Instructive Cultivation Plan for the Program of Mechanical Engineering

(Grade 2021)

Program Code: 080201

I. Orientation

The program of Mechanical Engineering is oriented towards the state-owned equipment manufacturing enterprises in the Yangtze River Delta, especially in Shanghai, as well as some small and medium-sized private advanced manufacturing enterprises, to cultivate knowledge-based, high-skilled and versatile site engineers and technical talents for development and design, precision processing and manufacturing technology, quality control technology and production operation management in the field of mechanical engineering for these corporations.

II. Cultivation Objectives

1. General cultivation objective

This program intends to cultivate knowledge-based, high-skilled on-site engineering and technical talents who have solid basic knowledge of mathematics and natural sciences, basic engineering knowledge, good humanities and professional ethics, master the specialized basic knowledge and application capabilities of mechanical design, mechanical manufacturing and automation, can be engaged in design, manufacturing, technology development, operation management and application support etc. in the industrial production field, and have comprehensive quality of moral, intellectual, physical, aesthetic and labor.

2. Objective of value guidance

In order to realize the transformation from a "manufacturing country" to a "manufacturing power", the program of Mechanical Engineering will expand on the ideological and political education of "manufacturing power" and "craftsman spirit", and based on school-enterprise cooperation, implement the cultivation of social responsibility, teamwork ability, lifelong learning ability and innovative spirit throughout the whole process of talent training and training program design.

3. Objectives to be achieved five years after graduation for students:

1) Able to use mechanical engineering expertise, technology and skills to analyze and solve mechanical engineering issues related to professional occupations, and able to independently solve complex mechanical engineering technical issues;

2) Have good scientific research literacy and teamwork spirit, and able to undertake and organize engineering issues related to mechanical engineering from the perspective of social responsibility, legal and ethical training, safety and environmental awareness, and sustainable development.

3) Understand the current situation and development trend of mechanical engineering at home and abroad, familiar with industry regulations and standards by learning advanced manufacturing technology at home and abroad through self strengthening study, and constantly improve their own quality and ability, and adapt to professional and social development.

III. Requirements for Graduation

Mechanical Engineering expands the core competence and quality expression of the 12 graduation requirements based on the 12 requirements for graduation of the General Standards of China Engineering Education Program Certification Association and the talent training orientation of our school. The breakdown of each target is as follows:

1. Engineering knowledge: Able to use mathematics, natural sciences, basic and professional engineering knowledge to solve complex mechanical engineering issues.

1-1: Able to express complex mechanical engineering issues by using mathematics, natural science, basic and professional professional knowledge requisite for mechanical engineering;

1-2: Able to establish a mathematical model and solve it for a complex mechanical system or mechanical manufacturing process;

1-3: Able to use relevant knowledge and mathematical models to deduct, analyze, and discriminate the solutions of complex mechanical engineering issues;

1-4: Able to apply mathematical models and related engineering knowledge to analyze and compare solutions of complex mechanical engineering issues, and try to improve them.

2. Problem analysis: Able to apply basic principles of mathematics, natural sciences and engineering sciences to identify, express, and analyze complex mechanical engineering issues through literature research, so as to obtain effective conclusions.

2-1: Able to use the basic principles of mathematics, natural science and engineering science to identify and judge the key technologies and key parameters of complex mechanical engineering issues;

2-2: Able to correctly express, derive, analyze and synthesize complex mechanical engineering issues based on relevant scientific principles and mathematical models;

2-3: Able to recognize that there are multiple solutions to complex mechanical engineering issues, and can seek alternative and backup solutions through literature research;

2-4: Able to use the basic principles of mechanical engineering and special application fields, analyze the influencing factors of the process, and obtain effective conclusions.

3. Design/development solutions: Able to design schemes for complex mechanical engineering issues, design mechanical systems, mechanical components or mechanical processing processes that meet specific needs, and reflect the sense of innovation and consider social, health, safety, legal, cultural and environmental factors in the design process.

3-1: Master the basic design/development methods and technologies of the whole life cycle and whole process of mechanical engineering design and mechanical product development, describe design goals, and understand various factors that affect design goals and technical solutions;

3-2: Able to formulate solutions and complete the design of systems, components and parts for specific needs in complex mechanical engineering, especially machinery design and precision machining and manufacturing;

3-3: Able to design complex mechanical systems or or precision manufacturing processes, and demonstrate innovation consciousness in the design;

3-4: Able to present the design results in the form of reports, drawings or objects;

3-5: Able to comprehensively consider social, health, safety, legal, ethical, cultural and environmental factors in the design.

4. Research: Able to study complex mechanical engineering issues based on scientific principles and by using scientific methods, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis.

4-1: Based on scientific principles, combined with literature research or related methods, conduct research and analysis for complex mechanical engineering issues, and design feasible research approach;

4-2: Select the research route and design the experimental plan according to the characteristics of the mechanical engineering system or problem;

4-3: Able to construct an experimental system according to the experimental plan, carry out experiments safely, and collect experimental data correctly;

4-4: Able to accurately analyze and interpret experimental results, and obtain reasonable and effective conclusions through information synthesis.

5. Modern tools: Able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for complex mechanical engineering issues, including prediction and simulation of complex mechanical engineering issues, and able to understand their limitations.

5-1: Understand the principles and methods of modern instruments, information technology tools, engineering tools and simulation software commonly used in the program of Mechanical Engineering, and understand their limitations;

5-2: Able to select and use appropriate instruments, information resources, engineering tools and professional simulation software to analyze, calculate and design complex mechanical engineering issues;

5-3: Able to develop or choose modern tools that meet specific needs for specific objects of complex engineering issues in the field of mechanical engineering, simulate and predict program issues, and able to analyze their limitations.

6. Engineering and social interaction: Able to conduct reasonable analysis based on engineering-related background knowledge, evaluate the impacts of mechanical engineering professional engineering practices and complex engineering problem solutions on society, health, safety, laws and culture, and understand the responsibilities that should be undertaken.

6-1: Understand the technical standard system, intellectual property rights, industrial policies, laws and regulations in mechanical engineering related fields, and understand the impact of different social cultures on engineering activities.

6-2: Able to analyze and evaluate the impacts of mechanical engineering practices on society, health, safety, laws, and culture, as well as the impact of these constraints on project implementation, and understand the responsibilities that need to be undertaken.

7. Environmental protection and sustainable development: Able to understand and evaluate the impacts of engineering practices for complex engineering issues on the environment and sustainable development of society.

7-1:Understand the connotation and significance of environmental protection and sustainable social development, and able to fulfill the concepts of environmental protection and sustainable development when solving complex mechanical engineering issues;

7-2: Able to evaluate the potential hazards to humans and the environment for actual mechanical engineering projects, and understand the social, safety and legal responsibilities that need to be undertaken.

8. Professional norms: Have humanistic social science literacy, and a sense of social responsibility, be able to understand and abide by engineering professional ethics and norms in mechanical engineering practices, and able to perform responsibilities.

8-1: Have humanistic social science literacy and correct values, understand the relationship between individuals and society, and understand the national conditions of China;

8-2: Understand the engineering professional ethics and norms of honesty, fairness and integrity, and able to consciously abide by them in the practice of mechanical engineering;

8-3: understand the social responsibility of mechanical engineers for the safety, health, well-being of the public and environmental protection, and able to consciously fulfill their responsibilities in the practice of mechanical engineering.

9. Individuals and teams: Able to assume the roles of individuals, team members and leaders in a team with the multidisciplinary background.

9-1: Able to communicate effectively with members of other disciplines, and work independently or cooperatively;

9-2: Able to organize, coordinate and direct team work in a multi-disciplinary team.

10. Communication: Able to effectively communicate and exchange with industry colleagues and the public on complex mechanical engineering issues, including compiling reports and design manuscripts, presentations, clear expressions or responds to instructions, and have a certain international perspective, be able to communicate under a cross-cultural background.

10-1: Able to accurately express one's own views, respond to queries, and understand the differences in communication with industry peers and the public in terms of oral, manuscripts, charts or drawings on complex mechanical engineering issues;

10-2: Understand the international development trends and research hotspots in the field of mechanical engineering, understand and respect the differences and diversity of different cultures in the world;

10-3: Have the oral and written expression skills for cross-cultural communication, and able to conduct basic communication and exchanges on complex mechanical engineering issues in a cross-cultural context.

11. Project management: Understand and master the management principles and economic decision-making methods of mechanical engineering, and able to apply them in a multidisciplinary context.

11-1: Master the engineering management principles and economic decision-making methods involved in mechanical engineering activities;

11-2: Understand the cost composition of the entire life cycle and process of engineering and mechanical products, and understand the engineering management and economic decision-making issues involved;

11-3: Able to use engineering management and economic decision-making methods in the process of designing and developing mechanical engineering project solutions in a multidisciplinary environment (including simulation environment).

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

12-1: Able to correctly understand the necessity of self-exploration and lifelong learning, and have the consciousness of independent learning and lifelong learning;

12-2: Able to adopt positive approaches for independent learning according to personal or professional development needs, and be able to adapt to the technological development and knowledge update in the field of social and mechanical engineering.

IV. Schooling System

Four years

V. Length of Study

Flexible study period, generally four years, the minimum length of flexibility shall not be less than three years, the maximum thereof shall not be more than six years.

VI. Requirements for Graduation and Degree Conferring

Students of this program must complete the minimum credits required for each category of courses and complete all the content specified in extracurricular class according to the requirements of the instructional training plan, and the total credits must reach 160 for graduation; those who meet the requirements for bachelor's degree can be conferred Bachelor of Engineering Science.

VII. Major Disciplines

Mechanics and Mechanical Engineering

VIII. Core Courses

1. Introduction to Engineering (16 course hours)

The purpose of this course is to enable students to understand the engineering issues involved in related engineering programs (especially mechanical engineering program), stimulate their interest in learning engineering programs (especially mechanical engineering program) and clarify their motivations by introducing the basic features and concepts of engineering, solutions to general engineering issues, and the tasks and responsibilities faced by engineers. Through the study of this course, students can put forward some ideas and thoughts for solving engineering issues when facing general engineering issues. The focus of this course is to cultivate students' engineering awareness and lay the necessary foundation for students to study subsequent professional courses.

2. Modern Engineering Drawing (96 course hours)

This course is a core professional basic course for mechanical programs. Its task is to cultivate students' ability to draw engineering graphics, read engineering graphics, and initially conceive spatial shapes. Through the study of this course, students will be able to master the basic theory of projection method, master the projection laws of spatial points, lines, surfaces and bodies, master the projection diagram expression methods of mechanical parts, be able to use common drawing tools and instruments to draw engineering draws correctly and skillfully, master the computer drawing ability of engineering drawings, master the general methods and specific steps of reading engineering drawings, and comprehensively improve the comprehensive quality of mechanical disciplines. Engineering drawings are hailed as the "language of the engineering field" and are important tools for scientific and technological workers to express and exchange technical ideas.

3. Engineering Mechanics I and Engineering Mechanics II (96 course hours)

Through the study of "Engineering Mechanics I", students will be able to select the isolator from the mechanism or structure and draw the free-body diagram accurately; be able to analyze the static force of the component and determine the binding force correctly; understand and solve the friction of the plane force system; correctly calculate the velocity and acceleration of a point, the angular velocity and angular acceleration of a rigid body; understand the relativity of motion, master the method of point motion and synthesis; correctly calculate the velocity and acceleration of each point on a rigid body in plane motion; use dynamics general theorems (theorem of momentum, theorem of moment of momentum, theorem of kinetic energy, theorem of mass center motion, differential equation of fixed axis rotation) to solve dynamic issues; use D'Alembert principle to solve dynamic reaction issues; understand the principle of virtual displacement. Through the study of "Engineering Mechanics II", students will obtain the preliminary ability to simplify general rod-like components into mechanical diagrams; be able to make the internal force diagrams of rods under basic deformation proficiently, calculate their stress and displacement, and carry out strength and stiffness calculations; understand the concept of stress state and strength theory, and apply it to the strength calculation of rods under combined deformation; understand

the method of solving simple statically indeterminate issues; understand the concept of stability of compression rods, and be able to calculate the critical load and critical stress of axial compression rod, and check for stability; understand the concepts of dynamic load coefficient in dynamic load and fatigue failure and endurance limit in alternating stress; have a preliminary understanding of the basic mechanical properties and test methods of commonly used materials; have a preliminary understanding of the basic principles and methods of stress analysis in electrical measurement experiments.

4. Mechanism and Machine Theory (48 course hours)

This course is a core technical basic course required for all mechanical engineering programs. This course mainly teaches the composition principle of the mechanism, basic knowledge of various commonly used mechanisms (such as link mechanisms, cam mechanisms, gear mechanisms, gear trains, intermittent motion mechanisms and other commonly used mechanisms, etc.) and their design methods. Through the study of this course, students will understand the basic theories of mechanism structure, mechanical kinematics and dynamics, master the performance, working principles and design methods of various mechanisms, and obtain the ability to design mechanical system schemes. In the process of plan conception and structure design, combining with the development history of mechanical engineering and the research and development of the pillars of a great power, inspire and cultivate students' ability of analysis, comparison, judgment and decision-making, as well as the sense of responsibility, quality and engineering.

5. Mechanical Design (48 course hours)

This course is a basic technical course that trains students to have the ability of mechanical design. Introduce the course from several aspects such as mechanical design criteria, mechanical development history, and research and development of the pillars of a great power. Through this course, students will understand the general knowledge of mechanical design, and understand the main types, performance, structural characteristics, applications, materials, and standards of mechanical components; grasp the basic principles of mechanical design, working principles of mechanical parts, stress analysis, stress state, failure mode, working capacity calculation criteria, etc.; be able to design and calculate simple machines; be trained in design calculations, structural design and drawing, experiments, and technical documentation skills. Through conceiving creativity and innovative design, the course can integrate industrial standards, safety awareness, responsibility awareness and other concepts into mechanical design.

6. Electrician and Electronics (48 course hours)

This course will enable students to master the basics of electrical engineering and electronics required for the program. Through the study of this course, students will grasp the basic concepts and basic laws of circuits, be familiar with the basic analysis methods of DC and AC circuits; be familiar with the transition

process of circuits, and obtain the ability to read and analyze relay contact control circuits; be familiar with the knowledge of factory power transmission and distribution and safe power use; master the application characteristics of common semiconductor components and the application of amplifying circuits and integrated operational amplifiers, be familiar with negative feedback circuits, and be familiar with gate circuits and combinational logic circuits, and trigger sequential logic circuits; be familiar with the basic experimental methods of electrical and electronic application technology. The study of this course is a necessary condition for students to become builders in the field of mechanical and electrical integration in the process of socialist modernization and to inherit the spirit of craftsmanship.

7. Fundamentals of Mechanical Manufacture (48 course hours)

This course teaches the basic knowledge in mechanical manufacturing, including the mechanical properties of commonly used metal materials, selection of metal materials and main heat treatment methods; basic knowledge of metal blank casting, forging, and welding forming methods; basic knowledge of cutting principles; based knowledge required for various cutting and machining methods of commonly used parts, and the machine tools, technology and other aspects required for the cutting process. In the study of this course, students are taught to cultivate the spirit of craftsmanship and model workers in a subtle way, thus laying the foundation for our country's development from a manufacturing country to a manufacturing power.

8. Machinery Manufacturing Technology (48 course hours)

This course is an important program technical course for mechanical engineering programs. It mainly teaches related manufacturing technologies in the mechanical manufacturing process, and lays a professional theoretical foundation for cultivating craftsmen in the new era. The course mainly involves content closely related to machining technology, such as cutting principles and reasonable selection of tools; process characteristics, transmission and structure of commonly used cutting machine tools; design principles and methods of special fixtures; principles, methods and steps of typical parts processing procedures. Through the study of this course, students will obtain the ability to compile the processing procedures and related technologies of medium-complex mechanical parts. In the process of the study of this course, it will cultivate the students' working spirit of craftsmen from a great country who seek truth from facts, closely integrate theory with practice, and study hard.

9. CNC Machine Tools and Programming (48 course hours)

This course is one of the program compulsory courses. Based on the basic knowledge of metal cutting machine tools, this course teaches the basic concepts of CNC machine tools, the mechanical structure of CNC machine tools; the functions and interpolation principles of CNC systems; the form and composition of servo drive systems; the application knowledge of the selection and maintenance of CNC machine tools;

the characteristics and analysis methods of CNC machining technology, and based on the FANUC system (or other systems), introduces the commonly used programming instructions of CNC lathes, milling machines, and machining centers, as well as the methods and steps of manufacturing program programming. The training objective of this course is to enable students to understand the structure and working principle of typical CNC machine tools, be familiar with and master the basic programming methods of CNC machine tools, and be able to independently complete typical parts processing. With the development of China's manufacturing and intelligent manufacturing industry, the "pillars of great power" demonstrates that China's manufacturing is moving towards mid-to-high end, and CNC technology is one of its supports.

10. Intelligent Manufacturing Production Management (MES/ERP)

MES is a kind of monitoring and feedback to ERP planning and a system of field operation level. ERP is the refinement of business management on the production site and a system of business management level. This course introduces the definition and framework of MES as well as the rapid response manufacturing execution mode and technical system; teaches core technologies such as the coordination of manufacturing execution process, the associated management of complex information, the coordination of dynamic batch and material, the control of incremental assembly, production scheduling and so on; introduces the concept, development and general composition of ERP system; the relation and difference between MRP, MRPII and ERP; Manufacturing production planning and product life cycle; Basic ERP data environment such as material master file, bill of materials, process route, lead time and inventory records; Plan management, material management, shop floor control, procurement management and cost management, etc.

IX. Main Practice(related main courses)

Corporate knowledge practice, interchangeability and measurement technology practice, numerical control programming and processing practice, computer-aided design and manufacturing practice, mechanism process specification design practice, multi-axis machining and simulation practice, comprehensive practice of mechanical engineering, mechanical system design, and precision manufacturing integration project, graduation practice and and graduation design (thesis) of mechanical engineering, etc.

X. Course Structure and Course Hours(excluding the extracurricular class)

Category	Total Credits	%	Total Course Hours	Theory Learning	Practical Training
Public Course	55.5	35	1056	988	68
Basic Course	36	23	576	509	67
Professional Course	18	11	288	230	58

Professional Practice	38.5	24	1072	0	1072
General Course	11	7	176	154	22
Total	159	100	3168	1881	1287
Theory : Practice(%)	59:41				

XI. Teaching Schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Recommended Semester
Public Course	Required	School of Marxism	b1080001	Basic Principles of Marxism	Test	3	48	42	6	Spring 1
	Required	School of Marxism	b1080003	Ideological and Moral Cultivation and Basic Law Education	Non-test	3	48	42	6	Spring 1
	Required	School of Marxism	b1080006	Outline of Chinese Modern History	Non-test	3	48	42	6	Autumn 1
	Required	School of Marxism	b1080004	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics I	Test	3	48	42	6	Autumn 2
	Required	School of Marxism	b1080007	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics II	Test	2	32	28	4	Spring 2
	Required	School of Marxism	-----	Situation and Policy (Modules 1～4)	Non-test	2	32	28	4	Autumn 1～Spring 2
	Required	School of Marxism	b1080008	Labor Education A	Non-test	0.5	16	16		Autumn 2
	Required	College of Arts and Sciences	b1020080+	Advanced Mathematics A1	Test	4	64	64		Autumn 1
	Required	School of Arts and Sciences	b1020081+	Advanced Mathematics A2	Test	4	64	64		Spring 1
	Required	School of Arts and Sciences	b1020012	Linear algebra	Test	2	32	32		Autumn 2
	Required	School of Arts and Sciences	b1020013	Probability Theory and Mathematical Statistics	Test	2	32	32		Autumn 2
	Required	School of Arts and Sciences	b1020076	Calculation method	Test	2	32	32		Autumn 2
	Required	School of Arts and Sciences	b1020023	Complex Function and Integral Transform	Non-test	2	32	32		Spring 2
	Required	School of Arts and Sciences	b1020062	College Physics A (Module 1)	Test	3	48	48		Spring 1
	Required	School of Arts and Sciences	b1020065	College Physics B	Test	2	32	32		Autumn 2
	Required	School of Arts and Sciences	b1020066	College Physics C	Non-test	1	32		32	Autumn 2
	Required	School of Arts and Sciences	b1020035	College chemistry	Test	1	32	28	4	Autumn 1
	Required	School of Arts and Sciences	b1020018	College Chinese	Non-test	2	32	32		Spring 1
	Required	Others	b1110003	Military Skills	Non-test	0.5	2W			Autumn 1
	Required	School of Arts and Sciences	b1110002	Military Theory	Non-test	0.5	32	32		Autumn 2
	Required	School of Physical Education	-----	Physical Education I～VI	Non-test	3	160	160		Autumn 1～autumn4
	Foreign language (alternative)	English module	b1020003	General English III	Test	3	48	48		Autumn 1
			b1020004	General English IV	Test	3	48	48		Spring 1
			b1020005	General Academic English A	Test	2	32	32		Autumn 2
			---	English Development	Non-test	2	32	32		Spring 2
		German module	b1020090	College German 1	Test	3	96	96		Autumn 1
			b1020061	Training of German 1	Non-test	(6)	(96)	(96)		Autumn 1
			b1020091	College German 2	Test	2	64	64		Spring 1
			b1020067	Training of German 2	Non-test	(10)	(160)	(160)		Spring 1
			b1020092	College German 3	Test	3	96	96		Autumn 2
			b1020031	Training of German 3	Non-test	(6)	(96)	(96)		Autumn 2
			b1020093	College German 4	Test	2	64	64x		Spring 2
			b1020033	Training of German 4	Non-test	(6)	(96)	(96)		Spring 2

Total (public courses)			**55.5**	**1056**	**988**	**68**	

XI. Teaching Schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Recommended Semester
General Course	Required	Art Education Center	b0-----	Aesthetic Education	Non-test	2	32	32		Autumn, spring
	Selective	Every school	b0-----	Social Science and Humanities Literacy	Non-test	2	32	32		Autumn, spring
	Required	School of Graphics and Text	b0021162	Scientific paper writing and document retrieval	Non-test	2	32	32		Autumn 1
	Required	School of Intelligent Manufacturing	b2011322jx	Fundamentals of Programming C++	Test	3	48	32	16	Spring 2
	Required	School of Intelligent Manufacturing	b2011143jx	Project Management	Non-test	2	32	26	6	Spring 3
	Subtotal (general courses)					**11**	**176**	**154**	**22**	
Basic Course	Required	School of Intelligent Manufacturing	b2011188jx	Introduction to Engineering	Non-test	1	16	16		Autumn 1
	Required	School of Intelligent Manufacturing	b2011137jx	Modern Engineering Drawing I	Test	3	48	40	8	Autumn 1
	Required	School of Intelligent Manufacturing	b2011138jx	Modern Engineering Drawing II	Non-test	3	48	32	16	Spring 1
	Required	School of Intelligent Manufacturing	b2011397jx	Fundamentals of Engineering Materials	Test	2	32	28	4	Spring 1
	Required	School of Intelligent Manufacturing	b2011049jx	Engineering Mechanics I	Test	3	48	48		Autumn 2
	Required	School of Intelligent Manufacturing	b2011079jx	Mechanism and Machine Theory	Test	3	48	42	6	Spring 2
	Required	School of Intelligent Manufacturing	b2011050jx	Engineering Mechanics II	Test	3	48	44	4	Spring 2
	Required	School of Intelligent Manufacturing	b2011080jx	Fundamentals of Machinery Manufacturing	Test	3	48	42	6	Spring 2
	Required	Engineering Training Center	b2090001jx	Electrician and Electronics	Test	3	48	42	6	Spring 2
	Required	School of Intelligent Manufacturing	b2011077jx	Mechanical Design	Test	3	48	45	3	Autumn 3
	Required	School of Intelligent Manufacturing	b2011081jx	Machinery Manufacturing Technology	Test	3	48	42	6	Autumn 3
	Required	School of Intelligent Manufacturing	b2011465jx	Thermodynamics and Heat Transfer	Non-test	2	32	32		Autumn 3
	Required	School of Intelligent Manufacturing	b2011047jx	Principles of Engineering Control	Test	2	32	30	2	Autumn 3
	Required	School of Intelligent Manufacturing	b2011016jx	Testing Technology	Non-test	2	32	26	6	Spring 3
	Subtotal (basic professional courses)					**36**	**576**	**509**	**67**	
Professional Course	Required	School of Intelligent Manufacturing	b2011176jx	Hydraulic and Pneumatic Transmission	Test	3	48	42	6	Autumn 3
	Required	School of Intelligent Manufacturing	b2011120jx	CNC Machine Tools and Programming	Test	3	48	40	8	Autumn 3
	Required	School of Intelligent Manufacturing	b2011055jx	Industrial Robot and application	Non-test	2	32	24	8	Spring 3
	Required	School of Intelligent Manufacturing	b2011433jx	Intelligent Manufacturing Production Management (MES/ERP)	Test	2	32	24	8	Spring 3
	Subtotal (required professional courses)					**10**	**160**	**130**	**30**	
	Selective 8 credits	School of Intelligent Manufacturing	b2011182jx	Programmable Logic Controller (PLC)	Non-test	2	32	24	8	Autumn 3
		School of Intelligent Manufacturing	b2011181jx	Mechtronics Control	Non-test	2	32	24	8	Autumn 3
		School of Intelligent Manufacturing	b2011469jx	Precision and Ultra-precision Processing Technology	Non-test	2	32	26	6	Spring 3
		School of Intelligent Manufacturing	b2011901jx	Intelligent Control System	Test	2	32	26	6	Spring 3
		School of Intelligent Manufacturing	b2011135jx	Advanced Manufacturing Technology	Non-test	2	32	26	6	Spring 3
		School of Intelligent Manufacturing	b2011141jx	Modern Design Theory and Method	Non-test	2	32	26	6	Spring 3
		School of Intelligent Manufacturing	b2011156jx	Finite Element Analysis and Practice	Non-test	2	32	24	8	Spring 3
	Subtotal (selective professional courses)					**8**	**128**	**100**	**28**	

	Subtotal (professional courses)		**18**	**288**	**230**	**58**	

XI. Teaching Schedule (3)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Recommended Semester
Professional Practice	Required	Engineering Training Center	b4090001jx	Basic Engineering Training A	Non-test	3	72		72	Summer 1
	Required	School of Intelligent Manufacturing	b4011088jx	Modern Engineering Drawing and Mapping	Non-test	2	48		48	Summer 1
	Required	School of Intelligent Manufacturing	b4011106jx	Corporate Cognition Internship	Non-test	1	24		24	Summer 2
	Required	School of Intelligent Manufacturing	b4011255jx	Interchangeability and Measurement Technology Practice A	Non-test	3	72		72	Summer 2
	Required	School of Intelligent Manufacturing	b4090005jx	Practice of Electrotechnics	Non-test	1	24		24	Summer 2
	Required	School of Intelligent Manufacturing	b4011059jx	Computer Aided Design and Manufacturing Practice	Non-test	3	72		72	Autumn 3
	Required	School of Intelligent Manufacturing	b4011111jx	CNC Programming and Machining Practice	Non-test	3	72		72	Spring 3
	Required	School of Intelligent Manufacturing	b4000012jx	Innovation and Entrepreneurship in Mechanical Engineering	Non-test	2	48		48	Spring 3
	Required	School of Intelligent Manufacturing	b4011339	Labor Education B	Non-test	0.5	16		16	Spring 3
	Required	School of Intelligent Manufacturing	b4011302jx	Mechanical Design Curriculum Design(English)	Non-test	2	48		48	Spring 3
	Required	School of Intelligent Manufacturing	b4011166jx	Machinery Technological Procedure Design Practice	Non-test	2	48		48	Summer 3
	Required	School of Intelligent Manufacturing	b4011058jx	Course Practice of Fundamentals of Mechanical Manufacture	Non-test	2	48		48	Summer 3
	Required	School of Intelligent Manufacturing	b4011328jx	Mechanical System Design and Precision Manufacturing Project Integration	Non-test	3	72		72	Autumn 4
	Required	School of Intelligent Manufacturing	b4011256jx	Multi-axis Machining and Simulation Practice	Non-test	2	48		48	Autumn 4
	Required	School of Intelligent Manufacturing	b4011264jx	Comprehensive Practice of Mechanical Engineering	Non-test	3	72		72	Autumn 4
	Required	School of Intelligent Manufacturing	b4011247jx	Graduation Practice and Graduation Design (Thesis) of Mechanical Engineering	Non-test	6	288		288	Spring 4
Subtotal (professional practice)						**38.5**	**1072**		**1072**	
Extracurricular Class	Required	Others	b5110001	Extracurricular Class	Non-test	1	-	-	-	Autumn, spring, summer
Total						**160**	**3168**	**1881**	**1287**	

Description of the interconnectedness between the courses and professional certificates:

Students of Mechanical Engineering program who have passed Modern Engineering Drawing, Modern Engineering Drawing and Mapping, Computer Aided Design and Manufacturing Practice can participate in professional qualification certificate assessments related to this program, such as UG/Solidworks Advanced Certificate, etc.; who have passed Machinery Manufacturing Technology, CNC Machine Tools and Programming, CNC Programming and Machining Practice, Mechanical System Design and Precision Manufacturing Project Integration can participate in CNC milling worker, CNC assembly and maintenance and other professional qualification certificate assessments related to this program, and apply for qualification certificate of trainee mechanical design engineer(supervised by Chinese Mechanical Engineering Society).

XII. Prerequisite for Course Study

No.	Course Name	Prerequisite Course	No.	Course Name	Prerequisite Course
1	Engineering Mechanics I	Advanced Mathematics A1	8	CNC Machine Tools and Programming	Modern Engineering Drawing
		Advanced Mathematics A2			Mechanical Design
		College Physics			Fundamentals of Mechanical Manufacture
2	Mechanism and Machine Theory	Advanced Mathematics A1	9	Machinery Manufacturing Technology	Modern Engineering Drawing
		Advanced Mathematics A2			Mechanical Design
		Engineering Mechanics I			Fundamentals of Mechanical Manufacture
3	Mechanical Design	Engineering Mechanics I	10	Advanced Manufacturing Technology	Modern Engineering Drawing
		Engineering Mechanics II			Mechanical Design
		Modern Engineering Drawing			Fundamentals of Mechanical Manufacture
		Mechanism and Machine Theory			Machinery Manufacturing Technology
4	Electrician and Electronics	Advanced Mathematics A1	11	Hydraulic and Pneumatic Transmission	Advanced Mathematics A1
		Advanced Mathematics A2			Advanced Mathematics A2
		College Physics			Modern Engineering Drawing
					College Physics
5	Principles of Engineering Control	Advanced Mathematics A1	12	Project Management	Probability and Mathematical Statistics
		Advanced Mathematics A2			Engineering related courses
		College Physics			Calculation Method
		Electrician and Electronics			
6	Fundamentals of Mechanical Manufacture	Modern Engineering Drawing	13	Computer Aided Design and Manufacturing Practice	Machinery Manufacturing Technology
		Engineering Mechanics II			CNC machine tool and programming
		Basic Engineering Training A			Fundamentals of Mechanical Manufacture
		Interchangeability and Measurement Technology Practice			Modern Engineering Drawing
7	Mechanical Design Curriculum Design(English)	Mechanical Design	14	Testing Technology	Electrician and Electronics
		Computer Aided Design and Manufacturing Practice			College Physics

XIII. Credits for Extracurricular Class

Through taking extracurricular classes, students are encouraged to take part in academic lectures, social practice activities, campus cultural and sports activities, innovative and entrepreneurial activities, voluntary service activities, etc. to improve their social adaptability and enhance the competitiveness in the job market. Please refer to the Students' Manual for details of regulations on *Implementation Measures(Trial) of the Credits for Extracurricular Classes of Shanghai Polytechnic University*.