of the required literature, device parameters, technical solutions and other information, and reasonable integration applied to the design process. ● Competence： Strengthen the ability of engineering observation and analysis, combine internship or industry research experience, accurately identify the design pain points of electronic information equipment and systems, analyze the advantages and disadvantages of existing technical solutions, deeply integrate theoretical knowledge with engineering practice, and propose reasonable design optimization ideas. 2.Improve the ability of problem solving and innovative application, in the face of technical problems in the design process, can independently carry out analysis, explore solutions, on the basis of drawing lessons from the existing technology, combined with the application requirements for program improvement or functional innovation, with preliminary engineering research and development ability. 3.Strengthen the ability of communication, cooperation and expression, and clearly and accurately explain the core ideas, technical difficulties and innovations of the design scheme to the instructors and defense experts. If it involves team graduation design, it can effectively divide and cooperate with team members to jointly promote the completion of design tasks. Consolidate the ability of independent learning and continuous improvement, in the face of the rapid iteration of technological dynamics in the field of electronic information, can actively learn new tools and new technologies, form the ability to independently build a knowledge system, and lay the foundation for adapting to the needs of professional positions. 5.Cultivate the awareness of career planning and engineering responsibility, through the practice of the whole process of graduation design, clarify the ability requirements of relevant positions in the electronic information industry, and sort out their own career development direction ; at the same time, we should establish a rigorous engineering attitude, pay attention to the reliability, safety and economy of the design, and practice the engineering ethics.
Content	**A.Practical teaching(240 contact hours; 435 self-study hours)** **Teaching content :** 1.Research, consult literature, complete the opening report ; (16

	hours ; 30 self-study hours) 2.Foreign language translation ; (16 hours ; 30 self-study hours) 3.Determine the design goal, determine the solution, analyze and compare to determine the best solution ; (32 hours ; 60 self-study hours) 4.Design and implementation of research programs in the field of electrical engineering, including program design, analysis, calculation, debugging, etc. (96 hours ; 170 self-study hours) 5.Draw relevant drawings, write design documents ; (48 hours ; 85 self-study hours) 6.Guide teachers to review and modify the relevant content of graduation design ; (16 hours ; 30 self-study hours) 7.Reply and performance evaluation. (16 hours ; 30 self-study hours)
Examination forms	Defense evaluation ； Graduation Thesis or Graduation Project Specification and Drawings
Study and examination Requirements	●The students themselves are completed independently under the guidance of the instructor. ●The total score assessment includes the assessment of the instructor (35 %), the assessment of the teacher (15 %) and the assessment of the defense (50 %).
Reading list	Required books [1] Graduation design guide for electronic information engineering. [2] Textbooks and related literature, materials, industry norms related to the field of electronic information engineering.
Data of last mendment	June 29, 2025

Sensor Detection Technology

Module designation	Sensor Detection Technology
Semester(s) in which the module is taught	5th Semester
Person responsible for the module	Lin Haibo
Language	Chinese
Relation to curriculum	'Sensor Detection Technology' is an elective course of electronic information engineering. The main teaching content of the course is the working principle, basic characteristics and engineering application of various sensors. Through the teaching of this course, students can obtain the basic knowledge and engineering application methods of sensor detection technology, and obtain the basic ability training of signal acquisition, processing, transmission and experiment. They can use sensor technology and electronic information engineering related knowledge to solve complex engineering problems such as signal acquisition, transformation, transmission, processing and control of electronic circuits or electronic information systems, enhance the comprehensive application ability and innovation ability of students ' professional knowledge, and lay a theoretical and application foundation for related work.
Teaching methods	Teacher-centered method : teaching method, questioning method, discussion method, experimental class
Workload (incl. contact hours, self-study hours)	Total workload = 75, of which : contact hours = 32, self-study hours = 43
Credit points （ECTS）	ECTS Credit=2.5
Required and recommended prerequisites for joining the module	Analog electronic technology, digital electronic technology
Module objectives/ intended learning outcomes	**Learning outcomes** ● **Knowledge：** Master the working principle and basic characteristics of common typical sensors ; 2. The nonlinear error of the sensor is calculated, the error compensation method of the sensor is mastered, and the working principle of the typical sensor measurement circuit can be analyzed. ●**Skill：** According to the existing experimental conditions or experimental devices, the research route of sensor characteristics and its engineering application can be selected, the experimental scheme can be designed, and the

	experimental system can be constructed. The technical performance and parameters of the sensor can be observed and tested by using the instruments and equipment in the experiment, and the experimental data can be collected correctly. The error analysis, calculation and interpretation of the experimental data of sensor technology can be carried out, and the reasonable and effective conclusions can be drawn through the comprehensive analysis of information, which has the ability to write technical summary and experimental test report. ● **Competence：** 1.and can analyze the working principle of the sensor detection system. 2.According to the engineering needs to select the appropriate sensor, the knowledge of sensor detection technology is applied to the engineering design of electronic information system, which can solve the complex engineering problems of sensor detection system.
Content	**A.Theoretical teaching(26 contact hours; 34 self-study hours)** **Chapter 1 Overview of sensor (2 contact hours; 3 self-study hours)** 1) The use of sensors, development trends and areas involved, the status quo at home and abroad ; 2) The definition, composition and classification of sensors ; 3) The basic characteristics of the sensor **Chapter 2 resistive strain gauge transducer (4 contact hours; 6 self-study hours)** 1) The working principle of resistance strain gauge ; 2) The characteristics of resistance strain gauge ; 3) Measuring electricity of resistance strain gauge ; 4) Application of resistance strain sensor. **Chapter 3** inductive transducer **(2 contact hours; 3 self-study hours)** 1) Self-inductive inductance sensor **Chapter 4** capacitance transducer **(2 contact hours; 3 self-study hours)** 1) The working principle, structure and classification order description statement of capacitive sensor ; 2) Sensitivity and nonlinear error of capacitive sensor ; 3) Measurement circuit of capacitive sensor ; 4) Application of capacitive sensor. **Chapter 5** piezoelectric transducer **(2 contact hours; 3 self-study hours)** 1) Piezoelectric effect and piezoelectric materials ; 2) Measurement circuit of piezoelectric sensor ; 3) The application of piezoelectric sensor. **Chapter 6 magnetic-electric transducer (2 contact hours; 3 self-study hours)** 1) Magnetoelectric induction sensor ; 2) Hall sensor. **Chapter 7 photoelectric transducer (2 contact hours; 3 self-study hours)** 1) Photoelectric effect ; 2) Photoelectric devices and their characteristics ; 3) The application of photoelectric sensor. **Chapter 8 thermoelectric transducer (6 contact hours; 8 self-study hours)** 1) Temperature measurement method ; 2) thermocouple sensor ; 3) Thermal resistance sensor ; 4) Thermistor sensor ; 5) Integrated temperature sensor. **Chapter 9 Sensor intelligent detection technology (2 contact hours; 2 self-study hours)** 1) the intelligence of the sensor ; 2) The basic composition of the sensor intelligent detection system ; 3) Preprocessing of sensor output signal **Part B. Experiment Teaching(6 contact hours; 9 self-study hours)** 1) Half-bridge performance experiment of metal foil strain gauge (2 hours ;

	3 self-study) ; 2) Piezoelectric sensor vibration measurement experiment (2 hours ; 3 self-study) ; 3) Characteristics experiment of Hall displacement sensor under DC excitation (2 hours ; 3 self-study).
Examination forms	The use of open-book written examination or design class big job
Study and examination Requirements	1.Students should independently complete the homework after each class. Late arrivals, early departures or unauthorized absences are not permitted. 2.This course is evaluated in a combination of usual performance, experimental performance and final exam results, and comprehensively evaluates students ' learning situation, ability to analyze and solve complex engineering problems. The usual performance evaluation standard is 50 %, including the unit work (30 %) and the experimental performance evaluation standard is 20 % ; the final examination accounted for 50 %. 4.Each achievement is evaluated by the percentage system, and 60 is the passing score of this course.
Reading list	Required books [1] Yu Youwen et al. Sensor principle and engineering application (5th edition). Xidian University Press. 2021, 7. Reference books [1] Hu Xiangdong et al. Sensor and Detection Technology (4th Edition). Mechanical Industry Press. 2021, 3. [2] Chen Jie, Huang Hongzhu. Sensor and Detection Technology (3rd Edition). Higher Education Press. 2021,4.
Data of last mendment	September 23, 2025

Course Design for Application of Microcontroller System

Module designation	**Course Design for Application of Microcontroller System**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Jiang Hang, Pu Xin
Language	Chinese
Relation to curriculum	Professional Compulsory Practical Course
Teaching methods	Teacher-centered Approach：Case Explanation Method、Technical Index Interpretation Method、Tutoring & Q&A Method、Discussion Method Autonomous Learning：Literature Review、Scheme Design、Software and Hardware Development 、 Simulation and Debugging 、 Report Writing
Workload (incl. contact hours, self-study hours)	Total Workload = 90, Contact Hours = 32, Self-study Hours = 58
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Principles and Applications of Single-Chip Microcomputer
Module objectives/ intended learning outcomes	●Knowledge: 1. Master the design flow, scheme demonstration methods and software and hardware integration principles of single-chip microcomputer control systems; 2. Master the use of Proteus software, hardware circuit schematic drawing and assembly/C language modular programming; 3. Understand relevant national standards for electronic product design, intellectual property protection, and safety and environmental protection specifications. ● Skills: 1. Independently complete the scheme design, hardware construction, software programming and simulation debugging of complex single-chip microcomputer control systems; 2. Standardize the writing of course design reports and accurately present design ideas, processes and results; 3. Skilled use of literature retrieval tools to investigate key technologies and apply them to design practice. ● Abilities: 1. Possess the ability to comprehensively apply professional knowledge to solve practical engineering problems and awareness of innovative design;

	2. Possess the ability to clearly express design schemes, effectively communicate and respond to defense questions; 3. Possess the abilities of independent learning, problem analysis and continuous design improvement.
Content	A. Core Design Stage (15-day full implementation) 1. Topic Selection and Scheme Design (2 days) - Select a topic from the assigned list or self-design a topic (subject to teacher approval), ensuring the topic conforms to engineering practice and has sufficient difficulty and workload; - Consult Chinese and foreign literature, propose 2 or more design schemes, draw scheme block diagrams, and demonstrate and select the optimal scheme. 2. System Hardware Design (5 days) - Complete the design of the single-chip microcomputer minimum system and peripheral circuits, clarify the chip functions and component selection basis; - Use Proteus software to draw hardware circuit schematic diagrams in accordance with national standards. 3. System Software Design and Simulation Debugging (6 days) - Use assembly language or C language to write programs with modular design method, draw flowcharts of the main program and key subroutines; - Use Proteus software for combined software and hardware simulation and debugging to ensure the realization of designed functions. 4. Report Writing and Defense Preparation (2 days) - Complete a 3,000–5,000-word course design report in handwriting according to specifications (appendices can be printed), including cover, task sheet, table of contents, main body, summary, references and appendices; - Sort out key links of the whole design process, prepare defense presentation and question answering. B. Auxiliary Teaching Content - Study relevant knowledge of national standards, patent literature retrieval and intellectual property protection; - Guidance on safety and environmental performance analysis of electronic products; - Explanation of design report writing specifications and defense skills.
Examination forms	Process Assessment (20%) + Achievement Assessment (40%) + Defense Assessment (40%), all evaluated on a 100-point scale.
Study and examination Requirements	● Absence without valid reason for 2 days or more, late submission/non-submission of design results, absence from examination, or plagiarism/copying of designs are strictly prohibited. Violators will receive a failing total grade. ● Process Assessment: Focuses on design progress and quality, proficiency in using Proteus software, research and autonomous learning effectiveness. ● Achievement Assessment: Evaluates the rationality of the scheme,

	quality of software and hardware design, simulation and debugging results, and report standardization. ● Defense Assessment: Assesses mastery of professional knowledge, communication and expression skills, and authenticity of the design through design presentation and question answering.
Reading list	1. Required Readings [1]Liu Shurong. Principles and Applications of MCS-51 Single-Chip Microcomputers (Revised 2017). Electric Power Press, 2017. [2]Zhang Yigang. Principles and Applications of Single-Chip Microcomputers (3rd Edition). Higher Education Press, 2016. [3]Xu Aijun. Practical Course on Single-Chip Microcomputer Principles — Based on Proteus Virtual Simulation (3rd Edition). Publishing House of Electronics Industry, 2014. 2. References [1]Zhang Yigang. Design of Practical Subroutines for MCS-51 Single-Chip Microcomputers. Harbin Institute of Technology Press, 2013. [2]Du Shuchun. 51 Single-Chip Microcontroller Made Easy — Introduction and Examples with Proteus and Assembly Language. Chemical Industry Press, 2017. [3]Ling Yichun. MCS-51 Single-Chip Microcomputers and Assembly Programming (2nd Edition). China Railway Press, 2015. [4]Ji Zongnan. Practical Handbook of Single-Chip Microcomputer Peripheral Devices: Input Channel Devices (2nd Edition). Beihang University Press, 2005. [5]Wu Kuanming. Practical Handbook of Single-Chip Microcomputer Peripheral Devices: Data Transmission Interface Devices. Beihang University Press, 2005. [6]Dou Zhenzhong. Practical Handbook of Single-Chip Microcomputer Peripheral Devices: Output Channel Devices. Beihang University Press, 2003.
Data of last mendment	June 29, 2025

Foreign Language Training for Electronic Information Engineering

Module designation	Professional Foreign Language Training for Electronic Information Engineering
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Zhang Xuemin
Language	Chinese
Relation to curriculum	Professional Compulsory Practical Course
Teaching methods	Teacher-centered Approach: Lecture Method, Interactive Communication Method Self-study: Practice, Training Report
Workload (incl. contact hours, self-study hours)	Total Workload = 45, of which: Contact Hours = 20, Self-study Hours = 25
Credit points（ECTS）	ECTS Credit=1.5
Required and recommended prerequisites for joining the module	College English and Relevant Basic Courses of Professional Technology
Module objectives/ intended learning outcomes	Learning Outcomes ● Knowledge: 1. On the basis of basic memorization methods, master how to use a large number of derivative words to strengthen vocabulary memory and expand vocabulary; understand word meaning, syntax, sentence patterns and tense characteristics; grasp the differences in translation between professional English and general English. 2. Be familiar with various translation skills of professional English, and practice rapid reading of professional articles; learn how to present the content of an English professional document accurately and concisely in Chinese. ● Skills: 1. Proficiently master the professional vocabulary related to electronic information, and achieve basically correct pronunciation and intonation in reading aloud. 2. Be able to read books, periodicals and documents in electronic information proficiently, with a translation speed of about 200 to 300 words per hour and an accuracy rate of over 70; independently read foreign professional documents to improve reading ability, and understand the current development of the domestic electronic information industry through extensive reading, so as to lay a solid foundation for future participation in international competition and cooperation in the electronic information field. ● Abilities: Be able to read professional documents and accurately

	capture the main content and core information.
Content	Training Teaching (45 class hours per week; 25 self-study hours) Training Tasks Task 1: Explanation of Basic Grammar Points (5 class hours, 6 self-study hours) 1. Splitting of Long Sentences: Analyze the structure of long sentences and split English long sentences into Chinese short sentences. 2. Word Prefixes and Suffixes: Derivatives appear frequently in professional English. Here, prefixes and suffixes in derivatives are introduced. 3. Adverbial Clauses: In professional English, complex logical relationships between things are often expressed by adverbial clauses, which are guided by subordinating conjunctions, including time, place, purpose, condition, reason, concession, manner and result. 4. Attributive Clauses: Attributive clauses include restrictive attributive clauses and non-restrictive attributive clauses. Relative pronouns and adverbs guiding attributive clauses include who/whom/whose/that/when/where/why/which/how, etc. Task 2: Explanation of Electrical and Electronic Technology (5 class hours, 8 self-study hours) 1. Master and understand the professional English vocabulary in electrical and electronic technology. 2. Based on textbook content and the teacher's explanation, students shall search literature, design functional circuits (such as amplifier circuits, filter 2. circuits, rectifier circuits, responder circuits, timing circuits, etc.), and write a report. 3. The report shall focus on the functions, characteristics and working principles of the circuit, with no less than 500 words. The circuit diagrams in the report shall be drawn with professional software. 4. Students shall translate the completed report into English (including the text in the diagrams). Task 3: Learning and Translation of Professional Knowledge in Information Transmission Theory (5 class hours, 5 self-study hours) 1. Master and understand the professional vocabulary of information transmission theory. 2. Write 10 relevant words in the information field with explanations (more than 100 words in total). 3. Search for materials and introduce digital communication or analog communication (more than 200 words). 4. Search for materials and introduce a modulation/demodulation or encoding/decoding method applied in information transmission (with principle block diagram and formulas) (more than 200 words). Task 4: Learning and Translation of English Literature on Internet of Things (5 class hours, 6 self-study hours)

	1. Master and understand the professional vocabulary in English manuals of the Internet of Things. 2. Students shall correctly translate the content in the English manual of the Internet of Things according to the comprehensive design exercises given by the teacher in the manual. 3. After completing the one-week training, submit the training report in accordance with the requirements of the task content.
Examination forms	Closed-book Written Examination
Study and examination Requirements	● Students shall complete the daily training tasks independently. Being late, leaving early or unapproved absence is not allowed. ● The assessment consists of process assessment and achievement assessment, with weights of 0.6 and 0.4 respectively.
Reading list	1.Required Readings [1] Su Xue (Ed.). Professional English for Electronic Information Engineering. Huazhong University of Science and Technology Press, 2023. [2] Li Baiping (Ed.). Professional English for Electronic Information. Xidian University Press, 2022. 2. References [1] Gao Lixin. Professional English for Electronic Information. Publishing House of Electronics Industry, 2021. [2] Yang Zeqing. Professional English for Electronic Information. China Machine Press, 2021.
Data of last mendment	June 25, 2025

Course Design for Application of Embedded System

Module designation	Course Design for Application of Embedded System
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	Liu Hongxi
Language	Chinese
Relation to curriculum	Course Design of Embedded System Application is one of the compulsory intensive practical teaching activities for the major of Electronic Information Engineering. It is an important part to train students' ability to solve practical engineering problems by applying the professional theoretical knowledge they have learned. In the design process, students are required to determine the embedded system design scheme through analysis and demonstration according to the course design requirements, build the system hardware circuit and draw hardware circuit diagrams, compile system software programs, realize system debugging through simulation, and write the design report. Thus, students can master the steps and methods of preliminary embedded system design and improve their ability to comprehensively analyze and solve problems.
Teaching methods	Teaching Methods: Lecture method, discussion method, guidance and Q&A, student self-study, report completion Target Students: Students majoring in Electronic Information Engineering Teaching Type: Practical Teaching
Workload (incl. contact hours, self-study hours)	Total Workload = 90, of which: Contact Hours = 32, Self-study Hours = 58
Credit points （ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Cortex-M3 Development Technology and Practice, Analog Electronic Technology, Digital Electronic Technology
Module objectives/ intended learning outcomes	**Learning Outcomes** ● **Knowledge:** 1. Master the core theoretical knowledge of STM32 and Cortex-M3, understand the design principles of complex embedded systems and the software-hardware coordination mechanism, and be familiar with the characteristics and limitations of common design tools. 2. Understand the humanistic factors such as laws, regulations and industry standards related to electronic product design, and master the writing standards of course design reports, as well as the methods of literature retrieval and key technology extraction. ● **Skills:**

	1. Be able to build a hardware platform, compile software programs according to the design requirements of complex embedded systems, optimize the scheme through joint software and hardware debugging, and complete an innovative design with certain functions. 2. Be able to independently search for literature, carry out research and extract key technologies, select suitable tools for design and analyze their limitations, write reports in accordance with specifications, and clearly elaborate on the design and respond to questions in the defense. ● **Competence:** 1. Have the ability to decompose complex requirements and design schemes, and can flexibly apply embedded theoretical knowledge to complete designs and solve practical problems with a sense of compliance. 2. Possess the abilities of independent inquiry, innovative design and academic expression, can present results standardly, complete the defense efficiently, and form a rigorous engineering thinking.
Content	1. Determine the Control System Design Scheme Based on the basic theoretical knowledge of Cortex-M3 and STM32, by consulting relevant Chinese and foreign literature, starting from the design requirements of complex embedded systems, propose two or more system design schemes, provide system scheme block diagrams, and select and determine the scheme through comparison, analysis and demonstration. 2. System Hardware Design Including the design of the STM32F10x minimum system and the design of peripheral circuits, etc., and use Proteus software to draw the hardware circuit schematic diagram. It is required to clarify the functions of relevant chips, which can be found in chip manuals or other relevant materials, and the selection of components must be based on evidence. The hardware circuit design must be reasonable and meet the technical index requirements of the course design. 3. System Software Design Assembly language or C language can be used for software programming, and a modular design method is adopted to realize the functional requirements of the course design, and draw the main flow chart and the flow charts of main subroutines. 4. Proteus Simulation and Debugging Use Proteus software to simulate and debug the designed software and hardware, which is required to simulate and realize the design requirements of the topic. 5. Course Design Report Submit a course design report, which is required to be handwritten on A4 paper with a word count of about 3000-5000 words (excluding appendices); appendices and simulation debugging screenshots can be printed on A4 paper. The course design report should be well-organized, and the graphics,

	symbols, lines, etc. in the drawings should comply with national standards. The course design report includes the following parts: cover; design task book; table of contents; main text, including chapters such as the purpose and significance of the project design, system scheme design and determination, system hardware design, system software design, Proteus simulation and debugging, etc. The content and order of each chapter can be set independently; summary; references; appendices, including software program list and system hardware schematic diagram. 6. Course Design Defense Defend the entire process of the course design, including system design scheme, system hardware design, system software design and simulation debugging.
Examination forms	Process Assessment, Achievement Assessment and Defense Assessment
Study and examination Requirements	●Students shall independently complete the project design content. Being late, leaving early or unapproved absence is not allowed. ●The project assessment consists of three parts: Process Assessment, Achievement Assessment and Defense Assessment, with weights of 20%, 40% and 40% respectively. ●All scores are evaluated on a 100-point scale, and 60 points is the passing score for this course.
Reading list	1. Required Books [1] Qingdao Yingu. Cortex- M3 Development Technology and Practice. Xidian University Press, 2021. 2. Reference Books [1] Gao Yanzeng. Basic Tutorial for Embedded System Development. China Machine Press, 2021. [2] Feng Zhanrong. Principles and Applications of STM32 Microcontrollers — Based on Proteus Virtual Simulation. Huazhong University of Science and Technology Press, 2021. [3] Zhang Yang. Atom Teaches You to Play with STM32. Beihang University Press, 2015. [4] Wu Qisheng. ARM-Based Microcontroller Application and Practice — STM32 Case Teaching. China Machine Press, 2017.
Data of last mendment	September 23, 2025

Digital Image Processing

Module designation	Digital Image Processing
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	Ni Hongxia
Language	Chinese
Relation to curriculum	Digital Image Processing is one of the compulsory professional courses for the major of Electronic Information Engineering. Through the study of this course, students can master the basic concepts and core algorithms of digital image processing, acquire the initial ability to analyze simple image processing problems and select appropriate technical schemes, lay a foundation for the subsequent study of related courses such as computer vision, pattern recognition and machine learning, and meet the basic technical needs in fields such as intelligent terminals, security monitoring, medical imaging and industrial inspection.
Teaching methods	Teacher-Centered Methods: Lecture method, Questioning method, Discussion method, Computer demonstration
Workload (incl. contact hours, self-study hours)	Total Workload = 90, of which: Contact Hours = 32, Self-study Hours = 58
Credit points （ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Probability and Mathematical Statistics, Linear Algebra, Signals and Systems, Digital Signal Processing
Module objectives/ intended learning outcomes	**Learning Outcomes** ● **Knowledge:** 1. Understand the basic concepts and theories of time-domain transformation of digital images. 2. Explain the basic theories and core ideas of typical algorithms such as image enhancement, restoration, segmentation and feature extraction. 3. Understand the basic theories and analysis methods of Fourier transform for digital image processing. ● Skills: 1. Be able to use MATLAB for basic image processing operations, and independently write and debug programs for image reading, type conversion, basic operations, enhancement, filtering, edge detection and segmentation. 2. Master basic application skills of digital image processing technology,

	select appropriate algorithms for specific problems, complete simple image processing tasks (e.g. image denoising, enhancement, edge extraction, target segmentation) and analyze the processing effects. ● Competence: 1. Be able to apply theoretical knowledge and mathematical tools to the deduction and analysis of image processing problems, and propose preliminary solutions. 2. Have the ability to analyze complex engineering problems in the field of digital image processing, sort out key technical difficulties, compare and integrate schemes with learned algorithms, and cultivate engineering thinking and problem decomposition capabilities. 3. Be able to master cutting-edge application trends of image processing through self-study, actively explore technical optimization directions in PBL and flipped classroom, and have the potential to complete comprehensive practical tasks (e.g. digital recognition system design) through teamwork.
Content	**A.Theoretical teaching(32 contact hours; 58 self-study hours)** **Chapter 1 Introduction** **Chapter 1 Overview of Digital Image Processing (2 contact hours; 4 self-study hours)** 1) Basic concepts of images 2) Digitalization methods of images, numerical description of digital images 3) Bitmap file structure of digital images, grayscale histogram of digital images, etc. **Chapter 2 Basic Concepts of Images (10 contact hours; 16 self-study hours)** 1) Image and pixel 2) Relationship between pixels, 4-connectivity and 8-connectivity of pixels 3) Sampling and quantization of images 4) Types of images 5) Pixel distance **Chapter 3 Image Enhancement (6 contact hours; 11 self-study hours)** 1) Histogram specification 2) Linear contrast stretching (power-law transformation) 3) Gray-level window and gray-level window slicing 4) Histogram equalization, smoothing filtering, and sharpening filtering **Chapter 4 Image Restoration (Denoising) (4 contact hours; 8 self-study hours)** 1) Basic concepts of image noise 2) Mean filtering 3) Median filtering 4) Edge-preserving smoothing filtering **Chapter 5 Image Sharpening (6 contact hours; 11 self-study hours)** 1) Basic characteristics of image details 2) First-order differential operators, second-order differential operators 3) Canny operator 4) LOG filtering method **Chapter 6 Image Segmentation (4 contact hours; 8 self-study hours)** 1) Discontinuity detection 2) Edge linking and boundary detection methods 3) Thresholding methods based on image gray-level distribution 4) Thresholding methods based on spatial distribution of image gray levels 5) Region extraction methods 6) Segmentation method based on morphological watershed
Examination forms	1. Usual Assessment: 40% of the total course grade (40 points), consisting of class performance, assignments, projects/group discussions/PPT/questionnaires, and quizzes. 2. Final Examination: 60% of the total course grade, closed-book written exam.

Study and examination Requirements	1. Students shall complete the after-class assignments independently. Late arrival, early departure, or unapproved absence is not allowed. 2. This course adopts a combination of usual assessment and final examination to comprehensively evaluate students' learning performance and their ability to analyze and solve complex engineering problems. 3. The usual assessment accounts for 40% of the total grade, including class performance (30%), assignments (40%), major project/group discussion/PPT/questionnaire (10%), and quizzes (20%); the final examination accounts for 60%. 4. All components are graded on a 100-point scale, and 60 points is the passing score for this course.
Reading list	1. Required Books [1] Cai Limei. Digital Image Processing: Analysis and Implementation Using MATLAB (2nd ed.). Tsinghua University Press, 2015.12. [2] Zhu Hong, et al. Fundamentals and Applications of Digital Image Processing. Beijing: Tsinghua University Press, 2021. [3] Li Junshan, et al. Digital Image Processing (5th ed.). Tsinghua University Press, 2025.08. [4] Hu Xuelong. Digital Image Processing (3rd ed.). Beijing: Publishing House of Electronics Industry, 2014. [5] Rafael C. Gonzalez. Digital Image Processing Using MATLAB (2nd ed.). Beijing: Publishing House of Electronics Industry, 2014.
Data of last mendment	September 23, 2025

Practical Training in Electronic Circuit PCB Design

Module designation	Practical Training in Electronic Circuit PCB Design
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Jiang Hang
Language	Chinese
Relation to curriculum	Professional Compulsory Practical Course
Teaching methods	Teaching Methods: Lectures, discussions, tutoring and Q&A, computer operations, and student self-study.
Workload (incl. contact hours, self-study hours)	Total workload = 90, including: practical hours = 40, self-study hours = 50
Credit points（ECTS）	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Circuit Theory，Analog Electronics Technology
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** 1. Master the core basic theories of PCB design, understand the structural composition, classification (single-layer/double-layer/multi-layer boards) and working principles of printed circuit boards, and clarify the internal connection between schematic design and PCB design as well as the engineering design logic. 2. Proficiency in the core functional principles of JLCPCB EDA software, understand the working mechanism and application logic of the schematic drawing module (component library calling, schematic wiring, netlist generation) and the PCB design module (PCB layout, routing rules, copper laying, DRC check). 3. Master the circuit principle of the intelligent tracking car control board, clarify the selection basis, pin definition and interface connection rules of core components (single-chip microcomputer, sensor, motor drive module, power supply module, etc.), and understand the cooperative working principle of each functional module of the control board (power supply, signal acquisition, motor drive, single-chip microcomputer control). 4. Understand the engineering specifications and technical requirements of PCB design, including component package selection standards, routing spacing rules, basic design principles of electromagnetic compatibility (EMC), key points of power integrity design, and basic requirements of PCB manufacturing processes (such as board thickness, hole diameter,

	solder mask and silk screen specifications). 5. Know the basic theories of electronic circuit debugging, understand the causes and troubleshooting logic of common faults (such as cold solder joints, short circuits, poor contact) after PCB soldering, and master the basic principles of functional verification of the intelligent tracking car control board. ● **Skill：** 1. Possess proficient practical skills in using JLCPCB EDA software, and be able to independently complete the entire process of schematic design, including component library calling, component placement and editing, schematic drawing and inspection, netlist generation and import. 2. Master the core practical skills of PCB design, and be able to complete the entire process of PCB design based on the imported netlist, including PCB board frame definition, component layout (reasonably planning functional areas and optimizing component placement), routing (following routing rules and achieving signal integrity), copper laying and division, DRC rule setting and error troubleshooting. 3. Possess special design skills for the intelligent tracking car control board, and be able to independently complete the schematic drawing and PCB layout & routing of the control board, accurately realize the interface connection between the single-chip microcomputer and external devices such as sensors, motor drive modules and power supply modules, and ensure the integrity of circuit functions and rationality of design. 4. Possess skills in PCB design file output and manufacturing docking, be able to correctly generate Gerber files, BOM lists and other files required for PCB manufacturing, and be familiar with the basic process and file requirements for docking with PCB manufacturers. 5. Possess basic PCB soldering and debugging skills, be able to complete the soldering of components on the intelligent tracking car control board, use instruments such as multimeters and oscilloscopes for circuit continuity detection, voltage measurement and basic function debugging, and troubleshoot simple soldering faults and circuit problems. ● **Competence：** 1. Cultivate engineering practice and system design capabilities, be able to deeply integrate electronic circuit theoretical knowledge with PCB design practice, start from the functional requirements of the intelligent tracking car, complete the entire engineering practice process of "demand analysis — schematic design — PCB design — board manufacturing and soldering — functional verification", and form a complete electronic circuit design thinking. 2. Improve problem-solving and design optimization capabilities, be able to independently analyze and solve problems such as software operation errors, DRC errors, circuit short circuits, and functional failures during

	schematic drawing, PCB layout and routing, and soldering and debugging; be able to optimize the PCB design scheme based on requirements such as electromagnetic compatibility and power integrity, so as to improve circuit stability and reliability. 3. Enhance software application and independent learning capabilities, be able to quickly master the core functions of JLCPCB EDA software and adapt to the operation logic of EDA tools; be able to actively learn advanced knowledge of PCB design (such as multi-layer board design, high-speed signal routing) to meet the design needs of electronic circuits with different complexities. 4. Strengthen team collaboration and communication capabilities; if involved in group training tasks, be able to clarify the division of labor with team members (such as schematic design, PCB layout, soldering and debugging), cooperate efficiently, and jointly promote the control board design and production tasks; be able to clearly and accurately report the design progress, technical difficulties and solutions to the instructor, so as to improve technical expression and communication efficiency. 5. Cultivate a rigorous engineering attitude and sense of responsibility, strictly follow engineering specifications during the design process, and attach importance to design details and board manufacturing process requirements; develop the habit of careful operation and standardized recording during soldering and debugging, establish a sense of responsibility for design results, and lay a foundation for subsequent engineering practice and career development.
Content	**I. Training Preparation and Theoretical Basis** 1. Training Cognition and Safety: Clarify the training objectives, processes and assessment requirements; learn safety specifications such as soldering, instrument use and electrostatic protection. 2. PCB Design Foundation: Explain the concept, structure, classification and board manufacturing process of PCB; sort out the connection between schematic diagram and PCB design, and introduce the core design principles. 3. JLCPCB EDA Cognition: Introduce the software interface, core functional modules and basic operation logic. **II. Phase 1: Designated Task Learning (EDA Foundation and Specifications)** 1. Schematic Drawing: Learn the core operations of EDA schematic diagrams (component calling, wiring, ERC check, etc.); complete the

	drawing of designated basic circuit schematic diagrams and generate netlists. 2. PCB Drawing: Learn the core operations of EDA PCB design (board frame definition, layout, routing, etc.); complete the designated PCB design, pass the DRC check, and generate qualified PCB files. 3. File Output: Learn the specifications for generating Gerber files and BOM lists, and complete the output of designated task files. **III. Phase 2: Comprehensive Practice of Simple Topics (Independent Consolidation)** 1. Topic Assignment: Provide 2-3 simple design topics (such as LED running lights, simple temperature measurement circuits) and clarify the functional requirements. 2. Independent Design: Complete demand analysis and scheme design; finish the entire process of schematic diagram, PCB design and file output, and write a brief design description. 3. Exchange and Comment: Share the achievements; the teacher comments on the rationality and standardization of the design and sorts out the improvement directions. **IV. Phase 3: Design and Production of Intelligent Tracking Car Control Board (Comprehensive Application)** 1. Scheme Planning: Analyze the core functions of the control board (single-chip microcomputer minimum system, sensor/motor interface, etc.); complete the architecture design, component selection and system block diagram drawing. 2. Full-Process Design: Complete the control board schematic drawing (ERC check) and PCB layout & routing (DRC check); generate Gerber files and BOM lists after design optimization, and submit them for board manufacturing. 3. Soldering and Verification: Complete the soldering of components; troubleshoot faults through instrument debugging; test the core functions of the control board after assembly. **Practical Teaching (40 Class Hours; 50 Self-Study Hours)** 1. Basic Practice (15 Class Hours; 5 Self-Study Hours); 2. Design Training (10 Class Hours; 15 Self-Study Hours); 3. Comprehensive Design (15 Class Hours; 30 Self-Study Hours).

Examination forms	Internship Report
Study and examination Requirements	● If a student has any of the following situations during the internship, the overall score will be failing: being absent from class without reason for 1 day or more, failing to submit or submitting the internship report late without reason, plagiarizing achievements, etc. ● The overall score assessment includes process assessment (40%) and achievement assessment (60%).
Reading list	References [1] Zhong S D. Quick Start to Circuit Design and Manufacturing with JLCPCB EDA (Professional Edition). Publishing House of Electronics Industry, 2024. [2] Fan Q. Practical Guide to Electronic Design with JLCPCB EDA Professional Edition. Publishing House of Electronics Industry, 2019.
Data of last mendment	June 29, 2025

Comprehensive Training in Signal and Image Processing

Module designation	Comprehensive Training in Signal and Image Processing
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Ni Hongxia
Language	Chinese
Relation to curriculum	Professional Compulsory Practical Course
Teaching methods	Teaching Methods: Lecturing, Discussion, Guidance and Q&A, Student Self-study, Report Target Students: Students majoring in Electronic Information Engineering Teaching Type: Practical Teaching
Workload (incl. contact hours, self-study hours)	Total Workload = 180, including: Theoretical Hours = 80, Self-study Hours = 100
Credit points（ECTS）	ECTS Credit=6.0
Required and recommended prerequisites for joining the module	All Basic and Professional Courses of Electronic Information Category
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge）：** 1. Systematically integrate the core knowledge of Electronic Information Engineering major, and clarify the connection and application logic of professional knowledge such as Signals and Systems, Digital Signal Processing, Digital Image Processing, and Communication Principles in the field of signal processing. 2. Memorize the basic processes and technical specifications of signal acquisition, conversion, encoding, and image acquisition and processing; understand the core logic of mathematical modeling of signal and image data, as well as the basic theories of algorithm simulation and system debugging. 3. Distinguish the applicable scenarios, advantages and disadvantages of different signal processing algorithms and modulation/demodulation technologies. 4. List the new technologies and new equipment types in the field of signal and image processing, as well as the use methods of literature retrieval tools. ● **Skill：**

	1. Use simulation software such as MATLAB to complete the design and verification of algorithms such as signal filtering, modulation and demodulation, and image recognition. 2. Use assembly language or C language for modular programming, and draw the system main flow chart and subroutine flow chart. 3. Conduct Chinese and foreign literature retrieval, screen materials related to the design topic, and assist in scheme demonstration and selection. 4. Write a standardized training report to present the design scheme, process and results. ● Competence： 1. Cultivate the ability of comprehensive knowledge application and engineering practice, be able to integrate scattered professional knowledge into practical project development, and realize the in-depth integration of theory and practice. 2. Improve the ability of problem-solving and innovative thinking, be able to independently analyze and explore solutions for technical difficulties in project development, and try scheme optimization and function expansion within the specification scope. Collaborate to complete team projects, coordinate the division of labor among team members, and play their own roles to promote the progress of tasks. Enhance team collaboration and communication skills, be able to clarify the division of labor, cooperate efficiently in group work, clearly report project progress and technical points, and improve the efficiency of technical communication. 4. Analyze actual engineering needs, decompose complex problems, compare multiple algorithm schemes and demonstrate the optimal choice. Design the software and hardware scheme of the signal and image processing system, combine new technologies to optimize the design, and achieve innovative breakthroughs.
Content	This training takes "algorithm-driven, simulation verification, and system integration" as the core. Through the full-process development of projects related to signal and image processing, it realizes the comprehensive application of professional knowledge such as signal processing, image processing, and programming simulation, laying a solid foundation for graduation design and engineering employment. The specific content is promoted according to the project development stage as follows: **I. Training Preparation and Topic Selection Planning Stage** 1. Training Cognition and Task Clarification: Explain the training objectives, processes and assessment requirements; sort out typical project types of signal and image processing, including voice signal filtering, modulation and demodulation systems, digital image

	recognition, etc. Clarify the topic selection scope and functional boundaries of the designated project task book or self-selected project; self-selected topics must be reviewed and confirmed by the instructor. 2. Knowledge Sorting and Scheme Preparation: Guide students to integrate core professional knowledge such as Signals and Systems, Digital Signal Processing, Image Processing, and Programming Design, and clarify the application scenarios of each knowledge module in the project. Learn project demand analysis and literature retrieval methods, complete the demand decomposition of the selected project, and clarify the functional indicators, performance requirements and implementation difficulties. 3. Project Scheme Design: Students independently complete the project scheme demonstration and propose two or more algorithm schemes. Determine the overall system architecture and plan the composition of core modules, including signal acquisition module, algorithm processing module, simulation verification module, etc. Write a scheme design specification, draw a system scheme block diagram, and submit it to the instructor for review. **II. Algorithm Research and Design Stage** 1. Algorithm Research and Simulation Verification: Conduct research on core algorithms for the selected project, including FFT spectrum analysis of voice signals, FIR/IIR filter design, modulation and demodulation algorithms, image recognition model construction, etc. Use simulation software such as MATLAB to complete algorithm modeling and simulation, generate simulation waveforms and data, and verify the feasibility and effectiveness of the algorithm. 2. Software Design and Development: Adopt assembly language or C language for modular program design, and complete the writing of core function codes such as signal/image data reading, algorithm logic implementation, and result output. Draw the main flow chart and main subroutine flow chart to ensure clear code structure and rigorous logic, and complete unit module debugging. 3. Hardware Design (Optional): For projects requiring hardware support, complete the drawing of the system hardware schematic diagram and determine the selection of core components, including processors, sensors, data acquisition cards, etc. Conduct functional division and interface design of the hardware circuit to ensure the compatibility between the hardware module and the software algorithm. **III. Experiment and Test Stage** 1. Algorithm Simulation and Verification: Build a verification environment based on simulation software such as MATLAB to independently test the designed core algorithms such as signal filtering, modulation and demodulation, and image recognition. Input

	standard test data sets or analog signals, output algorithm processing results, verify the logical correctness and functional effectiveness of the algorithm, and locate and solve problems such as insufficient algorithm accuracy and low operation efficiency. System Comprehensive Joint Debugging: 2. Functional Integrity Test: Conduct a comprehensive test of various system functions according to the project demand indicators, including signal filtering effect, modulation and demodulation success rate, image recognition accuracy, etc. Compare the simulation data with the measured data, analyze the source of errors, iteratively optimize algorithm parameters and program logic, and ensure the system has complete functions and stable operation. 3. Multi-scenario Adaptability Verification: Simulate complex scenarios in practical applications to carry out tests; adjust the noise intensity in voice signal processing to test the robustness of the filter; input images of different clarity and angles in image recognition to verify the generalization ability of the model. Conduct quantitative analysis on the test results, generate data reports and comparison charts, optimize the algorithm design for the system performance shortcomings, and improve the efficiency and accuracy of signal and image processing. **IV. Report Writing and Defense Presentation Stage** Training Report Writing: Organize complete materials of the whole project development process and write the practical training report in accordance with the specifications. The report shall include the cover, design assignment, table of contents, main body, summary, references, appendices and other parts. The main body includes the purpose and significance of the training, system scheme design, software and hardware implementation, debugging and result analysis, etc. It shall be handwritten with a word count of 3,000–5,000 words. Results Sorting and Filing: Submit complete technical materials, including scheme design specifications, program code lists, hardware schematics, simulation screenshots, test data records, etc. File all training results as required to ensure complete and traceable documentation. Defense and Exchange: Organize a practical training defense. Students report the project development process, key technical points, innovations and practical gains. Answer questions raised by instructors on site and clearly explain the design ideas and rationality of the scheme. Carry out teacher-student exchanges and comments, summarize common problems and improvement directions in the training, and strengthen the training effect. **Practical Teaching (80 class hours; 100 self-study hours)** 1. Topic Analysis and Scheme Selection (10 class hours; 10 self-study hours);

	2. Algorithm Research (40 class hours; 50 self-study hours); 3. Experiment and Verification Stage (30 class hours; 40 self-study hours).
Examination forms	Internship Report
Study and examination Requirements	● Any of the following circumstances during the internship will result in a failing overall assessment: unauthorised absence of one day or more, failure to submit or late submission of the internship report without justification, or evidence of plagiarism in the deliverables. ● The overall assessment comprises a process evaluation (50%) and an outcome evaluation (50%).
Reading list	1. References [1] Zhang Hong, et al. Digital Image Processing (3rd Edition). China Machine Press, 2020.2. [2] Hu Qiming, et al. Digital Image Processing Technology and Practice. Publishing House of Electronics Industry, 2024.12. [3] Liu Huazhang, et al. Digital Signal Processing Training. Sun Yat-sen University Press, 2022.03. [4] Rafael C. Gonzalez, et al. Digital Image Processing (4th Edition, English Version). 2024.12.
Data of last mendment	June 29, 2025

Comprehensive Practice of Intelligent Hardware

Module designation	Comprehensive Practice of Intelligent Hardware
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Jiang Hang
Language	Chinese
Relation to curriculum	Professional Compulsory Practical Course
Teaching methods	Teaching Methods: Lecturing Method, Discussion Method, Guidance and Q&A, Student Self-study, Operation and Debugging . Target Students: Students majoring in Electronic Information Engineering Teaching Type: Practical Teaching
Workload (incl. contact hours, self-study hours)	Total Workload = 270, including: Theoretical Class Hours = 120, Self-study Class Hours = 150
Credit points（ECTS）	ECTS Credit=9.0
Required and recommended prerequisites for joining the module	All basic and professional courses of Electronic Information category
Module objectives/ intended learning outcomes	**Learning outcomes:** ● Knowledge： 1. Systematically integrate the core knowledge of Electronic Information Engineering, and clarify the connection and application logic of professional knowledge such as single-chip microcomputer principle, digital/analog circuits, signal processing, sensor technology, and communication interfaces in intelligent hardware systems. 2. Master the architecture design knowledge of intelligent hardware systems, and understand the composition principles and collaborative working mechanisms of core modules (control module, sensing module, execution module, communication module, power supply module). 3. Understand the complete process of intelligent hardware project development, be familiar with the engineering logic of requirement analysis, scheme design, software and hardware implementation, debugging and optimization, function verification, and know the relevant technical specifications and engineering ethics requirements. 4. Master the specialized knowledge of the selected practical training project (designated/self-selected), including the basis for core device selection, the design principles and applicable scenarios of key technical schemes. ● Skill：

	1. Possess the full-process development skills of intelligent hardware systems, and be able to independently complete project requirement decomposition, scheme demonstration, core device selection and system block diagram design. 2. Proficiency in using professional tools to complete software and hardware implementation, including using EDA software to draw circuit schematics and PCB diagrams, conducting embedded program development and debugging, and completing hardware soldering and assembly. 3. Possess system debugging and fault troubleshooting skills, be able to use instruments such as multimeters and oscilloscopes to detect the performance of hardware circuits, and locate and solve common problems in the collaborative work of software and hardware. 4. Possess standardized technical document writing skills, be able to completely record the project development process, and write a practical report including design ideas, implementation steps and test results. ● Competence： 1. Cultivate the ability of comprehensive knowledge application and engineering practice, integrate scattered professional knowledge into practical project development, and realize in-depth integration of theory and practice. 2. Improve problem-solving and innovative thinking abilities, independently analyze and explore solutions for technical difficulties in project development, and attempt scheme optimization and function expansion within specifications. 3. Enhance teamwork and communication skills, clarify division of labor and cooperate efficiently in group work, clearly report project progress and technical points, and improve the efficiency of technical communication. 4. Strengthen autonomous learning and professional adaptability, proactively learn new technologies and tools in the field of intelligent hardware, develop a rigorous engineering attitude, and lay a solid foundation for graduation design and career development.
Content	This practice takes "project-driven, knowledge integration, and practical implementation" as the core. Through the full-process development of designated or self-selected electronic information hardware projects, it realizes the comprehensive application of professional knowledge and lays a solid foundation for graduation design and employment. The specific content is promoted according to the project development stage as follows: **I. Practice Preparation and Project Planning Stage** 1. Practice Cognition and Task Clarification: Explain the practice objectives, processes and assessment requirements; sort out typical

	types of electronic information hardware projects (such as intelligent monitoring terminals, Internet of Things control devices, embedded application systems, etc.), and clarify the topic selection scope and functional boundaries of the designated project task book or self-selected project. 2. Knowledge Sorting and Scheme Preparation: Guide students to integrate core professional knowledge such as single-chip microcomputer principle, digital and analog circuits, sensor technology, and communication interfaces, and clarify the application scenarios of each knowledge module in the project; learn project requirement analysis methods, complete the requirement decomposition of the selected project, and clarify the functional indicators, performance requirements and implementation difficulties. 3. Project Scheme Design: Students complete the project scheme demonstration in groups or independently, determine the overall system architecture, and plan the composition of core modules (control module, sensing module, execution module, etc.); select core components (such as single-chip microcomputers, sensors, communication modules), write a scheme design specification, draw a system block diagram, and submit it to the instructor for review. **II. Software and Hardware Design and Implementation Stage** 1. Hardware Design and Production: Use EDA software to complete circuit schematic design, focusing on correct connection of each module interface and stable design of power supply circuit. After correcting errors through Electrical Rule Check (ERC), perform PCB layout and routing, optimize circuit performance and installation adaptability, generate Gerber files and submit for board production. Collect components to complete PCB soldering and assembly, ensuring the soldering quality meets requirements. 2. Software Design and Development: Conduct embedded program architecture design based on the selected microcontroller or control chip. Use programming tools to complete core function code development, including sensor data acquisition, actuator control logic, communication protocol implementation, human-computer interaction (if any) and other modules. Finish code debugging to ensure independent implementation of each software module function. 3. Preparation for Software and Hardware Joint Debugging: Build a debugging environment, connect hardware circuits and development tools, complete program downloading and initial configuration. Check the continuity of hardware circuits, power supply stability and working status of core devices to eliminate basic faults for software and hardware joint debugging. **III. Debugging, Optimization and Function Verification Stage** 1. Software and Hardware Joint Debugging: Conduct system joint

	debugging, gradually verify the collaborative working performance of each functional module, locate and solve common problems in software and hardware interaction (such as sensor data distortion, abnormal actuator response, unstable communication link, etc.); use instruments such as multimeters and oscilloscopes to detect circuit signals and system performance, and optimize program logic and hardware parameters. 2. Functional Integrity Verification: According to the project requirement indicators, comprehensively test various system functions, including the realization of core functions, the compliance of performance parameters, environmental adaptability (such as voltage fluctuation, temperature change), etc.; for defects found in the test, iteratively optimize the software and hardware design scheme to ensure the system has complete functions and stable operation. 3. Detail Optimization and Reliability Improvement: Optimize key performances such as system power consumption and response speed; improve hardware protection design (such as anti-static, anti-short circuit) and software fault-tolerant mechanism to enhance system operation reliability; add necessary labels (such as silk screen, interface marking) to improve product practicality. IV. Summary, Filing and Achievement Display Stage 1. Practice Summary Writing: Organize the full-process data of project development and write a practice summary report, which includes project requirements, scheme design, software and hardware implementation process, debugging and optimization details, problem-solving methods, function verification results, as well as practice gains and experiences. 2. Achievement Sorting and Filing: Submit complete technical materials, including scheme design specifications, circuit schematics, PCB files, program codes, test data records, etc.; sort out achievements such as project physical objects and function demonstration videos, and file them in a standardized manner as required. 3. Achievement Display and Exchange: Organize a project achievement exhibition, where students report the project development process, key technical points and innovations; carry out exchanges and comments among groups, and instructors summarize common problems and improvement directions in practice to strengthen the practice effect. Practical Teaching (120 class hours; 150 self-study hours) 1. Topic Analysis and Scheme Selection (10 class hours; 10 self-study hours); 2. System Design and Production (50 class hours; 60 self-study hours); 3. System Comprehensive Debugging (60 class hours; 80 self-study hours).

Examination forms	Internship Report
Study and examination Requirements	● If any of the following situations occurs during the internship, the overall score will be unsatisfactory: being absent from class without reason for 1 day or more, failing to submit or submitting the internship report late without reason, plagiarism in achievements, etc. ● The overall score assessment includes process assessment (40%) and achievement assessment (60%).
Reading list	1. References [1] Zhang Weifeng. Electronic Product Development and Production. Xidian University Press, 2020.4. [2] Huang Keya. ARM Cortex-M3 Embedded Principles and Applications. Tsinghua University Press, 2020.1. [3] He Jingkai. Single-Chip Microcomputer System Design, Simulation and Applications. Xidian University Press, 2018.5.
Data of last mendment	June 29, 2025

Professional Cognition Practice

Module designation	Professional Cognition Practice
Semester(s) in which the module is taught	3th semester
Person responsible for the module	Jiang hang
Language	Chinese
Relation to curriculum	Professional Compulsory Practical Course
Teaching methods	Teaching Methods: Lecturing Method, Discussion Method, Guidance and Q&A, Student Self-study, Report Completion Target Students: Students majoring in Electronic Information Engineering Teaching Type: Practical Teaching
Workload (incl. contact hours, self-study hours)	Total Workload = 45, including: Theoretical Class Hours = 20, Self-study Class Hours = 25.
Credit points	ECTS Credit=1.5
Required and recommended prerequisites for joining the module	Circuit Theory
Module objectives/ intended learning outcomes	Learning outcomes: ● Knowledge： 1. Systematically understand the core connotation, research scope and development trend of the Electronic Information Engineering major, clarify the corresponding relationship between the professional knowledge system and industrial applications, and comprehend the core role of electronic information technology in fields such as communication, intelligent control, Internet of Things, and integrated circuits. 2. Master the basic principles of key technologies in the electronic information field, including the application scenarios and implementation logic of core knowledge such as signal generation and processing, information transmission and reception, embedded system architecture, digital circuit design, and sensor technology. 3. Know the relevant industry standards, technical specifications and quality requirements of Electronic Information Engineering, and initially understand the importance of intellectual property rights and engineering ethics in professional practice. ● Skill： 1. Possess the basic skills to identify the core components of electronic information systems, be able to distinguish various key components such as sensors, processors, memories, and communication modules,

	and initially understand their selection basis and application scenarios. 2. Initially master the operation methods of equipment and systems related to Electronic Information Engineering, including the use of basic measuring instruments (oscilloscopes, multimeters, signal generators), the debugging process of simple embedded systems, and the functional testing of communication terminal equipment and other basic practical skills. 3. Learn to collect and sort out technical data and industry reports in the electronic information field, and be able to extract core technical parameters and application points through enterprise research, equipment observation, technical document study and other methods, and form standardized internship records and data summaries. ● Competence： 1. Improve communication and teamwork abilities. Through group research and enterprise communication activities, learn to express questions and opinions clearly, communicate effectively with classmates and enterprise technicians, and complete internship tasks and research reports collaboratively. 2. Enhance independent learning and information screening abilities. In the face of rapidly iterating technologies and industrial trends in the electronic information field, take the initiative to explore unknown knowledge, accurately screen valuable information, and form a preliminary ability to update the knowledge system independently. 3. Cultivate career planning and problem inquiry awareness. Understand enterprise post settings, career development paths and competency requirements to clarify personal learning directions and key improvement areas; propose preliminary inquiry ideas and solutions for technical or engineering problems found during the internship.
Content	1. Study the Introduction to Electronic Information Engineering. Students will be able to grasp the main learning contents and characteristics of the major, master the requirements for knowledge, abilities and skills of the major, and understand the major they are studying and the work field they will engage in in the future. 2. Study the history of electronic information technology development. Students will be able to understand the current development status, development direction, development trends and research hotspots of the electronic information field at home and abroad. 3. Visit and practice in the Electronic Information Comprehensive Laboratory, and conduct simple electronic product soldering and production. Introduction to professional laboratories, main instruments and equipment, laboratory opening requirements, etc.; solder and produce simple electronic products (two-color flashing

	lights). 4. Special lecture on innovation and entrepreneurship to understand innovation and entrepreneurship methods. 5. Interpretation of the professional talent training program to understand the professional training objectives and graduation requirements. 6. Visit and practice in off-campus internship bases. 1) Understand the development direction and technical application fields of the major through on-site internships or online lectures; 2) Understand the production factors of enterprises such as products, production capacity, cost and safety through on-site observation and consultation; 3) Understand the organizational structure and management procedures of enterprise production, as well as the production, processing and manufacturing processes of enterprise electronic products through on-site visits or online lectures. Practical Teaching (20 class hours; 25 self-study hours) 1. Internship Lectures; (8 class hours; 10 self-study hours) 2. Production Enterprise Internship; (4 class hours; 5 self-study hours) 3. Electronic Product Production. (8 class hours; 10 self-study hours)
Examination forms	Internship Report
Study and examination Requirements	● If any of the following situations occurs during the internship, the overall score will be unsatisfactory: being absent from the internship without reason for 1 day or more, failing to submit or submitting the internship report late without reason, plagiarism in achievements, etc. ● The overall score assessment includes process assessment (40%) and achievement assessment (60%).
Reading list	1. References [1] Yang Jie. Introduction to Electronic Information Engineering (3rd Edition). Publishing House of Electronics Industry, 2020.01. [2] Ye Shujiang. Introduction to Electronic Information Engineering. China Electric Power Press, 2016.06. [3] Tushuobang. Electronic Components from Zero Basics to Practice. Water Resources and Electric Power Press, 2024.10. [4] Han Guangxing. Identification, Testing and Soldering of Electronic Components. Publishing House of Electronics Industry, 2012.08.
Data of last mendment	June 29, 2025

University Physical Education and Health

Module designation	University Physical Education and Health
Semester(s) in which the module is taught	1-4 th semester
Person responsible for the module	Department of Physical Education
Language	Chinese
Relation to curriculum	School physical education is an important part of school education. The Physical Education and Health Course is based on modern educational theories, in accordance with the principles of human biology and the laws of educational psychology, to conduct physical education and health education for college students. In teaching, we cultivate students' interest in learning physical education, enable students to master the basic methods of physical exercise through reasonable and scientific physical education and exercise means, develop students' habit of lifelong physical exercise, and complete the quality-oriented education in physical education teaching, namely: the cultivation of students' behavioral literacy, mental health education, physical health education, and sports practice education, so as to cultivate students into qualified talents who are fully developed morally, intellectually and physically and meet the needs of socialist modernization.
Teaching methods	1. Lecture method 2. Case method 3. Discussion method 4. Blended teaching method
Workload (incl.contact hours，self-study hours)	Total workload = 128 hours Teach Class=128 Self Study Hour=0
Credit points（ECTS）	ECTS Credit=4
Required and recommended prerequisites for joining the module	NO
Module objectives/ intended learning outcomes	Goals of sports skills, physical and mental health: Students shall basically master the basic knowledge, techniques and skills of the selected sports, and improve their sports performance. They shall correctly evaluate and test their physical fitness and health status, develop a positive and progressive attitude toward life, regulate their emotions with appropriate methods, actively adjust and improve their psychological state, and experience the joy and sense of success in physical exercise. Enable students to establish the concept of "health first", cultivate lifelong sports awareness, formulate feasible personal physical exercise plans, and possess a certain ability to appreciate sports culture.

	Cultivate good sports ethics and the spirit of unity, cooperation and mutual assistance; foster a positive and enterprising attitude toward life; teach students how to conduct themselves and handle the relationship between competition and cooperation properly, so as to enhance their ability to adapt to social life.
Content	Elective Physical Education and Health Course (compulsory) is offered in the first and second academic years (Semesters 1, 2, 3 and 4). The course content is designed based on students' interests and hobbies in sports, to help them develop the habit of physical exercise and further improve their sports skills. According to the basic facilities of our college, elective courses are provided in the following sports: basketball, volleyball, football, table tennis, badminton, tennis, softball, taekwondo, Tai Chi, aerobics, yoga, outward bound, orienteering, radio direction finding, track and field, swimming, skating, fancy rope skipping and other events. Students are enabled to master one or two lifelong physical exercise methods. Theoretical teaching and practical teaching are integrated. Teaching competitions and referee internships are organized.
Examination forms	The course assessment aims mainly to evaluate the achievement of students' ability development objectives, including physical education theory, physical fitness assessment, attendance and performance, elective courses, and physical fitness test courses. Accordingly, the overall course score is weighted by physical education theory, physical fitness assessment, attendance and performance, elective courses and characteristic courses, and a comprehensive scoring method is adopted to evaluate students' PE performance.
Study and examination Requirements	The course assessment aims mainly to evaluate the achievement of students' ability development objectives, including physical education theory, physical fitness assessment, attendance and performance, elective courses and physical fitness test courses. Accordingly, the overall course score is weighted by physical education theory, physical fitness assessment, attendance and performance, elective courses and characteristic courses. A comprehensive scoring method is adopted to evaluate students' PE performance. The specific methods are as follows (PE score is based on a 100-point scale): 1. Classroom performance and attendance account for 30% of the total PE score. 0–5 points will be deducted per class according to classroom performance and attendance. 2. Physical fitness assessment accounts for 20% of the total PE score: 1000 meters for male students and 800 meters for female students. Scores are calculated and proportionally determined based on test results. 3. Elective course score accounts for 30% of the total PE score. Students are required to master certain sports skills of the elective

	course, and the score is determined by test performance. 4. PE theory accounts for 20% of the total PE score, converted from PE theory assignment results. 5. Students must take all required examinations before their score can be assessed. Those who are unfit to take certain examinations due to health reasons must provide a medical certificate. The instructor shall submit an application, and the postponement of assessment is approved only by the Department of Physical Education. 6. Students found cheating or violating discipline during the assessment will receive a score of 0 for PE in the current semester. The case will be reported to the university, and corresponding disciplinary sanctions will be imposed.
Reading list	Hu, Weidong, and Zhenjun Xu. College Physical Education and Health. Beijing Sport University Press, 2021.
Data of last mendment	June 29, 2025

Military Theory

Module designation	Military Theory
Semester(s) in which the module is taught	1th semester
Person responsible for the module	Yang Xiukun
Language	Chinese
Relation to curriculum	Theoretical Military Education is integrated into the talent training system of ordinary institutions of higher education, included in the school's talent training program and teaching plan, and managed under a credit system. The course assessment results shall be recorded in the student's academic files. Teaching shall be conducted in accordance with the requirements of the Teaching Outline for Military Courses in Ordinary Institutions of Higher Education, and the attendance and assessment system shall be strictly enforced. The Theoretical Military Education course consists of 36 class hours, carrying 1 credit. In addition to completing the required class hours, the teaching content and effectiveness shall be continuously extended and enhanced through the offering of elective courses, organization of lectures, and conduct of regular national defense education activities. Through the teaching, students shall be enabled to establish a correct outlook on life and the world, possess good humanistic knowledge and moral cultivation, understand the national conditions, comprehend the core socialist values, and develop a sense of social responsibility.
Teaching methods	1. Lecture method
Workload (incl.contact hours，self-study hours)	Total workload = 36 hours Contact hours=36 hours Self Study Hours=0
Credit points（ECTS）	ECTS Credit=1.0
Required and recommended prerequisites for joining the module	
Module objectives/ intended learning outcomes	**Learning outcomes:** ● **Knowledge：** The Military Theory course shall be guided by Xi Jinping's Thought on Strengthening the Military and General Secretary Xi Jinping's important expositions on education. It shall fully implement the Party's education policy, the military strategic guidelines for the new era, and a holistic approach to national security. Centering on the fundamental task of fostering virtue through

	education and the basic requirements of the goal of strengthening the military, and focusing on cultivating and practicing core socialist values, the course prioritizes enhancing students' national defense awareness and military literacy, so as to serve the implementation of the military-civilian integration development strategy and the development of national defense reserve forces. ● **Skill：** It enables students to understand and master basic military knowledge and military science and technology knowledge, learn about the history, current situation and development direction of the national defense science, technology and industry, enhance their national defense awareness, national security awareness and sense of crisis and hardship, promote the spirit of patriotism, inherit the red gene, improve their comprehensive national defense quality, strengthen their sense of responsibility and mission to love the national defense, fulfill the military service obligations entrusted by law, and lay a foundation for cultivating reserve officers and making them high-quality socialist builders and defenders. ● **Competence：** Have a sense of teamwork, be able to communicate effectively and collaborate with members of other disciplines, and be capable of working independently or in teams to carry out tasks.
Content	**Part B.Theoretical teaching(36 contact hours; 0 self-study hours)** **Chapter 1 China's National Defense** **(10contact hours; 0 self-study hours)** (1) Overview of China's National Defense: connotation of national defense, types of national defense, national defense history and enlightenment, modern view of national defense (2) National Defense Laws and Regulations: national defense legal system, citizens' rights and obligations in national defense (3) National Defense Development: national defense system, national defense strategy, national defense policy, achievements in national defense, military-civilian integration (4) Armed Forces: nature, purpose and mission of China's armed forces, composition of armed forces, and development history of the people's army (5) National Defense Mobilization: connotation of national defense mobilization, main contents and significance of national defense mobilization **Chapter 2 National Security** **(10contact hours; 0 self-study hours)** (1) Overview of National Security: connotation and principles of national security, holistic view of national security (2) National Security Situation: basic overview of China's geographical environment, geo- security, national security under the new situation,

	national security in emerging fields (3) International Strategic Situation: current status and development trends of the international strategic landscape, military strength and strategic trends of major world powers **Chapter 3 Military Thought** **(8 contact hours; 0 self-study hours)** (1) Overview of Military Thought: connotation, development process, status and role of military thought (2) Foreign Military Thought: main content, characteristics and representative works of foreign military thought (3) Ancient Chinese Military Thought: main content, characteristics and representative works of ancient Chinese military thought (4) Contemporary Chinese Military Thought: Mao Zedong Military Thought, Deng Xiaoping Thinking on Army Building in the New Era, Jiang Zemin Thinking on National Defense and Army Building, Hu Jintao Thinking on National Defense and Army Building, Xi Jinping Thought on Strengthening the Military **Chapter 4 Modern Warfare** **(4 contact hours; 0 self-study hours)** (1) Overview of War: connotation, characteristics and development process of war (2) New Military Revolution: connotation, evolution and main contents of the new military revolution (3) Mechanized Warfare: basic connotation, main forms, characteristics and typical cases of mechanized warfare (4) Informationized Warfare: basic connotation, main forms, characteristics, typical cases of informationized warfare, and development trends of war forms **Chapter 5 Informationized Equipment** **(4 contact hours; 0 self-study hours)** (1) Overview of Informationized Equipment: concepts, categories and development trends (2) Informationized Combat Platforms: concepts and characteristics (3) Informationized Lethal Weapons: computer network weapons
Examination forms	Open-book written examination.
Study and examination Requirements	●Students should attend classes on time. Being late, leaving early or unapproved absence is not allowed. ●Assessment method for this course: Attendance: 30% Written examination score: 70%
Reading list	[1] Qinfa Xu, Xiukun Yang, Shujiao (Eds.). College Students' Military Course Tutorial (1st ed.). University of Electronic Science and Technology of China Press, 2020.
Data of last mendment	June 29, 2025

Production Practice

Module designation	**Production Practice**
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	Jiang hang
Language	Chinese
Relation to curriculum	"Enterprise Production Practice" is one of the compulsory intensive engineering practice courses for the Electronic Information Engineering major. It is a comprehensive engineering practice module taken after students complete all theoretical courses and on-campus practical teaching. Through the whole process of on-the-job practice in enterprises, students integrate the core theoretical knowledge of Electronic Information Engineering with practical engineering applications, master the development, design and production processes of electronic information technology, become familiar with enterprise production and operation management, safety assurance systems and industry development demands. This course deepens students' understanding of the engineering application of theoretical knowledge, cultivates core competencies such as engineering practice, teamwork, problem-solving and professional literacy, and lays a solid practical foundation for graduation projects and engineering employment.
Teaching methods	On-the-job Enterprise Internship ,On-site Guidance Method ,University-Enterprise Joint Guidance Method ,Seminar Method,Report Writing Guidance Method,Defense Comment and Evaluation Method
Workload (incl. contact hours, self-study hours	Total workload = 270 hours Contact hours = 120 hours Self-study hours = 150 hours
Credit points	ECTS Credit=9.0
Required and recommended prerequisites for joining the module	Basic and Professional Courses for Electronic Information Engineering
Module objectives/ intended learning	Learning outcomes ● Knowledge：

outcomes	1. Master the development, design and production processes of electronic information technology, and be familiar with the core procedures and technical specifications for the formulation, implementation and safety assurance of enterprise production plans. 2. Understand the operating procedures of electronic instruments and equipment, accident diagnosis and emergency response methods, and clarify the demand for technological innovation in electronic systems/equipment as well as the industry development trend of the electronic information major. 3. Master the technical standards, industrial policies and intellectual property requirements related to the development and production of electronic information products, and understand the inherent relationship between engineering activities and social culture, environmental protection and sustainable development. ● Skill： 1. Be able to investigate and analyze solutions to complex engineering problems in the electronic information field, independently collect on-site technical data from enterprises, and propose reasonable technical improvement plans. 2. Be able to write internship reports in accordance with standard requirements, express professional viewpoints accurately through oral presentations, written documents, charts and other forms, respond to questions, and complete the internship defense. 3. Be able to apply professional knowledge to analyze the sustainability of enterprise production processes, and scientifically evaluate the potential impacts and safety hazards of production activities on operators and the surrounding environment. ● Competence ： 1. Be able to reasonably evaluate the impact of enterprise production processes on society, health, safety, law and culture, establish a sense of engineering social responsibility, and consciously abide by post professional requirements and engineering ethics norms. 2. Be able to assume the role of individual, team member or person in charge in an internship team with a multidisciplinary background, effectively organize and coordinate team work, and achieve efficient communication and cooperation. 3. Be able to deeply integrate the theoretical knowledge of the electronic information major with the actual enterprise engineering, and cultivate the engineering practice ability and innovative thinking of independently analyzing and solving problems. 4. Be able to carry out research and analysis in combination with

	the actual needs of enterprises, sort out effective materials and formulate reasonable directions for the graduation project, so as to realize the effective connection between the internship and the graduation project.
Content	A. Practical Teaching(120 contact hours; 150 self-study hours) Taking on-the-job practice in enterprises, university-enterprise collaboration, integration of knowledge and practice, and connection between posts and courses as the core, this internship is carried out in three stages, covering the requirements of the entire internship process. The class hour allocation for each stage is as follows: 1. Internship Preparation and Safety Education Training (10 contact hours; 10 self-study hours) The enterprise's safety specialist engineer will give lectures on the enterprise overview, corporate culture, technological development and operation management system; conduct systematic safety education and confidentiality education, and learn the enterprise's safety and confidentiality regulations as well as post operation specifications; familiarize with the professional responsibilities of on-site technical personnel, complete the internship post-entry assessment and preparation, and study the basic materials related to the post independently. 2. On-the-job Enterprise Internship and Data Collation (90 contact hours; 110 self-study hours) Familiarize yourself with the entire process of electronic information technology development/design/production and operation in the enterprise; learn the standardized operation of electronic instruments and equipment, accident judgment and emergency handling methods from enterprise mentors; investigate the formulation of enterprise production plans, operation management and energy conservation and emission reduction measures; take the initiative to communicate with engineering and technical personnel, analyze the use of electronic systems/equipment, carry out functional analysis, collect on-site technical data, and put forward preliminary technical improvement plans; investigate the ability requirements of the industry for electronic information professionals, independently study relevant cutting-edge industry materials, and sort out materials and formulate directions for the graduation project. 3. Internship Report Writing and Defense Assessment (20 contact hours; 30 self-study hours) Collate the technical data and practical achievements of the entire

	internship process, and complete the writing of the internship report in accordance with specifications (covering the internship purpose, content, achievements, problem analysis and improvement suggestions, etc.); independently study the report writing specifications and defense skills, and prepare materials for the internship defense; complete the oral internship defense and respond to teachers' questions; file relevant internship materials and complete the internship summary and reflection.
Examination forms	1. Process Assessment Score: Accounting for 30% of the total course score (30 points in total), it consists of the overall performance during the internship, including internship research, performance of social responsibilities, and teamwork performance. 2. Achievement Assessment Score: Accounting for 30% of the total course score (30 points in total), it takes the internship achievements such as internship report, research data and improvement plan as the core assessment basis. 3. Defense Assessment Score: Accounting for 40% of the total course score (40 points in total), it is conducted in the form of on-site oral defense to assess the mastery of internship achievements, problem analysis and professional expression ability.
Study and examination Requirements	1. Students must complete the whole process of on-the-job enterprise internship and independently write the internship report and relevant achievement materials. Being late, leaving early or unapproved absence is prohibited. Students absent without reason for 3 or more consecutive days will fail the course. 2. The internship assessment adopts a combination of process assessment, achievement assessment and defense assessment to comprehensively evaluate students' practical ability, knowledge application ability, teamwork ability and professional literacy. 3. All assessments are scored on a 100-point scale, with 60 as the passing score. Students who violate safety regulations and cause accidents, operate equipment without permission and cause serious consequences, or plagiarize internship achievements/reports will fail the course directly. 4. Process assessment, achievement assessment and defense assessment shall be carried out in accordance with the detailed scoring criteria based on internship objective attainment, and the assessment results shall serve as the core basis for evaluating the achievement of internship objectives.
Reading list	1.Required books mzi

	[1] Wei Xiaohui.Production Practice Guide for Electronic Information Engineering[M]. Science Press, 2016. [2] Ye Mao, et al. Electronic Engineering Practice and Innovation [M]. Tsinghua University Press, 2019. [3] Ministry of Industry and Information Technology. Compilation of Technical Standards and Policies for Electronic Information Industry [M]. Publishing House of Electronics Industry, 2022. [4] National Vocational Skill Appraisal Guidance Center of Electronic Information Industry. Professional Literacy and Norms for Electronic Information Major[M]. Publishing House of Electronics Industry, 2023. 2. Reference books [1] Xiao Mingming, et al. Engineering Practice Tutorial for Electronic Information Engineering [M]. Sun Yat-sen University Press, 2020. [2] Xiong Ying. Graduation Design Guidance for Electronic Information Engineering [M]. China Machine Press, 2019.
Data of last mendment	September 23, 2025

Fundamental Military Training Course

Module designation	Fundamental Military Training Course
Semester(s) in which the module is taught	First semester
Person responsible for the module	Department of Physical Education
Language	Chinese
Relation to curriculum	Military Skills is a compulsory course established in accordance with the Circular on Carrying Out Military Training in Regular Institutions of Higher Education and Senior High Schools (Guo Ban Fa [2001] No. 48), which was forwarded by the General Office of the State Council and the General Office of the Central Military Commission to the Ministry of Education, the General Staff Headquarters and the General Political Department. The document stipulates that student military training is a compulsory course for undergraduate and junior college students in regular institutions of higher education. Military training for college students is conducted in accordance with the relevant provisions of the Education Law of the People's Republic of China, the National Defense Education Law, the Military Service Law and the Outline for the Reform and Development of Chinese Education. It is the basic form for students to fulfill their military service obligations and receive national defense education during their studies.
Teaching methods	Target students: The entire student body Type of teaching: Theoretical teaching and experimental teaching
Workload (incl.contact hours，self-study hours)	Total workload = 3 weeks / 120 class hours Contact hours = 3 weeks / 120 class hours Self-study hours = 0
Credit points	ECTS Credit=4.0
Required and recommended prerequisites for joining the module	NO
Module objectives/ intended learning outcomes	·Course Objectives and CompetenciesCourse Objective 1: Enable students to fulfill their military service obligations, receive national defense education, stimulate patriotic enthusiasm, enhance national defense awareness and organizational discipline during their studies at school, master basic military knowledge and skills, and lay a solid foundation for training and cultivating reserve officers.

Content

2. Main Teaching Content

(1) Brief Introduction to the Internal Affairs Regulations of the Chinese People's Liberation Army

(2) Brief Introduction to the Discipline Regulations of the Chinese People's Liberation Army

(3) Brief Introduction to the Formation Regulations of the Chinese People's Liberation Army

(4) Formation Movements for Individual Soldiers

(5) Formation Movements for Units

3. Requirements for Knowledge and Competencies

Internal affairs arrangement, individual soldier movements and formation movements. Through military training, improve students' ideological and political awareness, stimulate patriotic enthusiasm, establish revolutionary heroism spirit, enhance organization and discipline, master basic military skills, and lay a foundation for the Chinese People's Liberation Army to train reserve troops and reserve officers. Strengthen the education of collectivism, cultivate good military demeanor, habits and style, and integrate them into daily life to promote the construction of school spirit.

3. Key Teaching Points and Difficulties

Key Teaching Points: Focus on key points in training, that is, take formation training as the focus to cultivate students' basic military qualities;

Teaching Difficulties: Address difficulties, that is, take overcoming negative thoughts and correcting isolated movements as the breakthrough, combine formal class training with morning exercises and after-class training, and carry out activities where officers teach soldiers and soldiers teach each other.

Class Hour Allocation Table

No.	Item	Teaching Content	Recommended Class Hours	Recommended Teaching Method	Supporting Course Objective

<table>
<tr><td></td><td>
<table>
<tr><td>1</td><td>Regulations of the Chinese People's Liberation Army</td><td>1. Internal Affairs Regulations; 2. Discipline Regulations; 3. Formation Regulations; 4. Formation Movements for Individual Soldiers; 5. Formation Movements for Units.</td><td>3weeks</td><td>Explain movement essentials, demonstrate movements well, and students practice.</td><td>1</td></tr>
<tr><td colspan="3">Total</td><td colspan="3">3weeks</td></tr>
</table>
</td></tr>
<tr><td>Examination forms</td><td>Assessment</td></tr>
<tr><td>Study and examination Requirements</td><td>
(1) Assessment Methods and Basic Requirements
The assessment of this course mainly aims to evaluate the achievement of students' ability training objectives, and takes checking students' mastery and application ability of each knowledge point as an important content. The assessment rules are as follows:
<table>
<tr><td>Course Score Composition and Proportion</td><td>Assessment Components</td><td>Target Score</td><td>Assessment/Evaluation Criteria</td></tr>
<tr><td>Attendance and Performance</td><td>Attendance Check</td><td>10</td><td>Absent once: deduct 5 points; leave of absence or sick leave once: deduct 1 point; until the score is exhausted.</td></tr>
<tr><td>Internal Affairs Assessment</td><td>Inspection</td><td>40</td><td>Inspected in accordance with the Internal Affairs Regulations of the Chinese People's Liberation Army. One failure: deduct 5 points; until the score is exhausted.</td></tr>
<tr><td>Military Appearance and Discipline</td><td>Inspection</td><td>10</td><td>Inspected in accordance with the Discipline Regulations of the Chinese People's Liberation Army. One failure: deduct 2 points; until the score is exhausted.</td></tr>
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	Formation Movements	Assessment	40	Individual Formation Movements: Attention, At Ease, Stand At Ease, Turning at Halt, Salute, Return to Attention, Remove Headgear, Put on Headgear, Sit Down, Squat, Stand Up, Quick March and Halt, Formal March and Halt, Running March and Halt, Turning on the March, Change of Step. Unit Formation Movements: Formation, Assembly, Dispersion, Alignment, Count Off, Step Out, Step In, March, Halt, Formation Change, Direction Change. Standard movements: 20 points Basically standard movements: 15 points Can complete movements but not standard: 10 points
Reading list	[1] Regulations of the Chinese People's Liberation Army on Internal Affairs, Discipline, and Formation			
Data of last mendment	June 29, 2025			

Writing and Communication

Module designation	Writing and Communication
Semester(s) in which the module is taught	2
Person responsible for the module	Zhang Dongmei
Language	Chinese
Relation to curriculum	Writing and Communication is a second-class quality development course offered to all undergraduate students in the university, as well as a general education course. Focusing on the writing and communication knowledge and skills required for students' academic and career development, this course designs various scenarios of study, life and work, sets different writing and communication tasks, and specifically strengthens the training of written and oral expression abilities. Through the teaching of this course, it aims to improve students' language application ability and writing level, exercise their basic interpersonal communication skills, thus cultivating modern talents who "can speak, write and communicate well", and enhance their employability and career development ability.
Teaching methods	1. Lecture Method; 2. Case Analysis Method; 3. Discussion Method; 4. Situational Teaching Method.
Workload (incl.contact hours，self-study hours)	Contact hours:16; Self-study hours=14
Credit points（ECTS）	ECTS Credit=1.0
Required and recommended prerequisites for joining the module	NO
Module objectives/ intended learning outcomes	Learning Outcomes: ● Knowledge 1. Master the types and writing methods of administrative documents, official documents, academic documents, and economic documents; 2. Understand the basic principles of interpersonal communication, and grasp the principles, methods, and language skills of daily communication, personal presentation, and workplace communication. ● Skills 1. Be able to apply basic theoretical knowledge of writing to compose official documents, official documents, academic documents, and economic documents closely related to academic and career development; 2. Be able to apply basic knowledge of oral expression and communication to conduct effective language communication on different occasions according to the needs of study, life, and work, and

	master the language art of communication. ● Competencies 1. Possess strong Chinese written expression ability; 2. Possess strong oral communication ability.
Content	**Part 1: Written Writing (8 class hours)** **Lecture 1: Official Document Writing (2 class hours)** 1. Introduction: Main teaching content, learning objectives and significance 2. 2. Overview of practical writing 3. Types and formats of official documents 4. Writing of notices, letters, requests for instructions and reports **Lecture 2: Practical Document Writing (2 class hours)** 1. Writing of plans 2. Writing of summaries 3. Writing of resumes **Lecture 3: Academic Document Writing (2 class hours)** 1. Overview of academic papers and dissertations 2. Structure and writing requirements of graduation theses 3. Citation standards in academic writing **Lecture 4: Economic Document Writing (2 class hours)** 1. Market research reports 2. Contracts and agreements **Part 2: Oral Expression (8 class hours)** **Lecture 5: Basic Competence in Language Communication (2 class hours)** 1. Basic knowledge of Mandarin 2. Methods to improve communication skills 3. Auxiliary tools in communication: use of body language **Lecture 6: Daily Communication and Self-cultivation (2 class hours)** 1. Basic principles of interpersonal communication 2. Introduction and conversation 3. Telephone communication **Lecture 7: Personal Presentation and Communication (2 class hours)** 1. Prepared speeches and impromptu speaking 2. Academic thesis defense 3. Presentation for awards, social practice and research projects **Lecture 8: Teamwork and Effective Communication (2 class hours)** 1. Job interview forms and communication skills 2. Workplace communication etiquette and methods 3. Skills and tips for communicating with supervisors, colleagues and subordinates
Examination forms	Open-book Written Exam

Study and examination Requirements	●Students shall complete the assignments after each class independently. Being late, leaving early or unapproved absence is not allowed. ●The assessment of this course consists of two parts: daily assessment and final assessment. Daily score: 20%, based on assignment results. Final score: 80%.
Reading list	[1] Chen Jin, Du Rong (Eds.). Practical Communication and Writing (3rd ed.). Beijing: China Machine Press, 2020. [2] Wu Jie (Ed.).Effective Communication and Practical Writing Course (3rd ed.). Beijing: China Renmin University Press, 2017. [3] Wang Yongyuan (Ed.).Communication and Writing:Language Expression and Communication Skills.Beijing: Posts and Telecommunications Press, 2020. [4] Wang Yongyuan (Ed.). Communication and Writing: Practical Writing Skills and Norms. Beijing: Posts and Telecommunications Press, 2019. [5] Wang Xiaoxu (Ed.). Writing · Communication. Hangzhou: Zhejiang University Press, 2020. [6] Tao Wenquan. Heat Transfer(6th ed.) [M]. Beijing: Higher Education Press, 2025.
Data of last mendment	June 29, 2025

RFID Development Technology and Practice

Module designation	**RFID Development Technology and Practice**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Yujia Liu
Language	Chinese
Relation to curriculum	RFID Development Technology and Practice is one of the compulsory professional courses for Electronic Information Engineering. Studying this course plays an important role in cultivating students' engineering capabilities in the Internet of Things and artificial intelligence fields. Through this course, students will understand the application modes and development trends of Radio Frequency Identification (RFID), master the basic system and key technologies of RFID, acquire the basic skills of RFID system design and equipment installation, and learn to solve engineering problems related to low-frequency, high-frequency and ultra-high-frequency RFID systems. In theoretical teaching, this course focuses on several typical practical RFID systems, including RFID reader development, low-frequency RFID reader design, high-frequency RFID reader design, and ultra-high-frequency RFID reader design. It covers system design, system framework composition, microcontroller programming, and other aspects. In experimental teaching, the course emphasizes microcontroller interfaces, RFID readers and other related content, so as to cultivate students' ability to analyze simple practical application systems and solve engineering application problems, and help students establish engineering awareness.
Teaching methods	Teacher-centered methods: Lecture method, questioning method, discussion method Target Students: Electronic Information Engineering
Workload (incl.contact hours，self-study hours)	Total Workload: 90 hours Contact Hours: 32 hours Self-study Hours: 58 hours
Credit points	ECTS Credit=3.0
Required and recommended prerequisites for joining the module	Circuit Theory, Principles and Applications of Single-chip Microcomputers
Module objectives/ intended learning	**Module objectives:** 1. Module objectives (Course Objectives): Objective 1: Be able to apply the basic principles of RFID, as well as

outcomes	technologies such as general I/O ports, interrupts, timers, and serial communication of single-chip microcomputers, to formulate reasonable design schemes for the design of RFID systems. Objective 2: Be able to use the basic theory of RFID to establish low-frequency RFID reader systems, high-frequency RFID reader systems and ultra-high-frequency RFID reader systems, and conduct software and hardware design. Objective 3: Be able to select and use appropriate instruments and meters, information resources, engineering tools and professional simulation software to test, analyze, calculate and design complex engineering problems of RFID. 2. Intended Learning Outcomes Outcome 1: Understand the concept of RFID; classification and applications of RFID technology; basic principles of RFID; coupling methods; RFID standard system; composition of RFID application systems; functions and characteristics of AVR single-chip microcomputers. Outcome 2: Master the structure of EM4095; MCU interface; peripheral circuit design; programming method of low-frequency RFID reader. Characteristics of RC522 chip; relevant commands of RC522; radio frequency identification communication method of Mifare; programming method of high-frequency RFID reader. Characteristics of ultra-high-frequency RFID readers; overview of relevant standards; hardware design of ultra-high-frequency RFID readers; principle of ultra-high-frequency RFID tags. Outcome 3: Conduct experiment preview, operation, experimental data processing and experimental report writing. The experimental projects are as follows: 1. Basic Experiment on Reader Development 2. Low-Frequency ID Card Reading Experiment 3. High-Frequency RFID RC522 Card Reading Experiment 4. Ultra-High-Frequency RFID Reading and Writing Experiment 5. Design Experiment of Public Transport/Subway Card Consumption System
Content	**Part A.Theoretical teaching(20 contact hours; 36 self-study hours)** Unit 1 Introduction to Radio Frequency Identification (RFID) Technology (1) Overview of Radio Frequency Identification Technology (2) Application System Framework of Radio Frequency Identification (3) Composition and Classification of RFID Systems Unit 2 RFID Technology and Data Transmission (1) RFID Encoding and Modulation (2) RFID Data Verification and Anti-Collision (3) RFID Standard System (4) Working Principle of RFID Technology Unit 3 Fundamentals of RFID Reader Development (1) Composition of Reader Circuit (2) Hardware Composition and Pin Functions of AVR Single-Chip Microcomputer (3) AVR Interrupts/Timers (4) Programming Design of AVR Interrupts/Timers (5) AVR Communication Interfaces (6) Programming Design of AVR Communication Interfaces

	Unit 4 Low-Frequency RFID Reader Design (1) Low-frequency ID cards and reader chips (2) Programming of low-frequency RFID readers Unit 5 High-Frequency RFID Reader Design (1) Memory structure of Mifare cards; Mifare card reading and writing (2) MF RC522 reader chip; Interface between RC522 and MCU (3) Basic operations of RC522 via AVR (4) Programming of high-frequency RFID readers Unit 6 Ultra-High-Frequency RFID Reader Design (1) UHF RFID protocol standards (2) Secondary development of UHF RFID readers **Part B :Experimental Teaching (12 contact hours; 22 self-study hours)** Experiment 1: Basic Experiment on Reader Development Experiment 2: Low-Frequency ID Card Reading Experiment Experiment 3: High-Frequency RFID RC522 Card Reading Experiment Experiment 4: Ultra-High-Frequency RFID Reading and Writing Experiment Experiment 5: Design Experiment of Public Transport / Subway Card Consumption System
Examination forms	Open-book written exam
Study and examination Requirements	The assessment of this course mainly aims to evaluate the achievement of students' ability training objectives, focusing on checking students' mastery of various knowledge points and application capabilities. The assessment score is comprehensively evaluated based on three aspects: daily performance score, experimental score and final score. The daily performance score accounts for 20% of the total score, the experimental score accounts for 30%, and the final score accounts for 50%. The daily assessment score is comprehensively evaluated based on three aspects: classroom performance, homework and tests. 1. The daily assessment is composed of homework and tests, accounting for 20% of the total score. (1) Homework accounts for 40% of the daily score: a total of 2-4 assignments, whose content covers Course Objective 2. It mainly assesses students' understanding and mastery of the knowledge points related to the course objectives. The assignments can be in the form of objective questions, subjective questions, course papers, etc. The homework score is the average of all assignments. The evaluation criteria for each assignment are as follows: (2) Tests account for 60% of the daily score: Classroom tests will be conducted in the middle or at the end of the semester, covering Course Objective 1, with 1-2 tests. It mainly tests students' understanding and comprehensive application of the knowledge points of this objective; each test score is calculated on a 100-point scale, and the average of all test scores is taken as the total test score. 2. Experimental Assessment: The experimental score accounts for 30% of

	the total score.There are 5 experiments in this course, including 4 confirmatory experiments and 1 comprehensive experiment. Combined with practical engineering problems, relevant experimental content is assigned for Course Objective 3, requiring students to propose solutions, so as to cultivate their ability to solve complex engineering problems. At the same time, it aims to establish students' professional confidence, strengthen their socialist core values, and foster their ideals and beliefs of building a strong country through science and technology and serving the country with science and technology. Each experiment is evaluated from three aspects corresponding to Course Objective 3: experimental preview (experimental plan), experimental process and experimental report, with weights of 0.2, 0.5 and 0.3 respectively. Finally, the score of each experimental project is given by weighted average. The experimental score is the average of the 5 experimental projects. 3. Final Assessment: It adopts an open-book exam, accounting for 50% of the total score. The assessment content covers all course objectives, and the question types include objective questions (multiple-choice questions, true/false questions or fill-in-the-blank questions), short-answer questions, programming design questions and hardware design questions (adjustable). The daily performance score, experimental score, final score and total score are all calculated on a 100-point scale. In the total score, the daily performance score accounts for a weight of 0.2, the experimental score accounts for 0.3, and the final score accounts for 0.5. The scores and proportions of each assessment link can also be adjusted according to teaching needs.
Reading list	[1] Shan Chenggan (Ed.). Principles and Applications of Radio Frequency Identification (RFID) (3rd ed.). Beijing: Electronic Industry Press, February 2020. [2] Tang Zhiling (Ed.). Application Technology of Radio Frequency Identification (RFID) (2nd ed.). Beijing: China Machine Press, January 2018. [3] Pan Yan (Ed.). Wireless Communication Systems and Technologies (1st ed.). Beijing: Posts and Telecommunications Press, October 2011. [4]Wireless Dragon (Ed.). Advanced Course on High-Frequency RFID Technology (1st ed.). Metallurgical Industry Press, April 2012. [5] China University MOOC. https://www.icourse163.org/
Data of last mendment	Jan 11, 2026

Virtual Instrumentation Technology and Applications

Module designation	**Virtual Instrumentation Technology and Applications**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Yujia Liu
Language	Chinese Elective Course
Relation to curriculum	Virtual Instrument Technology and Application is a elective Course based on computer and test module hardware, with computer software learning as its core. Virtual instruments are computer instruments that can be defined by user software, featuring virtual instrument panels on computer display screens and instrument functions performed by computers. Currently, virtual instruments are rapidly developing and widely used in industries, transportation, military, scientific research, teaching, and other fields. This course teaches the working principles, composition methods, and development software LabVIEW programming of virtual instruments, mastering the panel design, program block diagram design, test signal analysis and processing of virtual instruments, learning the working principles and circuit design of virtual instrument hardware, virtual instrument system integration, and software technology. Students learn to design virtual instruments. The teaching content of the "Virtual Instrument Technology" course is technologically advanced, comprehensive, and practical, with a reasonable and comprehensive theoretical teaching system structure. It also applies scientific research achievements to teaching, making it very suitable for cultivating high-level electronic information science and technology talents with an innovative spirit.
Teaching methods	Teacher-centered methods: Lecture method, questioning method, discussion method Target Students: Students majoring in Electronic Information Engineering
Workload (incl.contact hours，self-study hours)	Total workload = 60 hoursContact hours = 24 Self-study hours = 36 hours
Credit points	ECTS Credit=2.0
Required and recommended prerequisites for joining the module	C Language, Principles and Applications of Single-chip Microcontrollers
Module objectives/ intended learning	**Module objectives:** Objective 1: Be able to use LabVIEW to establish a host computer

outcomes	interface, process and display data, and control external devices. Objective 2: Be able to design and develop data acquisition systems and even measurement and control systems using virtual instrument technology, and be capable of innovatively solving engineering problems. **Intended learning outcomes** Achievement 1: Master the characteristics and applications of LabVIEW; LabVIEW programming environment; basic concepts of LabVIEW; composition and creation steps of VI; VI front panel design; VI debugging methods. LabVIEW data types; LabVIEW data operations; LabVIEW data manipulation. LabVIEW program flow control; use of LabVIEW nodes. LabVIEW graphical display; LabVIEW local and global variables. Achievement 2: Master the design of serial port communication; design of data acquisition system; design of multi-channel oscilloscope.
Content	**Part A.Theoretical teaching(6 contact hours; 6 self-study hours)** Unit 1 Fundamentals of LabVIEW Programming (1) LabVIEW programming environment (2) Composition and creation steps of VI; VI front panel design; VI debugging methods Unit 2 LabVIEW Data Operations (1) LabVIEW data types (2) LabVIEW data operations; LabVIEW data manipulation Unit 3 LabVIEW Program Flow Control and Nodes (1) LabVIEW program flow control (2) Application of LabVIEW nodes Unit 4 LabVIEW Graphical Display and Variables (1) LabVIEW graphical display (2) LabVIEW local variables and global variables **Part B. Experiment teaching(18 contact hours; 30 self-study hours)** Experiment 1: Common Program Structures and Data Types in LabVIEW Experiment 2: Design of Electronic Calculator Based on LabVIEW Experiment 3: Serial Communication Based on LabVIEW Experiment 4: Design of LabVIEW Serial Debugging Assistant Experiment 5: LabVIEW Data Acquisition Experiment 6: Design of LabVIEW Virtual Oscilloscope
Examination forms	Open-book and computer-based examination
Study and examination Requirements	The assessment of the course primarily aims to evaluate the achievement of student ability cultivation objectives, with a focus on checking students' mastery of various knowledge points and their application abilities. It includes two parts: regular performance and final examination. 1. The regular assessment and evaluation primarily assesses students' understanding and mastery of the knowledge points of each course

	objective, and is conducted through hands-on experiments. The experiment score is out of 100 points (on a 100-point scale) and accounts for 100% of the usual grades. The assessment form of the experiment score is reflected through hands-on training. 2. The final assessment will be conducted through a computer-based exam. It is allowed to bring officially published materials such as textbooks, but handwritten or printed materials are not permitted. The assessment content will cover all course objectives. The usual performance, final exam scores, and overall evaluation scores all adopt a 100-point system. In the overall evaluation score, the weight of usual performance is 0.5, and the weight of final exam score is 0.5. The proportion of scores for each assessment link can also be adjusted according to the teaching arrangement.
Reading list	[1] The Complete LabVIEW Cookbook / Edited by Chen Shuxue and Liu Xuan. - Beijing: Publishing House of Electronics Industry, March 2017 [2] Written by me and LabVIEW/Ruan Qizhen. - Beijing: Beihang University Press, September 2016 [3] Colon Classroom / Written by Zheng Hui. - Beijing: Publishing House of Electronics Industry, October 2015 [4] Fundamentals of Virtual Instrument Design / Edited by Huang Songling, Wu Jing. - Beijing: Tsinghua University Press, 2013.10 [5] Digital Voltmeter and Digital Multimeter Testing Technology / Edited by Feng Zhanling. - Beijing. China Metrology Publishing House, April 2014.
Data of last mendment	Jan 11, 2026

Engineering Economics

Module designation	Engineering Economics
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	Zhu Yali
Language	Chinese
Relation to curriculum	Engineering Economics is a characteristic professional elective course in the teaching plan for Electronic Information Engineering. It is a practical discipline that takes engineering technology as the main body and the techno-economic system as the core. It studies how to effectively utilize engineering and technical resources to promote economic growth, and evaluates the economic effects of various engineering and technical schemes.
Teaching methods	Teacher-centered methods: Lecture method, questioning method, discussion method
Workload (incl. contact hours, self-study hours)	Target Students: Students majoring in Electronic Information Engineering Teaching Type: Theoretical Teaching Total workload = 60 hours; Contact hours = 24 hours; Self-study hours = 36hours.
Credit points (ECTS)	ECTS Credit=2.0
Required and recommended prerequisites for joining the module	Advanced Mathematics
Module objectives/ intended learning outcomes	**Learning Outcomes** ● **Knowledge:** Master the basic concepts of Engineering Economics, the time value of money, and the core knowledge points of economic effect evaluation of engineering projects. Understand the basic theories of uncertainty analysis, value engineering, and risk analysis of engineering projects. ● **Skills:** Be able to draw cash flow diagrams, use compound interest formulas for fund equivalence calculation and economic evaluation of single and multiple schemes. Be able to carry out uncertainty analysis of engineering projects by using methods such as break-even analysis and sensitivity analysis. ● **Competence:** Possess the initial ability to apply engineering economics theories to project

	decision-making in the electronic information field. Be able to analyze the economic feasibility of engineering projects and put forward reasonable suggestions combined with practical cases.
Content	**Theoretical teaching(24 contact hours; 36 self-study hours)** **Chapter 1 Introduction to Engineering Economics (2 contact hours; 2 self-study hours)** 1) Basic concepts such as engineering, technology, economy, and economic benefits; 2) The emergence and development of Engineering Economics; 3) The research object of Engineering Economics; 4) The basic principles of engineering economic evaluation. **Chapter 2 Engineering Economic Factors (4 contact hours; 6 self-study hours)** 1) Composition and estimation of project investment; 2) Composition and calculation of product costs and expenses; 3) Composition and calculation of major taxes under the current tax system. **Chapter 3 Time Value of Money (4 contact hours; 6 self-study hours)** 1) Basic concepts of the time value of money; 2) Basic formulas for compound interest calculation of the time value of money; 3) Concepts of nominal interest rate and effective interest rate and their conversion formulas. **Chapter 4 Evaluation of Single Scheme (4 contact hours; 6 self-study hours)** 1) Project calculation period and cash flow statement; 2) Concepts of single scheme evaluation, and concepts of criteria such as payback period, investment return rate, net present value (NPV), net annual value (NAV), net future value (NFV), net present value rate (NPVR), internal rate of return (IRR), and their discrimination criteria in single scheme evaluation. **Chapter 5 Evaluation of Multiple Schemes (4 contact hours; 6 self-study hours)** 1) Scheme types and scheme combinations; 2) Comparison and selection of mutually exclusive schemes; 3) Selection of independent schemes; Comparison and selection of generally related schemes. **Chapter 6 Uncertainty Analysis (4 contact hours; 6 self-study hours)** 1) Basic concepts of uncertainty analysis; 2) Break-even analysis; 3) Sensitivity analysis; 4) Probability analysis. **Chapter 7 Value Engineering (2 contact hours; 4 self-study hours)** 1) Basic principles of Value Engineering (VE);

	2) Selection of VE objects and collection of information and data; 3) Functional analysis, sorting and evaluation; 4) Formulation and evaluation of improvement schemes.
Examination forms	Written examination (closed-book).
Study and examination Requirements	1. Students shall complete the after-class assignments independently. Late arrival, early departure or unapproved absence is not allowed. 2. This course is assessed by a combination of daily performance and final examination score, to comprehensively evaluate students' learning status and ability to analyze and solve complex engineering problems. 3. Daily performance accounts for 20% of the total score, including assignments (40%), attendance (2%) and periodic assessments (40%); the final examination accounts for 60%. 4. All scores are graded on a 100-point scale, and 60 points is the passing score of this course.
Reading list	1. Required Books [1] Engineering Economics (4th ed.). Edited by Yu Lijun. China Machine Press, April 2023. [2] Engineering Economics. Edited by Liu Wei. Harbin Engineering University Press, July 2018. 2. Reference Books [1] Engineering Economics (4th ed.). Edited by Liu Xiaojun. China Architecture & Building Press, July 2020. [2] Engineering Economics (5th ed.). Edited by Shao Yinghong. Tongji University Press, February 2015.
Data of last mendment	September 23, 2025