Programme Handbook for Mechanical Engineering

(Version No. V2024.09)

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Programme Director: Associate Professor Hu Hai

I. Basic Information of the Major

College: School of Mechanical and Automotive Engineering	**Industry College: School of Intelligent Manufacturing**
Discipline Category: Engineering	**Professional Category: Mechanical Engineering**
Programme Name: Mechanical Engineering	**Code: 080201**
School System: Four years	**Degree Conferred: Bachelor of Engineering**
Total Credits of Chinese Rules: 168	**Total Teaching Hours: 2928**
ECTS (European Credit Transfer System): 197	**ECTS Total Hours: 5516**

II. Program Objectives

This major carries out the "Four-Education and Four-Achievement" learning activities (four educations: ideological and political education, general education, professional education, innovation and entrepreneurship education; four achievements: adult education, growth education, talent education, success education). It aims to cultivate talents with socialist core values, meeting the needs of socialist modernization, developing all-round moral, intellectual, physical, aesthetic and labor qualities. Students will master basic theories, fundamental knowledge, professional knowledge and skills in mathematics, natural sciences, humanities and social sciences related to the field of Mechanical Engineering. Through basic training for relevant certified engineers, they will gain the ability to analyze and solve complex problems in mechanical engineering, engineering practice ability, innovation ability, team cooperation spirit and lifelong learning awareness. They will become “Hengxing Five-Excellence” traits (Five-Excellence traits: good morality, strong academic ability, proficient theory, diligent practice, internationalization) high-quality applied talents engaged in mechanical design and manufacturing, technology development, applied research, production organization and operation management in the field of Mechanical Engineering.

1.Graduation Requirements

(1) Engineering Knowledge: Ability to apply mathematical, natural scientific, mechanical basic and professional knowledge to solve complex engineering problems in mechanical engineering and

related fields.

The requirement can be interpreted from the following perspectives:

Graduates should understand mathematical and natural scientific knowledge and apply it to solve complex problems in mechanical engineering and related fields. Graduates should be able to master basic engineering knowledge such as mechanical drawing, theoretical mechanics and material mechanics, electrotechnics, hydraulic and pneumatic transmission, fundamentals of engineering materials and mechanical manufacturing, and apply it to solve complex problems in mechanical engineering and related fields. Graduates should be able to master professional knowledge of mechanical engineering, and be able to solve complex engineering problems in mechanical analysis, design, manufacturing processes, NC programming and processing, development and transformation based on professional knowledge.

(2) Problem Analysis: Ability to apply the basic principles of mathematics, natural science and mechanical engineering to identify, express and analyze complex engineering problems in mechanical engineering and related fields through literature research to obtain effective conclusions.

The requirement can be interpreted from the following perspectives:

Graduates should be able to apply the basic principles of mathematics, natural science and mechanical engineering to identify and judge complex problems in mechanical engineering and related fields. Graduates should be able to correctly express complex problems in mechanical engineering and related fields by applying the basic principles of mathematics, natural science and mechanical engineering. Graduates should be able to analyze complex problems in mechanical engineering and related fields through literature research and professional collaboration to obtain effective and reasonable conclusions.

(3) Design/Development Solutions: Ability to develop and design solutions for complex engineering problems, design systems, units (components) or process flows that meet specific requirements, reflect innovation, and consider feasibility from the perspectives of health and safety, life-cycle cost and net-zero carbon requirements, law and ethics, society and culture.

The requirement can be interpreted from the following perspectives:

For complex engineering and economic problems, graduates should be able to use professional knowledge in mechanical engineering and related fields, comprehensively consider social, health,

safety, legal, cultural and other factors for scheme design, structural analysis, process preparation, etc., and fully reflect innovation awareness. Graduates should be able to use computer-aided design software (such as CAD) to solve professional and related problems in mechanical engineering, and carry out design analysis and innovative design.

(4) Research: Ability to conduct research on complex engineering problems based on scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis.

The requirement can be interpreted from the following perspectives:

Graduates should be able to carry out research on complex engineering problems in mechanical engineering and related fields through theoretical analysis, literature research and related methods based on the theoretical knowledge of mechanical engineering and related disciplines, and collect basic data and information by adopting reasonable methods. Graduates should be able to consider multiple influencing factors and management objectives of complex engineering problems in mechanical engineering and related fields, use scientific principles and methods for data analysis and processing, and design specific and feasible research schemes. Graduates should be able to implement specific research schemes and engineering practices, and make reasonable explanations according to the problems arising in the implementation process against scientific objectives, so as to obtain reasonable and effective conclusions and apply them to engineering practices.

(5) Use of Modern Tools: Ability to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for complex engineering problems, including simulation and modeling of complex engineering problems, and understand their limitations.

The requirement can be interpreted from the following perspectives:

For complex engineering problems in mechanical engineering and related fields, graduates should be able to use various search tools, professional software and other modern information technologies for literature retrieval and information query in this major. Graduates should be able to develop or select and use appropriate technologies, modern information tools and resources to simulate and model complex engineering problems in mechanical engineering and related fields, and understand their limitations.

(6) Engineering and Sustainable Development: Ability to analyze and evaluate the impacts of engineering practices on health, safety, the environment, law, and economic and social sustainable development based on engineering-related background knowledge when solving complex engineering problems, and understand the responsibilities to be borne.

The requirement can be interpreted from the following perspectives:

Based on the background knowledge, standards and codes of mechanical engineering, graduates should be able to carry out reasonable analysis and evaluation of mechanical engineering project design, manufacturing and processes, and judge the impacts brought by the use of new materials, new processes, new technologies and new methods. Graduates should be able to analyze and evaluate the impacts of practical activities in the field of mechanical engineering and solutions to complex problems on society, health, safety, law and culture, so as to understand the responsibilities to be borne. Graduates should be able to understand the national sustainable development strategies in the aspects of environment, society, etc., as well as the policies, laws and regulations related to environmental and social sustainable development, and have the awareness of environmental protection and sustainable development. Graduates should be able to understand the impacts of practices in mechanical engineering and related fields on sustainable development, adopt scientific evaluation methods to analyze the impacts of engineering practices on environmental and social sustainable development in the practices of mechanical engineering and related fields, and integrate the concept of sustainable development into engineering practices.

(7) Ethic and Professional Norms: Have the awareness of serving the country and the people through engineering, have humanistic and social scientific literacy and social responsibility, be able to understand and apply Engineering Ethics, and abide by Engineering Ethics, norms and relevant laws in engineering practices, and fulfill responsibilities.

The requirement can be interpreted from the following perspectives:

Graduates should establish correct world outlook, outlook on life and values, have good professional ethics and professional dedication, and have strong collective honor and team spirit. Graduates should be able to understand the professional nature and professional responsibilities of mechanical engineering professionals in the practice of mechanical engineering and related fields, pay attention to programme ethics cultivation, abide by professional ethics norms and fulfill

responsibilities.

(8) Individual and Team: Ability to assume the roles of individual, team member and leader in a team composed of multiple disciplines.

The requirement can be interpreted from the following perspectives:

Graduates should understand the significance of teamwork, have the awareness of teamwork, and be able to assume the roles of individual, team member and leader in the implementation process of practices in mechanical engineering and related fields. Graduates should be able to play an appropriate role according to the role requirements in a multi-disciplinary background team, organize and coordinate team members to carry out work, and coordinate the relationship with personnel from other disciplines to jointly solve complex engineering problems in mechanical engineering and related fields.

(9) Communication: Ability to effectively communicate and exchange with industry peers and the public on complex engineering problems, including writing reports and design documents, making presentations, expressing clearly or responding to instructions; ability to communicate and exchange in cross-cultural contexts, and understand and respect language and cultural differences.

The requirement can be interpreted from the following perspectives:

Graduates should be able to effectively communicate and exchange with industry peers and the public on complex engineering problems in mechanical engineering and related fields through written or oral forms, and clearly express solutions to mechanical engineering-related problems through writing reports, design documents, making presentations, etc., and answer inquiries. Graduates should have good application ability of professional foreign languages in mechanical engineering, understand basic professional terms and the international status of related fields, have a certain international vision, and be able to communicate and exchange in cross-cultural contexts.

(10) Project Management: Understand and master mechanical design, manufacturing and economic decision-making methods and related engineering project management knowledge, and be able to apply them in a multi-disciplinary environment.

The requirement can be interpreted from the following perspectives:

Graduates should be able to master the principles of mechanical engineering management, have project management ability, and be able to select appropriate management and economic

decision-making methods according to the practices in mechanical engineering and related fields. Graduates should be able to apply mechanical design principles, engineering analysis methods and mechanical engineering project management knowledge to analyze and solve problems such as project rationality, reliability, economy, and scheme comparison and optimization.

(11) Life-long Learning: Have the awareness and ability of autonomous learning and life-long learning, be able to understand the impacts of extensive technological changes on engineering and society, adapt to new technological changes, and have critical thinking ability.

The requirement can be interpreted from the following perspectives:

Graduates should have the ability to actively find and put forward problems, have the awareness and requirement of life-long learning, master the methods of autonomous learning, and have ways to expand knowledge and abilities. Graduates should be able to carry out autonomous learning and life-long learning, master the frontiers and development trends of mechanical engineering and related fields, have strong comprehension ability in technology, economy, management, law and information, and have the ability to comprehensively analyze and solve problems.

2.Course-Objective Support Matrix

objective / Curriculum System	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
Introduction to Mechanical Engineering		√				√				√	√
Descriptive Geometry and Mechanical Drawing	√	√				√				√	
Electrotechnics	√	√	√	√			√		√	√	
Theoretical Mechanics	√			√			√				
Interchangeability and Technical Measurement		√	√			√					√
Fundamentals of Engineering Materials and Mechanical Manufacturing	√	√	√	√							
Mechanics of Material	√	√				√					
Hydraulic and Pneumatic	√	√	√						√		

objective / Curriculum System	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
Transmission											
Principles of Machinery	√	√		√						√	√
Mechanical Design		√	√				√			√	
Mechanical Engineering Testing Technology	√		√				√			√	
Intelligent Manufacturing Equipment Technology		√	√	√							
Mechanical Manufacturing Technology	√		√		√	√					
Mechatronic System Design		√	√			√				√	
Innovative Design Thinking											
Fundamentals of Entrepreneurship											
Innovation and Entrepreneurship Cases in Mechanical Engineering		√	√				√			√	
Mechanical Innovative Design	√	√			√						√
Labor Practice							√	√			√
Engineering Drafting Practicum		√	√		√				√	√	
3D Modeling Design Practice	√		√				√				
Intelligent Manufacturing Comprehensive Practice				√	√						√
Metalworking Practice		√	√								√
Programming and Control Design Practice	√	√	√		√		√		√	√	
Engineering Quality Management Training				√	√				√	√	
Structural Optimization Design Practice			√		√	√				√	√
Mechanical Design Course Project		√	√		√						√
Mechanical CAD/CAM Technology Practice		√	√			√					√

objective / Curriculum System	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
Mechatronic System Integrated Practice		√	√			√				√	
3D Modeling Design Practice	√		√							√	
Intelligent Manufacturing Comprehensive Practice		√	√			√				√	
Metalworking Practice	√		√	√		√					
Programming and Control Design Practice		√		√		√					√
Graduation Internship	√		√	√			√				
Undergraduate Thesis /Design			√		√				√	√	√
Ideological Morality and Rule by Law							√	√			√
Outline of Chinese Modern and Contemporary History							√	√			√
Basic Principles of Marxism						√	√				√
Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics						√		√	√	√	
Introduction for the study of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era						√	√			√	
Situation and Policy Ⅰ						√					√
Situation and Policy Ⅱ						√					√
Situation and PolicyⅢ						√					√
Situation and PolicyⅣ						√					√
Situation and Policy Ⅴ						√					√
Situation and PolicyⅥ						√					√
Situation and PolicyⅦ						√					√
Situation and PolicyⅧ						√					√

objective / Curriculum System	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
Advanced MathematicsA Ⅰ	√	√					√				
Advanced MathematicsA Ⅱ	√	√									
Linear Algebra	√	√									
Probability Theory and Mathematical Statistics	√	√									
University Physics Ⅰ	√	√									
University Physics Ⅱ	√	√									
College Physics Experiments	√	√									
College English Listening and Speaking Module Ⅰ					√				√		√
College English Reading and Writing Module Ⅰ					√				√		√
College English Listening and Speaking Module Ⅱ					√				√		√
College English Reading and Writing Module Ⅱ					√				√		√
College English Expansion Module Ⅰ					√				√		√
College English Expansion Module Ⅱ					√				√		√
University Digital Intelligence Quality					√						√
Information Retrieval and Utilization				√	√						√
Military Theory							√	√			
Physical Education Ⅰ								√			√
Physical Education Ⅱ								√			√
Physical EducationⅢ								√			√
Physical EducationⅣ								√			√

objective / Curriculum System	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
Mental Health Education							√	√	√		
Education on Outstanding Traditional Chinese Culture							√	√			√
National Security Education							√	√			
Career Planning for College Students							√	√	√		√
Career Guidance for College Students							√	√	√		√
Art Literacy Course							√	√			
Global Competence Curriculum								√	√		
Global Competence Activities								√	√		
Social Sciences Course						√	√				
Natural Sciences Course	√	√				√					
Co-curricular Activities(Elective Course Groups)									√	√	√
Specialization Tracks(Elective Course Groups)	√	√	√	√	√				√		√
Professional Enhancement(Elective Course Groups)	√	√	√	√	√	√		√			
Military Skills Training											

III. Professional Curriculum System and Topological Diagram

1. Curriculum System Diagram

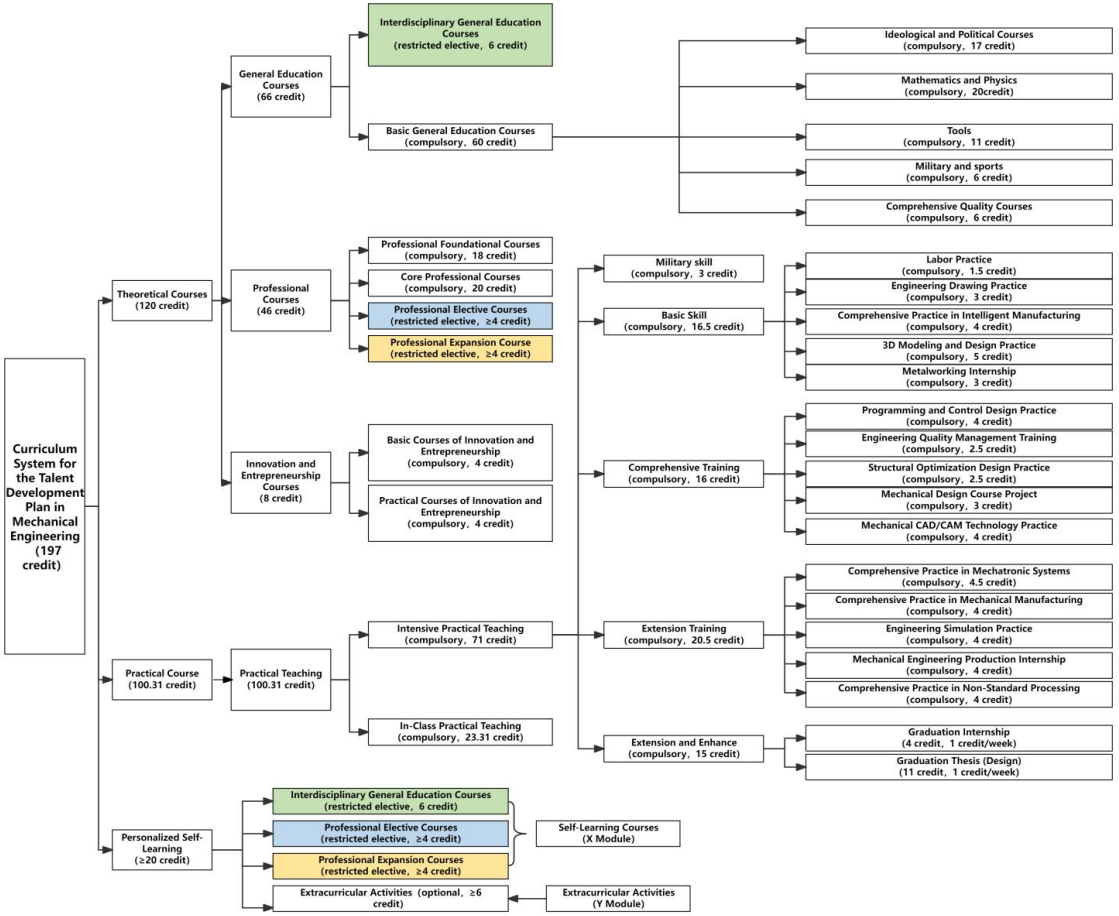
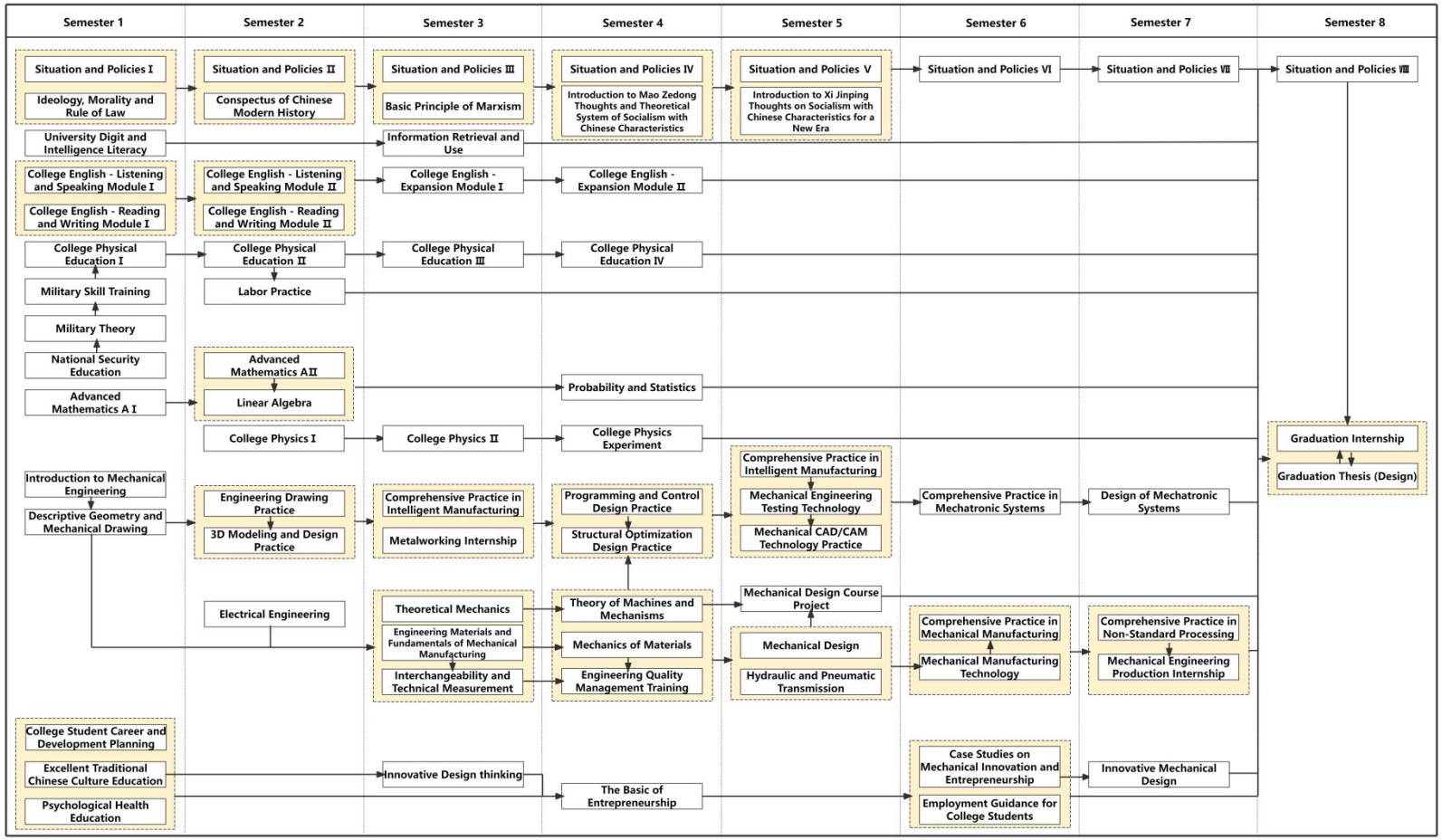


Figure 1: Curriculum System and Credit Composition Diagram of the Mechanical Engineering Major

2. Curriculum Topology Diagram



***Specialized Direction Courses and Specialized Elective Courses are not included**

Figure 2 Topology Diagram of the Mechanical Engineering Major's Curriculum

3. Curriculum Balance Rate

Table 1 Semester Teaching Balance Sheet of Mechanical Engineering Courses

Semester Distribution	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester6	Semester 7	Semester 8	Proportion
Compulsory Theory	18.36	14.36	15.86	14.11	14	4.75	5.75	0.25	**44.39%**
Compulsory Practice	7.89	12.39	10.39	14.14	8.25	14	7.5	15	**45.44%**
Recommended Electives	1.75	1.75	1.75	1.25	5.25	5.25	1.75	1.25	**10.15%**
Total	**28**	**28.5**	**28**	**29.5**	**27.5**	**24**	**15**	**16.5**	**100%**

4. Curriculum Distribution Ratio

Table 2 Credit-Hour Allocation and Proportion Table for Mechanical Engineering Major

Category	Credits	Proportion of Total Credits	Class Hours	Proportion of Total Class Hours
Basic General Education	60	30.46%	1680	30.46%
Compulsory Professional Education	38	19.29%	1064	19.29%
Innovation and Entrepreneurship Education	8	4.06%	224	4.06%
Personalized Training	20	10.15%	560	10.15%
Intensive Practical Training Module	71	36.04%	1988	36.04%
Total	**197**	**100.00%**	**5516**	**100.00%**

IV. Professional Basic, Core, Elective and Characteristic Courses

1. Professional Basic Courses (8 courses, 18 credits)

Introduction to Mechanical Engineering (1 Credit), Descriptive Geometry and Mechanical Drawing (2 Credits), Electrotechnics (2 Credits), Theoretical Mechanics (3 Credits), Interchangeability and Technical Measurement (2 Credits), Fundamentals of Engineering Materials and Mechanical Manufacturing (3 Credits), Materials Mechanics (3 Credits), Hydraulic and Pneumatic Transmission (2 Credits).

2. Programme Core Courses (6 courses, 20 credits)

Principles of Machinery (4 Credits), Mechanical Design (4 Credits), Mechanical Engineering Testing Technology (3 Credits), Intelligent Manufacturing Equipment Technology (3 Credits), Mechanical Manufacturing Technology (3 Credits), Mechatronics System Design (3 Credits).

3. Professional Elective Courses (4 courses, credits).

Professional English for Mechanical Engineering (2 Credits), Metal-Cutting Machine Tools (2 Credits), CNC Technology and PLC (2 Credits), Fundamentals of Mechanical Engineering Control (2 Credits).

4. Professional Characteristic Course (1 course, 3 credits)

Mechatronics System Design (3 Credits): This course is a core professional and compulsory course set according to the core competencies of the Mechanical Engineering major. Mechatronics technology is an interdisciplinary and comprehensive high-tech. To meet the professional needs of new engineering for mechanical engineering talents in the new era, this course teaches basic theoretical knowledge such as the introduction to mechatronics, mechanical system components and their modeling, detection sensors and their interface circuits, control motors and their selection and calculation, industrial control computers and their interface technology. Meanwhile, it organically combines the classic knowledge of pre-requisite courses for mechatronics system design with cutting-edge technologies. From the perspective of practical engineering needs, it seamlessly integrates ideological and political education content such as the Lunar Exploration Project, HPR1000, and the spirit of manned spaceflight, which contain mechatronics elements, into engineering practice and comprehensive design cases of the course. This aims to enhance students' systematic design thinking for mechatronic products, cultivate their craftsmanship spirit of striving for excellence, and inspire their family-country feelings and mission of serving the country through science and

technology. Through the study of this course, students will master the basic laws and methods of mechatronics system design, and possess the preliminary ability to solve general engineering problems in the design, manufacturing, development, applied research, and management of mechatronic equipment in the production process.

V. Intensive Practical Teaching Links

1. Military Skills Training (1 course, 3 credits)

2. Basic Skills (5 courses, 16.5 credits)

Labor Practice (1.5 Credits), Engineering Drafting Practice (3 Credits), Intelligent Manufacturing Comprehensive Practice (5 Credits), 3D Modeling Design Practice (4 Credits), Metalworking Practice (3 Credits).

3. Comprehensive Training (5 courses, 16 credits)

Programming and Control Design Practice (4 Credits), Engineering Quality Management Training (2.5 Credits), Structural Optimization Design Practice (2.5 Credits), Mechanical Design Course Project (3 Credits), Mechanical Manufacturing Comprehensive Practice (4 Credits).

4. Extended Training (5 courses, 20.5 credits)

Mechatronic System Integrated Practice (4.5 Credits), Mechanical CAD/CAM Technology Practice (4 Credits), Engineering Simulation Practice (4 Credits), Mechanical Engineering Production Internship (4 Credits), Comprehensive Practice of Non-standard Processing (4 Credits).

5. Extended Enhancement (2 courses, 15 credits)

Graduation Internship (4 credits), Undergraduate Thesis /Design (11 credits)

VI. Professional Graduation and Degree Awarding Conditions

1. Professional Graduation Conditions

In accordance with the requirements of the *Academic Management Rules of Qingdao Qingdao Hengxing University of Science and Technology of Science and Technology*, students who have completed the course credits specified in the training program with qualified grades, and whose achievement degree of each training objective (i.e., graduation requirements) is at least qualified, can obtain the “Undergraduate Diploma in Mechanical Engineering of Qingdao Qingdao Hengxing

University of Science and Technology of Science and Technology".

The achievement degree of training objectives adopts a grade system, which is set to five grades: excellent, good, medium, pass, and fail. The corresponding relationship between the grade system and the hundred-mark system is usually: (1) 90-100 points: excellent; (2) 80-89 points: good; (3) 70-79 points: medium; (4) 60-69 points: pass; (5) <60 points: fail.

2. Professional Degree Awarding Conditions

Students who meet the graduation requirements and comply with the requirements of the *Detailed Rules for the Implementation of Bachelor's Degree Awarding of Qingdao Hengxing University of Science and Technology*, and have been reviewed and approved by the University Degree Committee, can be awarded the "Bachelor of Engineering Degree of Qingdao Hengxing University of Science and Technology".

VII. Professional Teaching Implementation Plan

Course Type	Course Level	Course Module	Course Name	Course Code	Course Nature	Chinese Credits	ECTS	Chinese Class Hours	ECTS Hours	Semester Offered								Evaluation Method	Offering Institution
										First Academic Year		Second Academic Year		Third Academic Year		Fourth Academic Year			
										1	2	3	4	5	6	7	8		
General Education Courses	Basic General Education Courses	Ideological and Political Courses	Ideological Morality and Rule by Law	3000000101	compulsory	3	3	48	84	√								Examination	School of Marxism
			Outline of Chinese Modern and Contemporary History	3000000102	compulsory	3	3	48	84		√							Examination	
			Basic Principles of	3000000	compuls	3	3	48	84			√						Examin	

			Marxism	03	ory													**ation**	
			Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	3000000104	compulsory	3	3	48	84				√					**Examination**	
			Introduction for the study of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	3000000147	compulsory	3	3	48	84					√				**Examination**	
			Situation and Policy Ⅰ	3000000105	compulsory	0.25	0.25	8	7	√								Non-written exam	
			Situation and Policy	30000001	compuls	0.2	0.25	8	7		√							Non-wr	

			Ⅱ	82	ory	5												itten exam	
			Situation and Policy Ⅲ	3000000106	compulsory	0.25	0.25	8	7				√						Non-written exam	
			Situation and Policy Ⅳ	3000000183	compulsory	0.25	0.25	8	7					√					Non-written exam	
			Situation and Policy Ⅴ	3000000107	compulsory	0.25	0.25	8	7						√				Non-written exam	
			Situation and Policy Ⅵ	3000000184	compulsory	0.25	0.25	8	7							√			Non-written exam	
			Situation and Policy Ⅶ	3000000108	compulsory	0.25	0.25	8	7								√		Non-written exam	
			Situation and Policy	30000001	compuls	0.2	0.25	8	7									√	Non-wr	

			Ⅷ	85	ory	5											itten exam	
			Subtotal 1			**17**	**17**	**304**	**476**								**5 exam-based courses**	
		Mathematical Courses	Advanced Mathematics AⅠ	300000016 0	compulsory	5	5	80	140	√							**Examination**	School of Education
			Advanced Mathematics AⅡ	300000016 1	compulsory	5	5	80	140		√						**Examination**	
			Linear Algebra	300000011 3	compulsory	2	2	32	56		√						**Examination**	
			Probability Theory and Mathematical Statistics	300000011 4	compulsory	2	2	32	56				√				**Examination**	
General Education	**Basic general course**	**Mathematical Courses**	University Physics Ⅰ	300000013 9	compulsory	2	2	32	56		√						**Examination**	School of Education
			University Physics	30000001	compuls	2	2	32	56			√					**Examin**	

Courses			Ⅱ	40	ory													**ation**	
			College Physics Experiments	300000 0401	compuls ory	2	2	32	56				√					Non-wr itten exam	
			Subtotal 2			**20**	**20**	**320**	**560**									**6 exam-based courses**	
		Tools Training Course	Digital Intelligent English Ⅰ	30000001 0B	compuls ory	2	2	64	56	√								**Examin ation**	School of International Education
			Digital Intelligent English Ⅱ	30000001 0C	compuls ory	2	2	64	56		√							**Examin ation**	
			Digital Intelligent English Ⅲ	30000001 0D	compuls ory	2	2	64	56			√						**Examin ation**	
			Digital Intelligent English Ⅳ	30000001 0E	compuls ory	2	2	64	56				√					**Examin ation**	
			University Digital Intelligence Quality	30000001 86	compuls ory	2	2	32	56	√								Non-wr itten exam	School of Electronic and Computer

																			Engineering
			Information Retrieval and Utilization	3000000134	compulsory	1	1	16	28			√						Non-written exam	Library
			Subtotal 3			**11**	**11**	**304**	**308**									**4 exam-based courses**	
		Military PE Course	Military Theory	3000000131	compulsory	2	2	32	56	√								Non-written exam	Student Development Office
			Physical Education Ⅰ	3000000192	compulsory	1	1	36	28	√								Non-written exam	School of Sports Science and Physical Education
			Physical Education Ⅱ	3000000193	compulsory	1	1	36	28		√							Non-written exam	
			Physical Education Ⅲ	3000000194	compulsory	1	1	36	28			√						Non-written	

																		exam	
			Physical Education Ⅳ	30000001 95	compuls ory	1	1	36	28				√					Non-wr itten exam	
			Subtotal 4			6	6	176	168										
General Educati on Courses	**Basic general course**	**Compre hensive Quality Educati on Course**	Mental Health Education	30000001 29	compuls ory	2	2	32	56	√								Non-wr itten exam	School of Education
			Education on Outstanding Traditional Chinese Culture	30000001 97	compuls ory	1	1	16	28	√								Non-wr itten exam	School of Humanities
General Educati on Courses	**Basic general course**	**Compre hensive Quality Educati on Course**	National Security Education	30000001 87	compuls ory	1	1	16	28	√								Non-wr itten exam	School of Marxism
			Career Planning for College Students	30000001 32	compuls ory	1	1	16	28	√								Non-wr itten exam	Business School

			Career Guidance for College Students	3000000133	compulsory	1	1	16	28						Y			Non-written exam	
			Subtotal 5			**6**	**6**	**96**	**168**										
	Interdisciplinary Liberal Arts Course	**Interdisciplinary Liberal Arts Course**	Art Literacy Course		Restricted Elective	2	2	32	56									Non-written exam	All Academic Units
			Global Competence Curriculum		Restricted Elective	1	1	16	28									Non-written exam	
			Global Competence Activities		Restricted Elective	1	1	16	28									Non-written exam	
			Social Sciences Course		Free Elective	1	1	16	28									Non-written exam	
			Natural Sciences Course		Free Elective	1	1	16	28									Non-written	

																	exam	
			Subtotal 6			**6**	**6**	**96**	**168**									
	Total 1=Subtotal 1+Subtotal 2+Subtotal 3+Subtotal 4+Subtotal 5+Subtotal 6					**66**	**66**	**1296**	**1848**									
Major Courses	**Fundamental Major Courses**	**Fundamental Major Courses**	Introduction to Mechanical Engineering	3080201233	compulsory	1	1	16	28	√							Non-written exam	School of Mechanical & Automotive Engineering
			Descriptive Geometry and Mechanical Drawing	3080201242	compulsory	2	2	32	56	√							**Examination**	
			Electrotechnics	3080201239	compulsory	2	2	32	56		√						**Examination**	
			Theoretical Mechanics	3080201205	compulsory	3	3	48	84			√					**Examination**	
			Interchangeability and Technical Measurement	3080201202	compulsory	2	2	32	56			√					**Examination**	

			Fundamentals of Engineering Materials and Mechanical Manufacturing	3080201203	compulsory	3	3	48	84			√						**Examination**	
Major Courses	**Fundamental Major Courses**	**Fundamental Major Course**	materials mechanics	3080201206	compulsory	3	3	48	84				√					**Examination**	School of Mechanical & Automotive Engineering
			Hydraulic and Pneumatic Transmission	3080201209	compulsory	2	2	32	56					√				**Examination**	
			Subtotal 1			**18**	**18**	**288**	**504**									**7 exam-based courses**	
	Core Major Courses	**Core Major Courses**	Principles of Machinery	3080201207	compulsory	4	4	64	112				√					Examination	School of Mechanical & Automotive Engineering
			Mechanical Design	3080201208	compulsory	4	4	64	112					√				Examination	
			Mechanical Engineering Testing	3080201216	compulsory	3	3	48	84					√				Examination	

			Technology																
			Intelligent Manufacturing Equipment Technology	3080201212	compulsory	3	3	48	84					√				Examination	
			Mechanical Manufacturing Technology	3080201210	compulsory	3	3	48	84						√			Examination	
			Mechatronic System Design	3080201217	compulsory	3	3	48	84							√		Examination	
			Subtotal 2			**20**	**20**	**320**	**560**									**6 exam-based courses**	
	Elective Major Courses	**Concentration Courses**	Professional English for Mechanical Engineering	308020 1213	Minimum 4 credits required	2	2	32	56					√				Non-written exam	School of Mechanical & Automotive Engineering
			Metal-Cutting Machine Tools	308020 1223		2	2	32	56					√				Non-written exam	

			CNC Technology and PLC	308020 1245		2	2	32	56						√			Non-written exam	
			Fundamentals of Mechanical Engineering Control	308020 1246		2	2	32	56						√			Non-written exam	
			Subtotal 3			**≥ 4**	**≥ 4**	**≥ 64**	**≥ 112**										
	Major Enhancement Course	**Major Enhancement Course**	Advanced Manufacturing Technology	308020 1247	Minimum 4 credits required	2	2	32	56					√				Non-written exam	School of Mechanical & Automotive Engineering
			Principles of Automatic Control	308020 1224		2	2	32	56					√				Non-written exam	
			Principles and Control of Intelligent Manufacturing	308020 1211		2	2	32	56						√			Non-written exam	

			Microcomputer Principles and Applications	3080201221		2	2	32	56						√			Non-written exam	
Major Courses	**Major Enhancement Course**	**Major Enhancement Course**	Electromechanical Transmission and Control	3080201250		2	2	32	56						√			Non-written exam	School of Mechanical & Automotive Engineering
			Subtotal 4			**≥ 4**	**≥ 4**	**≥ 64**	**≥ 112**										
	Total 2=Subtotal 1+Subtotal 2+Subtotal 3+Subtotal 4					**≥ 46**	**≥ 46**	**≥ 736**	**≥ 1288**										
Innovation and Entrepreneurship Educati	**Innovation and Entrepreneurship Educati**	**Fundamentals of Innovation and Entrepr**	Innovative Design Thinking	3000000305	compulsory	2	2	32	56			√						Non-written exam	School of Innovation & Entrepreneurship
			Fundamentals of Entrepreneurship	3000000306	compulsory	2	2	32	56				√					Non-written exam	

on Courses	**on Courses**	**eneursh ip**	**Subtotal 1**			**4**	**4**	**64**	**112**										
		Hands-o n Innovati on & Entrepr eneursh ip Progra m	Innovation and Entrepreneurship Cases in Mechanical Engineering	30802013 04	compuls ory	2	2	32	56						√			Non-wr itten exam	School of Mechanical & Automotive Engineering
			Mechanical Innovative Design	30802013 03	compuls ory	2	2	32	56							√		Non-wr itten exam	
			Subtotal 2			**4**	**4**	**64**	**112**										
	Total 3=Subtotal 1+Subtotal 2					**8**	**8**	**128**	**224**										
Intensiv e Practica l Training Module	**Intensiv e Practica l Training Module**	Military Skills Training		30000001 96	compuls ory	2	3	32	84	√								Non-wr itten exam	Student Developmen t Office
		Basic Skills	Labor Practice	30802015 18	compuls ory	1	1. 5	16	42		√							Non-wr itten exam	School of Mechanical &

			Engineering Drafting Practice	3080201519	compulsory	2	3	32	84		√						Non-written exam	Automotive Engineering
			3D Modeling Design Practice	3080201520	compulsory	4	5	64	140		√						Non-written exam	
			Intelligent Manufacturing Comprehensive Practice	3080201521	compulsory	3	4	48	112			√					Non-written exam	
			Metalworking Practice	3080201522	compulsory	2	3	32	84			√					Non-written exam	
		Integrated Training	Programming and Control Design Practice	3080201523	compulsory	3	4	48	112				√				Non-written exam	
			Engineering Quality Management	3080201524	compulsory	2	2.5	32	70				√				Non-written	

			Training														exam	
			Structural Optimization Design Practice	3080201525	compulsory	2	2.5	32	70				√				Non-written exam	
			Mechanical Design Course Project	3080201526	compulsory	2	3	32	84					√			Non-written exam	
			Mechanical CAD/CAM Technology Practice	3080201527	compulsory	3	4	48	112					√			Non-written exam	
Intensive Practical Training Module	**Intensive Practical Training Module**	**Outward Bound Training**	Mechatronic System Integrated Practice	3080201528	compulsory	2	4.5	32	126						√		Non-written exam	School of Mechanical & Automotive Engineering
			Mechanical Manufacturing Comprehensive Practice	3080201529	compulsory	3	4	48	112						√		Non-written exam	
			Engineering	308020	compuls	2	4	32	112						√		Non-wr	

			Simulation Practice	1530	ory													itten exam	
			Mechanical Engineering Production Internship	308020 1531	compuls ory	2	4	32	112							√		Non-wr itten exam	
			Comprehensive practice of non-standard processing	308020 1532	compuls ory	3	4	48	112							√		Non-wr itten exam	
		Competency Expansion Program	Graduation Internship	308020 1533	compuls ory	2	4	32	112								√	Non-wr itten exam	
			Undergraduate Thesis /Design	308020 1602	compuls ory	4	11	64	308								√	Non-wr itten exam	
	Total 4					**44**	**71**	**704**	**1988**										
Co-curri	**Co-curri**	**Co-curri**	Labor Education	30000009	Restricte	1	1.5	16	42									Non-wr	Communist

cular Activities	**cular Activities**	**cular Activities**	Activities	07	d Elective													itten exam	Youth League Committee
			Selected Readings from 100 Chinese and International Classics	300000091	Restricted Elective	1	1.5	3	8									Non-written exam	
			Freshman Orientation Program	300000092	Restricted Elective			3	8									Non-written exam	
			Student Organizations	300000094	Restricted Elective			3	8									Non-written exam	
			Sports Activities	300000095	Restricted Elective			4	10									Non-written exam	
			Aesthetic Education Initiatives	300000096	Restricted Elective			3	8									Non-written exam	

			Ideological-Political Cultivation	3000000908	Free Elective	2	3	32	84									Non-written exam	
			Student Club Cultural-Sports Events	3000000909	Free Elective													Non-written exam	
			Volunteer & Philanthropic Services	3000000910	Free Elective													Non-written exam	
Co-curricular Activities	**Co-curricular Activities**	**Co-curricular Activities**	Innovation, Entrepreneurship & Creativity (IEC)	3000000911	Free Elective													Non-written exam	Communist Youth League Committee
			Activities of Hands-on Practicum, Professional Internship & Technical	3000000912	Free Elective													Non-written exam	

			Simulation Training																
			Competency & Specialty Development	3000000913	Free Elective													Non-written exam	
	Total 5					**≥ 4**	**≥ 6**	**≥ 64**	**≥ 168**										
总计=Total 1+Total 2+Total 3+Total 4+Total 5						**≥ 168**	**≥ 197**	**≥ 2928**	**≥ 5516**										

Table 3: Teaching Implementation Plan for Mechanical Engineering Major

Mechanical Engineering Program

The Mechanical Engineering program is a core discipline of the School of Mechanical and Vehicle Engineering. It was approved by the Shandong Provincial Department of Education in 2014, and began enrolling undergraduate students in July of the same year, making it one of the earliest undergraduate programs established at our university. In 2016, it was recognized as a Featured and Advantageous Program among private undergraduate institutions in Shandong Province. Over the past 11 years, in alignment with regional industrial transformation and upgrading, the program has graduated seven cohorts with a total of 430 students.

The standard duration of the program is four years, and it leads to a Bachelor of Engineering degree. Guided by the positioning of an “application-oriented undergraduate institution,” the program focuses on serving local enterprises in Shandong while extending its reach nationwide. Through industry-academia collaboration and integration of production and education, it has built a talent cultivation system that meets the demands of the emerging “New Engineering” disciplines. It is mainly oriented toward the mechanical industry and manufacturing enterprises, with an emphasis on preparing students for careers such as mechanical design engineers and process engineers. The program aims to nurture well-rounded application-oriented technical professionals who are politically qualified, physically and mentally healthy, and excel in moral, intellectual, physical, aesthetic, and labor education. Students are expected to master solid theoretical knowledge in mathematics, natural sciences, and engineering sciences, along with fundamental knowledge and practical abilities in mechanical design and manufacturing. They are also expected to demonstrate strong social responsibility, professional ethics, and a certain degree of global perspective. Graduates can work in areas such as mechanical design, manufacturing, and electromechanical control, engaging in product design, process development, and mechatronics design, while embodying the spirit of craftsmanship characterized by diligence, adaptability, and innovation. Based on a stable and continuously improving level of teaching quality, the program has developed into a specialized and distinctive discipline with a rational structure of curriculum and academic focus, enjoying a certain level of influence in Qingdao and surrounding areas.

Currently, the program has 411 enrolled students across 9 classes. The teaching team consists of

28 full-time faculty members, including 13 with senior professional titles, 5 PhDs, and 2 PhD candidates, forming a well-balanced structure in terms of academic qualifications, titles, and age. Among them are one “Outstanding Teacher of Qingdao,” two university-level outstanding teachers, and one excellent teaching team. Over 60% of the faculty are dual-qualified teachers (i.e., both academic and industry experience). In recent years, faculty members have undertaken more than ten teaching reform projects and won over ten awards in teaching competitions at the university level or above. Three faculty members have obtained national qualifications as skill assessors. The program has developed three provincial-level online open courses and two first-class provincial-level courses. In 2024, the Mechanical Engineering Teaching Center was approved as a provincial-level teaching demonstration center.

The program is supported by multiple on-campus laboratories, including those for mechanical manufacturing technology, mechanical innovation, mechanics, electrical engineering, robotics simulation, heat treatment and metallography, mechanical principles and design, hydraulic and pneumatic transmission, mechatronics, and 3D printing. In addition, a non-standard processing center serves as an on-campus practical training base, complemented by more than ten off-campus practice teaching bases, which together ensure continuous and comprehensive hands-on training throughout the four years of study.

Based on the employment directions and actual job roles of graduates from the past five cohorts, students have gone on to work widely in mechanical manufacturing enterprises, research institutions, and other related industries both within and outside the province. This reflects the solid professional competence, strong employ ability, and growth potential of the program’s graduates.