2021 Chemical Engineering and Technology Undergraduate Talent Training Program

Major Code: 081301

Author: Cao Wenxiu

Reviewer: Liu Shiquan

I. Educational Objectives

These major aims to serve regional economic construction and chemical industry, especially the fine chemical industry and bio-chemical industry, focusing on local characteristic resources and advantageous industries such as black tea and capacitors. It aims to cultivate the all-round development of morality, intelligence, physical fitness, beauty, and labor, and have the foundation, professional knowledge, and skills of natural science and engineering. With a high sense of social responsibility and professional ethics, physical and mental health, and team spirit, with an international perspective, innovative spirit, and practical ability, High-quality applied engineering and technical personnel who can engage in engineering design, technology development, process analysis and synthesis, production technology management, analysis and testing in the fine chemical industry, energy, food, dark tea, environmental protection, and other departments or industries. After undergraduate training, students of this major have the following abilities within 5 years of graduation:

Training goal 1: Have the ability to apply the knowledge of mathematics, natural science, engineering, and economic management, and be able to conduct comprehensive analysis and research on complex engineering problems in the field of chemical engineering and propose solutions.

Training goal 2: Have a good humanities and social science literacy, engineering professional ethics, and social responsibility, can comprehensively consider social, safety, and environmental protection factors in the process of chemical engineering design and implementation, and actively practice socialist core values.

Training goal 3: Innovative ability to analyze and optimize the production process of chemical process, black tea golden blossoms, all-solid-state capacitor series deep processing products, etc., solve complex engineering problems, engineering practice ability to engage in chemical engineering design, production operation, technology development and management and related business activities, and consider and evaluate the impact on environmental and social sustainable development. In the field of chemical engineering, it has become the main force in production management, technology research and development, process design, management analysis, and testing.

Training goal 4: Have good individual and team cooperation skills, and be able to communicate and communicate effectively with chemical industry peers, related industries (such as the tea, capacitor industry), or the public.

Training goal 5: Have an international vision, be able to continuously expand their knowledge structure, improve chemical professional skills and comprehensive quality, and have the ability of lifelong learning, especially about 5 years after graduation to become the backbone of applied engineering technology.

II. Basic Graduation Requirements

Graduates of this major uphold the leadership of the Communist Party of China, love our socialist motherland, and have a solid grasp of Marxist, Mao Zedong Thought, and the theoretical system of socialism with Chinese characteristics, as well as Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era. They possess correct worldviews, outlooks on life, and values, abide by laws and regulations, foster unity, cooperation, dedication to their work, and are willing to contribute. Additionally, they possess the following knowledge, abilities, and qualities.

Graduation Requirement 1: Engineering Knowledge： Be able to apply mathematics, natural sciences, engineering fundamentals, and specialized knowledge to analyze and solve complex engineering problems in the field of chemical engineering.

Graduation Requirement 2: Problem Analysis： Being able to identify, articulate, and evaluate complex engineering problems in chemical production processes, such as those encountered in the deep processing techniques of black tea and the entire solid-state capacitor series, through methods such as research and literature review, using engineering fundamentals and specialized theoretical principles related to chemical engineering and processes. Furthermore, proposing viable solutions and deriving meaningful conclusions.

Graduation Requirement 3: Design/Development of Solutions: Utilizing the fundamental principles of chemical engineering and processes, while considering factors such as societal, health, safety, legal, cultural, and environmental aspects, to design and develop chemical products, systems, equipment, and process flows that meet the needs of the national economy. Furthermore, demonstrating innovation consciousness throughout the design and development process.

Graduation Requirement 4: Scientific Research: Capable of conducting research on complex engineering problems in chemical engineering and processes, such as those related to black tea and capacitors, based on scientific principles and methods. This involves designing experimental research plans, setting up apparatus, collecting data, analyzing results, and interpreting findings to derive valid conclusions, followed by thorough analysis and explanation of these conclusions.

Graduation Requirement 5: Use of Modern Tools: Proficient in developing, selecting, and utilizing appropriate instrumentation, equipment, information resources, and chemical simulation software, among other modern tools, to assist in solving complex engineering problems during chemical research, design, and computation tasks. Additionally, capable of understanding the limitations of these modern tools. Able to employ modern technological methods to predict,

simulate, and optimize chemical processes, thereby addressing complex engineering issues encountered in the production of substances such as black tea and capacitors.

Graduation Requirement 6: Engineering and Society: Capable of analyzing and evaluating the impact of engineering practices and solutions to complex chemical engineering problems in the chemical engineering field, such as those related to black tea and capacitors, on society, health, safety, legal, and cultural aspects. Additionally, understanding the responsibilities that should be undertaken in addressing these impacts.

Graduation Requirement 7: Environmental and Social Sustainable Development: Capable of understanding and assessing the impact of engineering practices in chemical processes on environmental protection and social sustainable development in addressing complex chemical engineering problems.

Graduation Requirement 8: Professional Ethics: Having the correct world view, outlook on life, and socialist core values, capable of understanding and adhering to engineering professional ethics and norms, fulfilling responsibilities, and nurturing virtue through engineering practice.

Graduation Requirement 9: Individual and Team: Possessing organizational management skills, communication skills, interpersonal skills, teamwork mindset, and collaborative abilities that meet the requirements of positions related to black tea, capacitors, and similar fields. Capable of assuming roles as an individual contributor, team member, or leader within interdisciplinary teams in fields such as chemical engineering and environmental engineering.

Graduation Requirement 10: Communication and Exchange: Capable of effectively communicating and engaging with peers, stakeholders in related industries (such as the black tea and capacitor industries), and the general public on complex issues in chemical engineering. This includes writing reports and drafting documents, making presentations, articulating ideas clearly, responding to inquiries, and possessing an international perspective to communicate across cultural boundaries.

Graduation Requirement 11: Project Management: Capable of applying principles of engineering management and economic decision-making methods to the design of chemical processes and the operation and management of chemical engineering practice activities.

Graduation Requirement 12: Lifelong Learning: Having a sense of self-directed and lifelong learning, continuously engaging in autonomous learning and adapting to the professional and societal developments within the chemical engineering industry.

III. Professional features

This major focuses on local characteristic resources and advantageous industries such as Anhua dark tea, adapts to the development needs of the industry in the new era, focuses on the cultivation of students' engineering literacy and the improvement of practical ability, and cultivates applied talents required by the social and economic development in the field of "fine chemical industry" and "new technology of biological chemical industry".

IV. Main Courses

Chemical Engineering and Technology, Chemistry

V. Core courses

Introduction to Chemical Engineering, Principles of Chemical Engineering, Chemical Engineering Thermodynamics, Chemical Engineering Safety and Environmental Protection, Chemical Engineering Drawing, Chemical Reaction Engineering, Chemical Process Technology, Professional English and Literature Retrieval, Fundamentals of Chemical Machinery and Equipment, Chemical Engineering Design, Chemical Instrumentation and Automation, Chemical Separation Engineering, Chemical Process Analysis and Synthesis.

VI. Main practical teaching links

Professional main experiments: Inorganic Chemistry Experiment, Organic Chemistry Experiment, Physical Chemistry Experiment, Analytical Chemistry Experiment, Biochemistry Experiment, Chemical Engineering Principle Experiment, Chemical Engineering Professional Experiment

Major Internship (Training): Chemical Principle Simulation Experiment, Chemical Understanding Internship, Metalworking Internship, Electrical and Electronic Internship, Chemical Production Internship

Main Professional Design (Thesis): Course Design of Chemical Engineering Principles, Chemical Engineering Design, and Comprehensive Training for Chemical Engineering Graduation

VII. Duration and Degree Conferred

Education system: 4 years, with a study period of 3-6 years; Those who meet the "Implementation Rules of Hunan City University for Granting Bachelor's Degrees" will be awarded the Bachelor of Engineering degree.

VIII. Graduation credit requirements and total credit hours distribution

Students of this major are required to graduate with a minimum of 219 credits, and graduation comprehensive training requirements: pass

IX：Schedule of personnel cultivating program

1.Teaching schedule

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
1	Required Courses	General Education	9123311011	Ideological Ethics and Rule of Law Courses	3	90	48	42	40	8	test	3	1		School of Marxism
2	Required Courses	General Education	9124311041	Outline of Modern Chinese History	3	90	48	42	40	8	test	3	2		School of Marxism
3	Required Courses	General Education	9121311011	Basic Principle of Marxism	3	90	48	42	40	8	test	3	3		School of Marxism
4	Required Courses	General Education	9122311021	Introduction to MAO Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	5	150	80	70	72	8	test	5	4		School of Marxism
5	Required Courses	General Education	9125111050	Situation & Policy	2	60	32	28	32		examination	2	1—4	8—15 weeks	School of Marxism
6	Required Courses	General Education	9054311011	College English（1）	3	90	48	42	48		test	4	1		School of Humanities / Department of College English Teaching
7	Required Courses	General Education	9054311021	College English（2）	3	90	48	42	48		test	4	2		School of Humanities / Department of College English Teaching

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
8	Required Courses	General Education	9054311031	College English Extension Series（1）	1.5	45	24	21	24		test	2	2	exemption	School of Humanities / Department of College English Teaching
9	Required Courses	General Education	9054311041	College English Extension Series（2）	1.5	45	24	21	24		test	2	3	exemption	School of Humanities / Department of College English Teaching
10	Required Courses	General Education	9051111050	Practical Writing	1	30	16	14	16		examination	2	2		School of Humanities / Department of College English Teaching
11	Required Courses	General Education	9131311010	College Psychological Health Education	1.5	45	32	13	12	20	examination	2	2		Student Affairs Department of Hunan City University
12	Required Courses	General Education	9151311010	Career Development and Employment Guidance for College Students（1）	1	30	20	10	8	12	examination	2	4	lecture	Admission and Employment Office
13	Required Courses	General Education	9151311020	Career Development and Employment Guidance for College Students（2）	1	30	18	12	4	14	examination	2	6	lecture	Admission and Employment Office
14	Required Courses	General Education	9163311010	Basic Course of Innovation and Entrepreneurship	1.5	45	32	13	8	24	examination	2	2		College of Materials and Chemical Engineering
15	Required Courses	General Education	9132311020	Military Theory Course for College Students	2	60	36	24	12	24	examination	4	1		Student Affairs Department of Hunan

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
															City University
16	Required Courses	General Education	9063311011	Basic Computer Course for College Students	1.5	45	32	13	16	16	test	4	1		College of Information and Electronic Engineering
17	Required Courses	General Education	9063311021	Computer Programming Language Curriculum	3	90	56	34	40	16	test	4	2		College of Information and Electronic Engineering
18	Required Courses	General Education	9103811010	University Physical Education and Health Courses (1)	1.5	45	32	13	20	12	examination	2	1	practice course	College of Physical Education
19	Required Courses	General Education	9103811020	University Physical Education and Health Courses (2)	1.5	45	32	13	20	12	examination	2	2	practice course	College of Physical Education
20	Required Courses	General Education	9103811030	University Physical Education and Health Courses (3)	1	30	16	14	6	10	examination	2	3		College of Physical Education
21	Required Courses	General Education	9103811040	University Physical Education and Health Courses (4)	1	30	16	14	6	10	examination	2	4		College of Physical Education
			sub-total		**42.5**	**1275**	**738**	**537**	**536**	**202**					
22	Required Courses	Basic Courses	9092112011	Advanced Mathematics A（1）	4.5	135	72	63	72		test	6	1		College of Science
23	Required Courses	Basic Courses	9092112021	Advanced Mathematics A（2）	5	150	80	70	80		test	6	2		College of Science

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
24	Required Courses	Basic Courses	9092112051	Linear Algebra	2	60	32	28	32		test	4	3		College of Science
25	Required Courses	Basic Courses	9092112061	Probability and Statistics	2.5	75	40	35	40		test	5	4		College of Science
26	Required Courses	Basic Courses	9065112041	College Physics B(1)	3	90	48	42	48		test	4	3		College of Information and Electronic Engineering
27	Required Courses	Basic Courses	9065212030	College Physics Experiment	1	30	16	14		16	examination	4	3		College of Information and Electronic Engineering
28	Required Courses	Basic Courses	9081112251	Inorganic Chemistry A（1）	2	60	32	28	32		test	4	1		College of Materials and Chemical Engineering
29	Required Courses	Basic Courses	9081112261	Inorganic Chemistry A（2）	2	60	32	28	32		test	4	2		College of Materials and Chemical Engineering
30	Required Courses	Basic Courses	9081212140	Inorganic Chemistry Experiments A	2	60	32	28		32	examination	4	1		College of Materials and Chemical Engineering
31	Required Courses	Basic Courses	9081112151	Organic Chemistry A（1）	2.5	75	40	35	40		test	4	3		College of Materials and Chemical Engineering
32	Required Courses	Basic Courses	9081112161	Organic Chemistry A（2）	2.5	75	40	35	40		test	4	4		College of Materials and Chemical Engineering
33	Required Courses	Basic Courses	9081212070	Organic Chemistry Experimen B（1）	1.5	45	32	13		32	examination	4	3		College of Materials and Chemical Engineering

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
34	Required Courses	Basic Courses	9081212080	Organic Chemistry Experiment B（2）	1	30	16	14		16	examination	4	4		College of Materials and Chemical Engineering
35	Required Courses	Basic Courses	9081112191	Analytical Chemistry	2.5	75	40	35	40		test	4	2		College of Materials and Chemical Engineering
36	Required Courses	Basic Courses	9081212110	Analytical Chemistry Experiment	1.5	45	32	13		32	examination	4	2		College of Materials and Chemical Engineering
37	Required Courses	Basic Courses	9081112121	Physical Chemistry A（1）	3	90	48	42	48		test	4	3		College of Materials and Chemical Engineering
38	Required Courses	Basic Courses	9081112131	Physical Chemistry A（2）	2	60	32	28	32		test	4	4		College of Materials and Chemical Engineering
39	Required Courses	Basic Courses	9081212140	Physical Chemistry Experiment B（1）	1.5	45	32	13		32	examination	4	3		College of Materials and Chemical Engineering
40	Required Courses	Basic Courses	9081212150	Physical Chemistry Experiment B（2）	1	30	16	14		16	examination	4	4		College of Materials and Chemical Engineering
41	Required Courses	Basic Courses	9081212141	Biological Chemistry	2	60	32	28	32		test	4	4		College of Materials and Chemical Engineering
42	Required Courses	Basic Courses	9081212170	Biological Chemistry Experiment	1	30	16	14		16	examination	4	4		College of Materials and Chemical Engineering
			Sub-total		**46**	**1380**	**760**	**620**	**568**	**192**					
43	Required Courses	Professional Core	9081113070	Introduction to Chemical Engineering	1	30	16	14	16		examination	2	1		College of Materials and Chemical Engineering

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
44	Required Courses	Professional Core	9081313011	Chemical Engineering Drawing	2.5	75	48	27	32	16	test	2	4		College of Materials and Chemical Engineering
45	Required Courses	Professional Core	9081113011	Principles of Chemical Industry A（1）	3.5	105	56	49	56		test	4	4		College of Materials and Chemical Engineering
46	Required Courses	Professional Core	9081113021	Principles of Chemical Industry A（2）	3.5	105	56	49	56		test	4	5		College of Materials and Chemical Engineering
47	Required Courses	Professional Core	9081213010	Principles of Chemical Industry Experiment A	1.5	45	32	13		32	examination	4	5		College of Materials and Chemical Engineering
48	Required Courses	Professional Core	9081213020	Chemical Principle Simulation Experiment	1	30	16	14		16	examination	4	5		College of Materials and Chemical Engineering
49	Required Courses	Professional Core	9081113031	Chemical Reaction Engineering	3	90	48	42	48		test	4	5		College of Materials and Chemical Engineering
50	Required Courses	Professional Core	9081213050	Chemical Engineering Experiment	3	90	64	26		64	examination	4	5		College of Materials and Chemical Engineering
51	Required Courses	Professional Core	9081133041	Chemical Engineering Thermos Dynamics	3.5	105	56	49	56		test	4	5		College of Materials and Chemical Engineering
52	Required Courses	Professional Core	9081113051	Chemical Separation Engineering	3	90	48	42	48		test	4	6		College of Materials and Chemical Engineering
53	Required Courses	Professional Core	9081133061	Chemical Technology	3	90	48	42	48		test	4	5		College of Materials and Chemical Engineering
54	Required Courses	Professional Core	908111 071	Chemical Security & Environmental Protection	2	60	32	28	32		test	4	6		College of Materials and Chemical Engineering

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
55	Required Courses	Professional Core	9081113090	Professional English and Literature Retrieval B	2	60	32	28	32		examination	2	5		College of Materials and Chemical Engineering
56	Required Courses	Professional Core	9081113101	Chemical Machinery and Equipment Foundation	3	90	48	42	48		test	4	5		College of Materials and Chemical Engineering
57	Required Courses	Professional Core	9081113081	Chemical Process Analysis and Synthesis	3	90	48	42	48		test	4	6		College of Materials and Chemical Engineering
58	Required Courses	Professional Core	9081413010	Chemical Engineering Design A	3	90	48	42	48		examination	4	6		College of Materials and Chemical Engineering
59	Required Courses	Professional Core	9081113111	Chemical Industry Instrument and Automation	3	90	48	42	48		test	4	6		College of Materials and Chemical Engineering
			Sub-total		**44.5**	**1335**	**744**	**591**	**616**	**128**					
60	Optional Course	Self-directed Development	9081124190	Fine Chemical Formulation Design	1	30	16	14	16		examination	4	7	No less than 6.5 credits in fine chemical industry direction	College of Materials and Chemical Engineering
61	Optional Course	Self-directed Development	9081124030	Chemical Experiment Design and data Processing	2	60	32	28	32		examination	4	7		College of Materials and Chemical Engineering
62	Optional Course	Self-directed Development	9081124180	Chemical Enterprise Human Resource Management	1	30	16	14	16		examination	4	7		university-industry cooperation
63	Optional Course	Self-directed Development	9081124061	Instrumental Analysis	2	60	32	28	32		test	4	4		College of Materials and Chemical Engineering
64	Optional Course	Self-directed Development	9081124210	Instrumental Analysis Experiment	1	30	16	14		16	examination	4	4		College of Materials and Chemical Engineering

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
65	Optional Course	Self-directed Development	9081124151	Technical Economics of Chemical Engineering	2	60	32	28	32		test	4	7		College of Materials and Chemical Engineering
66	Optional Course	Self-directed Development	9065122011	Electrical and Electronic Technology	2	60	32	28	32		test	4	4		College of Information and Electronic Engineering
67	Optional Course	Self-directed Development	9081124200	Chemical Process Simulation Training（Aspen Plus）	2	60	32	28	32		examination	4	7		College of Materials and Chemical Engineering
68	Optional Course	Self-directed Development	9081124151	Technical Economics of Chemical Engineering	2	60	32	28	32		test	4	7	No less than 6.5 credits in bio-chemical industry direction	College of Materials and Chemical Engineering
69	Optional Course	Self-directed Development	9081124160	Chemical Professional Frontier Lecture	1.5	45	24	21	24		examination	4	7		College of Materials and Chemical Engineering
70	Optional Course	Self-directed Development	9081124030	Chemical Experiment Design and data Processing	2	60	32	28	32		examination	4	7		College of Materials and Chemical Engineering
71	Optional Course	Self-directed Development	9081124270	Molecular Biology	1	30	16	14	16		examination	4	7		College of Materials and Chemical Engineering
72	Optional Course	Self-directed Development	9081124061	Instrumental Analysis	2	60	32	28	32		test	4	4		College of Materials and Chemical Engineering
73	Optional Course	Self-directed Development	9081124210	Instrumental Analysis Experiment	1	30	16	14		16	examination	4	4		College of Materials and Chemical Engineering
74	Optional Course	Self-directed Development	9065122011	Electrical and Electronic Technology	2	60	32	28	32		test	4	3		College of Information and Electronic Engineering

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
75	Optional Course	Self-directed Development	9081124160	Chemical Process Simulation Training（Aspen Plus）	2	60	32	28	32		examination	4	7		College of Materials and Chemical Engineering
			Sub-total	No less than 9 credits in each direction	9	**270**	**144**	**126**	**128**	**16**					
76	Optional Course	Self-directed Development	9081124010	Fine Organic Synthesis Unit Reaction	1.5	45	24	21	24		examination	4	7	No less than 3 credits in fine chemical industry direction Professional experiment required	College of Materials and Chemical Engineering
77	Optional Course	Self-directed Development	9081124020	Fine Chemical Industry Technology	1.5	45	24	21	24		examination	4	7		College of Materials and Chemical Engineering
78	Optional Course	Self-directed Development	9081224010	Fine Chemical Specialty Experiment	1	30	16	14		16	examination	4	7		College of Materials and Chemical Engineering
79	Optional Course	Self-directed Development	9081124050	Industrial Catalysis	2	60	32	28	32		examination	4	7		College of Materials and Chemical Engineering
80	Optional Course	Self-directed Development	9081124220	Circular Economy and Resource Reuse	1	30	16	14	16		examination	4	7		University-industry Cooperation
81	Optional Course	Self-directed Development	9081124230	Bioreaction Engineering	2	60	32	28	32		examination	4	7	No less than 3 credits in bio-chemical industry direction Professional experiment	College of Materials and Chemical Engineering
82	Optional Course	Self-directed Development	9081124130	Fermentation Engineering	2	60	32	28	32		examination	4	7		College of Materials and Chemical Engineering
83	Optional Course	Self-directed Development	9081224030	Biological Chemical Engineering Specialty Experiment	1	30	16	14		16	examination	4	7		College of Materials and Chemical Engineering

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
84	Optional Course	Self-directed Development	9081124240	Food Biotechnology	2	60	32	28	32		examination	4	7	required	College of Materials and Chemical Engineering
85	Optional Course	Self-directed Development	9081124250	Biochemical Separation Technique	1	30	16	14	16		examination	4	7		College of Materials and Chemical Engineering
86	Optional Course	Self-directed Development	9081124281	Biochemical Technology	2	60	32	28	32		test	4	7		College of Materials and Chemical Engineering
			Sub-total	No less than 5 credits	5	**150**	**80**	**70**	**64**	**16**					
87	Optional Course	Self-directed Development	9163311020	Innovation and Entrepreneurship	3	90	64	26		64	examination			Natural science majors choose humanities and Social Sciences, arts and sports, and innovation and entrepreneurship for 2 credits each	College of Innovation and Entrepreneurship
88	Optional Course	Self-directed Development	9171824020	Humanities and Social Sciences	2	60	32	28	32		examination				Office of Academic Affairs
89	Optional Course	Self-directed Development	9171824030	Art and Sports	2	60	32	28	32		examination				Office of Academic Affairs
			Sub-total	No less than 7 credits	7	**210**	**128**	**82**	**64**	**64**				No less than 6 points in public elective courses (including 2 credits of innovation and	

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
														entrepreneurship)	
90	Required Courses	Concentrated Practice	9132311030	Entrance Education and Military Training	4	120	96	24		96	examination		1	Counts towards the General Studies curriculum	Student Affairs Department of Hunan City University
91	Required Courses	Concentrated Practice	9133315010	Voluntary Labour	2	60	32	28		32	examination		1		Student Affairs Department of Hunan City University
92	Required Courses	Concentrated Practice	9141315010	Social Practice and Volunteer Service	2	60	32	28		32	examination		vacation	vacation	Chinese Communist Youth League committee
93	Required Courses	Concentrated Practice	9162715010	Metalworking Training A	2	60	32	28		32	examination		3		College of Innovation and Entrepreneurship
94	Required Courses	Concentrated Practice	9161715010	Electrical and Electronic Training A	2	60	32	28		32	examination		3		College of Innovation and Entrepreneurship
95	Required Courses	Concentrated Practice	9081615010	Chemical Understanding Internship	2	60	32	28		32	examination		6		College of Materials and Chemical Engineering
96	Required Courses	Concentrated Practice	9081615020	Chemical Production Practice	15	450	320	130		320	examination		7、8		College of Materials and Chemical Engineering
97	Required Courses	Concentrated Practice	9081415010	Course Design for Chemical Engineering	4	120	64	56		64	examination		5		College of Materials and Chemical Engineering
98	Required Courses	Concentrated Practice	9081415020	Chemical Engineering Design B	10	300	192	108		192	examination		6		College of Materials and Chemical Engineering

Serial Number	Course Type	Course Type	Curriculum Code	Course Title	Credit	Total Hour	Contact Hour	Self-Study Hour	Theory Class Hour	Practice Class Hour	Evaluation mode	Credit Hour Per Week	Semester	Notes	College
99	Required Courses	Concentrated Practice	9081515010	Chemical Graduation Comprehensive Training	20	600	480	120		480	examination		8		College of Materials and Chemical Engineering
100	Required Courses	Concentrated Practice	9081515020	Graduation education	2	60	32	28		32	examination		7		College of Materials and Chemical Engineering
			Sub-total		**65**	**1950**	**1344**	**606**	**0**	**1344**					
			Total		**219**	**6570**	**3938**	**2632**	**1976**	**1962**					

2. Semester schedule

The First Academic Year													
	Curriculum Code	**Course Title**	**Chinese Credit**	**ECTS Credit**	**Contact Hour**	**Self-Study Hour**		**Curriculum Code**	**Course Title**	**Chinese Credit**	**ECTS Credit**	**Contact Hour**	**Self-Study Hour**
First Semester	9123311011	Ideological Ethics and Rule of Law Courses	3	3	48	42	Second Semester	9124311041	Outline of Modern Chinese History	3	3	48	42
	9125111050	Situation & Policy	0.5	0.5	8	7		9054311021	College English (2)	3	3	48	42
	9054311011	College English (1)	3	3	48	42		9051111050	Practical Writing	1	1	16	14
	9063311011	Basic Computer Course for College Students	1.5	1.5	32	13		9131311010	College Psychological Health Education	1.5	1.5	32	13
	9103811010	University Physical Education and Health Courses (1)	1.5	1.5	32	13		9163311010	Basic Course of Innovation and Entrepreneurship	1.5	1.5	32	13
	9081112251	Inorganic Chemistry A (1)	2	2	32	28		9063311021	Computer Programming Language Curriculum	3	3	56	34
	9081212140	Inorganic Chemistry Experiments A	2	2	32	28		9103811020	University Physical Education and Health Courses (2)	1.5	1.5	32	13
	9081113070	Introduction to Chemical Engineering	1	1	16	14		9092112021	Advanced Mathematics A (2)	5	5	80	70
	9132311030	Entrance Education and Military Training	4	4	96	24		9081112261	Inorganic Chemistry A (2)	2	2	32	28
	9133315010	Voluntary Labour	2	2	32	28		9054311031	College English Extension Series (1)	1.5	1.5	24	21

	9132311020	Military Theory Course for College Students	2	2	36	24		9125111050	Situation & Policy	0.5	0.5	8	7
	9092112011	Advanced Mathematics A (1)	4.5	4.5	72	63		9081112191	Analytical Chemistry	2.5	2.5	40	35
								9081212110	Analytical Chemistry Experiment	1.5	1.5	32	13
	Semester total hours		**27**	**27**	**484**	**326**		**Semester total hours**		**27.5**	**27.5**	**480**	**345**
The Second Academic Year													
	Curriculum Code	**Course Title**	**Chinese Credit**	**ECTS Credit**	**Contact Hour**	**Self-Study Hour**		**Curriculum Code**	**Course Title**	**Chinese Credit**	**ECTS Credit**	**Contact Hour**	**Self-Study Hour**
First Semester	9121311011	Basic Principle of Marxism	3	3	48	42	Second Semester	9122311021	Introduction to MAO Zedong Thought and the Theoretical System of Socialism with Chinese Characteristics	5	5	80	70
	9054311041	College English Extension Series (2)	1.5	1.5	24	21		9125111050	Situation & Policy	0.5	0.5	8	7
	9103811030	University Physical Education and Health Courses (3)	1	1	16	14		9151311010	Career Development and Employment Guidance for College Students (1)	1	1	20	10
	9092112051	Linear Algebra	2	2	32	28		9103811040	University Physical Education and Health Courses (4)	1	1	16	14
	9065112041	College Physics B (1)	3	3	48	42		9092112061	Probability and Statistics	2.5	2.5	40	35

9065212030	College Physics Experiment	1	1	16	14		9081112161	Organic Chemistry A (2)	2.5	2.5	40	35
9081112151	Organic Chemistry A (1)	2.5	2.5	40	35		9081212080	Organic Chemistry Experiment A (2)	1	1	16	14
9081212070	Organic Chemistry Experiment A (1)	1.5	1.5	32	13		9081112131	Physical Chemistry A (2)	2	2	32	28
9161715010	Electrical and Electronic Training A	2	2	32	28		9081212150	Physical Chemistry Experiment B (2)	1	1	16	14
9065122011	Electrical and Electronic Technology	2	2	32	28		9081212141	Biological Chemistry	2	2	32	28
9081112121	Physical Chemistry A (1)	3	3	48	42		9081212170	Biological Chemistry Experiment	1	1	16	14
9081212140	Physical Chemistry Experiment B (1)	1.5	1.5	32	13		9081313011	Chemical Engineering Drawing	2.5	2.5	48	27
9162715010	Metalworking Training A	2	2	32	28		9081113011	Principles of Chemical Industry A (1)	3.5	3.5	56	49
9125111050	Situation & Policy	0.5	0.5	8	7		9081124061	Instrumental Analysis	2	2	32	28
							9081124210	nstrumental Analysis Experiment	1	1	16	14
Semester total hours		**26.5**	**26.5**	**440**	**355**		**Semester total hours**		**28.5**	**28.5**	**468**	**387**

The Third Academic Year														
	Curriculum Code	**Course Title**	**Chinese Credit**	**ECTS Credit**	**Contact Hour**	**Self-Study Hour**		**Curriculum Code**	**Course Title**	**Chinese Credit**	**ECTS Credit**	**Contact Hour**	**Self-Study Hour**
First Semester	9081113021	Principles of Chemical Industry A (2)	3.5	3.5	56	49	Second Semester	9151311020	Career Development and Employment Guidance for College Students (2)	1	1	18	12
	9081213010	Principles of Chemical Industry Experiment A	1.5	1.5	32	13		9081113051	Chemical Separation Engineering	3	3	48	42
	9081213020	Chemical Principle Simulation Experiment	1	1	16	14		908111 071	Chemical Security & Environmental Protection	2	2	32	28
	9081113031	Chemical Reaction Engineering	3	3	48	42		9081113081	Chemical Process Analysis and Synthesis	3	3	48	42
	9081213050	Chemical Engineering Experiment	3	3	64	26		9081413010	Chemical Engineering Design A	3	3	48	42
	9081133041	Chemical Engineering Thermo Dynamics	3.5	3.5	56	49		9081113111	Chemical Industry Instrument and Automation	3	3	48	42
	9081133061	Chemical Technology	3	3	48	42		9081415020	Chemical Engineering Design B	10	10	192	108
	9081113090	Professional English and Literature Retrieval B	2	2	32	28		9081615010	Chemical Understanding Internship	2	2	32	28
	9081113101	Chemical Machinery and Equipment Foundation	3	3	48	42							
	9081415010	Course Design for Chemical Engineering	4	4	64	56							
	Semester total hours		**27.5**	**27.5**	**464**	**361**		**Semester total hours**		**27**	**27**	**466**	**344**

The Fourth Academic Year													
	Curriculum Code	**Course Title**	**Chinese Credit**	**ECTS Credit**	**Contact Hour**	**Self-Study Hour**		**Curriculum Code**	**Course Title**	**Chinese Credit**	**ECTS Credit**	**Contact Hour**	**Self-Study Hour**
First Semester	9081615020	Chemical Production Practice	7.5	7.5	160	65	Second Semester	9081515010	Chemical Graduation Comprehensive Training	20	20	480	120
	9141315010	Social Practice and Volunteer Service	2	2	32	28		9081615020	Chemical Production Practice	7.5	7.5	160	65
	9081124151	Technical Economics of Chemical Engineering	2	2	32	28							
	9081124200	Chemical Process Simulation Training (Aspen Plus)	2	2	32	28							
	9081515020	Graduation education	2	2	32	28							
		Self-development curriculum 1	2	2	32	28							
		Self-development curriculum 2	2	2	32	28							
		Self-development curriculum 3	1	1	16	14							
		Self-development curriculum 4	3	3	64	26							
		Self-development curriculum 5	2	2	32	28							

		Self-development curriculum 6	2	2	32	28							
	Semester total hours		**27.5**	**27.5**	**496**	**329**		**Semester total hours**		**27.5**	**27.5**	**640**	**185**

X. The realization matrix of talent training standard

The curriculum system is constructed according to the cultivation objectives and basic requirements of graduates, and the cultivation objectives and basic requirements are realized through the implementation of the curriculum system. The correspondence between the basic requirements of graduates and the cultivation objectives of this specialty is shown in Table 10-1, and Table 10-2 shows the correspondence between the teaching links and the graduation requirements formed after the index analysis of graduation requirements of this specialty, that is, the correspondence matrix between the specialized curriculum system and the basic requirements of graduates.

Table 10-1 Supporting Matrix of Graduation Requirements and Training Objectives

Training Objectives / Graduation Requirements	Objective **1**	Objective **2**	Objective **3**	Objective **4**	Objective **5**
Graduation Requirement 1	H	L			
Graduation Requirement 2	H		L		
Graduation Requirement 3	H	L	H		
Graduation Requirement 4	H	L	H		
Graduation Requirement 5	H		H		
Graduation Requirement 6	L	H			
Graduation Requirement 7		H		M	
Graduation Requirement 8		H		M	
Graduation Requirement 9		M		H	
Graduation Requirement 10				H	M
Graduation Requirement 11	M		H	M	
Graduation Requirement 12		M	M		H

Notes: The support of graduation requirements and training objectives is indicated by "H (high support), M (medium support), L (low support)" respectively. H stands for direct support, M stands for indirect support, and L stands for related support.

Table 10-2 Supporting Matrix of Curriculum System and Graduation Requirements

Courses	Graduation Requirement 1	Graduation Requirement 2	Graduation Requirement 3	Graduation Requirement 4	Graduation Requirement 5	Graduation Requirement 6	Graduation Requirement 7	Graduation Requirement 8	Graduation Requirement 9	Graduation Requirement 10	Graduation Requirement 11	Graduation Requirement 12
Ethics, Morality, and Rule of Law								H				
Outline of Chinese Modern and Contemporary History								H				
Basic Principle of Marxism								H				
MAO Zedong Thought and Chinese Characteristic Socialism Theory System Introduction							H	H				
Current Affairs and Policy								H				H
College Physical Education and Health									H			
College English										H		
Practical Writing										H		
Psychological Health Education for College Students								L				H
Academic Planning and Career Development								H	M			H
Innovation and entrepreneurship foundation			H									M
Military theory									H			
Fundamentals of Computer for College Students					H							
Computer Language				H								

Advanced Mathematics A	H	M										
linear algebra	H											
Probability and Mathematical Statistics	H											
College Physics	H											
College Physics Experiments				H								
Electrical Engineering and Electronics	H											
Inorganic Chemistry A	H	M										
Inorganic Chemistry Experiment A				H								
Organic Chemistry A	H											
Organic Chemistry Experiment A				H								
Analytical Chemistry		H										
Analytical Chemistry Experiment				H								
Physical Chemistry A	H	M										
Physical Chemistry Experiments A				H								
Instrumental Analysis					H							
Instrumental Analysis Experiments					H							
Biochemistry	M	M										
Biochemistry Experiment				H								
Principles of Chemical Engineering A	H	H										
Principles of Chemical Engineering Experiments A				H								
Principles of Chemical Engineering Simulated			M	H								

Experiment												
Chemical Reaction Engineering	H		H								M	
Chemical Engineering Experiment				H								
Chemical Engineering Thermodynamics	M	H					M					
Chemical Separation Engineering	M	H	M									
Chemical Technology	H				M							
Chemical Cartography	H				M							
Chemical Engineering Design A			H			H	M				M	
Safety & Environmental Protection in Chemical Industry			M			H	M					
Introduction to Chemical Engineering	H											
Synthesis and Analysis in Chemical Process		H	H									
Mechanical Fundamentals of Chemical Equipments	H											
Chemical Engineering Instrument &Automation	H											
Fine Organic Synthesis Unit Reaction			H				M					
Professional English and Literature Search B		H	L							M		
Chemical Technology						M					H	

Economy												
Freshman Orientation Course and Military Training									H			
Metallurgical Training A						H						
Practice of Electrical Engineering A						H			L			
Chemical Engineering Acquaintance Practice						M	H	M				
Chemical Engineering Plant Operation Practice			M			H	M	M	M			H
Chemical Unit Operation Design		L	H	M	M					M		
Chemical Design B		M	H	H	M				L		M	
Production Plan and Control		H	H	M				H		H		H

Note: The curriculum system and graduation requirements are supported by "H (high support), M (medium support), L (low support)" respectively. Here, H represents direct support, M represents indirect support, and L represents related support.