

Talent Cultivation Scheme for the Industrial Engineering Major (2023 Edition)

(120701)

1 Introduction of the major

This major began enrolling undergraduate students in 2004 and has been running for 19 years, which has become a first-class undergraduate major construction site in Hunan Province since 2022. It is mainly based on the urgent demand for new engineering composite talents in modern manufacturing and service industries, and is oriented towards fields such as new energy and mechanical equipment, as well as the development strategy of "Three Highlands and Four New Missions" in Hunan Province. This major cultivates applied senior specialized talents with the ability to analyze, plan, design, optimize production systems and service systems. Graduates of this major can apply for master's degrees in engineering, management, and other fields. Many of their previous graduates have been admitted to domestic and foreign universities to continue pursuing master's and doctoral degrees. The graduates trained in this major have a solid professional foundation and strong practical technical abilities, and are highly welcomed by domestic and foreign high-tech enterprises such as production manufacturing, logistics services, and lean consulting.

2. Training Objectives

The primary objective of this major is to cultivate individuals who can adapt to the economic and social development of the country and the region, with comprehensive development in morality, intelligence, physical fitness, aesthetics, and labor skills, as socialist constructors and successors. Specifically, the program aims to nurture well-rounded individuals with a solid foundation, possessing innovative consciousness, self-learning ability, practical skills, and teamwork spirit, capable of engaging in systematic analysis, planning, design, management, and operation work. Within approximately five years after graduation, students should possess the following qualities and professional capabilities:

Objective 1: Possess good humanistic scientific literacy and professional ethics, be familiar with the national laws and regulations of the industry they are engaged in, have environmental protection awareness and social responsibility, understand and be able to correctly evaluate the impact of the designed engineering objects and engineering practice activities on culture, health, safety, environment and social sustainable development.

Objective 2: Be able to apply mathematics, natural sciences, engineering basic theories and their related field professional knowledge and modern tools to solve practical complex engineering problems in the field of industrial engineering, and have the ability to engage in technical development, intelligent simulation and optimization design, experimental research and operation

management in this professional field.

Objective 3: Be able to demonstrate independent work, teamwork and leadership abilities in professional practice and multidisciplinary teams, be proactive in adapting to social development and environmental changes, and have an international perspective, good communication and project management skills.

Objective 4: Have a lifelong learning awareness and ability, be able to continuously update knowledge and enhance capabilities through further education or other means, continuously track and understand new knowledge, new technologies, new products, new standards and norms in this professional field, and apply them to professional practice.

3. Graduation Requirements

Upon graduation, students are expected to demonstrate the following competencies:

(1). Engineering Knowledge: The ability to apply mathematics, natural sciences, engineering fundamentals, and professional knowledge to solve complex engineering problems in the field of industrial engineering .

(2). Problem Analysis: The ability to apply the basic principles of mathematics, natural sciences, and engineering science to identify, express, and analyze complex engineering problems in the field of industrial engineering through literature research to obtain effective conclusions.

(3). Design/Development of Solutions: The ability to design solutions for complex engineering problems in the field of industrial engineering , design systems, units (components), or processes that meet specific requirements, and demonstrate innovation consciousness, considering social, health, safety, legal, cultural, and environmental factors in the design process.

(4). Research: The ability to conduct research on complex engineering problems in the field of industrial engineering based on scientific principles and scientific methods, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis.

(5). Use of Modern Tools: The ability to develop, select, and use appropriate technologies, resources, modern engineering tools, and information technology tools for complex engineering problems in the field of industrial engineering , including prediction and simulation of complex engineering problems in the field of industrial engineering , and understanding their limitations.

(6). Engineering and Society: The ability to analyze and evaluate the impact of professional engineering practices and solutions to complex engineering problems in the field of industrial engineering on society, health, safety, law, and culture based on engineering-related background knowledge, and understanding of responsibilities.

(7). Environment and Sustainable Development: The ability to understand and evaluate the impact of engineering practices on the environment and social sustainability in addressing complex engineering problems in the field of industrial engineering .

(8). Professional Ethics: Possession of humanistic and social science literacy, social responsibility, the ability to understand and comply with engineering professional ethics and norms, and fulfill responsibilities in engineering practice.

(9). Individual and Team: The ability to assume individual, team member, and leader roles in interdisciplinary teams.

(10). Communication: The ability to effectively communicate and interact with peers in the industry and the general public on complex engineering problems, including writing reports and designing documents, making presentations, clear expression, or responding to instructions. Also, possessing a certain international perspective and being able to communicate and interact in a cross-cultural context.

(11). Project Management: Understanding and mastering engineering management principles and economic decision-making methods, and applying them in a multidisciplinary environment.

(12). Lifelong Learning: Possession of awareness of independent learning and lifelong learning, and the ability to continuously learn and adapt to development.

4 Relationship Between Training Objectives and Graduation Requirements

Matrix table of the relationship between training objective and graduation requirement

Objective Requireme	Objective 1	Objective 2	Objective 3	Objective 4
1 Engineering knowledge	•			
2 Problem analysis		•	•	
3 Design/development of solutions	•	•		
4 Research	•	•		
5 Use of modern tools	•		•	
6 Engineering and society		•		•
7 Environment and sustainable development	•	•		
8 Professional ethics			•	•
9 Individuals and teams	•		•	
10 Communication			•	•
11 Project management	•		•	
12 Lifelong learning		•		•

5 Major Disciplines and Professional Core Courses

Major Disciplines: Mechanical engineering, Management science and engineering

Professional Core Courses: Fundamental of Mechanical Design, Fundamental of Mechanical Manufacturing, Human Factors Engineering, Engineering Economics, Introduction to Systems Engineering, Fundamental Industrial Engineering, Operations Research, Production Planning and Control, Quality Management and Reliability, Facility Planning and Logistics Analysis, Production System Modeling and Simulation, etc.

Correspondence between course modules and cluster is as shown in the table.

No.	Modules	Cluster
1	General education foundation courses	mathematics and natural science(C1), informatics(C2), foreign language(C6), general courses(C7), quality expansion courses(C8)
2	subject basic courses	engineering foundation(C3)
3	professional courses	engineering application(C4)
4	practice courses	practical training(C5), bachelor thesis(C9)

The correspondence between course groups and courses is as shown in the table.

Cluster	Cluster	ECTS
C1	Advanced Mathematics A (1) (2), Linear Algebra, Probability Theory and Mathematical Statistics, University Physics (1) (2), University Physics Experiment (1) (2).	22
C2	C Language Programming, Matlab Mathematical Modeling and Simulation, Python Language Programming, Literature Review and Thesis Writing.	8.5
C3	Professional Ethics and Responsibilities of Engineers, Introduction to Intelligent Manufacturing, Engineering Mechanics B, Mechanical Drawing (1)(2), Fundamentals of Mechanical Design A, Fundamentals of Interchangeability and Technical Measurement, Materials for Mechanical Engineering B, 3D CAD Technology, Fundamentals of Mechanical Manufacturing A.	21.5
C4	Management, Engineering Economics, Human Factors Engineering, Fundamentals of Industrial Engineering, Engineering Statistics, Introduction to Systems Engineering, Operations Research, Quality Management and Reliability, Facility Planning and Logistics Analysis, Production Planning and Control, Production System Modeling and Simulation, Project Management, Management Information Systems, Lean Production.	38

C5	National Defense and Entrance Education, Practice of English Application Ability, Professional Cognitive Education, Comprehensive Practice in Ideological and Political Theory Courses, Course Design of C Language Programming, Mapping of Mechanical Parts and Components, Metalworking Practice (2), Voluntary Labor, Course Design of Fundamentals of Mechanical Design, Course Design of Human Factors Engineering, Social Investigation, Course Design of Fundamentals of Industrial Engineering, Production Practice, Course Design of Facility Planning and Design, Course Design of Production Planning and Control, Comprehensive Course Design of Industrial Engineering Project Optimization, Graduation Practice.	54
C6	College English (1)(2)(3)(4)	11
C7	Morality and Fundamentals of Law, Basic Principles of Marxism, Outline of Modern and Contemporary Chinese History, General Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics, Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics for a New Era, Situation and Policy.	15
C8	Physical Education (1) (2) (3) (4), Cultural Literacy Education (Chinese Culture, Natural Sciences, etc.), Cultural Literacy Education (Public Art), Military Theory and National Security Education, Mental Health Education for College Students, Second Classroom, Career Development and Employment Guidance for University Students(1)(2), Innovation and Entrepreneurship Education(1)(2).	14
C9	Bachelor Thesis	30
	Total	214

6 Program Duration and Degree

Duration: 4 years

Degree conferred: Bachelor of Engineering

7 Credits

Total Credits: 170

Course category	In-class teaching			Engineering practice and graduation design
	General education foundation courses	Subject basic courses	Professional course	

Credits	68	40	20	42
Percentage in total credits	40%	23.53%	11.76%	24.71%

8 Teaching Schedule

8.1 Schedule of Teaching Weeks

Item Weeks Semester	Orientation and Military Training	Theoretical Teaching	Course Design	Intensive Training	Comprehensive Experiment	Practical Training	Comprehensive Practice of Morals and Ethics	Bachelor Thesis	Graduation Education	Final Examinations	Flexible Instruction Weeks	Number of Weeks in a Semester
1st	2	13	1							2	2	20
2st		15	1	1		1				2		20
3st		16				2				2		20
4st		15	2				1			2		20
5st		14	4							2		20
6st		12	4			2				2		20
7st		14	4							2		20
8st						2		15	1		2	20
Total	2	99	16	1		7	1	15	1	14	4	160

8.2 Schedule of Practicum Courses

Course Code	Type	Name	Semester	Number of weeks	Credits
1602000	Orientation and Military Training	National Defense and Entrance Education	1st	2	1
0302900	Course Design	Course Design of C Language Programming	1st	1	1
0202401	Practical Training	Professional Cognitive Education	2st	1	1
0502001	Comprehensive Practice in Ideological and Political Theory Courses	Internet + Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era has entered thousands of villages and thousands of households	2st	(1)	1
0402000	Intensive Training	Practice of English Application Ability	2st	1	1
0202000	Skill training	Mapping of Mechanical Parts and Components	2st	1	1
1402001	Practical Training	Metalworking Practice (2)	3st	2	2
0502000	Comprehensive Practice of Ideological and Moral Cultivation	Voluntary Labor	4st	1	1
0202002	Course Design	Course Design of Fundamentals of Mechanical Design	4st	2	2
0202401	Course Design	Course Design of Human Factors Engineering	5st	2	2
0502002	Social Practice	Social Investigation	Summer	(4)	(4)
0202403	Course Design	Course Design of Fundamentals of Industrial Engineering	5st	2	2

0202404	Practical Training	Production Practice	6st	2	2
0202405	Course Design	Course Design of Facility Planning and Design	6st	2	2
0202406	Course Design	Course Design of Production Planning and Control	6st	2	2
0202407	Comprehensive experimental week	Comprehensive Course Design of Industrial Engineering Project Optimization	7st	4	4
0202408	Practical Training	Graduation Practice	8st	2	2
0202409	Bachelor Thesis	Bachelor Thesis	8st	15	15
Total				42	42

8.3 Schedule of Theoretical Courses

course type	required/ elective	course code	course name	credits	course hours			week in each semester								examin ation mode
					total	teaching	experime nt and practice	1st	2nd	3rd	4th	5th	6th	7th	8th	
								13 wee ks	15 wee ks	16 wee ks	14 wee ks	15 wee ks	12 wee ks	14 wee ks		
	required	Ideology and Politics Module														
		0500000	Morality and Fundamentals of Law	2.5	40	32	8	3								examinati on

course type	required/ elective	course code	course name	credits	course hours			week in each semester								examination mode
					total	teaching	experiment and practice	1st	2nd	3rd	4th	5th	6th	7th	8th	
								13 weeks	15 weeks	16 weeks	14 weeks	15 weeks	12 weeks	14 weeks		
General education foundation courses		0500001	Basic Principles of Marxism	3	48	40	8		4							examination
		0500002	Outline of Modern and Contemporary Chinese History	2.5	40	32	8			3						examination
		0500003	General Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	2	32	32				3						examination
		0500004	Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics for a New Era	3	48	40	8				4					examination
		0500005	Situation and Policy	2	32	32										assessment

course type	required/ elective	course code	course name	credits	course hours			week in each semester								examin ation mode
					total	teaching	experime nt and practice	1st	2nd	3rd	4th	5th	6th	7th	8th	
								13 wee ks	15 wee ks	16 wee ks	14 wee ks	15 wee ks	12 wee ks	14 wee ks		
		Mathematics and Natural Sciences Module														
		1000000	Advanced Mathematics A(1)	4.5	72	72		6								examinati on
		1000001	Advanced Mathematics A(2)	6	96	96			6							examinati on
		1000008	University Physics (1)	2.5	40	40			3							examinati on
		1000009	University Physics (2)	3	48	48				3						examinati on
		1001000	University Physics Experiment (1)	1	16		16		2							assessme nt
		1001001	University Physics Experiment (2)	1	16		16			2						assessme nt
		1000004	Linear Algebra	2	32	32			3							examinati on
		1000006	Probability Theory and Mathematical Statistics	2	32	32				2						examinati on
		Comprehensive Application Ability Module														
		0400000	College English (1)	3	48	48		4								examinati on

course type	required/ elective	course code	course name	credits	course hours			week in each semester								examination mode
					total	teaching	experiment and practice	1st	2nd	3rd	4th	5th	6th	7th	8th	
								13 weeks	15 weeks	16 weeks	14 weeks	15 weeks	12 weeks	14 weeks		
		0400001	College English (2)	2	32	32			3							examination
		0400002	College English (3)	3	48	48				3						examination
		0400003	College English (4)	3	48	48					3					examination
		0300901	C Language Programming	4	64	44	20	5								assessment
		0200014	Literature Review and Thesis Writing	1	16	16						2				assessment
		0210001	Professional Ethics and Responsibilities of Engineers	1	16	16						2				assessment
		Quality Expansion Module														
		1100000	Physical Education (1)	1	36	32	4	2								assessment
		1100001	Physical Education (2)	1	36	32	4		2							assessment
		1100002	Physical Education (3)	1	36	32	4			2						assessment
		1100003	Physical Education (4)	1	36	32	4				2					assessment

course type	required/ elective	course code	course name	credits	course hours			week in each semester								examination mode
					total	teaching	experiment and practice	1st	2nd	3rd	4th	5th	6th	7th	8th	
								13 weeks	15 weeks	16 weeks	14 weeks	15 weeks	12 weeks	14 weeks		
		0000000	Cultural Literacy Education (Chinese Culture, Natural Sciences, etc.)	1	16	16										assessment
		0000001	Cultural Literacy Education (Public Art)	2	32	32										assessment
		1600000	Military Theory and National Security Education	2	36	24	12		*							assessment
		1800000	Mental Health Education for College Students	1	16+ (16)	16	(16)	*								assessment
		0000002	Second Classroom	*												assessment
		Entrepreneurship and Innovation Education Module														
		0010000	Development and Employment Guidance for University Students	2	16+ (22)	16	(22)						*			assessment
		5210000	Innovation and Entrepreneurship Education(1)	1	8+ (8)	8	(8)			2						assessment

course type	required/ elective	course code	course name	credits	course hours			week in each semester								examination mode
					total	teaching	experiment and practice	1st	2nd	3rd	4th	5th	6th	7th	8th	
								13 weeks	15 weeks	16 weeks	14 weeks	15 weeks	12 weeks	14 weeks		
		5210001	Innovation and Entrepreneurship Education(2)	1	8+(8)	8	(8)						2			assessment
		Subtotal		68	1140+(54)	1020	120	20	23	20	9	4	2	0		
Subject basic courses	required	0200001	Mechanical Drawing (1)	2.5	40	40		3								examination
		0200002	Mechanical Drawing (2)	2	32	32			3							examination
		0210002	Introduction to Intelligent Manufacturing	1	16	16		2								assessment
		0200907	Engineering Mechanics B	3	48	42	6			3						examination
		0200009	Fundamentals of Mechanical Design A	4	64	52	12				5					examination
		0200010	Fundamentals of Interchangeability and Technical Measurement	2	32	26	6				3					examination
		0200012	Materials for Mechanical Engineering	2	32	28	4				3					examination

course type	required/ elective	course code	course name	credits	course hours			week in each semester								examination mode
					total	teaching	experiment and practice	1st	2nd	3rd	4th	5th	6th	7th	8th	
								13 weeks	15 weeks	16 weeks	14 weeks	15 weeks	12 weeks	14 weeks		
			B													
		0201100	3D CAD Technology	1.5	24		24			2						assessment
		0200101	Fundamentals of Mechanical Manufacturing A	2.5	40	36	4					3				examination
		0200400	Management	2	32	32							3			assessment
		0200401	Engineering Economics	3	48	40	8				4					examination
		0200402	Human Factors Engineering	3	48	38	10					4				examination
		0200403	Fundamentals of Industrial Engineering	3	48	38	10					4				examination
		0200404	Engineering Statistics	2.5	40	32	8						4			assessment
		0200405	Introduction to Systems Engineering	3	48	38	10						4			examination
		0200406	Operations Research	3	48	38	10					4				examination

course type	required/ elective	course code	course name	credits	course hours			week in each semester								examin ation mode
					total	teaching	experime nt and practice	1st	2nd	3rd	4th	5th	6th	7th	8th	
								13 wee ks	15 wee ks	16 wee ks	14 wee ks	15 wee ks	12 wee ks	14 wee ks		
		Subtotal		40	640	528	112	5	3	5	15	15	11	0		
Professi onal course	required	0200407	Quality Management and Reliability	3	48	38	10							4		examinati on
		0200408	Facility Planning and Logistics Analysis	3	48	38	10						4			examinati on
		0200409	Production Planning and Control	3	48	38	10						4			examinati on
		0200410	Production System Modeling and Simulation	3	48	28	20							4		examinati on
		Subtotal		12	192	142	50	0	0	0	0	0	8	8		
	elective	0200411	Industrial Engineering Cases	1.5	24	24								4		ssessment
		0200412	Project Management	2	32	32								4		ssessment
		0200413	Advanced Manufacturing Systems	1.5	24	24							3			ssessment
		0200414	Management Information Systems	2.5	40	32	8							3		ssessment

course type	required/ elective	course code	course name	credits	course hours			week in each semester								examination mode
					total	teaching	experiment and practice	1st	2nd	3rd	4th	5th	6th	7th	8th	
								13 weeks	15 weeks	16 weeks	14 weeks	15 weeks	12 weeks	14 weeks		
		0200415	Lean Production	2	32	32								4		assessment
		0200416	Modern Equipment Management	1.5	24	24								4		assessment
		0200417	Scheduling Principles, Algorithms and Systems	2	32	32								4		assessment
		0200418	Principles and Applications of Database	1.5	24	24								4		assessment
		0200420	English for Industrial Engineering	1.5	24	24								4		assessment
		0200421	Matlab Mathematical Modeling and Simulation	1.5	24	0	24		2							assessment
		0200422	Python Language Programming	2	32	0	32			3						assessment
		Subtotal	At least 8 credits	8	128	128								12		assessment
		Total		128	2100	1818	282	25	26	25	24	19	21	20		

9 Observation Points for the Connotation of Graduation Requirements and the Supporting Courses

Graduation requirements	Observation Points for the Connotation of Graduation Requirements	Supporting courses
1.Engineering knowledge	1.1 Ability to apply mathematics, natural sciences and economic management, master the basic and professional knowledge of industrial engineering and management science, and be able to apply them to the formulation of industrial engineering problems.	University Physics (1)(2), Advanced Mathematics A(1)(2), Linear Algebra, Probability Theory and Mathematical Statistics, Engineering Mechanics B, Engineering Economics, Management
	1.2 Able to construct and solve suitable mathematical models targeting industrial engineering problems	Advanced Mathematics A(1)(2), Linear Algebra, C Language Programming, Operations Research, Introduction to Systems Engineering, Matlab Mathematical Modeling and Simulation, Python Language Programming
	1.3 Able to apply relevant knowledge and mathematical modeling methods to deduce and analyze the improvement and optimization problems in industrial engineering processes.	Lean Production, Fundamentals of Industrial Engineering, Fundamentals of Mechanical Manufacturing A, Facility Planning and Logistics Analysis
	1.4 Able to apply relevant engineering fundamentals and professional knowledge to the comparison and synthesis of solutions for complex engineering and management problems in industrial engineering.	Fundamentals of Mechanical Design A, Fundamentals of Interchangeability and Technical Measurement, Materials for Mechanical Engineering B, Human Factors Engineering, Operations Research, Introduction to Systems Engineering, Production System Modeling and Simulation, Bachelor Thesis
2.Problem Analysis	2.1 Able to apply relevant scientific principles to identify and determine the key links in complex industrial engineering problems.	Advanced Mathematics A(1)(2), Linear Algebra, University Physics (1)(2), Probability Theory and Mathematical Statistics, Engineering Mechanics B, Lean Production, Quality Management and Reliability, Engineering Statistics
	2.2 Able to correctly express complex engineering problems in industrial	C Language Programming, Operations Research,

Graduation requirements	Observation Points for the Connotation of Graduation Requirements	Supporting courses
	engineering based on relevant scientific principles and mathematical modeling methods.	Production System Modeling and Simulation, Introduction to Systems Engineering, Matlab Mathematical Modeling and Simulation, Python Language Programming
	2.3 Able to recognize that there are multiple alternative solutions available for addressing complex industrial engineering problems, and capable of exploring alternative solutions through scheme research..	Facility Planning and Logistics Analysis, Introduction to Systems Engineering, Production Practice, Graduation Practice
	2.4 Able to apply basic principles and obtain technical routes and influencing factors for solving complex industrial engineering problems through literature research.	Fundamentals of Industrial Engineering, Production Planning and Control, Comprehensive Course Design of Industrial Engineering Project Optimization, Bachelor Thesis
3.Design/Development of Solutions	3.1 Able to analyze complex engineering problems such as the design, simulation and optimization of intelligent manufacturing systems in industrial engineering for specific requirements, and put forward corresponding solutions.	Lean Production, Human Factors Engineering, Facility Planning and Logistics Analysis, Production Planning and Control, Production System Modeling and Simulation, C Language Programming, Mapping of Mechanical Parts and Components, Bachelor Thesis
	3.2 Able to analyze and demonstrate the feasibility of solutions and compile feasibility study reports.	Engineering Economics, Production System Modeling and Simulation, Course Design of C Language Programming, Comprehensive Course Design of Industrial Engineering Project Optimization, Course Design of Fundamentals of Mechanical Design
	3.3 Able to design the optimized design of intelligent manufacturing systems that meet specific requirements and reflect a sense of innovation..	Fundamentals of Mechanical Design A, Fundamentals of Interchangeability and Technical Measurement, Management Information Systems, Matlab Mathematical Modeling and Simulation, Mapping of Mechanical Parts and Components, Python Language Programming
	3.4 Able to design process flows that meet product requirements and prepare	Mechanical Drawing (1)(2), Fundamentals of Mechanical Design A, Fundamentals of

Graduation requirements	Observation Points for the Connotation of Graduation Requirements	Supporting courses
	technical documents such as manufacturing process specifications.	Interchangeability and Technical Measurement, Materials for Mechanical Engineering B, Fundamentals of Mechanical Manufacturing A, Course Design of Fundamentals of Industrial Engineering, Course Design of Facility Planning and Design, Course Design of Production Planning and Control
	3.5 Able to comprehensively consider restrictive factors such as economy, environment, laws, safety, health and ethics in the intelligent manufacturing process and derive acceptable indicators.	Introduction to Intelligent Manufacturing, Quality Management and Reliability, Course Design of Human Factors Engineering
4.Research	4.1 Able to investigate and analyze solutions to relevant complex engineering problems in the field of industrial engineering through literature research or related methods based on scientific principles.	Literature Review and Thesis Writing, Course Design of Fundamentals of Industrial Engineering, Course Design of Production Planning and Control, Comprehensive Course Design of Industrial Engineering Project Optimization, Graduation Practice, Bachelor Thesis
	4.2 Able to select research approaches and design experimental schemes according to the characteristics of research objects.	Fundamentals of Industrial Engineering, Production Planning and Control, Facility Planning and Logistics Analysis
	4.3 Able to construct experimental systems according to experimental schemes, conduct experiments safely, and collect experimental data scientifically.	Course Design of C Language Programming, University Physics Experiment (1)(2), Engineering Statistics
	4.4 Able to analyze and interpret experimental results, and draw reasonable and valid conclusions through information synthesis.	Engineering Mechanics B, Course Design of Production Planning and Control, Course Design of Facility Planning and Design, Management Information Systems
5.Use of Modern Tools	5.1 Understand the principles and methods for using modern instruments, information technology tools, engineering tools and simulation software commonly applied in the field of industrial engineering, as well as their	3D CAD Technology, Facility Planning and Logistics Analysis, Course Design of Fundamentals of Mechanical Design

Graduation requirements	Observation Points for the Connotation of Graduation Requirements	Supporting courses
	limitations.	
	5.2 Able to select and apply appropriate instruments, information resources, engineering tools and professional simulation software to analyze, calculate and design complex engineering problems in the field of industrial engineering.	Mechanical Drawing (1)(2), C Language Programming, Operations Research, Course Design of Facility Planning and Design, Matlab Mathematical Modeling and Simulation, Python Language Programming, Engineering Statistics, Bachelor Thesis
	5.3 Able to develop or select modern tools meeting specific requirements for specific objects, simulate and predict industrial engineering management processes, and analyze their limitations.	Course Design of C Language Programming, Comprehensive Course Design of Industrial Engineering Project Optimization, Production System Modeling and Simulation
6.Engineering and Society	6.1 Understand the technical standards, intellectual property rights, industrial policies, laws and regulations related to industrial engineering, and comprehend the impacts of different social cultures on engineering activities.	Situation and Policy, Morality and Fundamentals of Law, Cultural Literacy Education (Chinese Culture, Natural Sciences, etc.), Cultural Literacy Education (Public Art), Quality Management and Reliability, Course Design of Fundamentals of Mechanical Design
	6.2 Able to conduct rational analysis based on the relevant background knowledge of industrial engineering, objectively evaluate the impacts of professional engineering practices on society, health, safety, laws and culture, as well as the influences of these restrictive factors on project implementation, and understand the corresponding responsibilities to be undertaken..	Introduction to Intelligent Manufacturing, Engineering Economics, Project Management, Human Factors Engineering, Course Design of Human Factors Engineering
7.Environment and Sustainable Development	7.1 Understand the current development status of the professional field, as well as the relevant environmental and sustainable development policies and regulations, and recognize and comprehend their guiding role and significance for the development of the professional field..	Outline of Modern and Contemporary Chinese History, Basic Principles of Marxism, General Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics, Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics for a New Era, Situation and Policy, Professional Cognitive Education

Graduation requirements	Observation Points for the Connotation of Graduation Requirements	Supporting courses
	7.2 Able to understand and evaluate the impacts of industrial engineering management processes on environmental and social sustainable development.	Morality and Fundamentals of Law, Human Factors Engineering, Lean Production, Quality Management and Reliability, Introduction to Intelligent Manufacturing, Introduction to Systems Engineering
8. Professional Ethics	8.1 Master the necessary knowledge of humanities and social science literacy, hold correct values, understand the relationship between individuals and society, and have a good grasp of China's national conditions.	Outline of Modern and Contemporary Chinese History, Basic Principles of Marxism, General Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics, Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics for a New Era, Cultural Literacy Education (Chinese Culture, Natural Sciences, etc.), Cultural Literacy Education (Public Art), Morality and Fundamentals of Law
	8.2 Understand the engineering professional ethics and norms of honesty, impartiality, integrity and compliance with codes, and consciously abide by them in engineering practice.	National Defense and Entrance Education, Professional Ethics and Responsibilities of Engineers, Mental Health Education for College Students, Voluntary Labor, Graduation Practice
	8.3 Understand engineers' social responsibilities for the public's safety, health and well-being as well as environmental protection, and consciously fulfill such responsibilities in engineering practice.	Professional Cognitive Education, Physical Education (1) (2) (3) (4), Military Theory and National Security Education, Professional Ethics and Responsibilities of Engineers, Quality Management and Reliability, Production Practice
9. Individual and Team	9.1 Able to communicate effectively with team members of other disciplines in a multidisciplinary team, and carry out work independently or in cooperation with team members.	Practice of English Application Ability, Comprehensive Course Design of Industrial Engineering Project Optimization, Industrial Engineering Professional English
	9.2 Clarify the different responsibilities of team members and the person in charge corresponding to their roles, be able to listen to, synthesize and make	Project Management, Management, Metalworking Practice (2) Course Design of Fundamentals of Industrial Engineering, Graduation Practice

Graduation requirements	Observation Points for the Connotation of Graduation Requirements	Supporting courses
	rational decisions on the opinions of team members, and organize, coordinate or direct team members to carry out work.	
10.Communication	10.1 Able to communicate and exchange ideas effectively with industry peers and the general public on professional issues related to industrial engineering by means of oral presentations, written documents, charts and diagrams, and understand the differences in communication with industry peers and the general public.	Literature Review and Thesis Writing, Professional Cognitive Education, Innovation and Entrepreneurship Education(1)(2), Development and Employment Guidance for University Students(1)(2), Management, Production Practice, Graduation Practice, Industrial Engineering Professional English
	10.2 Understand the international development trends and research hotspots of this major, and comprehend and respect the differences and diversity of various cultures in the world; possess linguistic and written expression abilities for cross-cultural communication, and be able to conduct basic communication and exchanges on professional issues in a cross-cultural context.	College English, Practice of English Application Ability, Bachelor Thesis, Literature Review and Thesis Writing, Professional Cognitive Education
11.Project Management	11.1 Understand and master the management and economic decision-making methods involved in engineering projects.	Project Management, Engineering Economics, Management, Production Planning and Control
	11.2 Understand the relationships among engineering technology, management and economic effects, and be able to apply the principles of engineering management and economic decision-making methods to the process of designing and developing solutions for engineering projects in a multidisciplinary environment.	Innovation and Entrepreneurship Education(1)(2), Project Management, Engineering Economics, Bachelor Thesis
12.Lifelong Learning	12.1 Understand the necessity of independent learning and lifelong learning	Basic Principles of Marxism, Outline of Modern and Contemporary Chinese History, Introduction to Xi

Graduation requirements	Observation Points for the Connotation of Graduation Requirements	Supporting courses
	against the backdrop of social development.	Jinping Thoughts on Socialism with Chinese Characteristics for a New Era, Development and Employment Guidance for University Students(1)(2), Innovation and Entrepreneurship Education(1)(2)
	12.2 Possess the ability of independent learning, including the ability to comprehend technical issues in industrial engineering, the ability to summarize and conclude, and the ability to raise questions.	Literature Review and Thesis Writing, Cultural Literacy Education (Chinese Culture, Natural Sciences, etc.), Cultural Literacy Education (Public Art), Bachelor Thesis

10 Curriculum System Support Matrix for Graduation Requirements

Course code	Course name	Graduation requirements																																		
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning	
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2
0500000	Morality and Fundamentals of Law																					M			L	H										
0500001	Basic Principles of Marxism																							L		M									H	
0500002	Outline of Modern and Contemporary Chinese History																							L		M									H	
0500003	General Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics																							L		M										
0500004	Introduction to																							M		H									H	

Course code	Course name	Graduation requirements																																			
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning		
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2	
	Xi Jinping Thoughts on Socialism with Chinese Characteristics for a New Era																																				
0500005	Situation and Policy																					H		M													
1000000	Advanced Mathematics A (1)	H	H			H																															
1000001	Advanced Mathematics A (2)	H	H			H																															
1000008	University Physics (1)	H				M																															
1000009	University Physics (2)	H				M																															
1001000	University Physics Experiment (1)															H																					

Course code	Course name	Graduation requirements																																			
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning		
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2	
1001001	University Physics Experiment(2)															H																					
1000004	Linear Algebra	H	H			H											H																				
1000006	Probability Theory and Mathematical Statistics	H				H											H																				
0400000	College English (1)																															H					
0400001	College English (2)																															H					
0400002	College English (3)																															H					
0400003	College English (4)																															H					
0300901	C Language Programming		H				M			L									H																		
0200014	Literature Review and Thesis Writing														M																H	M					L

Course code	Course name	Graduation requirements																																			
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning		
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2	
0210001	Professional Ethics and Responsibilities of Engineers																										H	M									L
1100000	Physical Education (1)																											H									
1100001	Physical Education (2)																											H									
1100002	Physical Education (3)																											H									
1100003	Physical Education (4)																											H									
0000000	Cultural Literacy Education(Chinese Culture, Natural Sciences, etc.)																				H						M										L
0000001	Cultural Literacy Education (Public Art)																				H						M										L
1600000	Military Theory and National																											H									

Course code	Course name	Graduation requirements																																		
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning	
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2
	Security Education																																			
1800000	Mental Health Education for College Students																										H									
0010000	Development and Employment Guidance for University Students(1)(2)																														H					M
5210000	Innovation and Entrepreneurship Education(1)																														H			M	H	
5210001	Innovation and Entrepreneurship Education (2)																														H			M	H	
0200001	Mechanical Drawing（1）												H							M																
0200002	Mechanical Drawing（2）												H							M																

Course code	Course name	Graduation requirements																																			
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning		
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2	
0210002	Introduction to Intelligent Manufacturing													M									L		H												
0200907	Engineering Mechanics B	H				M											L																				
0200009	Fundamentals of Mechanical Design A				L								H	M																							
0200010	Fundamentals of Interchangeability and Technical Measurement				L								H	M																							
0200012	Materials for Mechanical Engineering B				M									H																							
0201100	3D CAD Technology																	H																			
0200101	Fundamentals of Mechanical Manufacturing A				M									H																							

Course code	Course name	Graduation requirements																																		
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning	
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2
0200400	Management	H																											H	M			L			
0200401	Engineering Economics	H								M												L											H			
0200402	Human Factors Engineering				H					H												M		L												
0200403	Fundamentals of Industrial Engineering			H					H							M																				
0200404	Engineering Statistics					H										H				M																
0200405	Introduction to Systems Engineering		H		H			L																	M											
0200406	Operations Research		H		H		M													L																
0200407	Quality Management and Reliability					H								H								M			L											
0200408	Facility Planning and Logistics			M				H		H						L				L																

Course code	Course name	Graduation requirements																																		
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning	
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2
	Analysis																																			
0200409	Production Planning and Control								M	H						L																	M			
0200410	Production System Modeling and Simulation				H		H			M	L										H															
0200412	Project Management																					M							H				M	L		
0200414	Management Information Systems											H					M																			
0200415	Lean Production					H				M													L													
0200420	Industrial Engineering Professional English																											M				H				
0200421	Matlab Mathematical		H				H					L							M																	

Course code	Course name	Graduation requirements																																		
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning	
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2
	Modeling and Simulation																																			
0200422	Python Language Programming		H				H				L								M																	
1602000	National Defense and Entrance Education																									H										
0302900	Course Design of C Language Programming										H					M				L																
0202401	Professional Cognitive Education																						H				H			H	M					
0402000	Practice of English Application Ability																											M			H					
0202000	Mapping of Mechanical									H		M																								

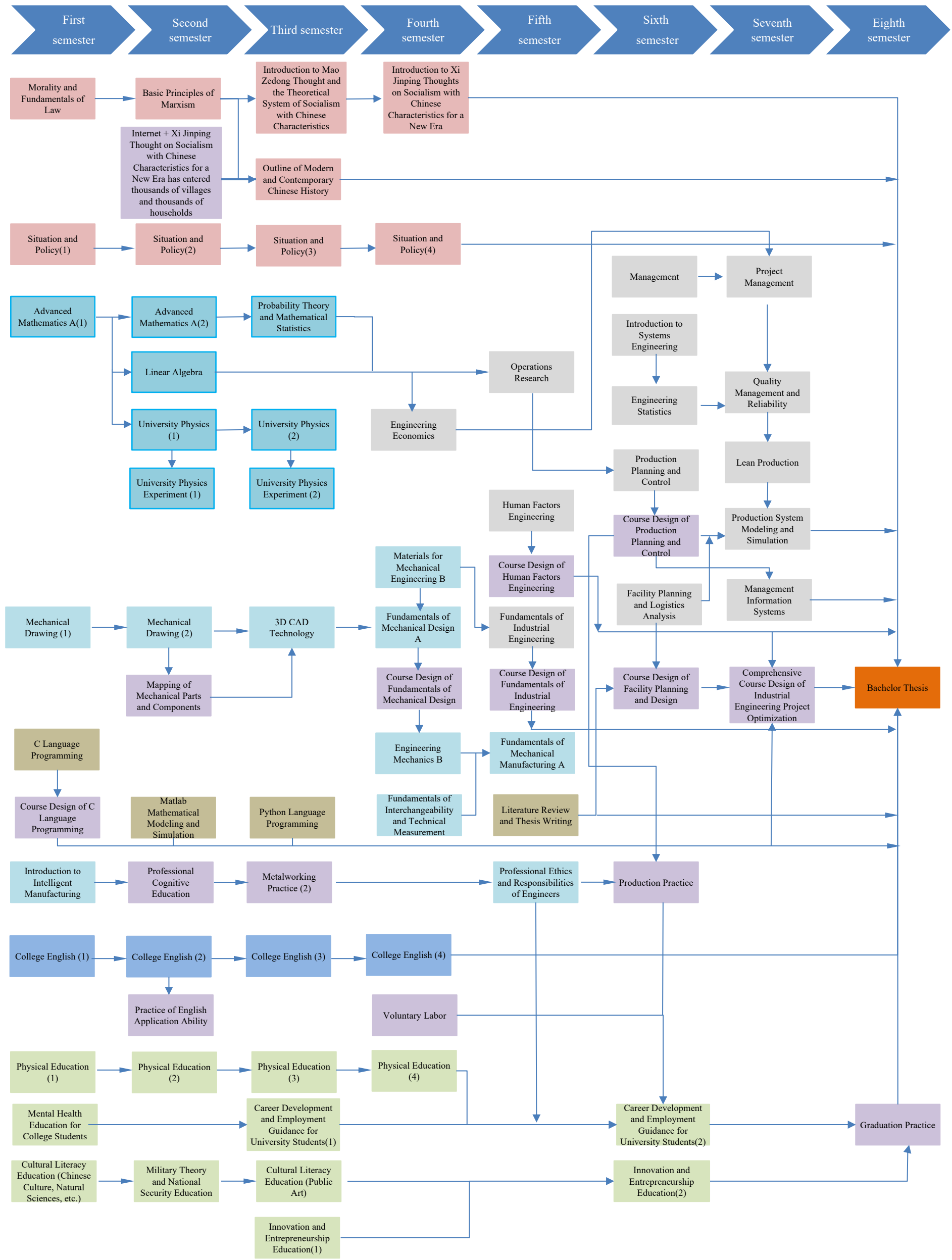
Course code	Course name	Graduation requirements																																			
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning		
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2	
	Parts and Components																																				
1402001	Metalworking Practice (2)																													M							
0502000	Voluntary Labor																										H										
0202002	Course Design of Fundamentals of Mechanical Design										H								H			M															
0202401	Course Design of Human Factors Engineering												H										H														
0202403	Course Design of Fundamentals of Industrial Engineering												H		M															L							
0202404	Production Practice							H																			M				L						

Course code	Course name	Graduation requirements																																			
		1.Engineering Knowledge				2.Problem Analysis				3.Design/Development of Solutions					4.Research				5.Use of Modern Tools			6.Engineering and Society		7.Environment and Sustainable Development		8.Professional Ethics			9.Individual and Team		10.Communication		11.Project Management		12.Lifelong Learning		
		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	3-1	3-2	3-3	3-4	3-5	4-1	4-2	4-3	4-4	5-1	5-2	5-3	6-1	6-2	7-1	7-2	8-1	8-2	8-3	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2	
0202405	Course Design of Facility Planning and Design												L				M		H																		
0202406	Course Design of Production Planning and Control												H		H		M																				
0202407	Comprehensive Course Design of Industrial Engineering Project Optimization								M		H			H														H									
0202408	Graduation Practice							H						H												M			M	L							
0202409	Bachelor Thesis								H	H				H					H												H		H			H	

11 The Structure Chart of Curriculum Plan and Allocation of Courses in Eight Semesters

The structural relationship of all courses, including prerequisite relationships, is as shown in the chart below:

Figure of logical relationship of all courses



12 Formulator & Reviewer

Formulator: **Xie Fuchun, Liu Yongxiang, Wang Juan, Ji Xukun**

Reviewer: **Cheng Yulan, Chen Guoqiang**