Instructive Cultivation Plan for the Program of Intelligent Science and Technology

(Grade 2021)

Program Code: 080907T

I. Orientation

The program of Intelligent Science and Technology is mainly aims at intelligent information processing and cultivates application-oriented technical and innovative talents who are engaged in intelligent data analysis, intelligent system application development and other artificial intelligence related works.

II. Cultivation Objectives

1. General cultivation objective

According to the orientation of application-oriented university and combining with our school's "career-oriented higher education" philosophy, this program is based on artificial intelligence technology, takes intelligent information processing as the starting point, and aims at cultivating application-oriented technical and innovative talents who love for the motherland, are comprehensively developed on the aspects of morality, intelligence, physical education, beauty and labor, are able to systematically master the basic theories, basic knowledge, basic skills and methods of artificial intelligence, have the ability to analyze problems, solve problems, and self-learning and innovation, have strong project practice capabilities, are able to adapt to the development of artificial intelligence technology, and can be engaged in the development and design, engineering application, and engineering management, etc. of intelligent data analysis, intelligent system application development, etc. in the fields of industrial Internet, finance, technology, artificial intelligence and so on.

2. Objective of value guidance

This program is guided by the professionalism of software engineers and the spirit of model workers in the new era, and will cultivate students with team spirit and collaboration ability; standardized and standardized code writing habits; reusability and modular thinking ability; and the ability to understand the actual needs of customers. At the same time, students will develop good test habits and the ability to learn and summarize through the study.

3. Objectives to be achieved five years after graduation for students:

① Able to complete product design, compile and manage complex programs, and become a qualified programmer;

② Capable of compiling demand analysis, solutions, system hardware and software configuration and other schemes;.

③ Continue to learn relevant professional knowledge and have the ability of a junior software engineer.

III. Requirement for Graduation

1. Engineering knowledge: Able to use mathematics, natural sciences, basic and professional engineering knowledge to solve complex engineering issues.

1.1. Learn and master the professional basic knowledge and theories of advanced mathematics, linear algebra, discrete mathematics, probability theory and mathematical statistics, and the

fundamentals of artificial intelligence, etc.;

1.2. Learn and master the basic engineering technologies and applications such as the fundamentals of programming design, data structures and algorithms, the design and analysis of algorithm, data mining technology, and in-depth learning, etc.;

1.3. Learn and master the professional core knowledge of speech recognition and natural language processing, computer vision, human-computer interaction, humanoid robots and their applications in the development of humanoid robots.

2. Problem analysis: Able to apply basic principles of mathematics, natural science and engineering science to identify, express, and analyze complex engineering problems through literature research, and can obtain effective conclusions.

2.1. Able to find solutions to problems in the development of complex intelligent information processing systems through literature analysis;

2.2. Able to use basic verification test principles to analyze the rationality and feasibility of a plan.

3. Design/development solutions: Able to design solutions to complex engineering problems, design systems, units (components) or technological processes that meet specific needs, and able to reflect the sense of innovation in the design process, considering society, health, safety, legal, cultural and environmental factors.

3.1. With the project as the carrier, able to design intelligent information processing systems or humanoid robot application development software through the mastered intelligent information processing methods and technologies, and able to present them in reports, papers and other situations;

3.2. Taking into account the actual needs, in the process of intelligent information processing, enhance innovation and obtain patent applications.

4. Research: Able to study complex engineering issues based on scientific principles and by using scientific methods, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis.

4.1. Aiming at complex intelligent information processing problems, be able to design a feasible experimental plan through the professional knowledge and ability learned, and be able to collect data sets by using intelligent information collection technology;

4.2. Able to analyze and interpret data by using technologies such as data mining in intelligent processing, and draw effective conclusions.

5. Using modern tools: Able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for complex engineering problems, including the prediction and simulation of complex engineering problems, and understand their limitations.

5.1. Able to choose and use a modern technology and engineering tool in the field of machine learning according to the needs of intelligent information processing problems;

5.2. Able to use modern tools selected to simulate, analyze and predict complex information processing problems, and understand the limitations of the tools used and the improvement strategies.

6. Engineering and social interaction: Able to conduct reasonable analysis based on engineering-related background knowledge, evaluate the impact of professional engineering

practices and complex engineering problem solutions on society, health, safety, law, and culture, and understand the responsibilities that should be undertaken.

6.1. Familiar with the technical standards, intellectual property rights, laws and regulations related to computers and artificial intelligence, and have the basic qualities to engage in related works in this program;

6.2. Able to objectively evaluate the impact of intelligent science and technology projects on society, health, safety, law and culture.

7. Environment and sustainable development: Able to understand and evaluate the impact of engineering practice for complex engineering problems on the environment and sustainable development of society.

7.1. Understand the connotation and significance of environmental protection and sustainable social development, and able to practice the concepts of environmental protection and sustainable development in the process of solving intelligent information processing problems;

7.2. Able to evaluate the potential hazards to humans and the environment for actual engineering projects, and can use professional knowledge to propose constructive and scientific solutions.

8. Professional norms: Have humanities and social science literacy and a sense of social responsibility, able to understand and abide by engineering professional ethics and norms in engineering practices, and can perform their responsibilities.

8.1. Have humanities and social sciences, establish a good sense of social responsibility, love life, actively practice the socialist core value system, and have a sense of responsibility and mission to promote social progress;

8.2. Understand the professional nature and responsibilities of software and system development engineers, have legal awareness and consciously abide by professional ethics and norms in social work practices.

9. Individuals and teams: Be able to assume the roles of individuals, team members and leaders in a team with a multidisciplinary background.

9.1. Highlight the advantages of multidisciplinary and interdisciplinary, and able to assume the roles and responsibilities of individuals and members of the team under a multidisciplinary background;

9.2. Able to organize team members to carry out works in a multidisciplinary background.

10. Communication: Able to effectively communicate and exchange with industry colleagues and the public on complex engineering issues, including writing reports and design manuscripts, making statements, expressing clearly or responding to instructions; have a certain international perspective, and able to communicate and exchange in a cross-cultural context.

10.1. Able to express their ideas orally or in writing, and can effectively communicate and exchange with industry colleagues and the public on complex engineering issues;

10.2. Master at least one foreign language, have a basic understanding on the international situation of intelligent science and related fields, and able to communicate and exchange in a cross-cultural context.

11. Project management: Understand and master the principles of engineering management and economic decision-making methods, and able to apply them in a multi-disciplinary environment.

11.1. Understand and master important engineering management principles and economic decision-making methods involved in intelligent science and technology;

11.2. Able to apply relevant engineering management principles and economic decision-making methods in a multidisciplinary environment.

12. Lifelong learning: Have the consciousness of independent learning and lifelong learning, and have the ability to continuously learn and adapt to development.

12.1. Able to correctly understand the necessity of self-exploration and learning, have the awareness of autonomous learning and life-long learning; master the methods of autonomous learning, understand the ways of knowledge expansion and ability improvement, and able to maintain interest in new technologies;

12.2. Able to take appropriate methods for independent learning, adapt to development, and able to show the effectiveness of independent learning and exploration according to personal or professional development needs.

IV. Schooling System

Four-year undergraduate education

V. Length of Study

Flexible study period, generally four years, the minimum length of flexibility shall not be less than three years, the maximum thereof shall not be more than six years.

VI. 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 extracurricular class according to the requirements of the instructional training plan, and the total credits must reach 152 credits for graduation; those who meet the requirements for bachelor's degree can be conferred Bachelor of Engineering.

VII. Major Disciplines

Computer Science and Technology

VIII. Core Courses

1. Fundamentals of Programming Design

This course mainly teaches the basic concepts and basic techniques of programming design. Taking C language as an example, this course requires students to be relatively proficient in its grammar and semantics and master the basic methods of structured programming. The knowledge points of this course include data types, control structures, functions, arrays, files, operating mechanisms and preliminary debugging. Through the study of this course, students will master some common programming design skills, master programming techniques of top-down refinement, cultivate good programming habits and styles, and be able to master the basic process of computer programming operations, as well as the basic methods of eliminating grammatical and semantic errors.

2. Data Structure and Algorithm

This course mainly teaches data construction methods and algorithms for operating these data structures. The focus of this course is on various typical data structures and their storage structures,

related algorithms and basic spatiotemporal analysis, including linear tables and their derived structures (stacks, queues, strings and multidimensional arrays), trees and graphs, and typical algorithms for search and internal sorting. The focus is to enable students to further master relatively standardized algorithm design skills and improve their logic thinking skills on the basis of the existing programming capabilities.

3. Introduction to Database Systems

This course mainly teaches the basic concepts and theories of database system, including the progress of data management, composition of database system, three basic data models (with an emphasis on the relational model), normative design of rational schema(including function dependence, normal form, multi-value dependence, joint dependence, presentation theory), relational database system (focusing on relational database theory, SQL and query optimization), database security and integrity constraints, database design, database technology development trend and so on.

4. Fundamentals of Artificial Intelligence

This course mainly describes the basic concepts and basic techniques of artificial intelligence. The main contents include: history of artificial intelligence, problem representation and solution, expert systems, reasoning methods, machine learning methods, as well as explanation learning, analog learning, concept learning, machine learning and other major symbolic learning methods. Through the study of this course, students will be able to understand the concepts, research fields, and main applications of artificial intelligence; master problem representation, search and other reasoning and solving techniques; understand the structure and construction methods of expert systems; understand new theories and methods of artificial intelligence, the development trend and the basic ethics in the field of artificial intelligence.

5. Pattern Recognition

This course mainly introduces the purpose and significance of pattern recognition, enables students to understand the concept and process of pattern recognition, master the extraction and selection of pattern features, understand the basic principles and methods of statistical pattern recognition and structural pattern recognition, and master several typical algorithms of geometric classification and probability classification. Master the typical algorithm of artificial neural network and its application in pattern recognition, understand the basic thought of cluster analysis, master several typical algorithms of cluster analysis. By learning the basic theories and methods of pattern recognition and application examples, students are trained to solve practical problems in their own major and related fields by using pattern recognition methods and skills.

6. In-depth Learning and Application

This course mainly introduces the basic knowledge and implementation tools of deep learning. The contents of this course mainly include: simple neural network, backward propagation algorithm and its implementation, activation function and loss function, and commonly used optimization methods, such as gradient descent method, stochastic gradient method, etc. This course focuses on enabling students to understand the development of deep learning, the main application areas, basic concepts and principles of deep learning, and be able to apply deep learning tools to solve natural language processing and image processing problems.

7. Data Mining Technology

This course mainly introduces the data mining related content and implementation technology involved in intelligent science and technology, specifically including: data preprocessing, classification prediction, association mining, cluster analysis, etc. Through the study of this course, students will understand the overall overview of data mining technology, understand the main applications of data mining technology and current research hot issues, understand the

development direction of data mining technology, and master the most basic concepts, algorithm principles and technical methods.

8. Natural Language Processing

This course is the core course of intelligent science and technology program, mainly about the basic principles and main implementation methods of speech recognition and natural language understanding. The contents of this course include: regular expressions, part-of-speech tagging, syntactic analysis, HMM algorithms, information extraction, and machine translation, etc., intending to learn and understand natural language from the perspective of statistical learning. Through the study of speech recognition and natural language understanding, students will master the basic knowledge, basic principles and basic methods of natural language processing, and cultivate students' ability to use modern tools to realize natural language understanding and solve practical problems.

9. Humanoid Robot

As a professional course of intelligence and science and technology, this course mainly teaches the brief history and concepts of machine intelligence and robots; discusses the characteristics, research ideas and research contents of various machine simulation research methods, including structure simulation, function simulation, behavior simulation, mechanism simulation, and the integration of these intelligent simulation methods. Students will learn the mathematical foundation of robot mathematics, representation and solution of robot motion equations, robot dynamics equations, and robot programming, as well as the cutting-edge issues, including machine emotions, intelligent information networks, intelligent robots and unsolved problems, so as to further stimulate students' interest and enthusiasm in the subject field and build professional self-confidence.

IX. Main Practice

Program design and practice, social practice, data structure and algorithm course practice, database system course practice, artificial intelligence course practice, object-oriented technology practice, intelligent statistical technology course practice, humanoid robot course practice, data mining technology course practice, comprehensive design of intelligent terminal software, humanoid robot comprehensive design, graduation practice and graduation design (thesis).

X. Course Structure and Course Hours (excluding extracurricular class)

Category	Total Credit	%	Total Course Hours	Theory Learning	Practical Training
Public Course	50.5	33	**960**	**896**	**64**
Basic Course	27	18	432	360	72
Professional Course	26	17	416	272	144
Professional Practice	37.5	25	**904**	**0**	**904**
General Course	10	7	160	160	0
Total	151	100	2872	1688	1184
Theory : Practice(%)	59：41				

XI. Teaching Schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Recommended Semester
Public Course	Required	School of Marxism	b1080001	Basic Principles of Marxism	Test	3	48	42	6	Spring 1
	Required	School of Marxism	b1080003	Ideological and Moral Cultivation and Basic Law Education	Non-test	3	48	42	6	Spring 1
	Required	School of Marxism	b1080006	Outline of Chinese Modern History	Non-test	3	48	42	6	Autumn 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 (Module 1～4)	Non-test	2	32	28	4	Autumn 1～spring 2
	Required	School of Marxism	b1080008	Labor Education A	Non-test	0.5	16	16		Autumn 2
	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 1
	Required	College of Arts and Sciences	b1020013	Probability Theory and Mathematical Statistics	Test	2	32	32		Autumn 2
	Required	College of Arts and Sciences	b1020018	College Chinese	Non-test	2	32	32		Spring 1
	Required	College of Arts and Sciences	b1020063	College Physics A(Module 2)	Test	3	48	48		Spring 1
	Required	College of Arts and Sciences	b1020065	College Physics B	Test	2	32	32		Autumn 2
	Required	College of Arts and Sciences	b1020066	College Physics C	Non-test	1	32		32	Autumn 2
	Required	School of Physical Education	-----	Physical Education I～VI	Non-test	3	160	160		Autumn 1～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
	★English (Selective 1 Module 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 Development	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 Development	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
	★College German	College of Arts and Sciences	b1020040	College German I	Test	3	48	48		Autumn 1
		College of Arts and Sciences	b1020041	College German II	Test	3	48	48		Spring 1
		College of Arts and Sciences	b1020042	College German III	Test	4	64	64		Autumn 2
	★College Japanese	College of Arts and Sciences	b1020077	College Japanese I	Test	3	48	48		Autumn 1
		College of Arts and Sciences	b1020078	College Japanese II	Test	3	48	48		Spring 1
		College of Arts and Sciences	b1020079	College Japanese III	Test	4	64	64		Autumn 2
Sub-total (public courses)						**50.5**	**960**	**896**	**64**	
General	Required	Art Education Center	b0-----	Aesthetic Education	Non-test	2	32	32		Autumn, spring

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Recommended Semester
Course	Selective	Every school	b0-----	Social Science and Humanities Literacy	Non-test	4	64	64		Autumn, spring
				Natural Science and Technological Innovation	Non-test	2	32	32		Autumn, spring
	Required	School of Computing and Information	b1020018	Scientific Paper Writing and Document Retrieval	Non-test	2	32	32		Autumn 1
Sub-total (general courses)						**10**	**160**	**160**		

(★Note: The first foreign language has a total of 10 credits, including College English, College German, and College Japanese. Choose the appropriate language according to your needs; among them, if you choose College English, please choose the appropriate module in module ABC)

XI. Teaching Schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Recommended Semester
Basic Course	Required	School of Computer and Information Engineering	b2012182	Introduction to Intelligent Science and Technology	Non-test	1	16	16	0	Autumn 1
	Required	School of Computer and Information Engineering	b2012018	Fundamentals of Programming Design	Test	4	64	40	24	Autumn 1
	Required	College of Arts and Sciences	b1020022	Discrete Mathematics	Non-test	2	32	32	0	Autumn 1
	Required	School of Computer and Information Engineering	b2012084	Data Structure and Algorithm	Test	3	48	48	0	Spring 1
	Required	School of Computer and Information Engineering	b2090006	Fundamentals of Circuit Analysis	Test	2	32	28	4	Spring 1
	Required	School of Computer and Information Engineering	b2012088	Introduction to Database Systems	Test	3	48	32	16	Autumn 2
	Required	School of Computer and Information Engineering	b2012106	Design and Analysis of Algorithms	Test	2	32	32	0	Autumn 2
	Required	School of Computer and Information Engineering	b2012201	Fundamentals of Artificial Intelligence	Test	2	32	20	12	Spring 2
	Required	School of Computer and Information Engineering	b2012062	Pattern Recognition	Test	3	48	42	6	Autumn 3
	Required	School of Computer and Information Engineering	b2012045	Computer Network	Test	3	48	42	6	Spring 3
	Required	School of Computer and Information Engineering	b2012046	Principles of Computer Organization	Test	2	32	28	4	Spring 3
	Required	School of Computer and Information Engineering	b2012016	Operating System	Non-test	1	16	16	0	Autumn 1
Sub-total (basic courses)						**27**	**432**	**360**	**72**	
Professional Course	Required	School of Computer and Information Engineering	b2012202	Object-oriented Programming	Non-test	3	48	36	12	Spring 1
	Required	School of Computer and Information Engineering	b2012308	Fundamentals of Intelligent Development	Non-test	2	32	20	12	Spring 1
	Required	School of Computer and Information Engineering	b2012154	Intelligent Information Acquisition Technology	Non-test	2	32	20	12	Autumn 2
	Required	School of Computer and Information Engineering	b2012027	Humanoid Robot	Non-test	3	48	30	18	Spring 2
	Required	School of Computer and Information Engineering	b2012152	Intelligent Statistical Technology	Non-test	2	32	20	12	Spring 2
	Required	School of Computer and Information Engineering	b2012070	Introduction to Software Engineering	Test	2	32	28	4	Spring 2
	Required	School of Computer and Information Engineering	b2012309	Intelligent Terminal Application Development	Non-test	2	32	16	16	Spring 2
	Required	School of Computer and Information Engineering	b2012310	Natural Language Processing	Non-test	2	32	24	8	Autumn 3
	Required	School of Computer and Information Engineering	b2012092	Data Mining Technology	Non-test	2	32	20	12	Autumn 3

	Required	School of Computer and Information Engineering	b2012203	Computer Vision	Non-test	2	32	18	14	Autumn 3
	Required	School of Computer and Information Engineering	b2012311	In-depth Learning and Application	Non-test	2	32	20	12	Spring 3
	Sub-total (required professional courses)					**24**	**384**	**252**	**132**	
	★Selective by module	Module A	b2012303	Intelligent Human-computer Interaction Technology	Non-test	2	32	20	12	Autumn 4
		Module B	b2012204	Fundamentals of Big Data Technology	Non-test	2	32	32		Autumn 4
	Sub-total (professional module courses)					**2**	**32**	**32**		
Sub-total (professional courses)						**26**	**416**	**272**	**144**	

XI. Teaching Schedule (3)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Recommended Semester
Practical Training	Required	Engineering Training Center	b4090002	Basic Engineering Training B	Non-test	2	48		48	Autumn 1
	Required	School of Computer and Information Engineering	b4012186	Labor Education B	Non-test	0.5	16		16	Spring 3
	Required	School of Computer and Information Engineering	b4012005	Program Design and Practice	Non-test	2	48		48	Spring 1
	Required	School of Computer and Information Engineering	b4012050	Data Structure and Algorithm Course Practice	Non-test	2	48		48	Summer 1
	Required	School of Computer and Information Engineering	b4012054	Database System Course Practice	Non-test	2	48		48	Summer 1
	Required	School of Computer and Information Engineering	b4012190	Fundamentals of Intelligent Development Course Practice	Non-test	2	48		48	Autumn 2
	Required	School of Computer and Information Engineering	b4012152	Object-oriented Programming Practice	Non-test	2	48		48	Autumn 2
	Required	School of Computer and Information Engineering	b4012042	Artificial Intelligence Practice	Non-test	1	24		24	Summer 2
	Required	School of Computer and Information Engineering	b4012191	Comprehensive Design of Intelligent Terminal Software	Non-test	2	48		48	Summer 2
	Required	School of Computer and Information Engineering	b4012018	Humanoid Robot Course Practice	Non-test	2	48		48	Autumn 3
	Required	School of Computer and Information Engineering	b4012030	Computer Network Course Practice	Non-test	2	48		48	Spring 3
	Required	School of Computer and Information Engineering	b4000020	Innovation and Entrepreneurship in Intelligent Science and Technology	Non-test	2	48		48	Spring 3
	Required	School of Computer and Information Engineering	b4012115	Data Mining Technology Course Practice	Non-test	2	48		48	Spring 3
	Required	School of Computer and Information Engineering	b4012082	Humanoid Robot Comprehensive Design	Non-test	2	48		48	Summer 3
	Required	School of Computer and Information Engineering	b4012084	Graduation Practice and Graduation Design (Thesis) of Intelligent Science and Technology	Non-test	12	288		288	Spring 4
Sub-total (Practical Training)						**39.5**	**952**		**952**	
Extracurricular Class	Required	Others	b5110001	Extracurricular Class	Non-test	1	-	-	-	Autumn, spring, summer
Total						**151**	**2840**	**1672**	**1168**	

★1. Elective instructions for professional module courses and practical module courses:

Professional courses are divided into modules according to different ability requirements. Students must select one of the modules and attain the required credits for that module. Professional practice modules must be selected according to the corresponding professional course modules.

1. Module A: Service Robot Module

2. Module B: Data Application Development Module

2. Description of the interconnectedness between the courses and professional certificates:

Students who have passed the Fundamentals of Programming Design, Program Design and Practice courses can participate in the vocational qualification certificate assessment related to the program.

Students who have obtained a software engineer qualification certificate can apply for exemption from the Introduction to Software Engineering course and obtain corresponding credits.

XII. Prerequisite for Course Study

No.	Course Name	Prerequisite Course	No.	Course Name	Prerequisite Course
1	Data Structure and Algorithm	Fundamentals of Programming Design	6	Computer Vision	Fundamentals of Programming Design
					Fundamentals of Artificial Intelligence
2	Operating System	Data Structure and Algorithm	7	Intelligent Terminal Application Development	Data Structure and Algorithm
		Design and Analysis of Algorithms			Object-oriented Programming
3	Introduction to Database Systems	Data Structure and Algorithm	8	Humanoid Robot Comprehensive Design	Humanoid Robot
					Speech Recognition and Natural Language Processing
					Computer Vision
4	Object-oriented Programming	Fundamentals of Programming Design	9	Introduction to Software Engineering	Fundamentals of Programming Design
		Data Structure and Algorithm			Object-oriented Programming
5	Design and Analysis of Algorithms	Fundamentals of Programming Design	10	Fundamentals of Artificial Intelligence	Fundamentals of Programming Design
		Data Structure and Algorithm			Discrete Mathematics

XIII. Credits for 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 service activities, etc. to improve their social adaptability and enhance the competitiveness in the job market. Please refer to the Students' Manual for details of regulations on *Implementation Measures(Trial) of the Credits for Extracurricular Classes of Shanghai Polytechnic University*.