Instructive Cultivation Plan for the Program of Material Processing and Control Engineering

(Grade 2019)

Course code: 080203

1. Orientation

The program of Material Processing and Control Engineering is oriented to the needs of the machinery manufacturing industry in the Yangtze River Delta region, focusing on basic theories and basic skills in the advantageous directions of metal plastic shape technology, polymer material parts forming technology and equipment manufacturing, and cultivate application-oriented technical personnel with good professionalism and solidity professional skills for material forming process analysis and equipment manufacturing.

2. Cultivation Objectives

1. General cultivation objective

The program of Material Processing and Control Engineering intends to cultivate application-oriented technical talents with material forming process analysis and research capabilities who are comprehensively developed on the aspects of morality, intelligence, physique, beauty and labor, meet the needs of national and regional economic development, have good professional quality and solid professional skills, have critical thinking and lifelong learning ability, adhere to the core value of socialism, engaged in the development of metal plastic forming and plastic forming products and processes in the field of machinery manufacturing, mold design and manufacturing, product quality control and production management, etc., have computer application capabilities and advanced forming technology research and development capabilities.

2. Objective of value guidance

Take the spirit of model workers and craftsmanship as the value orientation, cultivate ingenuity and educate craftsmen. During the implementation process of education and teaching, the engineer values and engineer ethics education are embedded in the spirit of craftsmanship, and students are cultivated to develop a rigorous, meticulous, focused and responsible work attitude. Students will master advanced and exquisite skills, so as to promote China's "manufacturing" to China's "intelligent manufacturing" by improving quality, speed, product, and efficiency.

3. Objectives students must achieve five years after graduation:

Objective 1: Have a sound personality and good scientific and cultural literacy, adhere to the core socialist values, and have correct professional ethics, professional ethics and social responsibility.

Objective 2: Have the professional qualities of an engineer, be able to engage in professional-related technical and management work through using material forming and control engineering expertise, and be able to engage in technology and product development, process development, and equipment design, manufacturing, and improvement works, etc. in related engineering fields.

Objective 3: Be familiar with the development status and trends of material forming and control engineering, have the ability to participate in the formulation of corporate development plans, and focus on social harmony and sustainable development.

Objective 4: Have strong teamwork and communication skills, be able to work in a

multi-disciplinary team or a cross-cultural environment, and be able to play an effective role as a member and technical backbone in a technology development or engineering operation team.

Objective 5: Have lifelong learning ability, be able to improve one's professional quality through enterprise experience, continuing education, etc., and constantly adapt to the needs of national or regional economic and technological development.

3. Requirement for Graduation

Graduation requirement 1: Ability to use engineering knowledge: be able to apply professional knowledge such as mathematics, physics, chemistry, engineering mechanics and material science foundation, plastic forming principle, stamping process, polymer material shaping process and other professional knowledge to solve complex engineering issues of material shaping process and equipment manufacturing.

Index point 1-1: be able to use the language tools of mathematics, natural science, and engineering science to express material forming problems;

Index point 1-2: be able to establish a mathematical model and solve it for specific objects;

Index points 1-3: be able to use relevant knowledge and mathematical models to analyze complex engineering problems in the program;

Index points 1-4: be able to use relevant knowledge and mathematical models to compare and synthesize complex engineering problem solutions.

Graduation requirement 2: Ability to analyze problems: be able to apply basic engineering principles such as process analysis, mold design, and mold manufacturing in mathematics, natural sciences, Material Processing and Control Engineering to identify, express, and analyze complex Material Processing and Control Engineering issues through literature research, thus obtaining effective conclusions.

Index point 2-1: be able to use professional basic knowledge and other related theories to identify and judge the key technologies and key parameters of complex material shaping and control problems;

Index point 2-2: be able to correctly express complex engineering problems based on relevant scientific principles and mathematical models;

Index point 2-3: be able to recognize that there are multiple solutions to problems, and seek effective solutions through literature research and analysis;

Index points 2-4: be able to use basic principles and take advantage of literature research to analyze the influencing factors of the process and obtain effective conclusions.

Graduation requirement 3: Developing solutions: be able to design solutions to complex engineering problems in the entire life cycle of material molding process development, mold design and manufacturing, be able to design parts process, mold design and manufacturing processes that meet specific requirements, reflect the sense of innovation, and can fully consider social, environmental, health, safety, legal, cultural and other factors.

Index point 3-1: Master the basic methods and technologies of material shaping process, understand various factors that affect technical solutions, and determine design objectives and technical solutions according to customer needs;

Index point 3-2: be able to comprehensively evaluate the feasibility of the design scheme through technical indicators and economic indicators under realistic constraints such as safety,

environment, and law;

Index point 3-3: be able to use new technology and modern design tools to perform part process analysis and mold design;

Index point 3-4: be able to formulate and optimize the mold manufacturing process plan to reflect the sense of innovation.

Graduation requirement 4: Scientific research ability: based on the principle of metal plastic shaping and polymer material forming, be able to use appropriate methods to study the material mechanical properties, defect analysis, mold manufacturing process and other complex engineering issues in metal material forming engineering, including select experimental equipment, design experimental plans, conduct experimental tests, analyze data, and obtain reasonable and effective conclusions through information synthesis.

Index point 4-1: based on the knowledge learned, through literature research and related methods, be able to select research routes and design experimental programs;

Index point 4-2: be able to select experimental equipment, build experiment system, carry out experiments safely, and collect experimental data scientifically according to the experimental plan;

Index point 4-3: be able to correctly analyze and interpret experimental results, and obtain reasonable and effective conclusions through information synthesis.

Graduation requirement 5: Modern tools: be able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for complex engineering problems in the field of material processing, conduct prediction and simulation for metal plastic forming processes and polymer material forming processes, etc., and be able to understand their limitations.

Index point 5-1: understand the development status of materials science and engineering disciplines, and be able to initially master and use engineering technology software, methods, tools or equipment in practice;

Index point 5-2: be able to use engineering technology software to analyze complex engineering problems in the field of material forming and control;

Index point 5-3: For the complex engineering problems of material shaping, be able to conduct simulation analysis to obtain the best solution, and be able to understand the limitations of engineering software and tools.

Graduation requirement 6: Relations between engineering and society: be able to conduct reasonable analysis based on the background knowledge of Material Processing and Control Engineering, can evaluate the impact of solutions of material selection, process, mold manufacturing technology, production organization and management process on society, health, safety, laws and culture, and be able to understand the responsibility.

Index point 6-1: understand the technical standards, intellectual property rights, industrial policies, laws and regulations related to Material Processing and Control Engineering;

Index point 6-2: be able to correctly understand the current status of Material Processing and Control Engineering and the development and application of new products, new technologies, new processes, and new materials, as well as their impact on the objective world and society;

Index point 6-3: be able to correctly understand the social, safety and legal responsibilities of material forming and control engineering personnel in engineering practice.

Graduation requirement 7: Environment and sustainable development: be able to understand and evaluate the impact of professional engineering practices of complex engineering issues such as material molding technology and equipment manufacturing on the environment and the sustainable development of society.

Index point 7-1: be able to understand national and local policies, laws and regulations on environmental and social sustainable development;

Index point 7-2: be able to correctly recognize and understand the impact of engineering practices on the environment and social sustainable development for Material Processing and Control Engineering issues, and provide relevant countermeasures.

Graduation requirement 8: Professional standards: have humanities and social science literacy, a sense of social responsibility, be able to understand and abide by engineering professional ethics and standards in the practice of material processing engineering, and perform responsibilities.

Index point 8-1: have correct values and understand the relationship between individuals and society;

Index 8-2: understand the engineering ethics and norms of honesty, trustworthiness and fairness, and be able to consciously abide by them in engineering practices;

Index 8-3: understand the social responsibility of engineers to the public's safety, health and well-being, and environmental protection, and be able to consciously fulfill them in engineering practices.

Graduation requirement 9: individual and team: be able to assume the roles of individual, team member and leader in a team with a multidisciplinary background.

Index point 9-1: have basic interpersonal and communication skills, and be able to correctly understand the role and significance of team strength and wisdom on complex engineering problems;

Index point 9-2: be able to understand the meaning of each role in a multidisciplinary team for the objectives of the entire team, and be able to play a role in a multidisciplinary team.

Index 9-3: be able to understand the collaborative relationship between various departments in the profession, and coordinate the relationship between departments.

Graduation requirement 10: Communication ability: be able to effectively communicate and exchange with industry colleagues and the public on complex engineering issues in the field of material shaping, including writing material shaping process analysis feasibility reports, designing reasonable and feasible manuscripts such as equipment manufacturing process flow, and using materials shaping and control engineering professional knowledge to make presentation, clearly express or response to instructions, and have a certain international perspective, be able to communicate and exchange in a cross-cultural context.

Index point 10-1: be able to express one's thoughts orally or in writing, and effectively communicate and exchange with colleagues in the industry and the public on complex Material Processing and Control Engineering issues;

Index point 10-2: Master at least one foreign language, be able to read the literature of the program, be able to use technical language to explain professional issues, and be able to communicate and exchange in a cross-cultural context.

Graduation requirement 11: Project management ability: understand and master the

principles of engineering management and economic decision-making methods, and be able to apply them skillfully in a multidisciplinary environment after comprehensively considering material costs, equipment costs, and operating costs.

Index point 11-1: understand the important management and economic factors involved in the engineering activities of Material Processing and Control Engineering;

Index point 11-2: be able to apply engineering management and economic decision-making knowledge in a multidisciplinary environment;

Graduation requirement 12: lifelong learning ability: have the consciousness of independent learning and lifelong learning, and have the ability to continuously learn and adapt to technological progress and social development.

Index point 12-1: understand the diversity of the technological environment and the impact and requirements of technological progress on knowledge and capabilities;

Index point 12-2: have the ability to track and identify the development of knowledge and new research directions in the subject area.

Index point 12-3: be able to self-evaluate, and take this as the main means to track personal development needs and achievements.

4. Schooling System

Four years

5. Length of Study

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

6. Requirements for Graduation and Degree Conferring

Students of this program must complete the minimum credits required for each category of courses and complete all the content specified in extracurricular class according to the requirements of the instructional training plan, and the total credits must reach 151 credits for graduation; those who meet the requirements for bachelor's degree can be conferred bachelor degree in engineering.

7. Disciplines

Mechanical Engineering, Material Science and Engineering, Material Processing Engineering

8. Core Courses

1. Modern engineering drawing (96 course hours)

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.

2. Engineering Mechanics I (56 course hours)

"Engineering Mechanics I" is a highly theoretical technical basic course. 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 problems; use D'Alembert principle to solve dynamic reaction problems; understand the principle of virtual displacement.

3. Engineering Mechanics II (40 course hours)

The course "Engineering Mechanics II" is a basic technical course. 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 problems; 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. Engineering and technical personnel who are proficient in the knowledge structure of the basic courses of engineering mechanics will surely be able to play an important role in promoting our country from a manufacturing country to a manufacturing power.

4. Mechanical Principles (48 course hours)

Through the study of "Mechanical Principles", students will master and understand the working principles and design calculation methods of various mechanisms, master and understand the basic theories and basic knowledge of mechanism structure, mechanical kinematics and dynamics, and have a preliminary ability of determining the transmission system plan, and be cultivated to innovation ability. This course mainly teaches the basic principles of mechanism composition, related theories and design calculation methods of various commonly used mechanisms (such as gear mechanisms, cam mechanisms, linkage mechanisms, gear trains, etc.). The study of this course is the first threshold for students to enter a professional course.

5. Mechanical design (48 course hours)

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. 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 conceiving creativity and innovative design, the course can integrate socialist value outlook into mechanical design.

6. Electrician and Electronics (48 course hours)

This course will enable students to master the basics of electrical engineering and electronics

necessary 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. Fundamental 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. The study of this course can promote the development of our country from a manufacturing country to a manufacturing power, and promote the process of socialist construction under the guidance of the spirit of craftsmen and model workers.

8. Principle of Plastic Forming (32 course hours)

This course is a main program course for the program of Material Processing and Control Engineering. This course mainly describes the basic theory of metal plastic forming, expounds the basic knowledge of plastic deformation mechanics analysis, the principal stress method and the slip line method commonly used in the analysis of plastic processing procedures. The purpose is to enable students to understand the basic knowledge of metal plastic deformation; master the basic principles of metal plastic deformation and mechanical analysis, and have a basic understanding of the formulation and optimization of plastic processing process parameters. Through the study of this course, students will realize the key factor to solving the quality problem of material forming, and realize that innovation is in daily life and work.

9. Stamping Process and Die Design (CAD/CAE) (96 course hours)

The main content of this course is to analyze the basic stamping processes such as punching, bending, deep drawing, and other stamping forming process; describe the automatic die, multi-station progressive stamping and die, and the stamping and die of non-axisymmetric surface parts; discuss the basic methods of stamping deformation basis, the basic principles of stamping process design and the basic method of die design. At the same time, it also explains the CAD design of stamping die and CAE analysis of stamping process. This course is set up to promote the progress and upgrade of our country's automobile industry.

10. Injection Molding Process and Mold Design (CAD/CAE) (96 course hours)

This course mainly describes the basic composition of polymer materials, the process characteristics of common polymer materials, and the basic concepts and technical foundations of polymer material molding. Combined with the new development of mold technology, this course also explains the polymer material molding process, plastic product design and the theory, methods and skills of mold design. In order to help students understand the basic structure, assembly knowledge and operation principle of molds, this course also arranges corresponding mold disassembly experiments and practices of visiting to the production site. This course also includes the CAD design of injection mold and CAE analysis of injection molding process. Through the study of this course, students' ability of injection molding process analysis will be greatly improved, and their dedication to work will be further sublimated.

11. Die Manufacturing (48 course hours)

This course mainly teaches the basic requirements and characteristics of mold manufacturing, mold manufacturing process and process specification formulation and dimension chain, knowledge and methods of positioning, criterion and clamping of mold work-pieces, common processing technology of mold forming parts, processing process of typical mold parts, special processing technology and mold assembly process foundation. This course is to cultivate students' ability to analyze mold structure technology, reasonably design molds, engage in mold manufacturing process technology and organize mold production management. The study of this course is a necessary link for students to truly become applied mold engineers.

12. Metal Additive Manufacturing Technology (32 hours)

This course mainly teaches how to control the physical and chemical changes of the material unit during the stacking process in the metal additive manufacturing process, that is, the control technology of the material unit; teaches the automatic coating of necessary process of material accumulation in the additive manufacturing process, that is, the equipment re-coating technology; teaches how to achieve simultaneous manufacturing of multiple laser beams, improve manufacturing efficiency, ensure the consistency of the synchronous additive organization and the quality of the manufacturing integration area; teaches the application fields and development trends of metal additive manufacturing, so as to cultivate students' ability of intelligent manufacturing of molds. Through the study of this course, students will experience the charm and attraction of advanced manufacturing and realize the significance of this major to the industry.

9. Practical Training (Related courses)

Comprehensive practice of mold drawing, interchangeability and measurement technology practice, mechanical design curriculum design, stamping mold (CAD/CAE) curriculum design, injection mold (CAD/CAE) curriculum design, computer-aided design, mold numerical control processing and CAM, comprehensive practice of electromechanical liquid (gas) automation, innovation and entrepreneurship of material forming and control engineering, mold manufacturing training, graduation design (thesis), etc.

10. Course Structure and Course Hours

Category	Total Credit	%	Total Course Hours	Theory Learning	Practical Training
Public Course	51	34	976	908	68
Basic Course	29	19	464	411	53
Professional Course	26	17	416	334	82
Practical Training	34	23	960	0	960
General Course	10	7	160	160	0
Total	150	100	2976	1813	1163
Theory : Practice (%)	61:39				

11. Teaching schedule (1)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
General Education Basic 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 legal foundation	non-test	3	48	42	6	spring 1
	Required	School of Marxism	b1080006	Outline of Chinese Modern History	non-test	3	48	42	6	autumn 1
	Required	School of Marxism	b1080004	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics I	test	3	48	42	6	autumn 2
	Required	School of Marxism	b1080007	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics II	test	2	32	28	4	spring 2
	Required	School of Marxism	-----	Situation and Policy (module 1～4)	non-test	2	32	28	4	autumn 1～spring 2
	Required	College of Arts and Sciences	b1020080	Advanced Mathematics A1	test	4	64	64		autumn 1
	Required	College of Arts and Sciences	b1020081	Advanced Mathematics A2	test	4	64	64		spring 1
	Required	College of Arts and Sciences	b1020012	Linear algebra	test	2	32	32		autumn 2
	Required	College of Arts and Sciences	b1020013	Probability Theory and Mathematical Statistics	test	2	32	32		autumn 2
	Required	College of Arts and Sciences	b1020018	College Chinese	non-test	2	32	32		spring 1
	Required	College of Arts and Sciences	b1020062	College Physics A(module 1)	test	3	48	48		spring 1
	Required	College of Arts and Sciences	b1020065	College Physics B	test	2	32	32		autumn 2
	Required	College of Arts and Sciences	b1020066	College Physics C	non-test	1	32		32	spring 1
	Required	College of Arts and Sciences	b1020035	College Chemistry	non-test	1	32	28	4	spring 1
	Required	Department of Physical Education	-----	Physical Education I～VI	non-test	3	160	160		autumn 1～autumn 4
	Required	Others	b1110003	Military skills	non-test	0.5	2W			autumn 1
	Required	College of Arts and Sciences	b1110002	Military theory	non-test	0.5	32	32		autumn 2
	★College English (10 credits for 1 module)	Module A	b1020003	General English III	test	3	48	48		autumn 1
			b1020004	General English IV	test	3	48	48		spring 1
			b1020005	General Academic English A	test	2	32	32		autumn 2
			---	English development	non-test	2	32	32		spring 2
		Module B	b1020002	General English II	test	3	48	48		autumn 1
			b1020003	General English III	test	3	48	48		spring 1
			b1020006	General Academic English B	test	2	32	32		autumn 2
			---	English development	non-test	2	32	32		spring 2
		Module C	b1020001	General English I	test	4	64	64		autumn 1
			b1020002	General English II	test	3	48	48		spring 1
			b1020003	General English III	test	3	48	48		autumn 2
	★ German	College of Arts and Sciences	b1020040	German I	test	3	48	48		autumn 1
		College of Arts and Sciences	b1020041	German II	test	3	48	48		spring 1
		College of Arts and Sciences	b1020042	German III	test	4	64	64		autumn 2
	★ Japanese	College of Arts and Sciences	b1020077	Japanese I	test	3	48	48		autumn 1
		College of Arts and Sciences	b1020078	Japanese II	test	3	48	48		spring 1
		College of Arts and Sciences	b1020079	Japanese III	test	4	64	64		autumn 2
Total (General Education Basic Courses)						51	976	908	68	
General Course	Required	College of Engineering	b1020018	Scientific paper writing and document retrieval	non-test	2	32	32		autumn 1
	Selective	Others	b0-----	Social Science and Humanities Literacy (4 credits) Natural Science and Technological Innovation(2 credits) Public Art (2 credits)	non-test	8	128	128		autumn ， spring
Subtotal (general course)						10	160	160	0	

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

11. Teaching schedule (2)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
Basic professional courses	Required	College of Engineering	b2011241	Introduction to Material Processing and Control Engineering	non-test	1	16	14	2	autumn 1
	Required	College of Engineering	b2011137	Modern Engineering Drawing I	test	3	48	40	8	autumn 1
	Required	College of Engineering	b2011138	Modern Engineering Drawing II	test	3	48	32	16	spring 1
	Required	College of Engineering	b2011049	Engineering Mechanics I	test	3	48	48		autumn 2
	Required	College of Engineering	b2011050	Engineering Mechanics II	test	3	48	44	4	spring 2
	Required	College of Engineering	b2011079	Mechanical Principle	test	3	48	44	4	spring 2
	Required	College of Engineering	b2011080	Machinery Manufacturing Foundation	test	3	48	42	6	spring 2
	Required	College of Engineering	b2090001	Electrician and Electronics	test	3	48	42	6	autumn 2
	Required	College of Engineering	b2011091	Fluid Mechanics and Heat Transfer	test	2	32	32		autumn 3
	Required	College of Engineering	b2011077	Mechanical Design	test	3	48	45	3	autumn 3
	Required	College of Engineering	b2011013	Fundamentals of Materials Science (pan-English)	test	2	32	28	4	spring 2
Subtotal (Basic professional courses)						29	464	411	53	
Professional courses	Required	College of Engineering	b2011126	Principles of Plastic Forming	test	2	32	30	2	autumn 3
	Required	College of Engineering	b2011152	Hydraulic and Pneumatic Transmission	test	2	32	28	4	spring 2
	Required	College of Engineering	b2011019	Forming machinery and control	non-test	1	16	14	2	spring 2
	Required	College of Engineering	b2011143	Project Management (Bilingual)	non-test	2	32	26	6	spring 3
	Required	College of Engineering	b2011055	Industrial robots and applications	non-test	2	32	28	4	autumn 4
	Required	College of Engineering	b2011414	Metal additive manufacturing technology	non-test	2	32	32	0	autumn 4
	Required	College of Engineering	b2011092	Mold manufacturing	non-test	3	48	44	4	spring 3
	Subtotal (required professional courses)					14	224	202	22	
	★Selective according to module, 12 credits	Module A	b2011415	Stamping process and die design (CAD/CAE)	test	6	96	66	30	spring 3
			b2011416	Injection molding process and mold design (CAD/CAE)	test	6	96	66	30	autumn 3
		Module B	b2011042	Forming process and mold design	test	6	96	68	28	autumn 3
			b2011417	Finite element analysis of forming process	non-test	2	32	0	32	spring 3
			b2011043	Rapid Prototyping and Rapid Molding Technology	non-test	2	32	32	0	spring 3
			b2011295	Reverse engineering technology	non-test	2	32	32	0	spring 3
	Subtotal (module professional courses)					12	192	132	60	
Subtotal (professional courses)						26	416	334	82	

11. Teaching schedule (3)

Category	Type	Provided by	Course Code	Course Name	Assessment	Credit	Course Hour	Theory Learning	Practical Training	Semester
Vocational practice	Required	College of Engineering	b4011151	Computer Aided Design	non-test	2	48		48	summer 1
	Required	College of Engineering	b4090001	Basic engineering training A	non-test	3	72		72	summer 1
	Required	College of Engineering	b4011043	Interchangeability and measurement technology practice	non-test	2	48		48	summer 2
	Required	College of Engineering	b4011288	Comprehensive practice of mold drawing	non-test	3	72		72	summer 2
	Required	College of Engineering	b4000001	Innovation and entrepreneurship of material forming and control engineering	non-test	2	48		48	spring 3
	Required	College of Engineering	b4011056	Mechanical Design Course Exercise	non-test	2	48		48	spring 3
	Required	College of Engineering	b4011048	Comprehensive practice of electro-hydraulic (gas) automation	non-test	1	24		24	autumn 3
	Required	College of Engineering	b4011290	Mould CNC machining and CAM	non-test	2	48		48	autumn 4
	Required	College of Engineering	b4011289	Mold manufacturing training	non-test	5	120		120	autumn 4
	Required	College of Engineering	b4011250	Graduation Practice and Graduation Design (Thesis) for Material Forming and Control Engineering	non-test	6	288		288	spring 4
	Subtotal (required practice courses)					28	816		816	
	★select 6 credits according to professional courses	Module A	b4011291	Stamping die design	non-test	3	72		72	summer 3
			b4011292	Injection mold design	non-test	3	72		72	spring 3
		Module B	b4011293	Course Exercise of Forming Process and Die Design	non-test	3	72		72	spring 3
			b4011294	Comprehensive Practice of Rapid Molding	non-test	3	72		72	summer 3
	Subtotal (practice module)					6	144		144	
Subtotal (professional practice)						34	960		960	
Extracurricular Class	Required	Others	b5110001	Extracurricular Class	non-test	1				Autumn, spring, summer
Total						151	2976	1813	1163	

★ 1. Guidance for module professional courses and practical courses:

Professional courses are set in modules according to different ability requirements. Students must select one of the modules and obtain the required credits for that module. The professional practice module must be selected according to the corresponding professional course module.

1. Module A: Metal plastic forming process and equipment design, polymer material injection molding process and equipment design.
2. Module B: Material molding process and equipment design, rapid prototyping.

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

Students who have passed Modern Engineering Drawing, Interchangeability and measurement technology practice, Hydraulic and Pneumatic Transmission, Stamping process and die design (CAD/CAE), Injection molding process and mold design (CAD/CAE), Mold manufacturing and other courses can participate in professional qualification certificate assessment related to this program: mold worker (cold punch mold worker) level three, mold worker (plastic mold worker) level three.

Students who have obtained the third-level qualification certificates for mold workers (cold punching mold workers) and mold workers (plastic mold workers) can apply for exemption from courses including Modern Engineering Drawing, Interchangeability and measurement technology practice, Hydraulic and Pneumatic Transmission, Stamping process and die design (CAD/ CAE), Injection molding process and mold design (CAD/CAE), Mold manufacturing, and get corresponding credits.

12. Schedule for Semesters (Suggested)

Autumn semester 1:

Type	Course Name	Assessment	Credit	Course Hour
Required	Outline of Chinese Modern History	non-test	3	48
Required	First foreign language	test	3	48
Required	Advanced Mathematics A1	test	4	64
Required	Situation and Policy	non-test	0.5	8
Required	Physical Education I	non-test	0.5	32
Required	Military skills	non-test	0.5	2W
Required	Scientific paper writing and document retrieval	non-test	2	32
Required	Introduction to Material Processing and Control Engineering	non-test	1	16
Required	Modern Engineering Drawing I	test	3	48

Spring semester 1:

Type	Course Name	Assessment	Credit	Course Hour
Required	Basic principles of Marxism	test	3	48
Required	Ideological and moral cultivation and legal foundation	non-test	3	48
Required	First foreign language	test	3	48
Required	Advanced Mathematics A2	test	4	4
Required	College Physics A	test	3	48
Required	College Physics C	non-test	1	32
Required	College Chemistry	non-test	1	32
Required	College Chinese	non-test	2	32
Required	Situation and Policy	non-test	0.5	8
Required	Physical Education II	non-test	0.5	32
Selective	General Course	non-test	2	32
Required	Modern Engineering Drawing II	test	3	48

Summer semester 1:

Type	Course Name	Assessment	Credit	Course Hour
Required	Computer Aided Design	non-test	2	48
Required	Basic engineering training A	non-test	3	72

Autumn semester 2 :

Type	Course Name	Assessment	Credit	Course Hour
Required	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics I	test	3	48
Required	Military theory	non-test	0.5	32
Required	First foreign language	test	2	32
Required	Linear algebra	test	2	32
Required	Probability Theory and Mathematical Statistics	test	2	32
Required	College Physics B	test	2	32
Required	Situation and Policy	non-test	0.5	8
Required	Physical Education III	non-test	0.5	32
Selective	General Course	non-test	2	32
Required	Engineering Mechanics I	test	3	48
Required	Electrician and Electronics	test	3	48

Spring semester 2:

Type	Course Name	Assessment	Credit	Course Hour
Required	Introduction to Mao Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics II	test	2	32
Required	First foreign language	non-test	2	32
Required	Situation and Policy	non-test	0.5	8
Required	Physical Education IV	non-test	0.5	32
Selective	General Course	non-test	2	32
Required	Engineering Mechanics II	test	3	48
Required	Mechanical Principle	test	3	48
Required	Machinery Manufacturing Foundation	test	3	48
Required	Fundamentals of Materials Science (pan-English)	test	2	32
Required	Hydraulic and Pneumatic Transmission	test	2	32
Required	Forming machinery and control	test	1	16

Summer semester 2:

Type	Course Name	Assessment	Credit	Course Hour
Required	Interchangeability and measurement technology practice	non-test	2	48
Required	Comprehensive practice of mold drawing	non-test	3	72

Autumn semester 3:

Type	Course Name	Assessment	Credit	Course Hour
Required	Physical Education V	non-test	0.5	16
Selective	General Course	non-test	2	32
Required	Mechanical Design	test	3	48
Required	Fluid Mechanics and Heat Transfer	test	2	32
Required	Principles of Plastic Forming	test	2	32
Selective	Injection molding process and mold design(CAD/CAE)	test	6	96
Selective	Forming process and mold design	test	6	96
Required	Comprehensive practice of electro-hydraulic (gas) automation	non-test	1	24

Spring semester 3:

Type	Course Name	Assessment	Credit	Course Hour
Required	Innovation and entrepreneurship of material forming and control engineering	non-test	2	
Required	Project Management (Bilingual)	non-test	2	
Required	Mold manufacturing	non-test	3	
Selective	Stamping process and die design(CAD/CAE)	test	6	
Selective	Finite element analysis of forming process	non-test	2	
Selective	Rapid Prototyping and Rapid Molding Technology	non-test	2	
Selective	Reverse engineering technology	non-test	2	
Required	Mechanical Design Course Exercise	non-test	2	
Selective	Injection mold (CAD/CAE) design	non-test	3	
Selective	Course Exercise of Forming Process and Die Design	non-test	3	

Summer semester 3:

Type	Course Name	Assessment	Credit	Course

				Hour
Selective	Stamping die design	non-test	3	72
Selective	Comprehensive Practice of Rapid Molding	non-test	3	72

Autumn semester 4 :

Type	Course Name	Assessment	Credit	Course Hour
Required	Physical Education VI	non-test	0.5	16
Required	Metal additive manufacturing technology	non-test	2	32
Required	Industrial robots and applications	non-test	2	32
Required	Mold manufacturing training	non-test	5	120
Required	Mould CNC machining and CAM	non-test	2	48

Spring semester 4:

Type	Course Name	Assessment	Credit	Course Hour
Required	Graduation Practice and Graduation Project (Thesis) for Material Forming and Control Engineering	non-test	6	288

13. Prerequisite for Course Study

No.	Course name	Prerequisite Course	No.	Course name	Prerequisite Course
1	Engineering Mechanics	Calculus A1	7	Principles of Plastic Forming	Advanced Mathematics
		Calculus A2			Engineering Mechanics
		College Physics			
2	Mechanical Principle	Calculus A1	8	Computer Aided Design	Modern Engineering Drawing
		Calculus A2			Mechanical Design
		Engineering Mechanics			Machinery Manufacturing Foundation
3	Mechanical Design	Engineering Mechanics	9	Stamping process and die design(CAD/CAE)	Principles of Plastic Forming
		Modern Engineering Drawing			Fundamentals of materials science
		Mechanical Principle			Machinery Manufacturing Foundation
4	Electrician and Electronics	Calculus A1	10	Injection molding process and mold design(CAD/CAE)	Fundamentals of materials science
		Calculus A2			Machinery Manufacturing Foundation
		College Physics			Computer Aided Design
5	Machinery Manufacturing Foundation	Modern Engineering Drawing	11	Mold manufacturing	Machinery Manufacturing Foundation
		Interchangeability and measurement technology practice			Fundamentals of materials science
		Basic engineering training (metalworking practice)			Injection molding process and mold design(CAD/CAE)
		Engineering Mechanics			
6	Hydraulic and Pneumatic Transmission	Calculus A1	12	Mold manufacturing training	Injection molding process and mold design(CAD/CAE)
		Calculus A2			Stamping process and die design(CAD/CAE)
		Modern Engineering Drawing			Mold manufacturing
					Mould CNC machining and CAM

14. Extracurricular Class

Through taking extracurricular classes, students are encouraged to take part in academic lectures, social practice activities, campus cultural and sports activities, innovative and entrepreneurial activities, voluntary activities, etc. to improve their social adaptability and enhance the

competitiveness in the job market. Details are specified in Students' Manual.