Automation

(Grade 2022)

Course code: 080801

I. Cultivation Objectives

The program is oriented towards the intelligent manufacturing and automation-related industries in Shanghai and the Yangtze River Delta region, with the main focus on high-level talent training to serve high-quality development to promote the all-round integration of the structural elements of the supply side of talent training and the demand side of industry, and to practice the philosophy of running a modern university with practical characteristics; to strengthen the fundamental task of cultivating people with moral character, to promote the spirit of craftsmanship and the spirit of model workers, and to cultivate cultivate high quality interdisciplinary engineering talents with comprehensive development of morality, intellect, physique, aesthetics and labour, who have solid basic knowledge of mathematics and natural science, basic knowledge of engineering, good humanities and professional ethics, systematic mastery of the basic theories and methods in the field of automation, Be able to apply innovation, good training in engineering practice, and Be able to be competent in product design/development, system integration, operation, maintenance and technical management in the field of intelligent manufacturing and automation.

Five years after graduation, students in this program should achieve the following objectives:

1.Humanities: Perform and undertake the social obligations and responsibilities of engineers and technicians in automation and related fields, actively improve and demonstrate their social service responsibilities, social ethics, humanities and scientific literacy, and implement and perform engineering ethics, industry-related laws, environment, safety and sustainable development in engineering practice.

2.Engineering ability: Use mathematics and natural science, engineering basic theories and professional skills through analysis, judgement and comprehensive processing to carry out product design and development, system integration, operation and maintenance and technical management of complex engineering systems such as automation equipment, automation production lines, robotics and artificial intelligence in automation engineering and related fields, and propose and implement engineering solutions

3.Teamwork: Continuously track and learn cutting-edge technologies in automation engineering and related fields, lead or join work teams in R&D, service and management in automation and related fields as a cadre, proactively improve and demonstrate communication skills in a multidisciplinary context as well as teamwork spirit and communication skills in cross-cultural conditions.

4.Career development: Through continuing education or other learning options, take the initiative to cultivate lifelong learning skills, actively expand new knowledge and abilities, pursue new career opportunities, adapt to the tasks given by different environments, be able to contribute in different positions, and obtain their own continuous development.

II. Requirement for Graduation

According to the motto of Shanghai Polytechnic University of " Great life, Great Morality, great technology " and the 12 graduation requirements of the China Engineering Education Accreditation Association (CEEAA), the Program of Automation has expanded the core competencies and quality expressions of the 12 graduation requirements in accordance with the orientation of talent cultivation in our university, and the indicators of each

graduation requirement are listed as follows:

1: Engineering knowledge: Be able to apply mathematics, natural sciences, engineering fundamentals and professional knowledge to engineering practice and to solve complex engineering problems in the field of automation technology.

1-1: Description of the problem. Be able to describe engineering problems in the field of automation technology using tools from mathematics, natural sciences, engineering sciences and professional knowledge and skills of automation

1-2: Modeling. Be able to develop and solve mathematical models for specific intelligent devices or automatic control systems through rational simplification, deduction and analysis and applying knowledge from a wide range of automation fields.

1-3: Use of knowledge. Use relevant professional knowledge in the field of automation and mathematical modelling methods to deduct, analyse and solve complex engineering problems throughout the development of intelligent devices or automatic control system products in the field of automation.

2: Analysis of the Problem: Be able to apply fundamental principles of mathematics, natural and engineering sciences to identify, describe, and through literature research to analyse engineering problems in the field of automation technology in order to reach valid conclusions.

2-1: Identify and describe problem. be able to identify, analyse and describe problems through literature, mathematical modelling, solution comparison, engineering deduction and experimental research, and be able to determine the key to the problem, define the overall objective and refine ideas for solving control engineering problems.

2-2: Deduction of problem. Be able to apply the methods and tools of engineering deduction to hypothesize and simplify complex control systems based on the specific context of use, and be able to choose advanced detection and control theories to identify and determine the key aspects and parameters of complex control engineering problems and seek multiple ways to reach a solution.

2-3: Obtaining the conclusion. With the help of data and literature research and analysis and fundamental principles, be able to analyse the influencing factors of a process, validate the rationality of a solution and obtain valid conclusions for complex engineering problems.

3: Design/development of solutions: Be able to design solutions to complex engineering problems in the field of automation technology, to develop automatic control systems or devices that meet specific needs, and to demonstrate the spirit of innovation in the design process, taking into account social, health, safety, legal, cultural and environmental considerations.

3-1: Conception of the solution. Be able to identify specific solutions for detection, treatment and control based on user needs or design objectives, and to consider social, health, safety, legal, cultural and environmental factors in the design process.

3-2: Validation of the solution. Be able to analyse the results in terms of the performance of the object being controlled, taking into account social, health, safety, legal, cultural and environmental factors. Be able to demonstrate the spirit of innovation and design system structures, measurement and control units, control algorithms and testing methods to meet specific needs. Be able to develop a system solution and verify the feasibility of the system solution using simulation, modelling and experimentation .

3-3: Design and Integration. Be able to systematically integrate unit components for complex engineering problems

in automation and related fields, and design automation systems that meet the constraints of multiple technical factors.

4: Research: Be able to conduct research on complex engineering problems in automation and related fields based on scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, and synthesizing information to reach reasonable and valid conclusions.

4-1: Research and Analysis. Be able to develop hypotheses and select key objects to be verified based on scientific principles for an engineering problem in a process, device or system, and then research and analyse solutions to complex engineering problems by searching for relevant academic papers and scientific reports.

4-2: Design and Implementation. Be able to use systematic and innovative thinking in terms of the specific characteristics of the controlled object to select a research route, design an experimental programme, build a reasonable experimental system, select the collection and testing instruments, and use scientific methods to collect and collate experimental data correctly.

4-3: Analysis and Summarization. Be able to comprehensively analyse experimental results, compare them with theoretical models, apply engineering theory and scientific principles to analyse differences and make reasonable explanations to obtain valid conclusions.

5: Use of Modern Tools: Be able to develop, select and use appropriate techniques, resources, modern engineering tools and information technology tools for complex automation engineering applications, including prediction and simulation of complex engineering problems, and be able to understand their limitations.

5-1: Awareness of modern tools. Awareness of the use of automation technology, modern instrumentation and IT tools.

5-2: Selection of modern tools. Be able to select appropriate modern tools for the design of automated control systems or the development of automated inspection systems.

5-3: Use of modern tools. Be able to use appropriate modern engineering tools for simulation, for the simulation and prediction of complex engineering problems and be able to understand their limitations.

6: Engineering and Society: Be able to perform reasonable analysis based on automation engineering-related contextual knowledge and evaluate how the professional engineering practice and the solutions to complex engineering problems may impact society, health, safety, law, and culture, and understand the responsibilities involved.

6-1: Familiarity with standards and intellectual property rights. In internship, social practice and other studies, be familiar with the technical standards, intellectual property rights, industrial policies and laws and regulations related to the field of control engineering, be familiar with the quality management system for automation equipment, and technical standards for the installation, commissioning, operation and maintenance of control systems.

6-2: Awareness of control engineering projects in a social context. Be able to objectively explain the social, health, safety, legal and cultural impacts of the implementation of control projects or systems and to identify and quantitatively analyse the impact of the development of new systems, equipment, technologies and methods of automation on society and the external environment.

7: Environment and Sustainable Development: Be able to understand and evaluate the environmental and social sustainability impacts of engineering practices in the field of automation technology.

7-1: Understand the connotation of sustainable development. Be able to understand the connotations and significance of environmental protection and sustainable social development, and be able to understand the impact of intelligent

devices and automated control systems and their production processes on environmental protection and sustainable social development.

7-2: Sustainable Development and Design for Engineering Practice. Be able to analyse the corresponding resource efficiency, pollutant disposal and safety precautions for the design and development of intelligent devices and automated control systems, taking into account the scalability of products as well as ecological, environmental, economic and social sustainability.

8: Professional Codes: Have humanistic, social and scientific qualities, social responsibility, and the ability to understand and comply with engineering ethics and codes in the practice of mechanical engineering and fulfill the responsibilities.

8-1: Correct values. Be able to understand the basic meaning of world perspective, philosophy and values and their impact, have knowledge of humanities, ability to think and act, scientific spirit and social responsibility. Be able to understand the core values of socialist, have a nationalistic feeling and defend national interests.

8-2: Professional Ethics and Social Responsibility. Be able to understand the engineering ethics and professional conduct of control engineering practitioners, the nature and responsibilities of the profession, and the code of honesty, fairness and integrity. Be able to consciously observe professional ethics and codes in engineering practice, and to consider the safety, health and well-being of the public and environmental protection, and have the responsibility to promote social progress.

9: Individual and team: Be able to understand and assume the role of individual, team member and leader in a multidisciplinary context.

9-1: Team Awareness. Be able to take on the role of a team member and complete the work assigned by the team independently.

9-2: Teamwork. Be able to work proactively with members of other disciplines, to listen to other team members, to compromise and collaborate, and to organize the work of team members.

10: Communication: Be able to communicate and interact effectively with industry peers and the public on complex engineering issues in automation technology, including writing reports and design submissions, presenting statements, clearly expressing or responding to instructions, and having an international perspective and the ability to communicate and interact in a cross-cultural context.

10-1: Verbal Communication. Be able to communicate using appropriate language (including English), style, timing and process. Be able to answer questions and express personal views in a reasonable manner, using the aid of professionally appropriate non-verbal communication methods.

10-2: Written Communication. Be able to read and understand technical literature, use different writing styles and use a variety of electronic forms of expression such as diagrams, graphs and dynamic presentations. Be able to produce electronic presentation materials and demonstrate technical writing skills.

10-3: Diverse communication skills. Be able to follow international development trends and research hotspots in the field of specialization, have the oral and written communication skills for intercultural communication, be able to communicate and exchange basic information on professional issues.

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.

11-1: Awareness of the connotations of project management. Be able to organize and manage complex systems projects, understand the economic and management aspects of project engineering, control project costing and

scheduling, carry out quality testing and safety assurance, and understand the necessity of safety plan for complex systems.

11-2: Practice the project management process. Be able to understand and apply engineering management principles and economic decision-making methods in the process of conception-design-implementation-operation of intelligent devices or automatic control systems, and be able to understand the concept of full-cycle, full-process cost management for the operation, management and maintenance of complex control system facilities.

12: Lifelong Learning: Have the spirit of independent and lifelong learning and the ability to learn and adapt to development constantly.

12-1: Awareness of lifelong learning capacity. Be able to understand the necessity for continuous exploration and learning, to have an awareness of independent and lifelong learning, and to understand ways of expanding knowledge and competence.

12-2: Self-improvement. Be able to achieve self-improvement through independent learning to meet personal or professional development needs.

Table 1 Support for Cultivation Objectives from Requirement for Graduation

Requirement for Graduation	Objective 1	Objective 2	Objective 3	Objective 4
1. Engineering knowledge		√		
2. Analysis of the Problem		√		
3. Design/develop of solutions	√	√	√	
4. Research		√	√	
5. Use of modern tools		√	√	
6. Engineering and Society	√			√
7. Environment and sustainable development	√	√	√	
8. Professional codes	√			√
9. Individuals and teams	√	√	√	√
10. Communication	√		√	√
11. Project Management		√	√	√
12. Lifelong Learning		√	√	√

III. Schooling System

Four years.

IV. Length of Study

Flexible study period, generally four years, the minimum length of flexibility is not less than three years, the longest not more than six years.

V. Requirements for Graduation and Degree Conferring

Students of this program must complete the minimum credits required for each category of courses and complete all the content specified in Students of this program must complete the minimum credits required for each category of courses and complete all the content specified in extracurricular class according to the requirements of the instructional training plan, and the total credits must reach 165 credits for graduation; Those who meet the requirements for bachelor's degree can be conferred bachelor degree in Intelligent Manufacturing Engineering.

VI. Discipline

Control Science and Engineering

VII. Core Courses

Fundamentals of Programming (C), Principles of automatic control, Principles of microcontrollers, Fundamentals

of electric motor and driving, Electricity and electronics technology, Signals and systems, Electrical control and PLC, Modern control theory, Motion control systems, Comprehensive practical training for controller design, Control technology for automatic production lines, Comprehensive Practice/learning in enterprise for Intelligent manufacturing technology, etc.

VIII. Course Structure and Course Hours (excluding Extracurricular Class)

Course Type	**Total Credits**	**%**	**Total Course**	**Theory Learning**	**Practical Training**
Public Fundamental Course	59.5	36	1088	1008	80
General Education	10	6	160	160	0
Engineering Fundamental Course	18	11	288	221	67
Professional Fundamental Course	21	13	336	278	58
Professional Course	22	13	352	290	62
Professional Practice	33.5	21	952	0	952
Total	164	100	3176	1957	1219
Theory: Practical (%)	62:38				

IX. Teaching schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended semester
Public Fundamental Course	required	School of Marxism	b1080006	Outline of Modern Chinese History	non-test	3	48	42	6	Autumn 1
	required	School of Marxism	b1080001	Basic Principles of Marxism	test	3	48	42	6	Spring 1
	required	School of Marxism	b1080009	Ethics and the Rule of Law	non-test	3	48	42	6	Spring 1
	required	School of Marxism	b1080004	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics I	test	3	48	42	6	Autumn 2
	required	School of Marxism	b1080007	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics II	test	2	32	28	4	Spring 2
	required	School of Marxism	-----	Situation and Policy (Modules 1 to 4)	non-test	2	32	28	4	Autumn 1 to Spring 2
	required	School of Marxism	b1080008	Labour Education A	non-test	0.5	16	16		Autumn 2
	required	Others	b1110004	Mental Health Education for University Students	non-test	2	32	16	16	Autumn 1
	required	College of Arts and Sciences	b1020080+	Advanced Mathematics A1	test	4	64	64		Autumn 1
	required	College of Arts and Sciences	b1020081+	Advanced Mathematics A2	test	4	64	64		Spring 1
	required	College of Arts and Sciences	b1020012	Linear Algebra	test	2	32	32		Autumn 2
	required	College of Arts and Sciences	b1020114	Probability Theory and Mathematical Statistics	test	3	48	48		Spring 1
	required	College of Arts and Sciences	b1020100	Functions of complex variables and integral transformations	test	3	48	48		Autumn 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011157zd	Operations Research	non-test	2	32	32		Spring 2
	required	College of Arts and Sciences	b1020062	Academic Physics A (Module 1)	test	3	48	48		Spring 1
	required	College of Arts and Sciences	b1020065	Academic Physics B	test	2	32	32		Autumn 2
	required	College of Arts and Sciences	b1020111	Academic Physics C	non-test	2	32		32	Autumn 2
	required	College of Arts and Sciences	b1020018	Academic Chinese	non-test	2	32	32		Autumn 1
	required	Others	b1110003	Military skills	non-test	0.5	2W			Autumn 1
	required	College of Arts and Sciences	b1110002	Military theory	non-test	0.5	32	32		Autumn 2
	required	College of Arts and Sciences	b1020003	General English III	test	3	48	48		Autumn 1
	required	College of Arts and Sciences	b1020004	General English IV	test	3	48	48		Spring 1
	required	College of Arts and Sciences	b1020005	General Academic English A	test	2	32	32		Autumn 2
	required	College of Arts and Sciences	---	English Knowledge Expansion	non-test	2	32	32		Spring 2
	required	College of Physical Education	-----	Physical Education I to VI	non-test	3	160	160		Autumn 1 to Autumn 4
Subtotal (Public Fundamental Course)						**59.5**	**1088**	**1008**	**80**	
General Education	selective	Art Education Center	b0-----	Aesthetic Education	non-test	2	32	32		Autumn, Spring
	selective	Each Colleges	b0-----	Social Sciences and Humanistic Qualities	non-test	4	64	64		Autumn, Spring
				Natural Sciences and Technology Innovation	non-test	4	64	64		Autumn, Spring
Subtotal (General Education)						**10**	**160**	**160**		

IX. Teaching schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended semester
Engineering Fundamental Course	required	Engineering Training	b2011031zd	Electric Circuit	test	4	64	48	16	Spring 1
	required	Engineering Training	b2012060zd	Analog Electronics Technology	test	3	48	36	12	Autumn 2
	required	Engineering Training	b2012099zd	Digital Electronics Technology	test	3	48	36	12	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011910zd	Modern Engineering Drawing	test	3	48	39	9	Autumn 1
	required	School of Intelligent Manufacturing and Control Engineering	b2011920zd	Fundamentals of Programming (C)	test	3	48	30	18	Autumn 1
	required	School of Intelligent Manufacturing and Control Engineering	b2011911zd	Engineering Ethics	non-test	1	16	16		Autumn 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011520	Scientific and Technical Paper Writing and Literature Search	non-test	1	16	16		Autumn 1
	subtotal (engineering fundamental course)					**18**	**288**	**221**	**67**	
Professional Fundamental Course	required	School of Intelligent Manufacturing and Control Engineering	b2011243zd	Introduction to the Automation	check	1	16	16	0	Autumn 1
	required	School of Intelligent Manufacturing and Control Engineering	b2011915zd	Principle of automatic control	test	3	48	39	9	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011471zd	Signals and Systems	test	3	48	39	9	Autumn 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011902zd	Electricity and electronics technology	test	3	48	39	9	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011028zd	Fundamentals of electric motor and driving	test	3	48	39	9	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011901zd	Principles of Microcontroller	test	3	48	39	9	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011904zd	Sensors and detection technology	non-test	2	32	28	4	Autumn 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011411zd	Electrical Control and PLC	test	3	48	39	9	Autumn 3
	Subtotal (Professional Fundamental Course)					**21**	**336**	**278**	**58**	
Professional Course	required	School of Intelligent Manufacturing and Control Engineering	b2011223zd	Modern control theory	test	3	48	42	6	Autumn 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011301zd	Modelling and Simulation of Control System	non-test	2	32	28	4	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011412zd	Process control technology	test	2	32	28	4	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011159zd	Motion control systems	test	3	48	42	6	Autumn 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011304zd	Computer control technology	non-test	2	32	26	6	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011399zd	Industrial robotics	non-test	2	32	28	4	Spring 3
	Subtotal (Required Professional Course)					**14**	**224**	**194**	**30**	
	Selective 8 credits	School of Intelligent Manufacturing and Control Engineering	b2011917zd	Power supply and distribution technology	non-test	2	32	26	6	Spring 3
		School of Intelligent Manufacturing and Control Engineering	b2011922zd	Python programming	non-test	2	32	26	6	Autumn 3
		School of Intelligent Manufacturing and Control Engineering	b2011923zd	Industrial communication networks	non-test	2	32	26	6	Autumn 4
		School of Intelligent Manufacturing and Control Engineering	b2011924zd	Embedded Systems and Applications	non-test	2	32	24	8	Autumn 3
		School of Intelligent Manufacturing and Control Engineering	b2011405zd	Machine Vision	non-test	2	32	26	6	Autumn 4
		School of Intelligent Manufacturing and Control Engineering	b2011230zd	Virtual instrument technology	non-test	2	32	26	6	Autumn 4
		School of Intelligent Manufacturing and Control Engineering	b2011929zd	Intelligent optimization methods and Applications	non-test	2	32	28	4	Spring 3
		School of Intelligent Manufacturing and Control Engineering	b2011925zd	Principles and Control of Artificial Intelligence	non-test	2	32	28	4	Autumn 4
		School of Intelligent Manufacturing and Control Engineering	b2011926zd	Technology for generating electricity from new energy sources	non-test	2	32	26	6	Spring 3
		School of Intelligent Manufacturing	b2011927zd	Electrical CAD	non-test	2	32	16	16	Autumn 3
		School of Intelligent Manufacturing and Control Engineering	b2011928zd	3D modelling technology	non-test	2	32	16	16	Autumn 3
		School of Intelligent Manufacturing and Control Engineering	b2011930zd	Project Management	non-test	2	32	26	6	Spring 3
	Subtotal (Selective Professional Course)					**8**	**128**	**96**	**32**	
Subtotal (Professional Course)						**22**	**352**	**290**	**62**	

IX. Teaching schedule (3)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended semester
Professional Practice	required	Engineering Training	b4090003zd	Practice for Metalworking	non-test	1	24		24	Summer 1
	required	Engineering Training	b4090005zd	Practice for Electronics Process	non-test	2	48		48	Summer 1
	required	School of Intelligent Manufacturing and Control Engineering	b4011920zd	Comprehensive practical training for controller design	non-test	2	48		48	Summer 2
	required	School of Intelligent Manufacturing and Control Engineering	b4011921zd	Comprehensive practical training for microcontroller applications	non-test	2	48		48	Summer 2
	required	School of Intelligent Manufacturing and Control Engineering	b4011922zd	Comprehensive practical training for PLC applications	non-test	2	48		48	Autumn 4
	required	School of Intelligent Manufacturing and Control Engineering	b4011904zd	Comprehensive practical training for Electricity and electronics technology	non-test	2	48		48	Autumn 4
	required	School of Intelligent Manufacturing and Control Engineering	b4011923zd	Comprehensive practical training for electrical control	non-test	2	48		48	Autumn 4
	required	School of Intelligent Manufacturing and Control Engineering	b4011903zd	Comprehensive practical training for industrial robots	non-test	2	48		48	Summer 3
	required	School of Intelligent Manufacturing and Control Engineering	b4011924zd	Comprehensive practical training for process control systems	non-test	2	48		48	Summer 3
	required	School of Intelligent Manufacturing and Control Engineering	b4011911zd	Comprehensive practical training for motion control systems	non-test	2	48		48	Autumn 4
	required	School of Intelligent Manufacturing and Control Engineering	b4011925zd	Control technology for automatic production lines	non-test	2	48		48	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b4011339	Labour Education B	non-test	0.5	16		16	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b4000045	Innovation and Entrepreneurship for Automation	non-test	2	48		48	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b4011926zd	Comprehensive Practice/ Enterprise Learning for Intelligent Manufacturing Technology	non-test	4	96		96	Autumn 4
	required	School of Intelligent Manufacturing and Control Engineering	b4011253	Automation Graduation Internship and Graduation Design (Thesis)	non-test	6	288		288	Spring 4
Subtotal (Professional Practice)						**33.5**	**952**		**952**	
Extracurricular Class	required	Others	b5110001	**Extracurricular Class**	non-test	**1**	-	-	-	Autumn, Spring, Summer
Total						**165**	**3176**	**1957**	**1219**	

X. Prerequisite for Course Study

No.	Course Name	Prerequisite Courses	No.	Course Name	Prerequisite Courses
1	Electric Circuit	Advanced Mathematics A1	15	Modelling and Simulation of Control System	Motion control systems
		Advanced Mathematics A2			Modern control theory
		Academic Physics			Principle of automatic control
2	Analog Electronics Technology	Academic Physics	16	Electrical CAD	Electric Circuit
		Electric Circuit			Analog Electronics Technology
3	Digital Electronics Technology	Academic Physics			Digital Electronics Technology
		Electric Circuit	17	Sensors and detection technology	Electric Circuit
		Analog Electronics Technology			Comprehensive practical training for Electricity and electronics technology
4	Fundamentals of electric motor and driving	Academic Physics			Probability Theory and Mathematical Statistics
		Electric Circuit	18	Industrial communication networks	Principles of Microcontroller
5	Principle of automatic control	Advanced Mathematics A1, A2	19	Artificial Intelligence Technology and Applications	Principle of automatic control
		Functions of complex variables and integral transformations	20	Computer control technology	Principle of automatic control
		Electric Circuit			Electrical Control and PLC
		Fundamentals of electric motor and driving			Principles of Microcontroller
6	Principles of Microcontroller	Electric Circuit	21	Industrial robotics	Motion control systems
		Analog Electronics Technology	22	Process control technology	Sensors and detection technology
		Digital Electronics Technology			Electrical Control and PLC
7	Computer control Technology	Principles of Microcontroller	23	Virtual instrument technology	Sensors and detection technology
		Principle of automatic control			Principles of Microcontroller
8	Signals and Systems	Advanced Mathematics A2	24	Comprehensive practical training for controller design	Electric Circuit
		Electric Circuit			Fundamentals of electric motor and driving
		Functions of complex variables and integral transformations			Principle of automatic control
9	Electricity and electronics technology	Electric Circuit			
		Analog Electronics Technology			
		Digital Electronics Technology			
10	Motion control systems	Principle of automatic control	25	Comprehensive practical training for Electricity and electronics technology	Electric Circuit
		Fundamentals of electric motor and driving			Analog Electronics Technology
		Electricity and electronics technology	26		Digital Electronics Technology
11	Electrical Control and PLC	Electric Circuit			Electricity and electronics technology
		Digital Electronics Technology	27	Control technology for automatic production lines	Electrical Control and PLC
		Fundamentals of electric motor and driving			Fundamentals of electric motor and driving
12	Modern control theory	Linear Algebra			Industrial robotics
		Principle of automatic control	28	Comprehensive practical training for industrial robots	Fundamentals of electric motor and driving
					Industrial robotics
13	Intelligent optimization methods and applications	Principle of automatic control			Fundamentals of Programming
14	Power supply and distribution technology	Academic Physics			Signals and Systems
		Electric Circuit			
29	Embedded System Design	Fundamentals of Programming	32	Comprehensive Practice/ Enterprise Learning for Intelligent Manufacturing Technology	Process control technology
		Principles of Microcontroller			Electrical Control and PLC
30	Comprehensive practical training for electrical control	Electrical Control and PLC	33		Fundamentals of electric motor and driving
		Fundamentals of electric motor and driving			Industrial robotics
31	Comprehensive practical training for PLCs	Electrical Control and PLC			Artificial intelligence technologies and applications
		Fundamentals of electric motor and driving			Machine Vision
					Virtual instrument technology

XI. Credit of Extracurricular Class

Through taking extracurricular classes, students are encouraged to take part in academic lectures, social practice activities, campus cultural and Through taking extracurricular classes, students are encouraged to take part in academic lectures, social practice activities, campus cultural and sports activities, innovative and entrepreneurial activities, voluntary activities, etc. to improve their social adaptability and enhance the Details are specified in Students' Manual.