宁波东方理工大学

2026 级化学本科专业人才培养方案

Curriculum for the Program of Chemistry (2026)

Eastern Institute of Technology, Ningbo

一、专业介绍 Introduction to the Program

宁波东方理工大学化学专业融合化学、材料、生物、医药、能源及人工智能等多学科，鼓励学生在解决真实科学问题中提升综合能力。本专业师资力量雄厚，现有 24 位全职教师，其中院士 1 位、国家级人才 12 位，教师均拥有海外知名高校工作经历，且具备丰富的国际化教学及科研经验。专业课程体系以无机化学、有机化学、分析化学、物理化学等基础核心课程为主体，同时开设结构与计算化学、人工智能化学、能源与催化、药物化学与化学生物学等前沿交叉课程，构建“基础扎实、交叉融合、创新引领”的培养体系。培养特色突出“1+3”通专融合培养模式，强化科研训练与夏季小学期实践教学，引导学生尽早接触科学研究和产业前沿，在实践中提升创新能力、科研素养和解决实际问题的能力。毕业生既可赴国内外顶尖高校及科研机构继续深造，也可在半导体、新能源、新材料、生物医药等前沿创新领域从事科研、技术研发与管理工作。

The Chemistry program of EIT integrates multiple disciplines, including chemistry, materials, biology, pharmacy energy, and artificial intelligence (AI), encouraging students to enhance their comprehensive capabilities through solving real-world scientific problems. This program boasts a strong faculty comprising 24 full-time members, including 1 academician and 12 national-level talents. All faculty members have prior experience at leading overseas institutions and possess extensive international expertise in both teaching and research. The curriculum is built upon core foundational courses including Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, and Physical Chemistry, while also offering cutting-edge interdisciplinary courses such as Structural and Computational Chemistry, Artificial Intelligence Chemistry, Energy and Catalysis, and Medicinal Chemistry and Chemical Biology. This framework establishes a training system featuring "solid foundations, interdisciplinary integration, and innovation-driven leadership." The program adopts a "1+3" model that integrates general and specialized education with an emphasis on research training and hands-on summer session practice, enabling students to engage with frontier research and industrial applications, thereby fostering innovation, research literacy, and problem-solving skills in practice. Graduates are well-trained to pursue further studies at top universities and research institutions worldwide, or to embark on careers in research, technology development, and management in cutting-edge fields such as semiconductors, new energy, advanced materials, and biomedicine.

二、培养目标 Program Objectives

本专业面向国家实现高水平科技自立自强的战略需求，培养专业基础理论扎实，工程实践与创新能力强，致力于解决化学领域基础理论和关键技术问题、引领化学行业发展的拔尖创新人才。

Aligned with the national strategic demand of achieving high-level self-reliance and strength in science and technology, this program cultivates top-tier innovative talent with a solid foundation in professional theory, strong engineering practice and innovation capabilities, and a commitment to solving fundamental theoretical and key technical problems in chemistry and leading the development of the chemical industry.

学生毕业后五年左右的预期目标包括：

Approximately five years after graduation, graduates are expected to achieve the following objectives:

1. 具备家国情怀、国际视野；拥有良好的职业道德、社会责任感、领导力等人文素养。

Graduates possess devotion to the country and a global perspective, demonstrate professional ethics, a sense of social responsibility, leadership, and other humanistic qualities.

2. 掌握扎实的数理化信基础、化学专业及多学科交叉领域知识，具有从事高水平化学领域科研和创新工作的专业能力，以及解决化学领域复杂问题的能力。

Graduates master a solid foundation in mathematics, physics, chemistry, and information technology, as well as knowledge of chemistry and multidisciplinary fields, possess the professional competence to engage in high-level research and innovation in chemistry, and the capability of solving complex problems in the field of chemistry.

3. 具有思辨能力、创造性思维和工程理念，具有良好的表达与沟通能力，具备团队合作和终身学习能力。

Graduates possess critical thinking, creative thinking, and an engineering mindset, demonstrate strong expression and communication skills, and the capability of teamwork and lifelong learning.

三、培养要求 Program Requirements

1. 素养要求：践行社会主义核心价值观，具有良好的科学道德、职业伦理和社会责任感，理解化学科学对国家发展和社会进步的重要作用；具备人文素养、家国情怀和国际视野，了解国情社情与国际发展趋势；尊重科学规律，坚持诚实守信、严谨求实，恪守学术规范、实验规范和职业准则；树立可持续发展理念，能够认识化学及相关实践活动对资源、环境和人类健康的影响。

Ethical Competencies: Adhere to the core socialist values, demonstrate sound scientific integrity, professional ethics, and a sense of social responsibility, with a clear understanding the role of chemical science in national development and social progress; Possess humanistic qualities, a strong sense of commitment to the country, and a global perspective, and understand national conditions and the international situation. Respect scientific principles, uphold honesty, rigor, and intellectual integrity, strictly abiding by academic conventions, laboratory protocols, and professional standards; Embrace the concept of sustainable development and critically recognize the impacts of chemical research and related practices on natural resources, the environment, and human health.

2. 知识要求：系统掌握无机化学、有机化学、分析化学、物理化学、高分子化学等化学学科基础理论、基本知识和实验方法；掌握数学、物理学、信息科学等相关基础知识，具备运用多学科知识分析和解决化学问题的能力；了解化学与材料、生命、环境、能源及工程等交叉领域的基本知识和发展趋势；掌握文献检索、信息获取与学术交流的基本方法，了解化学学科前沿与发展动态。

Knowledge Requirements: Systematically master the core content and experimental foundations of inorganic chemistry, organic chemistry, analytical chemistry, physical chemistry, polymer chemistry, and related disciplines. Master foundational knowledge in mathematics, physics, and information technology to support modeling analysis and technical applications in chemistry. Understand the basic knowledge and development trends of interdisciplinary fields involving chemistry and materials science, life science, environmental science, chemical engineering, and sustainable development. Acquire, integrate, and evaluate chemical literature and academic information, and understand disciplinary frontiers and research developments.

3. 科学思维与问题解决能力：能独立分析和解决复杂化学问题，具备严密的逻辑推理能力和科学判断力；能够综合运用化学基础理论开展问题建模、实验设计与结果分析，并提出合理解决方案。

Scientific Thinking and Problem-Solving Capability: Independently analyze and solve complex chemistry problems, possess rigorous logical reasoning ability and scientific judgment, and apply theoretical knowledge to problem modeling, experimental design, and interpretation of results to propose reasonable

solutions.

4. 创新能力：敢于质疑，具有逻辑思维，创新精神和创业意识，掌握基本创新方法，了解创业基本途径，具有综合运用理论和技术手段开展创新创业活动的能力。

Innovation Capability: Have the courage to question, possess logical thinking, an innovative spirit, and entrepreneurial awareness, master basic innovation methods, understand the basic pathways of entrepreneurship, and possess the ability to comprehensively apply theoretical and technical methods to carry out innovation and entrepreneurship activities.

5. 实验与研究能力：熟练掌握基础化学实验操作与数据处理技能；能够设计并实施化学实验，规范采集与分析实验数据，并撰写实验报告；具备科研创新与独立开展基础课题研究的基本能力。

Experimental and Research Capability: Proficiently master basic chemistry laboratory operations and data-processing skills, design and implement chemical science experiments, comprehensively analyze experimental data, and write standardized laboratory reports, and possess the basic capability of conducting scientific research innovation and independently carry out research on foundational topics.

6. 信息与技术应用能力：能够熟练使用现代分析仪器和相关软件进行图谱解析、数据建模、文献管理等工作；具备基本的计算思维和信息检索能力，能使用信息技术工具支持学习与研究。

Information and Technology Application Capability: Proficiently use modern analytical instruments and relevant software for spectral analysis, data modeling, literature management, and related work. Possess basic computational thinking and information retrieval skills, and use information technology tools to support learning and research.

7. 沟通与合作能力：能清晰表达学术观点，具备撰写学术论文与报告、公开发表演讲等能力；具有良好的团队协作精神，能够在多学科背景下合作开展学习和研究工作；具备基本的跨文化理解与沟通能力。

Communication and Collaboration Capability: Clearly express academic views and possess the capability of writing academic papers and reports and delivering public presentations. Demonstrate strong teamwork, cooperate in learning and research in multidisciplinary settings, and possess a certain degree of cross-cultural understanding and communication ability.

8. 自主发展与终身学习能力：具有自主学习与持续更新知识的意识和能力，能够根据社会发展与个人发展需求进行学习与职业或学术发展规划；能够理解技术进步与社会变迁的关系，具备适应未来发展的能力。

Self-development and Lifelong Learning Capability: Possess awareness and ability to learn independently and continuously update their knowledge. Plan career paths or further academic study according to the needs of social and personal development, understand the relationship between technological progress and social change, and adapt to uncertainty in future development.

9. 国际化交流能力：至少掌握一门外语，具备基本的跨文化交流能力与全球视野，能够在国际环境中开展交流、合作与竞争。

International Communication Capability: Master at least one foreign language and possess a global perspective as well as the ability to engage in cross-cultural communication, competition, and cooperation.

四、培养特色 Program Highlights

本专业紧跟化学学科与产业发展的前沿趋势，培养基础扎实、实践能力强、具有国际视野的拔尖创新人才。具体培养特色包括：

This program closely follows frontier trends in the development of chemistry and relevant industries, and cultivates top-notch innovative talent with a solid foundation, strong practical capability, and a global perspective. The specific program features include:

1. 强化通识教育：全校实施“1+3”培养模式：第一学年不分专业，强化数理化基础与计算能力，通过科技与人文通识教育协同培养，提升学生科研创新意识、写作能力与沟通能力；学生于第二学期末进行专业选择，随后进入为期两年的专业培养阶段；第四学年在修读专业选修课程的同时，开展创新实践与毕业设计。

Emphasis on General Education: The university adopts a ‘1+3’ curriculum model: during the first academic year, students are not assigned to a specific major, enabling them to build a strong foundation in mathematics, physics, chemistry, and computational thinking capability, and enhance students’ creativity, writing, and communication skills through science, and technology, and humanities/liberal education. Students will choose their majors at the end of the second term followed by two years of specialized training. In the fourth year, students will work on their final year project while participating in innovation practice activities.

2. 书院制培养：实行书院制和生活导师制，开展全员、全过程、全方位育人，致力于培养学生的表达与沟通能力、团队协作能力、领导力等综合素质。

Residential College Model: Upon enrollment, students enter a residential college and are supported by a residential college mentor system. This model aims to cultivate students’ communication, teamwork, and leadership abilities, as well as their overall personal growth.

3. 本研贯通：实行学术导师制，强化科研与创新能力培养；鼓励学生及早参与科研创新活动，融合为期一年的本科“创新实践与毕业设计”与科研课题，为学生进入国内外大学攻读硕、博研究生学位做好准备，加速急需拔尖人才培养。

Integrated Bachelor–Master Pathways: An academic advisory system is implemented to strengthen research and innovation training. Students are encouraged to participate in research projects in the first year, with one year “Innovation Practice and Graduation Project” closely integrated with their further research. This design prepares students for admission to master and PhD programs at leading domestic and international universities, thereby accelerating the cultivation of top-tier innovative professionals in high demand.

4. 国际化培养：发挥国际化师资优势，专业课实行双语教学，支持学生赴世界一流大学与机构参与国际交流、项目合作，拓宽视野，提升国际竞争力。

Global Competence Development: Leveraging a globally oriented faculty team, the program incorporates bilingual instruction and supports student participation in international exchanges and collaborative projects at top world institutions, broadening their horizons and enhancing global competitiveness.

5. 智能化教育：探索 AI 时代的教学变革，利用智能工具提高知识传授与学习效率；开设人工智能通识课，培养学生利用数字资源和智能工具的自主学习能力。

AI for Education: Investigate pedagogical reform in the era of AI, employ intelligent technologies to optimize the efficacy of knowledge delivery and learning outcomes, and advocate for the implementation of a foundational AI literacy course designed to develop students' self-directed learning capabilities via the strategic deployment of digital assets and AI-powered tools.

五、学制和授予学位 Program Duration and Degree Awarded

专业学制：基本学制4年，采用学分制管理，实行弹性学习年限,最多不超过6年。

Program Duration: The standard duration of the program is four years with a credit-based management system, with maximum 6 years of study.

授予学位：对完成并符合培养方案学位要求的学生，授予理学学士学位。

Degree Awarded: Students who have completed the program and met the degree requirements stipulated in this Program Curriculum will be awarded the Bachelor of Science degree.

六、毕业学分要求 Credit Requirements for Graduation

毕业最低学分要求为 157 学分。课程结构要求如下：

A minimum of 157 credits is required for graduation. The curriculum structure is as follows：

课程模块 Module	课程要求 Requirement	课程类别 Category	学分 Credits
通识与基础课程 General Education and Foundational Course （81学分/Credits）	必修 Required	公共通识必修课 General Education Required Courses	41
		理工基础课 Fundamental Science and Engineering Courses	32
	选修 Elective	通识选修课 General Education Elective Courses	8
专业课程 Major-specific Course （56学分/Credits）	必修 Required	学科基础课程 Discipline-specific Foundational Course	21
	必修 Required	专业核心课 Major Core Courses	23
	选修 Elective	专业选修课 Major Elective Courses	12
集中实践环节 Intensive Practical Training Module （20学分/Credits）	必修 Required	夏季学期实践 Summer Internship	12（24周 /Weeks）
		毕业论文 Dissertation	8（32周 /Weeks）
毕业学分要求 Graduation Credits Requirement			157

基于国标要求的各指标如下：

Credit Distribution Against National Standard Requirements:

课程类别 Category	学分 Credits	学时数或学分所占比例 Credit Hours or Percentage (%)	国标要求 National Standard
专业理论课程 Major Theory Courses	45	720 学时	700-900 学时
专业选修课 Major Elective Courses	12	192 学时	>160 学时
实践性环节 Practical Training Module	50.5	30.8%	≥25%
化学实验 Chemistry Laboratories	14	432 学时	≥432 学时
注:上表中，实践性环节学分未包含选修课实践学分。 The credit for the practical training module excludes practical credits from elective courses.			

七、主要课程设置 Core Courses

无机化学I、II、有机化学I、II、分析化学I、II、物理化学I、II、高分子化学、无机化学实验I、II、有机化学实验I、II、分析化学实验I、II、物理化学实验I、II，综合化学实验。

Inorganic Chemistry I&II, Organic Chemistry I&II, Analytical Chemistry I&II, Physical Chemistry I&II, Polymer Chemistry, Inorganic Chemistry Laboratory I&II, Organic Chemistry Laboratory I&II, Analytical Chemistry Laboratory I&II, Physical Chemistry Laboratory I&II, Comprehensive Chemistry Laboratory.

八、主要实践性教学环节和主要专业实验 Practical Training Activities and Major Laboratories

主要实践性教学环节包括：夏季学期认知实践、专业实践、创新实践、化学前沿探索、毕业设计、各类国内外本科生学术竞赛、创新大赛等。另外，本科生入学即选择学术导师团队，及早参与科研创新项目，期间可以选择与暑假实践、第四学年创新项目相融合。

Practical Training Activities: Summer Internship I&II&III, Discipline-specific Professional Practice, Innovation-oriented Practice, Exploratory Research in Chemical Frontiers, Capstone Innovation Projects and Graduation Design, as well as various domestic and international academic competitions and innovation entrepreneurship contests for undergraduates. In addition, each student is assigned to a faculty research mentor upon enrollment, enabling early participation in research and innovation projects, which can be integrated with summer practical training and the fourth-year capstone innovation project.

主要专业实验包括：大学化学（实验部分）、无机化学实验I、II、有机化学实验I、II、分析化学实验I、II、物理化学实验I、II、综合化学实验等。

Major Laboratories: General Chemistry (laboratory section), Inorganic Chemistry Laboratory I&II, Organic Chemistry Laboratory I&II, Analytical Chemistry Laboratory I&II, Physical Chemistry Laboratory I&II, Comprehensive Chemistry Laboratory.

详细内容请参见附表一。

For details, please refer to Appendix Table 1.

九、课程设置与要求 Course Structure and Requirements

（一）通识与基础课程 General and Foundational Courses

1. 公共通识必修课 General Education Required Courses

（1）思想政治理论课 Ideological and Political Theory Courses

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
GENE1101	思想道德与法治 Ethics and Rule of Law	必 Required	3	1	3	无 None	1/秋 Y1/Fall
GENE1102	马克思主义基本原理 Basic Principles of Marxism	必 Required	3	1	3	无 None	1/春 Y1/Spring
GENE2101	中国近现代史纲要 Modern Chinese History: A Survey	必 Required	3	1	3	无 None	2/秋 Y2/Fall
GENE2102	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Maoism and Chinese Socialism	必 Required	2		2	无 None	2/春 Y2/Spring
GENE3101	习近平新时代中国特色社会主义思想概论 Introduction to Xi Thought on Chinese Socialism	必 Required	3	1	3	无 None	3/秋 Y3/Fall
GENE1103	形势与政策I Society and Public Policy in Contemporary China I	必 Required	0.5		0.5	无 None	1/秋 Y1/Fall
GENE1104	形势与政策II Society and Public Policy in Contemporary China II	必 Required	0.5		0.5	无 None	1/春 Y1/Spring
GENE2103	形势与政策III Society and Public Policy in Contemporary China III	必 Required	0.5		0.5	无 None	2/秋 Y2/Fall
GENE2104	形势与政策IV Society and Public Policy in Contemporary China IV	必 Required	0.5		0.5	无 None	2/春 Y2/Spring
GENE3301	思想政治理论课实践 Political Theory and Ideology: Experiential Learning	必 Required	2	2	2	无 None	3/秋 Y3/Fall
GENE3302	劳动教育实践 Practical Labor Education	必 Required	1	1	2	无 None	*
小计/Subtotal			19	7	20		

*具体见通识培养方案。
For details, please refer to the Curriculum for General Education.

（2）军事体育健康课 Military, Physical Education, and Health Courses

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
GENE1001	军事技能训练 Military Skills Training	必 Required	2	2		无 None	夏 Summer
GENE1002	军事理论与国家安全教育 Military Theory	必 Required	3			无 None	夏 Summer
GENE1401	体育与健康I Physical Education I	必 Required	0.5	0.5	2	无 None	1/秋 Y1/Fall
GENE1402	体育与健康II Physical Education II	必 Required	0.5	0.5	2	无 None	1/春 Y1/Spring
GENE2401	体育与健康III Physical Education III	必 Required	0.5	0.5	2	无 None	2/秋 Y2/Fall
GENE2402	体育与健康IV Physical Education IV	必 Required	0.5	0.5	2	无 None	2/春 Y2/Spring
GENE3401	体育与健康V Physical Education V	必 Required	0.5	0.5	2	无 None	3/秋 Y3/Fall
GENE3402	体育与健康VI Physical Education VI	必 Required	0.5	0.5	2	无 None	3/春 Y3/Spring
小计/Subtotal			8	5	12		

（3）语言和沟通技能提升课 Language and Communication Skills Courses

英语实行 ABC 分级教学，根据不同等级要求，总计修满 12 学分。

The English curriculum follows a three-tier A, B, and C level system. Students are required to complete a total of 12 credits according to their assigned level.

课程代码 Course Code	课程名称 Course Name	必修选修 Required / Elective	要求 Requirements	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
LC1501	大学英语I-A General Academic English I-A	必 Required	A级修读 Required for Level A	3		4	无 None	1/秋 Y1/Fall
LC1502	大学英语II-A General Academic English II-A	必 Required		3		4	LC1501	1/春 Y1/Spring
LC2501	大学英语III-A General Academic English III-A	必 Required		3		4	LC1502	2/秋 Y2/Fall
LC1503	大学英语I-B General Academic English I-B	必 Required	B级修读 Required for Level B	3		4	无 None	1/秋 Y1/Fall
LC1504	大学英语II-B General Academic English II-B	必 Required		3		4	LC1503	1/春 Y1/Spring
LC2502	大学英语III-B General Academic English III-B	必 Required		3		4	LC1504	2/秋 Y2/Fall
LC1505	大学英语I-C General Academic English I-C	必 Required	C级修读 Required for Level C	3		4	无 None	1/秋 Y1/Fall
LC1506	大学英语II-C General Academic English II-C	必 Required		3		4	LC1505	1/春 Y1/Spring
LC2503	大学英语III-C General Academic English III-C	必 Required		3		4	LC1506	2/秋 Y2/Fall
LC2504	学术英语写作与交流 Academic Writing and Presentation	必 Required	所有学生修读 Required for All Levels (A, B, C)	3		4	LC2501/ LC2502/ LC2503	2/春 Y2/Spring
小计/Subtotal				30		40		

其他沟通技能提升课程要求如下：Other requirements

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
GENE2301	沟通与协作 Communication and Collaboration	必 Required	2		2	无 None	2/秋 Y2/Fall
小计/Subtotal			2		2		

2. 理工基础课 Fundamental Science and Engineering Courses

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
MATH1101	高等数学I Calculus I	必 Required	4		5	无 None	1/秋 Y1/Fall
MATH1102	高等数学II Calculus II	必 Required	4		5	MATH1101	1/春 Y1/Spring
MATH1103	线性代数 Linear Algebra	必 Required	3		4	无 None	1/秋 Y1/Spring
MATH2101	概率论与数理统计 Probability Theory and Mathematical Statistics	必 Required	3		3	MATH1102	2/秋 Y2/Fall
PHYS1101	大学物理I General Physics I	必 Required	4		4	无 None	1/秋 Y1/Fall
PHYS1102	大学物理II General Physics II	必 Required	4		4	PHYS1101	1/春 Y1/Spring
PHYS1301	大学物理实验I General Physics Experiments I	必 Required	1	1	1	无 None	1/秋 Y1/Fall
PHYS1302	大学物理实验II General Physics Experiments II	必 Required	1	1	1	PHYS1301	1/春 Y1/Spring
CHEM1101	大学化学 General Chemistry	必 Required	3	1	3	无 None	1/春 Y1/Spring
CS1001	人工智能通识 Introduction to AI	必 Required	2	1	2	无 None	1/秋 Y1/Fall
CS1101	Python程序设计基础 Fundamentals of Python Programming	必 Required	3	1	3	无 None	1/春 Y1/Spring
小计/Subtotal			32	5	35		

3. 通识选修课程修读要求 Requirements for General Education Elective Courses

下列类型课程有最低学分修读要求：

The following types of courses have a minimum credit requirement.

课程类型 Course Type	必修选修 Required/ Elective	最低学分要求 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	推荐修读学期 Recommended Term
人文社科类通识课 Humanity and Social Science	选 Elective	2		2	无 None	2/秋 Y2/Fall
艺术类通识课 Arts	选 Elective	2		2	无 None	2/春 Y2/Spring
创新创业类通识课 Entrepreneurship	选 Elective	2	0.5	2	无 None	3/秋 Y3/Fall
其他通识课 Others	选 Elective	2		2	无 None	3/春 Y3/Spring
小计/Subtotal		8	0.5	8		

（二）学科基础课程 Major Foundation Courses

课程代码 Course Code	课程名称 Course Name	必修选修 Required / Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
CHEM2201	无机化学I Inorganic Chemistry I	必 Required	4		4	CHEM1101	2/秋 Y2/Fall
CHEM2203	有机化学I Organic Chemistry I	必 Required	4		4	CHEM1101	2/秋 Y2/Fall
CHEM2205	分析化学I Analytical Chemistry I	必 Required	4		4	CHEM1101	2/春 Y2/Spring

CHEM3207	物理化学I Physical Chemistry I	必 Required	3		3	CHEM1101	3/秋 Y3/Fall
CHEM2301	无机化学实验I Inorganic Chemistry Laboratory I	必 Required	1.5	1.5	3	CHEM1101	2/秋 Y2/Fall
CHEM2303	有机化学实验I Organic Chemistry Laboratory I	必 Required	1.5	1.5	3	CHEM1101	2/秋 Y2/Fall
CHEM2305	分析化学实验I Analytical Chemistry Laboratory I	必 Required	1.5	1.5	3	CHEM1101	2/春 Y2/Spring
CHEM3307	物理化学实验I Physical Chemistry Laboratory I	必 Required	1.5	1.5	3	CHEM1101	3/秋 Y3/Fall
小计/ Subtotal			21	6	27		

（三）专业课程 Major Courses

1. 专业核心课 Major Core Courses

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
CHEM2202	无机化学II Inorganic Chemistry II	必 Required	3		3	CHEM1101 CHEM2201	2/春 Y2/Spring
CHEM2204	有机化学II Organic Chemistry II	必 Required	3		3	CHEM1101 CHEM2203	2/春 Y2/Spring
CHEM3206	分析化学II Analytical Chemistry II	必 Required	3		3	CHEM1101 CHEM2205	3/秋 Y3/Fall
CHEM3208	物理化学II Physical Chemistry II	必 Required	4		4	CHEM1101 CHEM2207	3/春 Y3/Spring
CHEM3209	高分子化学 Polymer Chemistry	必 Required	3		3	CHEM1101	3/春 Y3/Spring
CHEM2302	无机化学实验II Inorganic Chemistry Laboratory II	必 Required	1.5	1.5	3	CHEM1101 CHEM2301	2/春 Y2/Spring
CHEM3306	分析化学实验II Analytical Chemistry Laboratory II	必 Required	1.5	1.5	3	CHEM1101 CHEM2305	3/秋 Y3/Fall
CHEM2304	有机化学实验II Organic Chemistry Laboratory II	必 Required	1.5	1.5	3	CHEM1101 CHEM2303	2/春 Y2/Spring
CHEM3308	物理化学实验II Physical Chemistry Laboratory II	必 Required	1.5	1.5	3	CHEM1101 CHEM2307	3/春 Y3/Spring
CHEM3309	综合化学实验 Comprehensive Chemistry Laboratory	必 Required	1	1	2	CHEM1101	3/春 Y3/Spring
小计/Subtotal			23	7	30		

2. 专业选修课（至少修读 12 学分，可自主修读）Elective Courses（At least 12 credits must be completed; students may choose courses independently.）

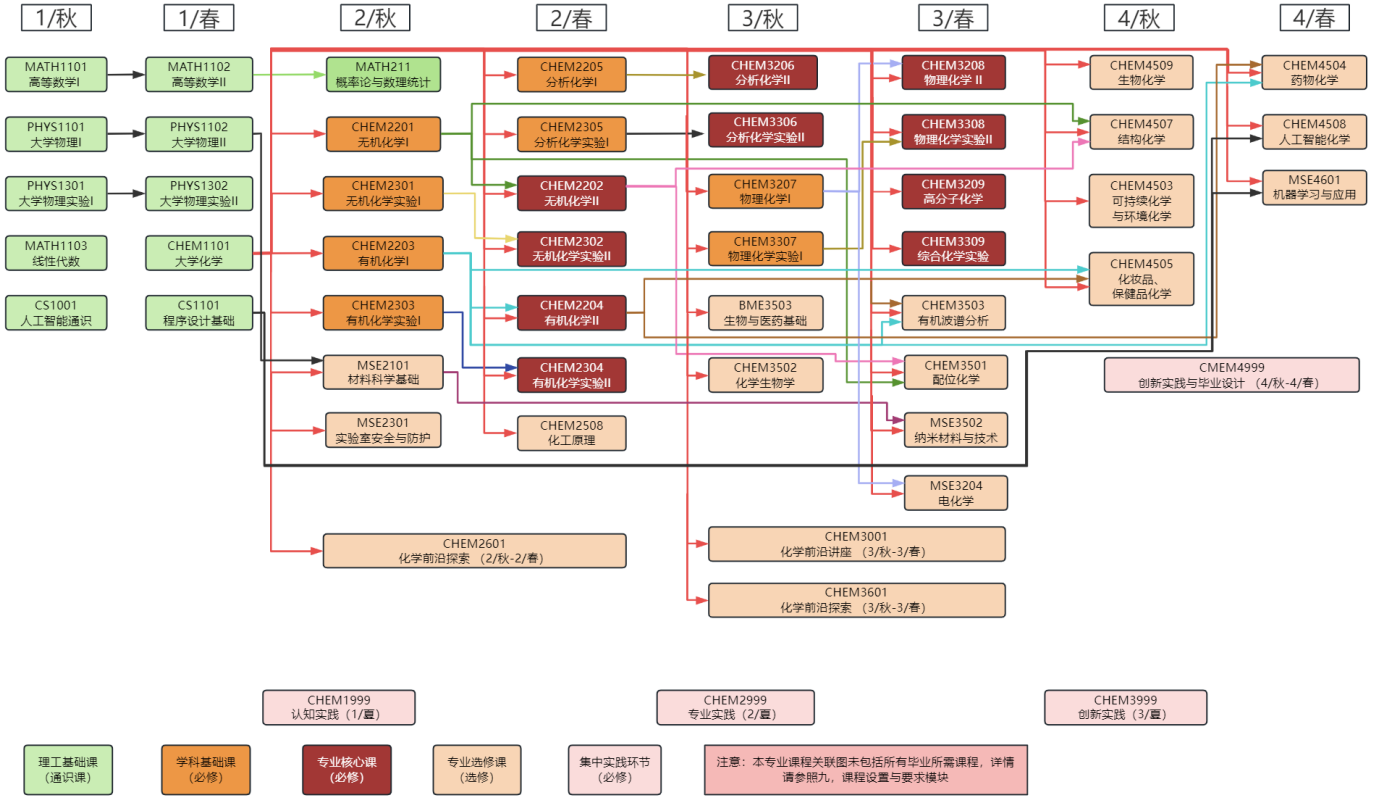
课程代码 Course Code	课程名称 Course Name	必修选修 Required / Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
CHEM4509	生物化学 Biochemistry	选 Elective	3		3	CHEM1101	4/秋 Y4/Fall
CHEM3503	有机波谱分析 Organic Spectroscopic Analysis	选 Elective	3		3	CHEM1101 CHEM2203	3/春 Y3/Spring
CHEM4507	结构化学 Structural Chemistry	选 Elective	3		3	CHEM1101 CHEM2201 CHEM3202	4/秋 Y4/Fall
CHEM2508	化工原理 Principles of Chemical Engineering	选 Elective	3		3	CHEM1101	2/春 Y2/Spring
MSE2301	实验室安全与防护 Laboratory Safety and Protection	选 Elective	0.5		0.5	CHEM1101 PHYS1101	2/秋 Y2/Fall
CHEM3501	配位化学	选	3		3	CHEM1101	3/春

	Coordination Chemistry	Elective				CHEM2201 CHEM3202	Y3/Spring
CHEM4508	人工智能化学 Artificial Intelligence in Chemistry	选 Elective	3		3	CHEM1101 CS1001	4/春 Y4/Spring
MSE4601	机器学习及应用 Machine Learning and Applications	选 Elective	2		2	CS1001	4/秋 Y4/Fall
CHEM3001	化学前沿讲座 Lectures on Frontiers of Chemistry	选 Elective	2		2	CHEM1101	3/秋-3/春 Y3/Fall-Y3/Spring
CHEM2601	化学前沿探索I Explorations on Frontiers of Chemistry I	选 Elective	2	2	4	CHEM1101	2/秋-2/春 Y2/Fall-Y2/Spring
CHEM3601	化学前沿探索II Explorations on Frontiers of Chemistry II	选 Elective	3	3	6	CHEM1101	3/秋-3/春 Y3/Fall-Y3/Spring
BME3503	生物与医药基础 Fundamentals of Biology and Medicine	选 Elective	3		3	CHEM1101	3/秋 Y3/Fall
MSE2101	材料科学基础 Fundamentals of Materials Science	选 Elective	4	1	4	CHEM1101	2/秋 Y2/Fall
MSE3502	纳米材料与技术 Nanomaterials and Technology	选 Elective	2	0.5	2	MSE2101	3/春 Y3/Spring
MSE3204	电化学 Electrochemistry	选 Elective	2	0.5	2	CHEM1101 CHEM2207	3/春 Y3/Spring
CHEM4503	可持续化学与环境化学 Sustainable Chemistry and Environmental Chemistry	选 Elective	3		3	CHEM1101	4/秋 Y4/Fall
CHEM3502	化学生物学 Chemical Biology	选 Elective	3		3	CHEM1101	3/秋 Y3/Fall
CHEM4504	药物化学 Medicinal Chemistry	选 Elective	3		3	CHEM1101 CHEM2203 CHEM2204	4/春 Y4/Spring
CHEM4505	化妆品、保健品化学 Chemistry of Cosmetics and Nutraceuticals	选 Elective	3		3	CHEM1101 CHEM2203 CHEM2204	4/秋 Y4/Fall
小计/Subtotal			50.5	7	55.5		

（四）集中实践环节 Intensive Practical Training Module

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
CHEM1999	认知实践 Summer Internship I	必 Required	4	4	8周/ Weeks	无 None	1/夏 Y1/Summer
CHEM2999	专业实践 Summer Internship II	必 Required	4	4	8周/ Weeks	无 None	2/夏 Y2/Summer
CHEM3999	创新实践 Summer Internship III	必 Required	4	4	8周/ Weeks	无 None	3/夏 Y3/Summer
CHEM4999	创新实践与毕业论文 Summer Internship and Dissertation	必 Required	8	8	32周/ Weeks	无 None	4/秋-4/春 Y4/Fall-Y4/Spring
小计/Subtotal			20	20	56周/ Weeks		

十、专业课程关联图 Roadmap for Major Courses



附表一：主要专业实验和集中实践性环节

Appendix Table 1: Major Laboratories and Intensive Practical Training Activities

课程代码 Course Code	课程名称 Course Name	必修选修 Required/ Elective	总学分 Credits	实践学分 Practical Credits	周学时 Weekly Load	先修课程 Prerequisites	学期 Term
CHEM1101	大学化学 General Chemistry	必 Required	3	1	3	无 None	1/春 Y1/Spring
CHEM2301	无机化学实验I Inorganic Chemistry Laboratory I	必 Required	1.5	1.5	3	大学化学 General Chemistry	2/秋 Y2/Fall
CHEM2303	有机化学实验I Organic Chemistry Laboratory I	必 Required	1.5	1.5	3	大学化学 General Chemistry	2/秋 Y2/Fall
CHEM2305	分析化学实验I Analytical Chemistry Laboratory I	必 Required	1.5	1.5	3	大学化学 General Chemistry	2/春 Y2/Spring
CHEM3307	物理化学实验I Physical Chemistry Laboratory I	必 Required	1.5	1.5	3	大学化学 General Chemistry	3/春 Y3/Spring
CHEM2302	无机化学实验II Inorganic Chemistry Laboratory II	必 Required	1.5	1.5	3	无机化学实验I Inorganic Chemistry Laboratory I	2/秋 Y2/Fall
CHEM3306	分析化学实验II Analytical Chemistry Laboratory II	必 Required	1.5	1.5	3	分析化学实验I Analytical Chemistry Laboratory I	3/秋 Y3/Fall
CHEM2304	有机化学实验II Organic Chemistry Laboratory II	必 Required	1.5	1.5	3	有机化学实验I Organic Chemistry Laboratory I	2/春 Y2/Spring
CHEM3308	物理化学实验II Physical Chemistry Laboratory II	必 Required	1.5	1.5	3	物理化学实验I Physical Chemistry Laboratory I	3/春 Y3/Spring
CHEM3309	综合化学实验 Comprehensive Chemistry Laboratory	必 Required	1	1	2	大学化学 General Chemistry	3/春 Y3/Spring
CHEM1999	认知实践 Summer Internship I	必 Required	4	4	8周/ Weeks	无 None	1/夏 Y1/Summer
CHEM2999	专业实践 Summer Internship II	必 Required	4	4	8周/ Weeks	无 None	2/夏 Y2/Summer
CHEM3999	创新实践 Summer Internship III	必 Required	4	4	8周/ Weeks	无 None	3/夏 Y3/Summer
CHEM4999	创新实践与毕业设计 Summer Internship and Dissertation	必 Required	8	8	32周/ Weeks	无 None	4/秋-4/春 Y4/Fall-Y4/Spring
CHEM2601	化学前沿探索I Exploration of Frontiers in Chemistry I	选 Elective	2	2	4	大学化学 General Chemistry	2/秋-2/春 Y2/Fall-Y2/Spring
CHEM3601	化学前沿探索II Exploration of Frontiers in Chemistry II	选 Elective	3	3	6	大学化学 General Chemistry	3/秋-3/春 Y3/Fall-Y3/Spring
小计/Subtotal			41	39			