Measurement Control Technology and Instruments

(Grade 2023)

Course code: 080301

I. Cultivation Objectives

1. General cultivation objective

This program is designed to meet the needs of national economic and scientific development and to cultivate high quality application-oriented engineering talents with comprehensive development of morality, intellect, physique, aesthetics and labour who have solid basic theory, broad professional knowledge, strong practical ability, modern scientific innovation spirit and international vision, who can engage in research, development, engineering design, technical management and service of modern instruments and testing equipment in the industrial field related to intelligent manufacturing.

2. Objective of value guidance

The objective of this program is to cultivate high quality application-oriented engineering talents who can adapt to the development of society, the value orientation of this program is craftsmanship, and the carrier of this program is school-enterprise cooperation and curriculum teaching. This program cultivates students' professional spirit of rigorous and meticulous, dedicated and responsible, and striving for excellence, and enhances students' ability of independent learning, teamwork, innovation and social adaptability.

3. Five years after graduation, students in this program should achieve the following objection:

1) Master solid engineering knowledge and professional knowledge of measurement and control, able to use measurement and control professional knowledge and modern tools to engage in the design, development and production and commissioning of complex measurement and control-related products, taking into account social and environmental factors and relevant policies and regulations.

2) Be able communicate effectively within and outside the industry, organize and manage, collaborate and make decisions.

3) A sense of social responsibility and adherence to the professional codes of ethics, engineering ethics and industry codes of conduct.

4) Master the current situation and development trend of the industry, with a sense of innovation, have independent learning ability and lifelong learning ability.

II. Graduation requirements

1. Engineering knowledge: Have knowledge of mathematics, natural sciences, engineering fundamentals and professional knowledge required to work in the field of measurement and control engineering and be able to use such knowledge in an integrated manner to solve engineering problems in the field of measurement and control and related engineering.

1-1: Master knowledge of mathematics and natural sciences, appreciate important mathematical and physical methods of thought, and be able to integrate the language of mathematics, natural sciences and engineering sciences in the appropriate formulation of engineering problems in the field of measurement, control and instrumentation.

1-2: Be able to develop mathematical and physical models and solutions for engineering problems in measurement, control and related engineering fields.

1-3: Knowledge of the fundamentals of measurement, control and related engineering fields and the ability to analyse and design for engineering problems in related engineering fields.

1-4: Master the professional knowledge in the field of measurement and control and related fields, and be able to apply the relevant knowledge to solve engineering problems in the field of measurement and control and related fields.

2. Problem analysis ability: Be able to apply literature, research and basic knowledge in mathematics, natural and engineering sciences relevant to the field of measurement and control engineering to model and analyse engineering problems in the field of measurement and control and related engineering and to obtain valid conclusions.

2-1: Be able to apply basic knowledge of mathematics, natural sciences and engineering sciences relevant to measurement and control engineering to identify and determine the key aspects of engineering problems.

2-2: Be able to apply basic professional knowledge to correctly formulate engineering problems and analyse object characteristics.

2-3: Be able to apply professional knowledge in a comprehensive manner to analyse the influencing factors of engineering problems with the help of literature research and to seek multiple ways to solve the problems and obtain valid conclusions.

3. Be able to design/develop solutions: Be able to apply basic principles and technical tools relevant to the field of measurement and control engineering to design solutions for measurement and control and related engineering problems, and be able to demonstrate a sense of innovation in the design process, taking into account social, health, safety, legal, cultural and environmental factors.

3-1: Be able to apply relevant professional knowledge to design and develop solutions to simple engineering problems and understand the factors that influence design objectives and technical solutions.

3-2: Master the basic design (development) methods and techniques for the full cycle and full process of measurement and control engineering design and product development, and apply them to design solutions to complex engineering problems, reflecting a sense of innovation.

3-3: Be able to consider social, health, safety, legal, cultural and environmental factors in the design process and evaluate the feasibility of solutions.

4. Scientific research ability: Be able to o model, simulate, optimize, synthesize and solve complex engineering problems in the field of measurement and control and related fields, based on scientific principles and methods.

4-1: Be able to identify reasonable objectives and feasible solutions to complex engineering problems in the field of measurement, control and related fields based on scientific principles, research and theoretical analysis.

4-2: Be able to select a line of research, design a simulation or experimental program, and construct an experimental system and identify the materials and devices required, based on specialist theories and object characteristics.

4-3: Be able to carry out simulation or experimental studies, collect and process experimental data, analyse, interpret and process experimental results, and obtain reasonable and valid conclusions through the synthesis of information.

5. Ability to use modern tools: Be able to develop, select and use appropriate techniques, resources, modern engineering tools and information technology tools for complex engineering problems in the field of measurement and control and related fields, including the prediction, modelling and testing of complex engineering problems in the field of measurement and control and related fields, and to understand their limitations.

5-1: Be able to search and retrieve professional literature and information on measurement and control through

information technology tools and means such as the internet.

5-2: Be able to select and use instruments, information technology tools, modern engineering tools and simulation software commonly used in measurement and control and related engineering fields to analyse, calculate and design complex engineering problems.

5-3: Be able to develop or secondarily develop appropriate instrumentation, modern engineering tools and simulation software for the simulation and prediction of complex engineering problems, and be able to understand their limitations.

6. Engineering and Society: Be able to carry out sound analysis based on relevant background knowledge in the field of measurement and control engineering and evaluate the social, health, safety, legal and cultural impacts of professional engineering practice and solutions to engineering problems in measurement and control and related fields, and understand the responsibilities involved.

6-1: Have experience of engineering internships and social practice.

6-2: Have consciousness and understanding of trends in the international and domestic situation and a sense of social responsibility.

6-3: Be able to objectively analyse and evaluate the social, health, safety, legal and cultural impacts of engineering practices and solutions in measurement and control, and understand the responsibilities involved.

7. Environment and Sustainable Development: Be able to understand and evaluate the impacts of professional engineering practice for engineering problems in the field of measurement and control and related fields on environmental, socially sustainable development.

7-1: Know and understand the concepts and contents of environmental protection and sustainable development in the context of concrete practice in solving complex engineering problems.

7-2: Be able to correctly understand and reasonably evaluate the impacts of professional engineering practice for complex engineering problems in the field of measurement, control and related fields on the environment and sustainable development of society from the perspective of environmental protection and sustainable development.

8. Professional norms: Have human, social and scientific literacy, social responsibility and the ability to understand and comply with the ethics and codes of the engineering profession and to fulfil responsibilities in engineering practice.

8-1: Have proper perspective on life, values and the World. Have human, social and scientific literacy and a sense of social responsibility.

8-2: Be able to understand and comply with engineering ethics and codes of practice and fulfil responsibilities in the practice for engineering.

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

9-1: Be able to understand the composition of a team in a multidisciplinary context and the responsibilities of different roles.

9-2: Be able to assume the role of an individual, team member and leader in a team. Be able to organize, co-ordinate and direct the work of a team and to be a good team player.

10. Communication skills: Be able to communicate and interact effectively with industry peers and the public on engineering issues in the field of measurement and control and related fields, and to have a certain international perspective and be able to communicate and interact in a cross-cultural context.

10-1: Understand the basic components of, and requirements for, scientific and technical documentation in measurement and control, and be able to express views accurately on professional issues. Be able to respond to queries orally, in manuscripts and diagrams, and understand the differences in communication with industry peers and the public.

10-2: Have a certain international perspective, have a basic understanding of international development trends and research hotspots in the field of measurement and control and related fields, and be able to communicate and exchange views on engineering issues in the field of measurement and control engineering in a cross-cultural context.

10.3: Be able to express verbally and in writing in English and be able to speak and write accurately in English on professional issues.

11. Project Management Competencies: Understand and master the procedures for the creation, implementation, acceptance, refinement and roll-out of engineering projects and have small-scale Project Management competencies that can be applied in a multidisciplinary environment.

11-1: Understand and appreciate the principles of engineering management and economic decision-making methods involved in engineering projects.

11-2: Be able to apply engineering management principles and economic decision-making methods to the design, operation and management of measurement and control engineering in a multidisciplinary environment.

12. Be able to learn throughout life: Have sense of independent and lifelong learning, have the ability to learn continuously and adapt to development.

12-1: Have a sound understanding of independent and lifelong learning.

12-2: ability for independent learning and self-improvement.

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

In order to graduate, students must complete the minimum number of credits required by the Instructive Cultivation Plan for each course category and all the content required by the Extracurricular Class, with a total of 166 credits, and will be awarded a Bachelor of Engineering degree if they meet the requirements for the award of a Bachelor's degree.

VI. Discipline

Instrument Science and Technology, Control Theory and Control Engineering, Testing Technology and Automation Devices.

VII. Core Courses

Fundamentals of Programming, Principles of Automatic Control, Principles of Sensors, Signals and Systems, Error Theory and Data Processing, Motion Control Systems, Optoelectronic Sensing and Detection, Intelligent Instrumentation Technology, Digital Image Processing (In Chinese and English), Virtual Instrumentation Technology, Measurement and Control Technology and Systems, Engineering Optics, Industrial Automation and Robotics, PLC Principles and Applications

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

Category	Total Credit	%	Total Course	Theory Learning	Practical Training
Public Fundamental Course	60.5	36.7	1104	1022	82
General Education	10	6	160	160	0
Engineering Fundamental Course	20	12.1	320	240	80
Professional Fundamental Course	16	9.7	256	206	50
Professional Course	25	15.2	400	302	98
Professional Practice	33.5	20.3	952	0	952
Total	165	100	3192	1930	1262
Theory: **Practical** (%)	60: 40				

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	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	b1080006	Outline of Modern Chinese History	non-test	3	48	42	6	Autumn 1
	required	School of Marxism	b1080010	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	test	3	48	42	6	Spring 2
	required	School of Marxism	b1080011	Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	test	3	48	42	6	Autumn 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	School of Mathematics, Physics and Statistics	b1020080	Advanced MathematicsA1	test	4	64	64		Autumn 1
	required	School of Mathematics, Physics and Statistics	b1020081	Advanced MathematicsA2	test	4	64	64		Spring 1
	required	School of Mathematics, Physics and Statistics	b1020012	Linear Algebra	test	2	32	32		Autumn 2
	required	School of Mathematics, Physics and Statistics	b1020013	Probability Theory and Mathematical Statistics	test	2	32	32		Autumn 2
	required	School of Mathematics, Physics and Statistics	b1020100	Functions of complex variables and integral transformations	test	3	48	48		Autumn 2
	required	School of Mathematics, Physics and Statistics	b1020018	Academic Chinese	non-test	2	32	32		Autumn 1
	required	School of Mathematics, Physics and Statistics	b1020062	Academic Physics A (Module 1)	test	3	48	48		Spring 1
	required	School of Mathematics, Physics and Statistics	b1020065	Academic Physics B	test	2	32	32		Autumn 2
	required	School of Mathematics, Physics and Statistics	b1020111	Academic Physics C	non-test	2	32		32	Spring 1
	required	College of Physical Education	-----	Physical Education I to VI	non-test	3	160	160		Autumn 1 to Autumn 4
	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	Others	b1110004	Mental Health Education for University Students	non-test	2	32	16	16	Autumn 1
	Academic English(Select 1 Module for 10 Credits)	Module A	b1020003	General English III	test	3	48	48		Autumn 1
			b1020004	General English IV	test	3	48	48		Spring 1
			b1020005	General Academic English A	test	2	32	32		Autumn 2
			---	English Knowledge Expansion	non-test	2	32	32		Spring 2
		Module B	b1020002	General English II	test	3	48	48		Autumn 1
			b1020003	General English III	test	3	48	48		Spring 1
			b1020006	General Academic English B	test	2	32	32		Autumn 2
			---	English Knowledge Expansion	non-test	2	32	32		Spring 2
		Module C	b1020001	General English I	test	4	64	64		Autumn 1
			b1020002	General English II	test	3	48	48		Spring 1
			b1020003	General English III	test	3	48	48		Autumn 2
	Academic German I	College of Arts and Sciences	b1020040	Academic German I	test	3	48	48		Autumn 1
		College of Arts and Sciences	b1020041	Academic German II	test	3	48	48		Spring 1
		College of Arts and Sciences	b1020042	Academic German III	test	4	64	64		Autumn 2
		College of Arts and Sciences	b1020077	Academic Japanese I	test	3	48	48		Autumn 1

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended Semester
	Academic Japanese	College of Arts and Sciences	b1020078	Academic Japanese II	test	3	48	48		Spring 1
		College of Arts and Sciences	b1020079	Academic Japanese III	test	4	64	64		Autumn 2
Subtotal (Public Fundamental Course)						**56.5**	**1040**	**960**	**80**	
General Education	selective	Art Education Center	b0 ---	Aesthetic Education	non-test	2	32	32		Autumn, Spring
	selective	Each College	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**		

Note: The total number of credits for the first foreign language is 10, including 3 languages: Academic English, Academic German and Academic Japanese, choose the appropriate language as required; When Academic English is chosen, please choose the appropriate module in Module A, B, C.

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	School of Intelligent Manufacturing and Control Engineering	b2013182	Modern Engineering Drawing	test	3	48	32	16	Spring 1
	required	School of Intelligent Manufacturing and Control Engineering	b2011169	Fundamentals of Programming	test	3	48	32	16	Spring 1
	required	Engineering Training	b2011031	Circuits	test	4	64	48	16	Spring 1
	required	School of Intelligent Manufacturing and Control Engineering	b2011539	Engineering Mechanics	test	2	32	32	0	Autumn 2
	required	Engineering Training	b2012060	Analog Electronic Technology	test	3	48	36	12	Autumn 2
	required	Engineering Training	b2012099	Digital Electronic Technology	test	3	48	36	12	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011045	Engineering Optics	test	2	32	24	8	Autumn 3
Subtotal (Engineering Fundamental Course)						**20**	**320**	**240**	**80**	
Professional Fundamental Course	required	School of Intelligent Manufacturing and Control Engineering	b2011296	Introduction to the Measurement and Control Technology and Instrumentation program	non-test	1	16	16		Autumn 1
	required	School of Intelligent Manufacturing and Control Engineering	b2011257	Fundamentals of microcontroller technology	test	2	32	24	8	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011471	Signal and System	test	3	48	36	12	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011418	Fundamentals of precision mechanics	test	2	32	24	8	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011292	Principle of automatic control	test	3	48	36	12	Autumn 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011025	Principle of the sensor	test	3	48	32	16	Autumn 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011540	Communication technology between buses and instruments for measurement and control	non-test	2	32	24	8	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011520	Scientific and Technical Paper Writing and Literature Search	non-test	1	16	16	0	Spring 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011541	Ethics in Engineering	non-test	1	16	16		Spring 3
Subtotal (Professional Fundamental Course)						**18**	**288**	**224**	**64**	
Professional Course	required	School of Intelligent Manufacturing and Control Engineering	b2011235	Virtual instrument technology	non-test	3	48	36	12	Autumn 2
	required	School of Intelligent Manufacturing and Control Engineering	b2011162	Intelligent instrument technology	non-test	3	48	32	16	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011297	Motion control systems	test	2	32	24	8	Autumn 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011006	PLC Principles and Applications	non-test	2	32	24	8	Autumn 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011124	Digital image processing	non-test	3	48	36	12	Autumn 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011131	Error theory and data processing	test	2	32	24	8	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011419	Photovoltaic sensing and detection	non-test	2	32	24	8	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011056	Technology for industrial automation and robotics	non-test	2	32	24	8	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b2011143	Project Management	non-test	2	32	26	6	Spring 3
Subtotal(Required Professional Course)						**21**	**336**	**250**	**86**	
	Selective 6 Credits	School of Intelligent Manufacturing and Control Engineering	b2011063	Circuit design and application of photovoltaic	non-test	2	32	24	8	Autumn 3
		School of Intelligent Manufacturing and Control Engineering	b2011273	Principles and interface technology of microcomputer	test	2	32	24	8	Autumn 4
		School of Intelligent Manufacturing and Control Engineering	b2011014	Application of measurement and control technology	non-test	2	32	24	8	Spring 3

	School of Intelligent Manufacturing and Control Engineering	b2011542	Machine vision and industrial inspection	non-test	2	32	24	8	Spring 3
	School of Intelligent Manufacturing and Control Engineering	b2011543	Virtual reality technology	non-test	2	32	24	8	Spring 3
	School of Intelligent Manufacturing and Control Engineering	b2011274	Technology and System of Measurement and Control	non-test	2	32	24	8	Autumn 4
	School of Intelligent Manufacturing and Control Engineering	b2011066	Infrared technology	non-test	2	32	24	8	Autumn 4
	School of Intelligent Manufacturing and Control Engineering	b2011275	Modern control theory	test	2	32	24	8	Autumn 4
	School of Intelligent Manufacturing and Control Engineering	b2011544	Artificial intelligence technologies and applications	non-test	2	32	26	6	Autumn 4
	School of Intelligent Manufacturing and Control Engineering	b2011545	Automotive sensors and detection technology	non-test	2	32	24	8	Autumn 4
	School of Intelligent Manufacturing and Control Engineering	b2011424	Introduction to automobiles	non-test	2	32	24	8	Autumn 4
	School of Intelligent Manufacturing and Control Engineering	b2011135	Advanced Manufacturing Technology	non-test	2	32	26	6	Spring 3
	Subtotal (Selective Professional Course)				**6**	**96**	**72**	**24**	
Subtotal (Professional Course)					**27**	**432**	**322**	**110**	

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	b4090002	Basic Engineering Training B	non-test	2	48		48	Autumn 1
	required	School of Intelligent Manufacturing and Control Engineering	b4011386	Cognitive practice for measurement and control systems	non-test	2	48		48	Summer 1
	required	School of Intelligent Manufacturing and Control Engineering	b4011128	Practice for Electronic Technology	non-test	1	24		24	Summer 1
	required	School of Intelligent Manufacturing and Control Engineering	b4011145	Computer-aided design	non-test	1	24		24	Summer 1
	required	School of Intelligent Manufacturing and Control Engineering	b4011387	Data acquisition system design	non-test	2	48		48	Summer 2
	required	School of Intelligent Manufacturing and Control Engineering	b4011388	Electronic Circuit Design and Simulation	non-test	1	24		24	Summer 2
	required	School of Intelligent Manufacturing and Control Engineering	b4011389	Embedded System Design and Applications	non-test	2	48		48	Summer 2
	required	School of Intelligent Manufacturing and Control Engineering	b4011390	Microcontroller design and applications	non-test	1	24		24	Autumn 3
	required	School of Intelligent Manufacturing and Control Engineering	b4011391	Virtual instrument design and development	non-test	2	48		48	Autumn 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	b4011392	Practice for Electrical Controls and Programmable Controllers	non-test	1	24		24	Spring 3
	required	School of Intelligent Manufacturing and Control Engineering	b4011171	Printed board design and implementation	non-test	1	24		24	Summer 3
	required	School of Intelligent Manufacturing and Control Engineering	b4011393	Design and development of measurement and control systems	non-test	2	48		48	Summer 3
	required	School of Intelligent Manufacturing and Control Engineering	b4011394	Integration of vision inspection and motion control systems	non-test	2	48		48	Summer 3
	required	School of Intelligent Manufacturing and Control Engineering	b4000004	the Program of Measurement Control Technology and Instruments Innovation and Entrepreneurship	non-test	2	48		48	Autumn 4
	required	School of Intelligent Manufacturing and Control Engineering	b4011358	Industrial robot system integration	non-test	2	48		48	Autumn 4
	required	School of Intelligent Manufacturing and Control Engineering	b4011298	Comprehensive Practice for Measurement and Control	non-test	2	48		48	Autumn 4
	required	School of Intelligent Manufacturing and Control Engineering	b4011251	Measurement Control Technology and Instruments Graduation Internship and Graduation Design (Thesis)	non-test	6	288		288	Spring 4
Subtotal(Professional Practice)						**32.5**	**928**		**928**	
Extracurricular Class	required	Others	b5110001	Extracurricular Class	non-test	**1**	-	-	-	Autumn, Spring, Summer
Total						**165**	**31316 8**	**1906**	**1262**	

X. Prerequisite for Course Study

No.	Course Name	Prerequisite Course	No.	Course Name	Prerequisite Course
1	Analog Electronic Technology	Circuits	11	PLC Principles and Applications	Digital Electronic Technology
					Circuits
					Fundamentals of Programming
2	Digital Electronic Technology	Circuits	12	Digital image processing	Digital Electronic Technology
		Analog Electronic Technology			Signal and System
3	Principle of automatic control	Circuits	13	Virtual instrument technology	Digital Electronic Technology
		University Physics			Circuits
		Digital Electronic Technology			Fundamentals of Programming
		Analog Electronic Technology			
4	Principle of the sensor	Digital Electronic Technology	14	Technology for industrial automation and robotics	Principle of automatic control
		Analog Electronic Technology			Mechanical fundamentals
					Fundamentals of Programming
5	Principles and interface technology of microcomputer	Digital Electronic Technology	15	Integration of vision inspection and motion control systems	Principle of the sensor
		Analog Electronic Technology			Fundamentals of microcontroller
					Principles and interface technology of microcomputer
6	Signal and System	Calculus	16	Circuit design and application of photovoltaic	Analog Electronic Technology
		Linear Algebra			Digital Electronic Technology
					Principle of the sensor
7	Error theory and data processing	Probability Theory and Mathematical Statistics	17	Machine vision and industrial inspection	Digital Electronic Technology
					Signal and System
					Digital image processing
8	Photovoltaic sensing and detection	Digital Electronic Technology	18	Communication technology between buses and instruments for measurement and control	Fundamentals of Programming
		Analog Electronic Technology			Principle of the sensor
		Principle of the sensor			Virtual instrument technology
9	Motion control systems	Principle of automatic control	19	Engineering Optics	Advanced Mathematics
		Circuits			University Physics
10	Intelligent instrument technology	Digital Electronic Technology	20	Fundamentals of microcontroller technology	Circuits
		Analog Electronic Technology			Digital Electronic Technology
		Principle of the sensor			Analog Electronic 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 sports activities, innovative and entrepreneurial activities, voluntary activities, etc. to improve their social adaptability and enhance the competitiveness in the job market. Details are specified in Students' Manual.