

Industrial Engineering

(Grade 2024)

Course code: 120701

I. Cultivation Objectives

1. General cultivation objective

The program of Industrial Engineering cultivates professional and technical talents who are well developed in moral, intellectual, physical, aesthetic and labor, have sense of social responsibility, good moral cultivation and healthy psychological quality, sense of innovation, teamwork spirit and international perspective, have solid basic knowledge of engineering science and management science, and are able to apply methods of system analysis, planning, optimization, design, control and evaluation to solve comprehensive management and engineering problems of system efficiency, quality, cost and environmental friendliness in manufacturing and other industrial fields, and meet the needs of economic construction in manufacturing and service industries and related fields in the Yangtze River Delta and surrounding areas.

2. Objective of value guidance

The program of Industrial Engineering takes advanced ideas such as the spirit of the model worker and the spirit of craftsmanship as its value guide, cultivates application-oriented and complex engineering and technology talents to meet the needs of social development as its goal, takes cultivating students' independent thinking, daring to innovate and the sense of cooperation as its concept, cultivates the spirit of craftsmanship and men with this spirit. During the implementation of education and teaching, students are trained to develop a rigorous, meticulous, dedicated and responsible working attitude. Through professional certification, the program promotes the improvement of the teaching and learning process, and uses school-enterprise cooperation as a carrier to cultivate students' scientific and technical knowledge, lifelong learning ability, communication and team working ability.

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

- 1: To work with good humanistic qualities, demonstrate patriotism, national pride and a good sense of social responsibility, and adhere to professional ethics.
- 2: Have good communication and teamwork skills with leadership ability to analyse, formulate and solve problems related to professional positions and to solve complex technical and managerial problems.
- 3: Have practical experience in engineering and technology, be able to assimilate advanced technologies from home and abroad, and to achieve certain achievements in system planning, design, management, improvement and innovation.
- 4: Be capable of lifelong learning and innovation, have an international perspective, and to maintain physical and mental health and motivation for continuous development.

II. Graduation requirements

Based on the 12 General Standards for the Certification of Undergraduate Programs and the relevant standards for the certification of new liberal arts education programs, and taking into account the needs of the social and economic development of the region and the actual situation of our university, the core competencies and qualities required for graduation of industrial engineering program are developed into 9 points, which are as follows:

1. Character and moral integrity: Have humanistic qualities, scientific spirit, professionalism, social responsibility and positive attitude. Understand national, social and public situations and practise core values of socialism.

1-1 Have a firm political orientation, be familiar with the basic lines, guidelines and policies of the Party and the State, and practise core values of socialism.

1-2 Have good humanistic qualities, understand national and social conditions, appreciate public sentiments and opinions, and pay attention to and think about major hot issues of national planning and people's livelihood.

1-3 Abide by professional ethics and be familiar with laws, regulations and industry codes.

2. Professional knowledge: Have solid theoretical knowledge and professional skills of the Program of Industrial Engineering, a mastery of basic research methods in the field of Industrial Engineering, and an understanding of the latest developments and development trends in the profession and related fields.

2-1 Have basic knowledge of the humanities and natural sciences, with professional knowledge in the related disciplines, such as industrial engineering, mechanical engineering and management science;

2-2 Understand the latest developments and trends in the Program of Industrial Engineering, master the basic research methods in the field of Industrial Engineering, and have the basic ability to improve the efficiency of industrial and service systems for various enterprises and service organizations.

3. Ability to innovate: Have the ability to identify, recognize and evaluate phenomena and problems in the field of Industrial Engineering.

3-1 The ability to capture and identify phenomena and problems in the field of Industrial Engineering.

3-2 Be able to provide own independent opinions, judgements and comments on phenomena and issues in the field of Industrial Engineering.

4. Ability to use knowledge: Be able to analyse and design solutions to complex problems, especially those involving related disciplines such as mechanical engineering, management engineering and systems engineering, using professional knowledge in natural sciences, engineering sciences and management sciences, including designing systems, units (components) to meet specific needs or using theories and methods from Industrial Engineering to enhance the efficiency and improve the performance of systems.

4-1 Be able to apply relevant knowledge to reason and analyse, identify and judge key aspects of complex problems.

4-2 Be able to recognize that there are multiple options for solving complex problems and will seek alternative and backup solutions through literature research.

4-3 Be able to select or develop a reasonable solution to a complex problem, drawing on the above options, and be able to design a system or unit to meet a specific need or to enhance the efficiency and improve the performance of a system using modern Industrial Engineering theories and methods.

5. Ability to use information: Be able to select reasonable tools and methods in the field of industrial engineering, such as operations and optimization, production modelling and simulation, statistical analysis, etc., to analyse, predict and simulate problems according to the needs of the complex problems in the field of industrial engineering , and understand the output and implications of the tools used, or propose appropriate improvement solutions accordingly.

6. Communication and Expression: Have the ability to communicate effectively with industry peers and the public on issues in the field of industrial engineering, including writing reports and design briefs, presenting statements, and expressing

or responding clearly to instructions.

6-1 Be able to express views accurately on professional issues, orally, in manuscripts, diagrams, etc.

6-2 Be able to communicate and interact effectively with industry peers and the public on issues in area of professional knowledge.

7. Teamwork: Have sense of teamwork, the ability to play effectively as an individual in various teams, the ability to coordinate and cooperate with other members, and a certain degree of organizational or leadership ability.

7-1 Be able to work cooperatively in a team and capable of completing tasks given by the team

7-2 Be able to work actively with other members of the team to achieve team objectives and develop some organizational or leadership skills.

8. International Perspective: Follow international trends and hotspots in Industrial Engineering, understand and respect the differences and diversity of different cultures around the world, and have the ability to communicate across cultures

9. Learning development: Maintain physical and mental health, have a sense of lifelong learning and the ability to self-manage and learn independently, and be able to adapt to sustainable social development and achieve personal career development goals through continuous learning.

9-1 Have a positive perspective on life, maintain physical and mental health, have a proper understanding of the need for self-exploration and learning, and have a sense of independent and lifelong learning.

9-2 Acquire independent learning methods, understand ways to expand knowledge and improve abilities, and be able to maintain an interest in new science and technology; be able to adopt a suitable approach to independent learning for personal or professional development needs and adapt to future social and personal sustainability.

III. Schooling System

Four years

IV. Length of Study

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

V. Requirements for Graduation and Degree Conferring

To graduate, students must complete the minimum number of credits required by the Instructive Cultivation Plan for each category of study, and all the content required by the Extracurricular Class, with a total of 163 credits. Those who meet the requirements for bachelor's degree can be conferred bachelor degree in Engineering.

VI. Discipline

Industrial Engineering, Mechanical Engineering, Management Science and Engineering

VII. Core Courses

Core Courses in Industrial Engineering include Introduction to Industrial Engineering, Modern Engineering Drawing, Fundamentals of mechanical design, Fundamentals of mechanical manufacturing, Engineering Economics, Fundamentals of Industrial Engineering, Operations Research, Systems Engineering, Human Factors Engineering, Quality management and reliability, Production planning and control, System Modelling & Simulation, Project Management

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

Category	Total Credit	%	Total Course Hours	Theory Learning	Practical Training
Public Fundamental Course	58.5	36	1072	982	90
General Education	10	6	160	160	0
Engineering Fundamental Course	20	12	320	248	72
Professional Fundamental Course	17	11	272	256	16
Professional Course	26	16	416	350	66
Professional Practice	30.5	19	880	0	880
Total	162	100	3120	1996	1124
Theory: Practical (%)	64:36				

IX. Teaching schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended Semester
Public Fundamental Course	required	School of Marxism	b1080001	Basic Principles of Marxism	test	3	48	42	6	Spring 1
	required	School of Marxism	b1080009	Ethics and the Rule of Law	non-test	3	48	42	6	Spring 1
	required	School of Marxism	b1080006	Outline of Modern Chinese History	non-test	3	48	42	6	Autumn 1
	required	School of Marxism	b1080010	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	test	3	48	42	6	Spring 2
	required	School of Marxism	b1080011	Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	test	3	48	42	6	Autumn 2
	required	School of Marxism	----	Situation and Policy (Modules 1 to 4)	non-test	2	32	28	4	Autumn 1 to Spring 2
	required	School of Marxism	b1080008	Labour Education A	non-test	0.5	16	16		Autumn 2
	required	School of Mathematics, Physics and Statistics	b1020080	Advanced Mathematics A1	test	4	64	64		Autumn 1
	required	School of Mathematics, Physics and Statistics	b1020081	Advanced Mathematics A2	test	4	64	64		Spring 1
	required	School of Mathematics, Physics and Statistics	b1020012	Linear Algebra	test	2	32	32		Spring 2
	required	School of Mathematics, Physics and Statistics	b1020013	Probability Theory and Mathematical Statistics	test	2	32	32		Autumn 2
	required	School of Foreign Language and Cultural Communication	b1020018	Academic Chinese	non-test	2	32	32		Autumn 1
	required	School of Mathematics, Physics and Statistics	b1020062	Academic Physics A (Module 1)	test	3	48	48		Spring 1
	required	School of Mathematics, Physics and Statistics	b1020065	Academic Physics B	test	2	32	32		Autumn 2
	required	School of Mathematics, Physics and Statistics	b1020111	Academic Physics C	non-test	2	32		32	Spring 1
	required	College of Physical Education	-----	Physical Education I to VI	non-test	3	160	160		Autumn 1 to Autumn 4
	required	Others	b1110003	Military skills	non-test	0.5	2W			Autumn 1
	required	Others	b1110002	Military theory	non-test	0.5	32	32		Autumn 2
	required	Others	b1110004	Mental Health Education for University Students	non-test	2	32	16	16	Autumn 1
	required	School of Intelligent Manufacturing and Control Engineering	b2011470	Scientific and Technical Paper Writing and Literature Search	non-test	2	32	32		Spring 1
	required	School of Computer and Information Engineering	b1012001	Artificial Intelligence Application and Practice	non-test	1	16	8	8	Autumn 1
	required	School of Resources and Environment	b1012002	Green, Low-carbon and Ecological Civilization	non-test	1	16	16		Spring 1
	★ Academic English(Select 1 Module for 10 Credits)	Module A	b1020003	General English III	test	3	48	48		Autumn 1
			b1020004	General English IV	test	3	48	48		Spring 1
			b1020005	General Academic English A	test	2	32	32		Autumn 2
			---	English Knowledge Expansion	non-test	2	32	32		Spring 2
		Module B	b1020002	General English II	test	3	48	48		Autumn 1
			b1020003	General English III	test	3	48	48		Spring 1
			b1020006	General Academic English B	test	2	32	32		Autumn 2
			---	English Knowledge Expansion	non-test	2	32	32		Spring 2
	★ Academic German	School of Foreign Language and Cultural Communication	b1020040	Academic German I	test	3	48	48		Autumn 1
		School of Foreign Language and Cultural Communication	b1020041	Academic German II	test	3	48	48		Spring 1
		School of Foreign Language and Cultural Communication	b1020042	Academic German III	test	4	64	64		Autumn 2
	★ Academic Japanese	School of Foreign Language and Cultural Communication	b1020077	Academic Japanese I	test	3	48	48		Autumn 1
		School of Foreign Language and Cultural Communication	b1020078	Academic Japanese II	test	3	48	48		Spring 1
		School of Foreign Language and Cultural Communication	b1020079	Academic Japanese III	test	4	64	64		Autumn 2
Subtotal (Public Fundamental Course)						58.5	1072	982	90	
General Education	selective	Art Education Center	b0----	Aesthetic Education	non-test	2	32	32		Autumn, Spring
	selective	Each College	b0----	Social Sciences and Humanistic Qualities	non-test	4	64	64		Autumn, Spring
				Natural Sciences and Technology Innovation	non-test	4	64	64		Autumn, Spring
Subtotal (General Education)						10	160	160		

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

IX. Teaching schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended Semester	
Engineering Fundamental Course	required	School of Intelligent Manufacturing and Control Engineering	b2011137	Modern Engineering Drawing I	test	3	48	40	8	Autumn 1	
	required	School of Intelligent Manufacturing and Control Engineering	b2011138	Modern Engineering Drawing II	non-test	3	48	32	16	Spring 1	
	required	School of Intelligent Manufacturing and Control Engineering	b2011048	Engineering Mechanics	non-test	3	48	48		Autumn 2	
	required	School of Intelligent Manufacturing and Control Engineering	b2011080	Fundamentals of Mechanical manufacturing	test	3	48	42	6	Spring 2	
	required	School of Intelligent Manufacturing and Control Engineering	b2011078	Fundamentals of mechanical design	test	3	48	42	6	Autumn 3	
	required	School of Intelligent Manufacturing and Control Engineering	b2011437	CAD/CAM	non-test	3	48	16	32	Spring 2	
	required	Engineering Training	b2090003	Fundamentals of Electronic and Electrical Technology	non-test	2	32	28	4	Autumn 3	
Subtotal (Engineering Fundamental Course)						20	320	248	72		
Professional Fundamental Course	required	School of Intelligent Manufacturing and Control Engineering	b2011557	Introduction to Industrial Engineering and Intelligent Manufacturing	non-test	1	16	16	0	Autumn 1	
	required	School of Intelligent Manufacturing and Control Engineering	b2011051	Statistics for Engineering	test	2	32	32		Spring 2	
	required	School of Intelligent Manufacturing and Control Engineering	b2011061	Management Studies	test	2	32	32		Autumn 2	
	required	School of Intelligent Manufacturing and Control Engineering	b2011046	Engineering Economics	non-test	2	32	32		Spring 2	
	required	School of Intelligent Manufacturing and Control Engineering	b2011538	Basic Industrial Engineering	non-test	3	48	32	16	Spring 2	
	required	School of Intelligent Manufacturing and Control Engineering	b2011158	Operations Research	non-test	3	48	48		Spring 2	
	required	School of Intelligent Manufacturing and Control Engineering	b2011132	Systems Engineering	test	2	32	32		Autumn 3	
required	School of Intelligent Manufacturing and Control Engineering	b2011108	Human Factors Engineering	non-test	2	32	32		Autumn 4		
Subtotal (Professional Fundamental Course)						17	272	256	16		
Professional Course	required	School of Intelligent Manufacturing and Control Engineering	b2011021	Programming and Algorithms	test	3	48	40	8	Autumn 2	
	required	School of Intelligent Manufacturing and Control Engineering	b2011117	Fundamentals of Database Applications	non-test	2	32	24	8	Spring 2	
	required	School of Intelligent Manufacturing and Control Engineering	b2011060	Information Management System	non-test	2	32	32		Autumn 3	
	required	School of Intelligent Manufacturing and Control Engineering	b2011160	Quality management and reliability	test	3	48	40	8	Autumn 3	
	required	School of Intelligent Manufacturing and Control Engineering	b2011438	Production planning and control	non-test	3	48	40	8	Autumn 3	
	required	School of Intelligent Manufacturing and Control Engineering	b2011133	System Modelling & Simulation	test	3	48	40	8	Spring 3	
	required	School of Intelligent Manufacturing and Control Engineering	b2011546	Project Management A (In Chinese and English)	non-test	2	32	32		Autumn 3	
	required	School of Intelligent Manufacturing and Control Engineering	b2011130	Logistics and Supply Chain	non-test	2	32	24	8	Autumn 4	
	required	School of Intelligent Manufacturing and Control Engineering	b2011490	Production Operations Management	non-test	2	32	32		Autumn 2	
	Subtotal(Required Professional Course)						22	352	304	48	
	Select different courses in different modules for 4 credits	Module A	b2011003	ERP Principles and Applications	non-test	2	32	20	12	Spring 3	
			b2011017	Management of product data	non-test	2	32	26	6	Autumn 4	
			b2011260	Advanced Manufacturing System Engineering (English-taught)	non-test	2	32	26	6	Autumn 4	
			b2011135	Advanced Manufacturing Technology	non-test	2	32	26	6	Autumn 3	
			b2011558	Python and intelligent data processing	non-test	2	32	26	6	Autumn 3	
		Module B	b2011185	Modern surveying technology	test	2	32	24	8	Spring 2	
			b2011012	Standardization Engineering	non-test	2	32	32		Spring 3	
			b2011261	Lean Manufacturing (English-taught)	non-test	2	32	32	0	Autumn 4	
			b2011140	Modern Design Methodology	non-test	2	32	32		Autumn 4	
			b2011559	Smart manufacturing and digital twin	non-test	2	32	32	0	Autumn 3	
	Subtotal (Selective Professional Course)						4	64	46	18	
Subtotal (Professional Course)						26	416	350	66		

IX. Teaching schedule (3)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hours	Theory Learning	Practical Training	Recommended Semester	
Professional Practice	required	School of Intelligent Manufacturing and Control Engineering	b4011373	Practice for mechanical product design and manufacturing I	non-test	2	48		48	Summer 1	
	required	School of Intelligent Manufacturing and Control Engineering	b4011028	Cognitive internship at the factory	non-test	1	24		24	Summer 2	
	required	Engineering Training	b4090001	Basic Engineering Training A	non-test	3	72		72	Spring 1	
	required	School of Intelligent Manufacturing and Control Engineering	b4011374	Practice for mechanical product design and manufacturing II	non-test	2	48		48	Summer 2	
	required	School of Intelligent Manufacturing and Control Engineering	b4011375	Practice for mechanical product design and manufacturing III	non-test	2	48		48	Summer 3	
	required	School of Intelligent Manufacturing and Control Engineering	b4011376	Product analysis and decision making I	non-test	1	24		24	Autumn 3	
	required	School of Intelligent Manufacturing and Control Engineering	b4011377	Product analysis and decision making II	non-test	1	24		24	Autumn 3	
	required	School of Intelligent Manufacturing and Control Engineering	b4011378	Quality management and reliability I	non-test	2	48		48	Spring 3	
	required	School of Intelligent Manufacturing and Control Engineering	b4011379	Management, Simulation and Control of Production I	non-test	2	48		48	Spring 3	
	required	School of Intelligent Manufacturing and Control Engineering	b4011380	Management, Simulation and Control of Production II	non-test	2	48		48	Autumn 4	
	required	School of Intelligent Manufacturing and Control Engineering	b4011381	Practice for Technology Innovation and Entrepreneurship in Industrial Engineering	non-test	2	48		48	Autumn 4	
	required	School of Intelligent Manufacturing and Control Engineering	b4011339	Labour Education B	non-test	0.5	16		16	Spring 3	
	required	School of Intelligent Manufacturing and Control Engineering	b4011248	Industrial Engineering Graduation Internship and Graduation Design (Thesis)	non-test	6	288		288	Spring 4	
	Subtotal(Required Professional Practice)						26.5	784		784	
	Select different courses in different modules for 4 credits	Module A	b4011382	Advanced manufacturing and information system applications I	non-test	2	48		48	Summer 2	
			b4011383	Advanced manufacturing and information system applications II	non-test	2	48		48	Summer 3	
		Module B	b4011384	Quality management and reliability II	non-test	2	48		48	Autumn 3	
			b4011385	Quality management and reliability III	non-test	2	48		48	Summer 3	
	Subtotal(Selective Professional Practice)						4	96		96	
Subtotal(Professional Practice)						30.5	880		880		
Extracurricular Class	required	Others	b5110001	Extracurricular Class	non-test	1	-	-	-	Autumn, Spring, Summer	
Total						163	3120	1996	1124		

i. Description of Selective Professional Course and Selective Practice:

Selective Professional Courses are divided into modules according to different competency requirements and students must take one of the modules and achieve the required credits for that module. Selective Practice modules must be taken in accordance with the corresponding Selective Professional Courses.

- Module A: Focus on knowledge of production process management, materials management and planning management of mechanical products, the ability to apply information systems such as PLM/ERP and system integration, and the ability to perform preliminary analysis, planning and simulation optimization for system.
- Module B: Focuses on knowledge of mechanical product quality management and process quality management, the ability to apply quality inspection tools, and the ability to apply and develop quality inspection software.

ii. Explanation of the relevance of professional certificates to the course:

Recommended certificates: Quality Management Engineer, Industrial Engineering Trainee, Project Management Engineer.

Through the courses of “Basic Industrial Engineering”, “Human Factors Engineering”, “Quality management and reliability”, “Production planning and control” and “Logistics and supply chain”, students can take the vocational qualification examination related to this program: Industrial Engineering trainee.

Through the courses of “Quality management and reliability” and “Lean Manufacturing”, students can take the vocational qualification examination related to this program: Quality Management Engineer.

Through the courses of “Project Management”, “Production planning and control” and “Engineering Economics”, Students students can take the vocational qualification examination related to this program: Project Management Engineer, after studying the courses.

Students who have obtained the Industrial Engineering Trainee Certificate are eligible to apply for exemptions and credits for the "Basic Industrial Engineering" course.

Students who have obtained the Quality Management Engineer Certificate are eligible to apply for exemption and credit for the “Quality management and reliability” course.

Students who have obtained the Project Management Engineer Certificate are eligible to apply for exemptions and credit for “Project Management” course.

X. Credit of Extracurricular Class

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