Instructive Cultivation Plan for the Program of Information Management and Information Systems

(Grade 2020)

Program code: 120102

1. Orientation

Based on the CDIO training model, this program takes the life cycle of information system from research and development to operation as the carrier, and takes learning as the focus, to train the applied technical talents with the ability of information system development, design, operation and maintenance.

2. Cultivation Objectives

2.1 General Objective

This program is based on the training objectives of the CDIO model, so that students may, after training, acquire the basic engineering knowledge, personal ability, interpersonal and team skills and the whole CDIO process ability which are necessary to engineers. The program aims to cultivate advanced applied technical talents who have a sense of social responsibility and international vision; have a broad professional foundation and comprehensive humanistic literacy; have a good mathematical foundation and solid knowledge of management, economics, information technology theory and application ability; master the methods and technologies for information system planning, analysis and design; have the certain ability to develop, implement and maintain information systems and information resources; may be able to engage in the development, design, implementation, operation and maintenance of information systems in various enterprises and institutions.

2.2 Cultivation Value

This program cultivates students with firm value and belief, love the motherland, have lofty ideological and moral character, master advanced scientific knowledge, so as to promote the informatization process of Chinese enterprises to make the management and informatizaiton of them to a better tomorrow.

2.3 Five-Year Goal after Graduation

2.3.1 Be able to plan, design, implement and manage information systems independently;

2.3.2 Have good scientific research literacy and teamwork spirit, may undertake the overall structure design and team organization for the informatization construction of various enterprises;

2.3.3 Have the professional ability of data governance, be competent for the requirements analysis and data analysis related to data governance.

3. Requirements for Graduation

The indexes for each graduation requirement are determined as follows in accordance with 12

general standards for professional certification and the extension to the core competences and qualities of 12 graduation requirements according to the actual situations of our university:

1: Ability to acquire and apply engineering knowledge: be able to apply mathematics, natural science, engineering fundamentals and expertise to solve engineering problems.

1-1: Master the mathematical knowledge and application of linear algebra, calculus, probability theory and mathematical statistics for solving complex information engineering problems;

1-2: Master the knowledge and application of natural science for solving complex information engineering problems;

1-3: Master the basic knowledge and application of computer science related to the information technology for solving complex information engineering problems.

2: Ability to analyze problems: be able to apply the basic principles of mathematics, natural science and engineering science, and identify, express, and analyze complex engineering problems through literature research to obtain effective conclusions.

2-1: Be able to use relevant knowledge to identify the information system process, carry out the modeling of information system process;

2-2: Be able to find complex information engineering solutions by analyzing literature;

2-3: Be able to analyze the rationality of selected solutions by using the basic principle.

3: Ability to design/develop innovative solutions: be able to design solutions for complex engineering problems; design systems, units (components) or processes that meet specific needs; reflect innovative awareness in design links; take into account social, health, safety, legal, cultural, and environmental factors.

3-1: Master the basic method of engineering design, may present the design method in various forms;

3-2: Be able to design solutions against the specific characteristics of complex information engineering problems, design information systems and appropriate management processes that meet specific needs;

3-3: Be able to integrate social, health, safety, legal, ethical, cultural and environmental factors in the design to reflect a certain sense of innovation.

4: Scientific research ability: be able to study complex information engineering problems based on scientific principles and scientific methods, including designing experiments, analyzing and interpreting data, and obtain reasonable and effective conclusions through information synthesis.

4-1: Be able to design feasibility scheme based on scientific principles and scientific methods for complex information engineering problems, and master general demand investigation and research methods;

4-2: Be able to correctly analyze and solve information engineering problems based on scientific principles and methods;

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

5-1: Be able to develop or select one or more modern technologies and engineering tools according to the specific needs of complex information engineering problems;

5-2: Be able to use the appropriate tools selected to model, analyze and predict complex information engineering problems, and understand the limitations and improvements of the tools

selected and used.

6: Ability to analyze and evaluate the relationship between engineering and society: be able to make reasonable analysis based on the knowledge related to information engineering background, evaluate the impact of professional engineering practice and complex environmental engineering problem solutions on society, health, safety, law and culture, and understand the responsibilities to be taken.

6-1: Experience in the internship and social practice of information management engineering;

6-2: Be familiar with the technical standards, intellectual property rights, laws and regulations related to information management engineering and information management, and use them to analyze and identify the potential social, health, safety, legal and cultural impacts of the development and application of new technologies;

6-3: Be able to objectively evaluate the impact of information management projects on society, health, safety, law and culture.

7: Ability to understand and evaluate environment and sustainable development: be able to understand and evaluate the impact of professional engineering practices complex information management engineering problems on environmental and social sustainable development.

7-1: Understand the connotation and significance of environmental and social sustainable development, and fulfill the concept of environment and sustainable development in solving complex information management engineering problems;

7-2: Be able to evaluate the hidden dangers to human beings and environment for actual engineering projects, and use professional knowledge to put forward constructive and scientific solutions.

8: Quality to abide by professional norms: achieve the humanistic and and social science literacy, social responsibility; be able to understand and abide by engineering professional ethics and norms in engineering practice, and fulfill their responsibilities.

8-1: Have humanistic literacy, understand and fulfill the socialist core values, respect for life, care for others, advocate justice, integrity, safeguard national interests, with a sense of responsibility and mission to promote social progress;

8-2: Understand the professional nature and responsibility of information management engineer, have legal consciousness, and abide by professional ethics and norms in the practice of information engineering.

9: Ability to assume individual and team roles: be able to assume individual, team member, and responsible roles in a multidisciplinary team.

9-1: Be competent for the roles and responsibilities of individuals and team members in a multidisciplinary team;

9-2: Be able to organize team members to work in a multidisciplinary context.

10: Ability to communicate and exchange effectively: be able to communicate and exchange effectively with industry colleagues and the public on complex information management engineering issues, including prepare reports and design documents, presentations, clear expression or response of instructions; have an international view, be able to communicate and exchange in a cross-cultural context.

10-1: Be able to express own ideas orally or in writing, and communicate effectively with industry colleagues and the public on complex engineering issues;

10-2: Master at least one foreign language, have a basic understanding of the international

situations of information engineering and related fields, and be able to communicate and exchange in a cross-cultural context.

11: Ability to manage engineering projects: understand and master engineering management principles and economic decision-making methods, and apply them in multidisciplinary environment.

11-1: Understand and master the important engineering management principles and economic decision-making methods involved in information management engineering activities;

11-2: Be able to apply the relevant engineering management principles and economic decision-making methods to multidisciplinary environment.

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

12-1: Be able to correctly understand the necessity of self-exploration and learning, have the consciousness of autonomous learning and lifelong learning, master the methods of autonomous learning, understand the ways of knowledge expansion and ability improvement, and keep interest in new sciences and technologies;

12-2: Be able to take appropriate ways to learn independently, adapt to development, and show the effect of autonomous learning and exploration to meet personal or career development needs.

4. Schooling System
Four-year undergraduate education

5. Duration
Generally four years. The shortest duration is not less than three years, and the longest is not more than six years.

6. Graduation and Academic Degree Awarding
Minimum Credits of Curriculum (required courses, practical trainings & extracurricular classes): 152.

Degree Awarded: Bachelor of Management

7. Major Disciplines
Management Science and Engineering, Computer Science and Technology

8. Core Courses
8.1 Management
The students are expected to master the basic functions, theory and methods of management, laying a basis for the further study of professional courses. The main course contents include: development of management thoughts, basic features of management works and technical requirements of management staff, the basic procedures and theory of planning, the procedure and methods of effective decision, the basic mode of organizational structure and the basic theory of organization design, the basic framework of HR management, the basic theory of motivation and basic skills of communication, the basic theory and methods of control, the leadership work and others.

8.2 Applied Statistics

The course mainly include the fundamentals and method of Statistics, collection and analysis of statistic data and related application methods. The course trains students to master the basic analytic and problem-solving ability of statistic data. Students are required to learn the main contents of the survey, collection and analysis in Statistics by learning the fundamentals and methods of Applied Statistics.

8.3 Operational Research

Students are required to master the basic modeling technology, quantitative analysis and optimization method, solve basic practical problems with quantitative methods, laying a basis and providing necessary tools and methods for the learning of following professional courses. The main course contents include: linear planning, dual problem, transportation problems, application of linear planning in management and integral planning. Through the course, the students are required to understand the basic theorem of linear planning, main theorems of dual problems, application of linear planning in management, modeling of objective planning and application of integral planning, economic significance of unbalanced transportation problems and shadow price, solutions of assignment problems with standard linear planning and Hungary algorithm, the basic solutions of integral planning, the graphic method of linear planning, initial solution with two-phase methods, optimum solution with simplex methods, initial solution of traffic problems with minimum elements methods, and the optimum solution of traffic problems with potential methods.

8.4 Operations Management

This course mainly introduces the theory of modern production management and latest achievements. It helps the students understand the contents of production management, the production management thoughts and methods of manufacturing field and service field. This course also systematically introduces the new methods and ideas with large influence in the field of production operation management and the organization of production line, methods of work research, methods of production and operational plan, MRP, MRP II and so on.

8.5 Management of Information System

Students are required to learn the basic concepts, property, features, types and progressive processes of information system from the perspectives of management and to have a clear idea of the function of information management in organization. They will learn to think of and solve management problems from the perspective of information system and to know the technical fundamentals of information system, including hardware, software, network, data management and analysis tools. They will also get familiar with the main application of current information systems in organizations, especially the strategic and integrated application system and e-commerce influencing the competitiveness of organizations and understand the individualized development of information system, implementation of standardized system, operation and maintenance of informationlized project management and information system, especially the responsibility and functions of users in the whole process of management informationalization.

8.6 Information System Analysis and Design

This course covers the introduction of information system engineering, the planning and development, analysis and design of information system, the object-oriented analysis and design method, the execution, operation and management of information system, the latest development of information system.

8.7 Database Theory and Application

This course requires the students to master the basic theory and knowledge of database and relational database, skillfully use SQL language, have the basic ability to design database mode and develop database application system, understand the basic methods of database management and understand the basic concepts of database warehouse.

8.8 Management Cost Accounting

This course requires the students to learn the basic theory and fundamental ability of cost accounting. They will become skilled talents who are able to do practical operation in the accounting of cost management. The focus of the course is cost accounting and cost management.

8.9 ERP Theory and Application

Students are required to learn the concept and development of ERP and general composition of ERP system. They are expected to distinguish the relation and difference between MRP, MRP II and ERP. Students will also learn the production planning mode of manufacturing industry and product life cycle; basic ERP data environments of material main files, material list, technological process, working center, lead time, preservation record, plan management, material management, job shop management, purchasing management and cost management; type selection strategy and development principles of ERP projects; organizational system, implementation plans and development procedures of ERP projects; inspection and evaluation system of ERP implementation effects, management specification and working principles of ERP operation; systematical structure and module function of ERP software; introduction of ERP software and simulated internship instruction.

9. Practical Training

Specialized practice, Basic Specialized practice, Comprehensive Specialized practice, Practice of Innovative Projects, Participation into the national contests related to the information management and information system, TERP 10 authentication training and qualification exams of SAP ERP, Enterprise-project-based Internship, Course Paper, Graduation Thesis and others. Related main courses include: System Development Project I, System Planning Project, Database Application Project, Data Processing Project, Implementation, Operation and Maintenance Project, System Development Project II, Data Visualization Project, etc.

10. Course Category and Course Hours (excluding extracurricular classes)

Category	Total Credit	%	Total Course Hours	Theory Learning	Practical Training
Public Course	50.5	33	960	896	64
Basic Course	29	19	464	428	36
Professional Course	34	23	544	398	146
Practical Training	27.5	18	808	0	808
General Course	10	7	160	160	0
Total	151	100	2936	1882	1054
Theory : Practice（%）	64:36				

11. Teaching Schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
Public Course	Required	School of Marxism	b1080001	Basic Theory of Marxism	test	3	48	42	6	spring 1
	Required	School of Marxism	b1080003	Moral Cultivation and Basic Legal Knowledge	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	b1080004	Introduction to the Thought of Mao Zedong and Theories of Socialism with Chinese Characteristics I	test	3	48	42	6	autumn 2
	Required	School of Marxism	b1080007	Introduction to the Thought of Mao Zedong and Theories 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 2
	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	b1020062	College Physics A (Module 1)	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	Department of Physical Education	------	PE I-VI	non-test	3	160	160		autumn 1 - autumn 4
	Required	Other	g1110003	Military Skills	non-test	0.5	2W			autumn 1
	Required	College of Arts and Sciences	g1110002	Military Theories	non-test	0.5	32	32		autumn 2
	* College English (Selective	Module A	b1020003	General English III	test	3	48	48		autumn 1
			b1020004	General English IV	test	3	48	48		spring 1

			Code	Course	Type	Credits	Hours			Term
, 1 module required, 10 credits)			b1020005	General Academic English A	test	2	32	32		autumn 2
			------	English Extension	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 Extension	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	General German I	test	3	48	48		autumn 1
	College of Arts and Sciences		b1020041	General German II	test	3	48	48		spring 1
	College of Arts and Sciences		b1020042	General German III	test	4	64	64		autumn 2
* College Japanese	College of Arts and Sciences		b1020077	General Japanese I	test	3	48	48		autumn 1
	College of Arts and Sciences		b1020078	General Japanese II	test	3	48	48		spring 1
	College of Arts and Sciences		b1020079	General Japanese III	test	4	64	64		autumn 2
Sub-total (Public Course)						**50.5**	**960**	**896**	**64**	
General Course	Selective	Other	b0----	Social Sciences and Humanities Literacy (4 credits) Natural Science and Technological Innovation (4 credits) Public Arts (2 credits)	non-test	10	160	160	0	autumn, spring
Sub-total (General Course)						**10**	**160**	**160**	**0**	

(*Notes: 1. A total of 10 credits for the First Foreign Language, including College English, College German and College Japanese, students may choose one from the above-mentioned three foreign language according to their own needs; students, who choose College English as their First Foreign Language, shall select one module from Module A, Module B and Module C to learn. 2. For students of a program taught in English, they must select Module A.)

11. Teaching Schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
Basic Course	Required	College of Engineering	b2011242	Introduction to Information Management and Information Systems	non-test	1	16	14	2	autumn 1
	Required	College of Engineering	b2011277	Management (in English)	test	3	48	48		autumn 1
	Required	College of Engineering	b2011158	Operation Research	non-test	3	48	48		spring 2
	Required	College of Engineering	b2011372	Operations Management (in English)	test	3	48	48		spring 2
	Required	College of Engineering	b2011278	Applied Statistics	test	3	48	48		spring 2
	Required	College of Engineering	b2011457	Management Cost Accounting	test	4	64	64		spring 2
	Required	College of Engineering	b2011487	Industrial Internet	test	3	48	48		autumn 3
	Required	College of Engineering	b2011118	Database Theory and Application	test	3	48	48		autumn 2
	Required	College of Engineering	b2011488	Intelligent Logistics Product Development and Application	test	3	48	30	18	spring 2
	Required	College of Engineering	b2011169	Foundation of Programming	test	3	48	32	16	spring 1
Sub-total (Basic Course)						**29**	**464**	**428**	**36**	
Professional Course	Required	College of Engineering	b2011060	Management Information System (in English)	test	2	32	32		spring 2
	Required	College of Engineering	b2011458	Information System Analysis and Design	non-test	3	48	30	18	autumn 3
	Required	College of Engineering	b2011287	ERP Principle and Application	test	3	48	32	16	autumn 3
	Required	College of Engineering	b2011286	Information Statistics and Analysis Technology	test	3	48	48		spring 2
	Required	College of Engineering	b2011282	Data, Model and Decision	test	3	48	48		autumn 3
	Required	College of Engineering	b2011450	Data Visualization Design	non-test	3	48	24	24	spring 3
	Required	College of Engineering	b2011285	Business Intelligence Analysis	test	3	48	48		spring 3
	Required	College of Engineering	b2011448	Information System Project Management	non-test	2	32	24	8	spring 3
Sub-total (Required Professional Course)						**22**	**352**	**286**	**66**	
	*Selective (12 credits)	Module A	b2011459	WEB Application Design	non-test	2	32	16	16	spring 3
			b2011472	Data Structure and Algorithm	test	3	48	32	16	spring 3
			b2011084	Computer Network and Application	non-test	2	32	26	6	autumn 3
			b2011390	Object-Oriented Programming Language	test	3	48	24	24	autumn 3
			b2011452	Software Testing Technology	non-test	2	32	16	16	autumn 4
		Module B	b2011088	Customer Relation Management	non-test	2	32	16	16	autumn 4
			b2011489	Business Process Modeling and Analysis	non-test	2	32	20	12	spring 3
			b2011453	Database Management and Maintenance	non-test	3	48	30	18	autumn 3
			b2011460	Supply Chain and Logistics Management	non-test	3	48	24	24	spring 3
			b2011035	E-commerce	non-test	2	32	24	8	autumn 3
		Module C	b2011114	Market Research and Forecasting	non-test	2	32	24	8	autumn 3
			b2011454	Big Data Analysis Technology	non-test	2	32	16	16	spring 3
			b2011455	Data Governance	non-test	2	32	20	12	spring 3
			b2011456	Python Language Design	non-test	3	48	24	24	autumn 3
			b2011266	Data Warehouse and Data Mining	non-test	3	48	30	18	autumn 4
Sub-total (Selective Professional Course)						**12**	**192**	**112**	**80**	
Sub-total (Professional Course)						**34**	**544**	**398**	**146**	

Notes: The two practices for program introduction will be carried out in smart factories.

11. Teaching Schedule (3)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
Practical Training	Required	College of Engineering	b4000018	Innovation and Entrepreneurship of Information Management and Information Systems	non-test	2	48		48	spring 3
	Required	College of Engineering	b4090002	Basic Engineering Training A	non-test	2	48		48	spring 1
	Required	College of Engineering	b4011200	Office Software Application Project	non-test	2	48		48	summer 1
	Required	College of Engineering	b4011338	Practice of MES Project	non-test	2	48		48	summer 2
	Required	College of Engineering	b4011319	Primary Project of System Development	non-test	3	72		72	summer 1
	Required	College of Engineering	b4011320	Database Application Project	non-test	3	72		72	summer 2
	Required	College of Engineering	b4011321	Data Visualization Project	non-test	2	48		48	summer 3
	Required	College of Engineering	b4011067	Comprehensive Practice in Enterprises	non-test	2	48		48	autumn 4
	Required	College of Engineering	b4011339	Labor Education B	non-test	0.5	16		16	spring 3
	Required	College of Engineering	b4011254	Graduation Internship and Graduation Design (Thesis) of Information Management and Information Systems	non-test	6	288		288	spring 4
	Sub-total (Required Practical Training)					24.5	736		736	
	Selective (3 credits)	Module A	b4011322	Comprehensive Project of System Development	non-test	3	72		72	summer 3
		Module B	b4011323	Implementation, Operations and Maintenance Project	non-test	3	72		72	summer 3
		Module C	b4011324	Data Processing Project	non-test	3	72		72	summer 3
	Sub-total (Selective Practical Training)					3	72		72	
	Sub-total (Practical Training)					27.5	808		808	
Extracurricular Class	Required	Other	b5110001	Extracurricular Classes	non-test	1				autumn, spring, summer
Total						152	2936	1882	1054	

*Guidance for the selective modules of professional course and practical training:

There are different modules for professional course to be selected according to different ability requirements, students must select one module to learn and achieve the credits required by the module. The selective modules of practice training must be selected according to the corresponding module of professional course.

Module A: Students are trained to master the ability to design and implement information system innovation projects by applying the professional knowledge, methods and tools learned in this module.

Module B: Students are trained to be familiar with the business management process and principle of ERP system, and improve the ability for implementation and maintenance of information systems, on the basis of ERP principle and application course, taking the implementation and maintenance of information systems as the direction.

Module C: Students are trained to improve the data analysis ability and be competent for data management, on the basis of management and economic theories.

12. Prerequisite for Course Study

No.	Course Name	Prerequisite Course	No.	Course Name	Prerequisite Course
1	Basic Program Design	Calculus A1	11	Data Warehouse and Data Mining	Management Information System
		Calculus A2			Information Statistics and Analysis Technology
		Introduction to Computer			Database Theory and Application
2	Operations Management	Management	12	Management Information System	Management
		Operational Research			Database Theory and Application
					Introduction to Computer
3	Computer Network and Application	Basic Project Design	13	Analysis and Design of Information System	Management Information System
		Introduction to Computer			Basic Program Design
		Calculus A1			Database Theory and Application
		Calculus A2			
4	Data Structure and Algorithm	Basic Program Design	14	E-commerce	Management
		Calculus A1			Management Cost Accounting
		Calculus A2			Applied Statistics
		Linear Algebra			
5	Database Theory and Application	Introduction to Computer	15	Information Statistics and Analysis Technology	Basic Program Design
		Linear Algebra			Probability Theory and Mathematical Statistics
					Applied Statistics
6	Operational Research	Calculus A1	16	Business Intelligent Analysis	Database Theory and Application
		Calculus A2			Operational Research
		Linear Algebra			Information Statistics and Analysis Technology
		Probability Theory and Mathematical Statistics			
7	Industrial Internet	Intelligent Logistics Product Development and Application	17	Customer Relation Management	Management Information System
		Practice of MES Project			Database Theory and Application
					Computer Network and Application
8	Applied Statistics	Calculus A1	18	Data Warehouse and Database Mining	Database Theory and Application
		Calculus A2			Information Statistics and Analysis Technology
		Linear Algebra			Linear Algebra
		Probability Theory and Mathematical Statistics			Basic Program Design
9	Management Cost Accounting	Probability Theory and Mathematical Statistics	19	ERP Principle and Application	Management Information System
		Management			Operations Management
		Linear Algebra			Logistics and Supply Chain Management
10	Data, Model and Decision	Management	20		
		Operational Research			
		Management Cost Accounting			

13. Extracurricular Classes

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.