Appendix 05-3

Learning Outcomes and a matrix of objectives-module

Learning Outcomes

Graduation Requirements 1 (Ideology and Morality): Firmly uphold the leadership of the Communist Party of China and the socialist system with Chinese characteristics, guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, practice core socialist values, and possess firm ideals and convictions, deep patriotism, and a sense of pride in the Chinese nation. Students must master national laws and industry regulations related to the professions covered by this major, possess a dedicated professional spirit, abide by professional ethics and behavioral norms, and possess a sense of social responsibility and commitment.

Graduation Requirements 1.1: Support the leadership of the Communist Party of China, love the socialist motherland, master Marxism, Mao Zedong Thought, and the theoretical system of socialism with Chinese characteristics, and systematically study the Party’s theories, national policies, and the rule of law.

Graduation Requirement 1.2: Through ideological and political education, mental health education, and professional ethics courses, guide students to establish a correct outlook on life, world view, and values, abide by laws and regulations, work in unity and cooperation, love their jobs, be willing to contribute, and have a sense of social responsibility and a spirit of commitment.

Graduation Requirement 2 (Engineering Knowledge): Be able to apply mathematics, physics, engineering fundamentals, and professional knowledge to the expression, analysis, derivation, comparison, and evaluation of complex engineering problems in the fields of information and communications, electronic technology, and intelligent control.

Graduation Requirement 2.1: Possess the mathematical and engineering knowledge necessary to understand and describe complex engineering problems in fields such as information and communications, electronics, and intelligent control.

Graduation Requirement 2.2: Possess basic knowledge of mathematics, physics, electronics, information technology, and computers, and be able to abstractly model and solve electronic information devices, equipment, and systems.

Graduation Requirement 2.3: Be able to apply specialized knowledge in electronics and information technology to analyze and deduce complex engineering problems in the field of electronics and information technology.

Graduation Requirement 2.4: Be able to apply comprehensive engineering

knowledge to compare and evaluate design proposals for electronic circuits, signal processing, and transmission systems.

Graduation Requirement 3 (Problem Analysis): Be able to apply the principles of mathematics, natural science, electronic science, and information science to identify, express, and analyze complex engineering problems in the fields of information communication, electronic technology, and intelligent control through literature research, and obtain effective conclusions.

Graduation Requirement 3.1: Be able to apply the fundamental principles of natural science, electronic science, and information science to identify the manifestations of complex engineering problems and the key components, modules, equipment, and procedures in the fields of information communication, electronic technology, and intelligent control.

Graduation Requirement 3.2: Be able to rationally express key components, modules, equipment, and programs in complex engineering projects in the fields of information communications, electronic technology, and intelligent control using electronic science, information science, mathematical modeling methods, and program flow charts.

Graduation Requirement 3.3: Be able to understand optional or alternative problem-solving solutions through literature research, and be able to draw effective conclusions by analyzing the influencing parameters of key components, modules, and equipment.

Graduation Requirement 4 (Design/Development of Solutions): Be able to design solutions for electronic circuits, signal processing, and transmission systems that meet user needs. Design unit circuits, functional modules, equipment design plans, and programs that meet these requirements, demonstrating a sense of innovation in design.

Graduation Requirement 4.1: Be able to develop unit circuits, functional modules, and program flows that meet specific needs based on functional requirements.

Graduation Requirement 4.2: Be able to propose systematic solutions to complex engineering problems in fields such as information and communications, electronics, and intelligent control, and determine design goals, technical requirements, development cycles, and processes.

Graduation Requirement 4.3: Be able to apply knowledge of electronics and

information technology to evaluate, optimize, and improve design/development solutions, and demonstrate a sense of innovation.

Graduation Requirement 5 (Research): Be able to apply principles of mathematics, natural sciences, engineering fundamentals, electronics science, information science principles, and scientific methods to conduct research on complex engineering problems in the fields of information communications, electronic technology, and intelligent control. This includes designing experiments, analyzing and interpreting data, and deriving reasonable and effective conclusions through information synthesis.

Graduation Requirement 5.1: Students should be able to determine experimental objectives and methods based on scientific principles and design experimental plans to solve complex engineering problems in the fields of information and communications, electronics, and intelligent control.

Graduation Requirement 5.2: Be able to select, build, or develop a hardware and software experimental environment for electronic circuits, signal processing, and transmission systems, conduct experiments, and record and organize experimental data.

Graduation Requirement 5.3: Be able to statistically analyze and interpret experimental data, and draw reasonable and valid conclusions through information synthesis.

Graduation Requirement 6 (Use of Modern Tools): Be able to use, select, and develop appropriate technologies, resources, electronic measuring instruments, and simulation software tools for complex engineering problems in the fields of information communication, electronics, and intelligent control. This includes simulation analysis and prediction of complex engineering problems, and an understanding of their limitations.

Graduation Requirement 6.1: Be able to use commonly used modern electronic measuring instruments, simulation software, and information technology tools to measure, analyze, and design typical modules and systems in electronic information engineering practice, and understand their characteristics.

Graduation Requirement 6.2: Be able to acquire and select appropriate information technology tools, electronic measuring instruments, and simulation software tools for testing, calculation, and simulation in the analysis, design, and research of electronic circuits, signal processing, and transmission systems.

Graduation Requirement 6.3: Be able to simulate and predict specific complex engineering problems in the fields of information and communications, electronics, and intelligent control using modern tools developed to meet specific needs, and understand and analyze their limitations.

Graduation Requirement 7 (Engineering and Sustainable Development): Be able to apply electronic information-related industrial policies, industry standards, and relevant industry laws and regulations to engineering practice; be able to evaluate the impact of solutions to complex engineering problems in the fields of information and communications, electronic technology, and intelligent control on society, health, safety, law, and culture, and understand the responsibilities that should be assumed; be able to understand and evaluate the impact of engineering practices for complex engineering problems in the fields of information and communications, electronic technology, and intelligent control on the environment and social sustainable development.

Graduation Requirement 7.1: Be able to apply relevant technical standards, intellectual property rights, industrial policies, and quality management systems in the fields of electronics, information technology, and computers to the engineering practice of complex engineering problems in the fields of information communication, electronic technology, and intelligent control.

Graduation Requirement 7.2: Be able to objectively analyze and evaluate the social, health, safety, legal, and cultural impacts of the development, production, and operation of new products, technologies, and processes, and understand the responsibilities that should be assumed.

Graduation Requirement 7.3: Be familiar with relevant laws and regulations on environmental protection and understand the relationship between electronic and information engineering practices and the environment and sustainable social development.

Graduation Requirement 7.4: Evaluate resource efficiency, pollutant disposal, and safety precautions for solutions to complex engineering problems in information and communications, electronics, and intelligent control, and assess potential harm to humans and the environment during the product life cycle.

Graduation Requirement 8 (Engineering Ethics and Professional Standards): Possess literacy in the humanities and social sciences, a correct outlook on life, the world, and morality, understand the core socialist values and abide by professional

ethics, be honest and trustworthy, and have a sense of responsibility.

Graduation Requirements 8.1: Possess a solid foundation in the humanities and social sciences, a sound outlook on life, the world, and morality, an understanding of the core socialist values and adherence to professional ethics, honesty and trustworthiness, and a strong sense of responsibility.

Graduation Requirement 8.2: Understand the core socialist values, understand national conditions, be able to safeguard national interests, and possess a sense of social responsibility**.**

Graduation Requirement 8.3: Understand the core concepts of engineering ethics and be able to abide by professional ethics and standards and fulfill corresponding responsibilities in the development, testing, and production practices of electronic information projects.

Graduation Requirement 9 (Individual and Team): Ability to assume roles as an individual, team member, and leader within a multidisciplinary team, possessing organizational and management skills, interpersonal skills, academic communication skills, and teamwork skills.

Graduation Requirement 9.1: Ability to proactively collaborate with members of other disciplines to carry out work.

Graduation Requirement 9.2: Able to fulfill the roles and responsibilities of a team member, listen to the opinions of other team members, and collaborate to complete team tasks.

Graduation Requirement 9.3: Be able to form a team based on the tasks and personnel characteristics, understand the roles and responsibilities within the team, and manage and coordinate team operations.

Graduation Requirement 10 (Communication): Be able to effectively communicate and exchange ideas with industry peers and the public on complex engineering problems in the field of electronic information engineering, including writing reports, design documents, making presentations, and clearly expressing or responding to instructions. Students must also possess a certain international perspective and be able to communicate and exchange ideas in a cross-cultural context.

Graduation Requirement 10.1: Be able to write reports and documents with standard format, clear organization, and accurate language, addressing theoretical and technical research and engineering practice requirements in electronic circuits, signal

processing, and transmission systems, and produce electronic materials that are convenient for presentation and communication.

Graduation Requirement 10.2: Be able to read foreign language materials related to the major, express and respond to professional issues, and possess basic cross-cultural communication skills.

Graduation Requirement 10.3: Possess excellent communication skills and be able to effectively communicate and exchange complex engineering problems in the field of electronic information through oral and written expression.

Graduation Requirement 11 (Project Management): Understand and master the principles of engineering management and economic decision-making methods, and be able to apply them in a multidisciplinary environment.

Graduation Requirement 11.1: Master the engineering management principles and basic economic decision-making methods involved in electronic information engineering projects.

Graduation Requirement 11.2: In the engineering practice of a multidisciplinary environment, be able to apply time and cost management, quality and risk management, and human resource management to the management of electronic information engineering projects.

Graduation Requirement 11.3: Ability to apply engineering management principles and economic decision-making methods to the development, design, and optimization of electronic circuits, signal processing, and transmission systems.

Graduation Requirement 12 (Lifelong Learning): Have the awareness of independent and lifelong learning, and possess the ability to continuously learn and adapt to social development.

Graduation Requirement 12.1: Be able to correctly understand the current status and development trends of electronics and information science, and have a sense of independent learning and lifelong learning.

Graduation Requirement 12.2: Possess a foundation of knowledge for lifelong learning, master methods of independent learning, and understand ways to expand knowledge and abilities.

Graduation Requirement 12.3: Be physically fit and able to choose appropriate independent learning methods to meet personal or professional development needs and adapt to industry and social development.

A matrix of objectives-module

A matrix of objectives-module compared with the ASIIN SSC

ASIIN Subject-Specific Criteria (SSC)	Learning Outcomes of the Study Programme (i.e., Achievements of the Training in section 1.1.2)	Corresponding Modules (More detailed description in sections 1.2 and 1.3)
Knowledge and Understanding Graduates have in particular		
acquired a broad and well-founded basic knowledge of mathematics, natural sciences, and engineering, which enables them to understand and analyse complex phenomena occurring in electrical engineering, information technology, or computer science, and to independently develop and apply practice-oriented or theory-oriented solutions	2) Knowledge of engineering 3) Ability of problem analysis	Linear Algebra Functions of Complex Variables College Physics, College Physics Experiment C Language Programming
acquired an understanding of the broader ethical and multidisciplinary context of engineering	1) Ideology and Morality 8) Engineering Ethics and Professional Standards	Outline of Modern Chinese History Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics
Interdisciplinary Competences Graduates		
can analyse and present technical contexts from their own and related fields in a comprehensible way	2) Knowledge of engineering	C Language Programming Introduction to Electronic Information Engineering Practical Writing
can work on technical tasks in a team and, if necessary, take over the coordination of the team	1) Ideology and Morality 9) Ability of individual and team cooperation 10) Skill of communication	Ideological and Moral Cultivation and Legal Basis Outline of Modern Chinese History Basic Principles of Marxism Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics Situation and Policy Literature Search and Thesis Writing Mental Health Education for College Students Career Development and Employment Guidance for College Students Basics of Innovation and Entrepreneurship Military Theory for College Students

		University Physical Education and Health College English College English Extension Series Practical Writing Metalworking Practice Microcontroller System Comprehensive Practical Training Internship Electronic System Engineering Practical Training Internship Embedded System Comprehensive Practical Training Internship Graduation Internship
know and understand the methods of project management and economic methods, such as risk and change management, as well as their limits	11) Ability of project mana-gement	Admission Education and Military Training Labor of Public Benefit Social Practice and Volunteer Service Metalworking Practice Graduation Internship Graduation Education Graduation Comprehensive Training
recognize the need for independent, lifelong learning and can pursue it	12) Ability of lifelong learning	STM32 Electronic System Design and Engineering Application FPGA Principles and Applications Innovation and Entrepreneurship Humanities and Social Sciences Art and Physical Education Basic Principles of Marxism Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics Career Development and Employment Guidance for College Students Basics of Innovation and Entrepreneurship Military Theory for College Students University Physical Education and Health Principle and Application of Microcontroller Modern Sensor and Detection Technology Digital Signal Processing.
know the foreign languages relevant to professional practice	10) Skill of communication	College English College English Extension Series Practical Writing
can identify problems and solve them using various research and working techniques	3) Ability of problem analysis 5) Ability of research	Linear Algebra, Functions of Complex Variables

		College Physics College Physics Experiment Digital Electronic Technology Signals and Systems Electromagnetic Field and Electromagnetic Wave
can work in an interdisciplinary environment	7) Ability of environmental and sustainable development	Ideological and Moral Cultivation and Legal Basis Situation and Policy STM32 Electronic System Design and Engineering Application FPGA Principles and Applications Principles and Applications of Embedded Systems Robot Development, Innovation and Entrepreneurship Humanities and Social Sciences Art and Physical Education
possess social and professional ethical competences and can shape social processes critically, reflectively, and with a sense of responsibility and in a democratic spirit	1) Ideology and Morality 8) Professional norms	Outline of Modern Chinese History Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics STM32 Electronic System Design and Engineering Application
Engineering Methodology Graduates are qualified to		
select and apply the current modelling, calculation, design, and test methods for their specialization	6) Ability to use modern tools 4) Ability of design/ development solution	C Language Programming Circuit Analysis Data Structure Analog Electronic Technology Digital Electronic Technology Signals and Systems Communication Fundamentals Electromagnetic Field and Electromagnetic Wave C++ Programming Language Principle and Application of Microcontroller PCB Design and Drawing High Frequency Electronic Circuits, Modern Sensor and Detection Technology Digital Signal Processing.
research technical literature and other sources	1) Ideology and Morality	Basic Principles of Marxism

of information on problems posed	12) Ability of lifelong learning	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics Career Development and Employment Guidance for College Students Basics of Innovation and Entrepreneurship Military Theory for College Students University Physical Education and Health
design and conduct experiments and computer simulations, and interpret the data obtained	5) Ability of research 6) Ability to use modern tools	C++ Programming Language Principle and Application of Microcontroller PCB Design and Drawing Modern Sensor and Detection Technology Digital Signal Processing.
use databases, standards, codes of good practice and safety regulations	8) Engineering Ethics and Professional Standards	High Frequency Electronic Circuits STM32 Electronic System Design and Engineering Application
Engineering Development Graduates		
have special skills in the development of analogue and digital, electrical and electronic circuits, systems, and products	4) Ability of design / development solution	Principle and Application of Microcontroller High Frequency Electronic Circuits Modern Sensor and Detection Technology Digital Signal Processing
are proficient in the use of the process elements modelling, simulation, and testing in a problem-oriented way as well as their integration during development	5) Ability of research	Linear Algebra Functions of Complex Variables College Physics Digital Electronic Technology Signals and Systems Electromagnetic Field and Electromagnetic Wave
are capable of developing saleable products for the global market	4) Ability of design/ development solution 8) Engineering Ethics and Professional Standards	Electronics Technology Internship and Electronic Product Assembly and Debugging Internship Digital Unit Circuit Simulation and Development Comprehensive Practical Training Internship Metalworking Practice Electronic and Electrical Practice Microcontroller System Comprehensive Practical Training Internship Electronic System Engineering Practical Training Internship

		Embedded System Comprehensive Practical Training Internship, Graduation Internship, Graduation Education Graduation Comprehensive Training
Engineering Practice and Product Development Graduates		
can apply their knowledge and understanding to gain practical skills for solving problems, carrying out investigations and developing systems and processes	8) Engineering Ethics and Professional Standards	High Frequency Electronic Circuits
can draw on experience of the possibilities and limitations of the application of materials, computer-aided model designs, systems, processes and tools when solving complex problems	8) Engineering Ethics and Professional Standards	High Frequency Electronic Circuits Metalworking Practice Graduation Internship Graduation Education
know the practice and requirements in production operations	12) Ability of lifelong learning	Graduation Internship
can research technical literature and other sources of information	8) Engineering Ethics and Professional Standards	Computer Basics for College Students
demonstrate an understanding of the health, safety, and legal implications of engineering practice and the impact of engineering solutions in a social and environmental context	8) Engineering Ethics and Professional Standards	Computer Basics for College Students Metalworking Practice Graduation Internship
undertake to act following the professional principles and standards of engineering practice	8) Engineering Ethics and Professional Standards	Computer Basics for College Students Metalworking Practice Graduation Internship
can transfer new results of engineering and natural sciences into industrial and commercial production, taking into account sustainability, environmental compatibility, as well as economic and safety requirements	7) Ability of environmental and sustainable development	Ideological and Moral Cultivation and Legal Basis Situation and Policy Admission Education and Military Training Labor of Public Benefit Social Practice and Volunteer Service Metalworking Practice Graduation Internship Graduation Education
can deepen the acquired knowledge independently	12) Ability of lifelong learning	STM32 Electronic System Design and Engineering Application FPGA Principles and Applications
are aware of the non-technical implications of engineering	1) Ideology and Morality 11) Ability of project mana-gement	Ideological and Moral Cultivation and Legal Basis Outline of Modern Chinese History

	7) Ability of environmental and sustainable development 8) Engineering Ethics and Professional Standards	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics Situation and Policy Literature Search and Thesis Writing Mental Health Education for College Students Career Development and Employment Guidance for College Students Basics of Innovation and Entrepreneurship Military Theory for College Students Computer Basics for College Students University Physical Education and Health STM32 Electronic System Design and Engineering Application FPGA Principles and Applications Principles and Applications of Embedded Systems Robot Development Innovation and Entrepreneurship Humanities and Social Sciences Art and Physical Education
are capable of developing saleable products for the global market	8) Engineering Ethics and Professional Standards	Metalworking Practice Graduation Internship Graduation Comprehensive Training