Instructive Cultivation Plan for the Program of Industrial Engineering

(Grade 2020)

Program code: 120701

1. Orientation

Industrial engineering program aims at cultivating the first-line application-oriented engineering talents who meet the needs of economic development in Shanghai and the Yangtze River Delta, possess both the mechanical and electrical engineering technology foundation, and the necessary basic theories, methods and means of modern industrial engineering, and can engage in industrial engineering technology and management work.

2. Cultivation Objectives

2.1. General cultivation objective

Based on the CDIO training model, the Industrial Engineering program aims at cultivating first-line, compound and professional technical talents who are comprehensively developed on the aspects of moral, intellectual, physical, aesthetics, and labor, have high-quality, innovative spirit and practical ability, and good scientific quality that meet the needs of economic development in Shanghai and the Yangtze River Delta, have systematic and professional knowledge and professional skills of industrial engineering, mechanical engineering and management science and other interdisciplinary, have the technical foundation of electromechanical engineering and master the necessary basic theories, methods and means of modern industrial engineering, and be able to engage in industrial engineering technology and management works, and can comprehensively apply engineering technology, management science and social science theories and methods to plan, design, manage, improve and innovate the integrated system composed of human resources, materials, equipment, energy and information.

2.2. Objective of value guidance

The industrial engineering program aims at cultivating application-oriented and compound engineering and technical talents that meet the needs of social development. This program adheres to the idea of cultivating students' independent thinking, daring to innovate and cooperative consciousness, and takes the spirit of model workers and craftsmanship as the value orientation to cultivate ingenuity and educate craftsman. In the implementation process of education and teaching, the engineer values and engineering ethics education are embedded in the spirit of craftsmanship, so as to cultivate students to develop a rigorous, meticulous and responsible work attitude. This program improves teaching links through the CDIO model, and use school-enterprise cooperation as a carrier to cultivate students' scientific and technical knowledge, lifelong learning ability, communication and team work ability.

2.3. Objectives students must achieve five years after graduation:

It is expected that graduates after graduating for more than five years will have the following abilities:

- Be able to analyze, formulate and solve engineering problems related to professional positions, be able to independently solve more complex technical and management problems, and adapt to an independent and team work environment;
- Familiar with the current status and development trend of the program at home and abroad; familiar with industry regulations and standards;

- Have certain practical experiences in engineering technology, work experience in intelligent manufacturing and other related fields, be able to absorb advanced technology at home and abroad, and achieve certain results in system planning, design, management, improvement and innovation.
- Be able to understand and solve engineering problems in industrial engineering and related fields from the perspectives of social responsibility, legal and ethical training, safety and environmental awareness, sustainable development and economics.

3. Requirement for Graduation

The Industrial Engineering program is based on 12 general professional certification standards, combines with the needs of local social and economic development and the actual situation of our school, and expands the 12 core competence and quality expressions of graduation requirements. The index points of each graduation requirement are broken down as follows:

3.1: Ability to acquire and apply engineering knowledge: be able to use mathematics, natural sciences, engineering foundations and professional knowledge to solve complex engineering problems.

1-1: Master the mathematical knowledge and applications of advanced mathematics, linear algebra, probability theory and mathematical statistics, engineering statistics and operations research to solve complex engineering problems;

1-2: Master the natural science knowledge and application of physics, chemistry, mechanics, etc. to solve complex engineering problems;

1-3: Master the basic engineering knowledge and applications of electrical engineering, machinery, and computers to solve complex engineering problems;

1-4: Master the basic knowledge and application of economics, management, systems engineering, etc. to solve complex engineering problems;

1-5: Master the professional basic knowledge and methods for solving modern industrial engineering in the field of industrial engineering, and devote to improving the efficiency of industrial and service systems for various enterprises and service organizations.

3.2: Problem analysis ability: be able to apply basic principles of mathematics, natural sciences and engineering sciences to identify, express, and analyze complex engineering problems through literature research, especially those complex problems involving interdisciplinary disciplines such as mechanical engineering, management engineering, and systems engineering in order to obtain valid conclusions.

2-1: Be able to use relevant knowledge to reason about, analyze, identify and judge the key links of complex engineering problems;

2-2: Be able to find solutions to complex engineering problems by analyzing documents;

2-3: Be able to use basic principles to analyze the rationality of the solution.

3.3: Ability to innovate design/development solutions: be able to design solutions to complex engineering problems, design systems, units (components) that meet specific needs, or use modern industrial engineering theories and methods to carry out existing technological processes analysis and optimization, improve the efficiency of the system, improve the performance of the system, and be able to reflect the sense of innovation in the design process while considering social, health, safety, legal, cultural, and environmental factors.

3-1: Master the basic methods of engineering design, and be able to present the design results in the form of reports, drawings or objects;

3-2: Be able to formulate solutions to the characteristics of complex engineering problems, design systems and units that meet specific needs, or use the theories and methods of modern industrial engineering to analyze and optimize the existing process flow to improve the efficiency of the system and improve system performance;

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

3.4: Scientific research ability: Be able to study complex engineering problems 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: Based on scientific principles and by using scientific methods, design feasible experiments and simulation schemes or propose corresponding optimization measures for complex engineering problems;

4-2: Be able to correctly analyze and interpret data based on scientific principles and methods;

4-3: Be able to obtain reasonable and effective conclusions by integrating basic principles, literature synthesis, and analysis of experimental data.

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

5-1: According to the needs of the complex engineering problems being studied, be able to select the methods and tools commonly used in modern industrial engineering field operations research and optimization, simulation, management and quality reliability management to predict and simulate the engineering problems, and understand the limitations of tools and methods used, and understand the improvement approaches.

3.6: Ability to analyze and evaluate the relationship between engineering and society: be able to conduct reasonable analysis and evaluation on the impact of professional engineering practices and complex engineering problem solutions on society and health, safety, legal and cultural influences based on relevant background knowledge of mechanical engineering, management science and engineering, operations research optimization and simulation, and understand the responsibilities that should be assumed.

6-1: Have internship and social practice experience in mechanical engineering, management science and engineering, operations research optimization and simulation, and quality and reliability management technology;

6-2: Familiar with the technical standards, intellectual property rights, laws and regulations related to mechanical engineering, management science and engineering, and environmental protection, and be able to use them to analyze and identify the potential impact of the development and application of new technologies and processes on society, health, safety, law and culture;

3.7: Ability to understand and evaluate the environment and sustainable development: be able to understand and evaluate the impact of professional engineering practices 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 be able to practice the concept of environmental protection and sustainable development when solving complex environmental engineering and environmental protection equipment problems;

7-2: Be able to evaluate the potential hazards to humans and the environment for actual engineering projects, and can use professional knowledge to propose constructive scientific solutions.

3.8: Abide by professional standards: have humanities and social science literacy and a sense of social responsibility, be able to understand and abide by engineering professional ethics and standards in engineering practice, and perform responsibilities.

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

8-2: Understand the application field of industrial engineering and the occupational nature and responsibilities of industrial engineers, have legal awareness and consciously abide by professional ethics and regulations in the application of complex engineering problems.

3.9: Ability to assume individual and team roles: Be able to assume the roles of individuals, team members and leaders in a multidisciplinary team.

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

9-2: Be able to organize team members to carry out work under a multidisciplinary background.

3.10: Ability to effectively communicate and exchange: Be 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 instruction, and have a certain international perspective, be able to communicate and exchange under a cross-cultural context.

10-1: Be able to express one's thoughts orally or in writing, and effectively communicate and exchange with colleagues in the industry and the public on complex engineering issues;

10-2: Master at least one foreign language, have a basic understanding of the international situation of industrial engineering and related fields, and be able to communicate and exchange under a cross-cultural context.

3.11: Ability to manage engineering projects: understand and master complex engineering issues, especially management principles and economic decision-making methods in complex projects, and be able to apply them in a multidisciplinary environment.

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

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

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

12-1: Be able to correctly understand the necessity of self-exploration and learning, have the awareness of autonomous learning and lifelong learning; master the methods of autonomous

learning, understand the ways of knowledge expansion and ability improvement, and be able to maintain interest in new technologies;

12-2: Be able to take appropriate methods to learn independently, adapt to development, and demonstrate the effectiveness of independent learning and exploration in accordance with personal or professional development needs.

4. Schooling System

Four years

5. 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.

6. 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 151 credits for graduation; those who meet the requirements for bachelor's degree can be conferred bachelor degree in engineering.

7. Discipline

Industrial Engineering, Mechanical Engineering, Management Science and Engineering

8. Core Courses

1. Introduction to Industrial Engineering (16 course hours)

The purpose of the course "Introduction to Industrial Engineering" is to introduce basic features and concepts of industrial engineering, solutions to general industrial engineering problems, economic characteristics of engineering projects, and tasks and responsibilities faced by industrial engineers, so as to enable students to understand related industrial engineering issues involved in programs, and stimulate students' interest in learning industrial engineering program, and clarify their learning motivations. Through the study of this course, the students will have ideas and thoughts for solving industrial engineering problems. The focus of this course is to cultivate students' awareness of industrial engineering and lay the necessary foundation for students to study subsequent professional courses. At the same time, this course will introduce the cultivation of professional awareness of students' cost and efficiency awareness and professional habits such as layered analysis of problems.

2. Modern engineering drawing (96 course hours)

"Modern Engineering Drawing" is aimed at industrial engineering students and is to cultivate the basic ability of drawing engineering graphics and reading engineering graphics. Through the study of this course, students will be able to master the basic theory of projection method, correctly use common drawing tools and instruments to draw engineering drawings, master the computer drawing ability of engineering drawings, and master the general methods and specific steps of reading engineering drawings.

3. Basis of mechanical designing (48 course hours)

Through "Basis of Mechanical Designing", students can acquire basic knowledge of the working principles and structural characteristics of commonly-used mechanisms and common parts in

machinery, have a preliminary grasp of basic design theory and calculation methods, and will be familiar with the mechanical design process.

4. Basic Machinery Manufacturing (48 course hours)

This course mainly teaches the basic knowledge in mechanical manufacturing, including the selection of common metal materials and main heat treatment methods; basic knowledge of metal blank casting, forging, and welding forming methods; basic knowledge of cutting principles; various cutting methods and cutting processes on the surface of common parts, basic knowledge of machine tools, tools, technology, etc. and basic process of product manufacturing required.

5. Engineering Economics (32 course hours)

The main contents of this course include: basic economic terms, time value theory of funds, economic evaluation indicators of engineering projects, selection of multiple projects and uncertainty analysis. Through the study of this course, students will learn to predict the prospects of engineering projects according to the country's technical and economic development strategies and related policies, and realize the economic selection of alternatives. The engineering economics course is integrated into the ideological and political teaching links in the daily teaching links to guide students to establish correct working attitudes and concepts.

6. Basic Industrial Engineering (32 course hours)

This course mainly teaches the basic theories, application principles and methods of industrial engineering overview, productivity management, work research, and field management. This course is the first compulsory course for professional training and an important foundation for cultivating industrial engineering professionals.

7. Operations Research (48 course hours)

This course is an applied science, which widely applies existing scientific and technological knowledge and mathematical methods, provides quantitative-based scientific methods to solve specific problems raised in practice, and provides quantitative basis for decision-makers to choose the best decision. This course mainly teaches the basic knowledge and methods of mathematical programming (linear programming, nonlinear programming, goal programming, dynamic programming, stochastic programming, etc.), graph theory and network, queuing theory (stochastic service system theory), storage theory, game theory, and decision theory.

8. Systems Engineering (32 course hours)

This course is an interdisciplinary subject to study large-scale complex systems. It is to organically integrate certain ideas, theories, methods, strategies and means of natural science and social sciences according to the needs of overall coordination, and apply methods that combine quantitative analysis and qualitative analysis and computer and other technical tools to improve the components, organizational structure, information exchange and feedback control functions of the system, thus achieving the purpose of optimal design, optimal control and optimal management. This course mainly teaches the basic theories of system engineering, structural modeling technology, modern simulation technology theories and methods, and basic theories and methods of decision analysis.

9. Human Factors Engineering (32 course hours)

This course is a subject that uses the research methods and means of anthropometry, physiology, psychology and biomechanics, and engineering to conduct research on human body structure, function, psychology and mechanics. The purpose of this course is to determine the optimization of the overall performance of the man-machine-environment system by revealing the law of the relationship between the three elements of man, machine and environment. This course mainly

allows students to obtain a clearer understanding of the subject, cultivates students' human-oriented design concepts, allows them to master certain man-machine design capabilities through the study of basic theories and certain design exercises, thus laying the foundation for product and environmental design. Human factors engineering integrates the concept of sustainable development into the teaching of human-machine-environment and other related links, and educates students to follow laws, regulations and relevant industry standards in their daily work, pay attention to sustainable development in product design, and abide by the laws.

10. Quality Management and Reliability (48 course hours)

This course mainly teaches related issues in the category of quality and reliability, systematically teaches the concept of quality and reliability, the theoretical system and technical methods of quality management and reliability. Through the study of this course, students will firmly establish the idea of "quality first", master the basic theories and methods of quality management and reliability, and be able to correctly apply quality management methods to manage and control the entire process of quality formation, and improve product and service quality. In the quality teaching process, students will be educated to have a correct working attitude towards quality management and control, abide by the rules, and establish the awareness of working seriously.

11. Production planning and control (48 course hours)

This course systematically introduces the basic concepts, basic methods and basic principles of production operation and management. After completing the study of this course, students will understand the basic structure and practical application of production operation and management, and cultivate the ability to use the basic principles of production operation and management to solve actual production problems.

12. System modeling and simulation (48 course hours)

This course mainly teaches the simulation characteristics of the basic components of the production system, the basic principles and methods of simulation modeling, the collection and analysis methods of simulation input data, and the system output data analysis methods and applications. After completing this course, students can initially use simulation technology to find key problems in the production system, and improve production capacity and efficiency through the realization of improvement measures.

13. Project management (32 course hours)

"Project Management" is an application-oriented course oriented to engineering practices. Through the study of this course, students can master the basic concepts of project management, and fully understand project scope management, time management, cost management, quality management, integrated management, risk management, and communication management, human resource management and procurement management of a project, and understand the concept of project process and project management process, project organization management and project manager’s responsibilities, and master various basic methods of project management.

9. Practical training

Factory knowledge internship, basic engineering training A, level two projects (mechanical product design and manufacturing practice I, II, III), level two projects (product analysis and decision-making I, II), level two projects (quality management and reliability I, II, III), secondary project (production management, simulation and control I, II), secondary project (advanced manufacturing and information system application I, II), level one project (industrial engineering technology innovation and entrepreneurship practice) and graduation project (thesis) etc.

Through the above-mentioned progressive project training, graduation design and graduation internship and other comprehensive training and cultivation, students will have the ability of

comprehensive design and application development, enhance teamwork and innovation, and adapt to social development.

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

Category	Total Credit	%	Total Course Hours	Theory Learning	Practical Training
General Education	50.5	33	960	896	64
Basic Course	36	24	576	500	76
Professional Course	22	15	352	292	60
Practical Training	32.5	21	928	0	928
General Course	10	7	160	160	0
Total	151	100	2976	1848	1128
Theory : Practice(%)	62:38				

11. Teaching schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
General Education	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 legal foundation	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 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	Spring 1

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
	Required	Department 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
	★German	College of Arts and Sciences	b1020040	German I	test	3	48	48		autumn 1
		College of Arts and Sciences	b1020041	German II	test	3	48	48		Spring 1
		College of Arts and Sciences	b1020042	German III	test	4	64	64		autumn 2
	★Japanese	College of Arts and Sciences	b1020077	Japanese I	test	3	48	48		autumn 1
		College of Arts and Sciences	b1020078	Japanese II	test	3	48	48		Spring 1
		College of Arts and Sciences	b1020079	Japanese III	test	4	64	64		autumn 2
Total (General Education s)						**50.5**	**960**	**896**	**64**	
General Course	Required	College of Engineering	b2011470	Scientific paper writing and document retrieval	non-test	2	32	32		Spring 1

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
	Selective	Others	b0-----	Social Science and Humanities Literacy (4 credits) Natural Science and Technological Innovation(2 credits) Public Art(2 credits)	non-test	8	128	128		Autumn, Spring
Subtotal (general course)						**10**	**160**	**160**	**0**	

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

11. Teaching schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
Basic professional courses	Required	College of Engineering	b2011137	Modern Engineering Drawing I	test	3	48	40	8	autumn 1
	Required	College of Engineering	b2011138	Modern Engineering Drawing II	non-test	3	48	32	16	Spring 1
	Required	College of Engineering	b2011239	Introduction to Industrial Engineering	non-test	1	16	16	0	autumn 1
	Required	College of Engineering	b2011048	Engineering mechanics	non-test	3	48	44	4	autumn 2
	Required	College of Engineering	b2011080	Machinery Manufacturing Foundation	test	3	48	42	6	Spring 2
	Required	College of Engineering	b2011078	Basis of Mechanical Designing	test	3	48	42	6	autumn 3
	Required	College of Engineering	b2011437	CAD/CAM	non-test	3	48	16	32	Spring 2
	Required	Work training	b2090003	Fundamentals of Electrician and Electrical Technology	non-test	2	32	28	4	autumn 3
	Required	College of Engineering	b2011051	Engineering Statistics	test	2	32	32		Spring 2
	Required	College of Engineering	b2011061	Management Science	test	2	32	32		autumn 2
	Required	College of Engineering	b2011046	Engineering economics	non-test	2	32	32		Spring 2
	Required	College of Engineering	b2011082	Basic Industrial Engineering	non-test	2	32	32		Spring 2
	Required	College of Engineering	b2011158	Operations Research	non-test	3	48	48		Spring 2
	Required	College of Engineering	b2011132	System Engineering	test	2	32	32		autumn 3
	Required	College of	b2011108	Human Factors Engineering	non-test	2	32	32		autumn 4

		Engineering								
Subtotal (Basic professional courses)						**36**	**576**	**500**	**76**	
Professional courses	Required	College of Engineering	b2011021	Program design and algorithm	test	3	48	40	8	autumn 2
	Required	College of Engineering	b2011117	Fundamentals of Database Application	non-test	2	32	24	8	Spring 2
	Required	College of Engineering	b2011060	Management Information System	test	2	32	32		autumn 3
	Required	College of Engineering	b2011160	Quality management and reliability	test	3	48	40	8	autumn 3
	Required	College of Engineering	b2011438	Production planning and control	non-test	3	48	40	8	autumn 3
	Required	College of Engineering	b2011133	System modeling and simulation	test	3	48	40	8	Spring 3
	Required	College of Engineering	b2011142	Project Management (Bilingual)	non-test	2	32	32		autumn 3
	Required	College of Engineering	b2011130	Logistics and supply chain	non-test	2	32	24	8	autumn 4
	Subtotal (required professional courses)					**20**	**320**	**272**	**48**	
	★Module, selective, 2 credits	Module A	b2011003	ERP PRINCIPLE AND APPLICATION	non-test	2	32	20	12	Spring 3，Summer 3
			b2011017	Product data management	non-test	2	32	26	6	autumn 4
			b2011260	Advanced Manufacturing System Engineering(English teaching)	non-test	2	32	26	6	autumn 4
			b2011261	Lean Manufacturing(English teaching)	non-test	2	32	32	0	autumn 4
			b2011262	Facility Planning(English teaching)	non-test	2	32	32	0	autumn 4
		Module B	b2011185	Modern measurement technology	non-test	2	32	24	8	Spring 2
			b2011012	Standardization Project	non-test	2	32	32		Spring 3
			b2011113	Experiment design	non-test	1	16	12	4	autumn 3
			b2011134	Advanced Manufacturing Technology	non-test	1	16	16		autumn 3
			b2011140	Modern design method	non-test	2	32	32		autumn 4
	Subtotal (selective professional courses)					**2**	**32**	**20**	**12**	
Subtotal (professional courses)						**22**	**352**	**292**	**60**	

11. Teaching schedule (3)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
Vocational practice	Required	College of Engineering	b4011200	Mechanical product design and manufacturing practice I(level two project)	non-test	2	48		48	Summer 1
	Required	College of Engineering	b4011028	Factory awareness internship(Smart factory internship)	non-test	1	24		24	Summer 2
	Required	Work training	b4090001	Basic engineering training A	non-test	3	72		72	Spring 1
	Required	College of Engineering	b4011201	Mechanical product design and manufacturing practice II(level two project)	non-test	2	48		48	Summer 2
	Required	College of Engineering	b4011202	Mechanical product design and manufacturing practice III(level two project)	non-test	2	48		48	Summer 3
	Required	College of Engineering	b4011308	Product analysis and decision I(level two project)	non-test	2	48		48	autumn 3
	Required	College of Engineering	b4011309	Product analysis and decision II(level two project)	non-test	2	48		48	autumn 3
	Required	College of Engineering	b4011205	Quality management and reliability I(level two project)	non-test	2	48		48	Spring 3
	Required	College of Engineering	b4011206	Production management, simulation and control I(level two project)	non-test	2	48		48	Spring 3
	Required	College of Engineering	b4011207	Production management, simulation and control II(level two project)	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	b4011248	Graduation Practice and Graduation Design (Thesis) for Industrial Engineering	non-test	6	288		288	Spring 4
	Subtotal (required practice courses)					**26.5**	**784**		**784**	
	★Corresponding	Module A	b4011208	Advanced manufacturing and information system application I(level two project)	non-test	2	48		48	Summer 2

	to course module, selective 6 credits		b4011209	Advanced manufacturing and information system application II(level two project)	non-test	2	48		48	Summer 3
			b4000007	Industrial Engineering Technology Innovation and Entrepreneurship Practice(Level 1 project)	non-test	2	48		48	autumn 4
		Module B	b4011211	Quality management and reliability II(level two project)	non-test	2	48		48	Spring 3,Autumn 3
			b4011212	Quality management and reliability III(level two project)	non-test	2	48		48	Summer 3
			b4000007	Industrial Engineering Technology Innovation and Entrepreneurship Practice (Level 1 project)	non-test	2	48		48	autumn 4
	Subtotal (practice module)					**6**	**144**		**144**	
Subtotal (professional practice)						**32.5**	**928**		**928**	
Extracurricular Class	Required	Others	b5110001	Extracurricular Class	non-test	1	-	-	-	Autumn, Spring, Summer
Total						**152**	**2976**	**1848**	**1128**	

★1.Guidance 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 obtain the required credits for that module. Professional practice modules must be selected according to the corresponding professional course modules.

1. Module A: Focus on knowledge of mechanical product production process management, material management, planning management, etc., apply PLM\ERP and other information systems and system integration capabilities, and have preliminary system analysis, planning and simulation optimization capabilities.

2. Module B: Focus on the knowledge of mechanical product quality management, process quality management, etc., the ability to apply quality inspection tools, and the ability to apply and develop quality inspection software.

2. Professional Certificates can be gained after learning following courses:

Suggested certificates: quality management engineer, industrial engineering trainee, project management engineer

Students who have passed the courses of "Basic Industrial Engineering", "Human Factors Engineering", "Quality management and reliability", "Production planning and control" and "Logistics and supply chain" can participate in the professional qualification certificate assessment related to this program: Industrial engineering trainee.

Students who have passed the courses of "Quality management and reliability" and "Lean Manufacturing" can participate in the professional qualification certificate assessment related to this program: quality management engineer.

Students who have passed the courses of "Project Management", "Production Planning and Control" and "Engineering Economics" can participate in the professional qualification certificate assessment related to this program: project management engineer.

Students who have obtained an industrial engineering trainee qualification certificate can apply for exemption from the "Basic Industrial Engineering" course and obtain corresponding credits.

Students who have obtained a quality management engineer qualification certificate can apply for exemption from the "Quality management and reliability" course and obtain corresponding credits.

Students who have obtained the project management engineer qualification certificate can apply for exemption from the "Project Management" course and obtain corresponding credits.

12. Prerequisite for Course Study

No.	Course name	Prerequisite Course	No.	Course name	Prerequisite Course
1	Engineering Statistics	Probability Theory and Mathematical Statistics	6	Production planning and control	Operations Research
2	Quality management and reliability	Engineering Statistics	7	Experiment design	Engineering Statistics
3	System modeling and simulation	Engineering Statistics	8	Engineering mechanics	CalculusA1
		Program design and algorithm			CalculusA2
4	Management Information System ERP PRINCIPLE AND APPLICATION	Program design and algorithm	9	Machinery Manufacturing Foundation	Engineering mechanics
		Fundamentals of Database Application			
5	Product data management	Management Information System	10	Basis of Mechanical Designing	Machinery Manufacturing Foundation

13. 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.