资源与环境学院

本科学分制人才培养方案

Undergraduate Program for College of Resources and Environment

(2022 级)

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资源与环境学院简介

资源与环境学院现有环境科学、环境工程、水文与水资源工程、资源循环科学与工程 4 个本科专业，其中环境科学和环境工程专业入选湖北省普通高等学校战略性新兴（支柱）产业人才培养计划，环境工程专业入选湖北省一流专业建设点。环境工程专业 2020 年申请了国际通行的工程教育专业认证，为国家民委院校首个获受理专业。在研究生教育方面，学院现有环境科学与工程学术型硕士点、环境化学学术型硕士点和资源与环境领域工程专业型硕士点，环境工程学科为湖北省楚天学者设岗学科。

学院拥有一支结构合理、奋发有为的师资队伍，现有教职员工 51 人。现有教授 9 人（其中二级教授 2 人，三级教授 2 人），副教授 11 人，包括教育部新世纪优秀人才 3 人、国家民委突出贡献专家 1 人及湖北省有突出贡献中青年专家 2 人。我院现有在校本科生 691 人，研究生 108 人。

学院现有 7000 平米的综合实验楼，建有环境监测实验室、环境工程综合实验室、水力学实验室、资源加工实验室、虚拟仿真实验室等专业教学实验室 18 个，另有 400 平米分析测试中心 1 个，校内气象站 1 个。学院现有湖北省中小企业共性技术工业废水处理及回用研发推广中心、湖北省重金属污染防治工程技术研究中心，“碳族废物资源化利用重点实验室”于 2016 年获批为全国循环经济工程实验室。学院已与美国加州大学、英国布里斯托尔大学、加拿大康考迪亚大学等高校建立了交流与合作，推进人才培养和科学研究。与广西中信大锰集团、长江三峡集团、湖北兴发集团、武汉水务集团等企业及众多环保部门建立了实践教学和产学研基地。学院坚持以人才培养为中心，并注重教学与科研相融合。学院现有 6 个科研团队——分别是重金属污染控制与含碳废物的能源化利用团队、环境材料和环境控制化学团队、碳基材料与环境修复团队、生态毒理与 VOCs 污染控制团队、矿产资源综合利用团队、水污染与防治团队。优质的学术环境、前沿的科研平台，无不彰显着学院高亢的学术热情和务实的科研精神。近年来，学院共承担科研项目 80 余项，包括国家科技支撑计划项目、科技部 863 计划、国家自然科学基金等国家级项目 30 余项，到账经费 5000 余万元。近年，学院教师主持获得湖北省科技进步三等奖 4 项，环境保护科学技术二等奖 1 项，湖北省自然科学二等奖、三等奖各 1 项。

学院积极融入“一带一路”、粤港澳大湾区建设等国家发展战略，积极拓展国际国内合作交流，承办了多个相关的国际学术会议，创建有品牌学术交流栏目——南湖环境讲坛，每年邀请国内外知名专家学者来学院学术讲座 10 余人次。自建院以来，学院先后举办了多次大型国内国际学术交流会议，2016 年，学院承办了第十六届世界催化大会卫星会议（环境催化国际研讨会）及第十一届海峡两岸催化学术会议，2017 年与清华大学环境学院共同承办持久性有机污染物论坛 2017 暨第十二届持久性有机污染物学术研讨会（POPs2017），2018 年承办环境与能源科技国际研讨会，2020 年承办中国环境科学学会 2020 科学技术年会“乡

村环境治理”分会。学院资源与环境相关学科在国内已具有一定的影响力，特别是工业废水处理和环境催化领域相关研究已达到国内先进水平。

学院围绕“立德树人”的根本任务，优化“三全育人”工作机制，以“崇德、尚学、自然、和谐”为院训，积极推行导师制，“德智体美劳”五育并举，全方位培养学生。第一课堂学生学习氛围浓厚，学院所有科研团队实验室向本科生开放，鼓励学生利用课余时间开展科研创新；学院创新开展“绿色空间”科技文化节和“世界环境日”等品牌特色学生活动，进一步丰富第二课堂教育平台，提升了学生的综合素质。

学生专业知识扎实，创新能力强，综合素质高。近年来学生曾在大学生“挑战杯”多次获得省级一、二等奖，在全国大学生节能减排社会实践与科技竞赛等多项国家级赛事中载誉而归，数位本科生以第一作者发表 SCI 一区等高水平科研论文，在“垃圾投进趣·全国青年公益实践大赛”获得总冠军，每年均有学生获得国家、省级和校级大学生创新创业训练计划项目立项、结题，先后注册成立了多家创业公司，也涌现出了杨晨等湖北省向上向善好青年和全国“中国电信”奖学金获得者蓝际荣等众多优秀学生。

毕业生升学就业率高。2019 届毕业生考研升学率超过 31%，不少学生考入浙江大学、武汉大学、中山大学、华中科技大学等国内名校以及英国曼彻斯特大学、韩国首尔大学等国外名校深造。毕业生就业率稳定在 95%左右，就业主要分布在环境类上市公司、设计和科研院所等企业，也有环保局、水文局、国土资源局等公务员、事业单位部门，学生培养质量受到用人单位好评，获得良好的社会声誉。

College of Resources and Environmental Science

The College offers four undergraduate programs (Environmental Science, Environmental Engineering, Hydrology, and Water Resources Engineering, and Resource and Environmental Science). Major Environmental Engineering was accredited of China Engineering Education Accreditation in 2021. And, both major Environmental Science and Environmental Engineering were selected as a strategic new-type (pillar) industrial talent training program for ordinary colleges and universities in Hubei Province. The College provides a doctoral program in Environmental Chemistry, a academic master's program in Environmental Science and Engineering, and a professional master's program in Resources and Environmental Engineering.

Among the full-time teachers of the college, there are 3 outstanding talents in the new century of the Ministry of Education, 1 expert with outstanding contributions from the National Ethnic Affairs Commission, 2 young and middle-aged experts with outstanding contributions from Hubei Province, and 1 teaching team from Hubei Province. The college attaches great importance to teaching and scientific researches. The College has 7,000 square meters of comprehensive laboratory building, including 18 professional teaching laboratories, among which there are Environmental Monitoring Laboratories, Hydraulics Laboratories, Environmental Engineering Laboratories, Virtual Simulation Laboratories, and an additional 400 square meters of Analysis and Testing Center, 1 Weather Station in school. The college has Hubei Province Heavy Metal Pollution Prevention and Control Engineering Technology Research Center, National Ethnic Affairs Commission Key Laboratory of Resource Transformation and Pollution Control and other research institutions. Among them, the "Key Laboratory of Carbon Waste Resource Utilization" has been approved as a national circular economy engineering laboratory.

In recent years, the college has undertaken more than 80 scientific research projects, including more than 30 national projects such as the National Science and Technology Support Program, the National Natural Science Foundation of China, and key projects, the total funds received are more than 50 million yuan. Teachers of the college have won 1 special prize for Scientific and Technological Progress of Hubei Province, 1 second prize of Science and Technology Award of the Ministry of Environmental Protection, 1 second prize and 1 third prize of Hubei Province Natural Science Award, and 5 third prizes of Hubei Province Science and Technology Progress Award. The college actively integrates into national development strategies such as the “Belt and Road Initiative” and the construction of the Guangdong-Hong Kong-Macao Greater Bay Area, actively expands international and domestic cooperation and exchanges, and has hosted a number of relevant international academic conferences. It has established exchanges and cooperation with universities such as the University of California, the University of Bristol in the United Kingdom, and Concordia University in Canada, and has created a brand academic exchange column - Nanhu Environmental Forum.

The college implements the fundamental task of "cultivating people with morality", optimizes the working mechanism of "three comprehensive education", takes "cultivating morality, honoring learning, nature, and harmony" as the school motto, and fully implements the

undergraduate tutor system, "moral, intellectual, physical, and beautiful". Emphasis on labor and five education, all-round training of students, there have emerged outstanding students such as the National College Student Annual Character Nomination Award, the National Self-Reliance and Self-improvement Model, the winner of the "China Telecom" scholarship, and the "upward and good" good young people in Hubei Province. The college has trained nearly 2,000 graduates, and most of them have grown into leaders and backbone talents in the fields of resource development and environmental protection in China.

专业简介

环境科学专业

环境科学是一门研究人类社会发展活动与环境演化规律之间相互作用关系，寻求人类社会与环境协同演化、持续发展途径与方法的学科。

本专业开设环境化学、现代环境分析、环境监测、环境影响评价、环境生态学、环境毒理学、环境微生物学、环境工程学、环境规划与管理等专业课程，注重污染物监测和分析方面的基本训练，培养学生掌握环境监测和环境影响评价的技能。本专业是一门综合研究“人类—环境”系统基本运动规律及其调控的学科，培养掌握环境自然科学、环境技术科学和环境人文社会科学等方面基础知识，具备环境科学的基本理论和基本技能的高级专业人才。学生毕业后，能在政府、企业与事业单位从事环境管理、环境科学研究、环保产品开发、环境监测和环境影响评价、自然资源与自然生态保护和管理规划工作。本科，学制四年，招理科生，毕业时若符合学位授予条件，即授予理学学士学位。

Environmental science is a discipline, seeking the interaction of the development of human society and environmental evolution, and exploring co-evolution of human society and environment as well as new ways and methods of sustainable development.

The major offers Environmental Chemistry, Modern Environmental Analysis, Environmental Monitoring, Environmental Impact and Assessment, Environmental Ecology, Environmental Toxicology, Environmental Microbiology, Environmental Engineering, Environmental Planning and Management and other professional courses, focusing on the basic training of pollutant monitoring and analysis, to develop students’ skills in environmental monitoring and environmental impact assessment. This major is a comprehensive discipline involving the basic movement laws and regulations of the "human-environment" system, which aims to culture senior talents with the basic theories and skills of environmental science, mastering the basic knowledge of environmental natural science, environmental technology science and environmental humanity and social sciences. After graduation, students can be engaged in the work of environmental management, environmental scientific research, environmental protection product development, environmental monitoring and environmental impact assessment, natural resources and ecological protection and management planning in government, enterprises and institutions. Undergraduate, four years of schooling, enrolling science students, awarded a Bachelor of Science degree when meeting the qualifications of the degree at the time of graduation.

环境工程专业

本专业以工程教育认证的标准制定了完善的培养目标、培养方案、毕业要求和课程质量管理体系，以学生为中心，以产出为导向，坚持可持续改进的理念，培养学生解决复杂环境工程问题的能力。为毕业生走向世界提供国际统一的“通行证”。

本专业开设环境工程微生物学、环境监测、环境工程原理、水污染控制工程、大气污染控制工程、物理性污染控制工程、固体废弃物的处理与处置、环境规划与管理、环境影响评价等专业基础理论课程。本专业培养符合国家、区域及少数民族经济和社会发展需要，具备良好的思想品德、人文素养、职业道德和敬业精神，系统掌握环境工程专业基础知识和污染控制工程、资源利用及环境修复等方面的理论与实践技能，具备创新意识和持续学习能力，不断适应行业科学与技术进步，能够从事环境污染控制工程的设计及运营、环境管理、环境监测和水土环境保护及修复技术研发等环境保护事业的高级专门人才，成长为扎根地方尤其是民族地区从事环境保护的骨干人才。本科，学制四年，按环境科学与工程大类招生，招收理科生，毕业时若符合学位授予条件，即授予工学学士学位。

The major of Environmental Engineering has formulated a complete training goal, training plan, graduation requirements, and course quality management system based on the standards of China Engineering Education Accreditation. It is student-centered, output-oriented, adheres to the concept of sustainable improvement, and trains ability of students to solve complex environmental engineering problems and provide graduates with an internationally unified "passport" to the world.

This major offers professional theoretical courses such as environmental engineering microbiology, environmental monitoring, environmental engineering principles, water pollution control engineering, air pollution control engineering, physical pollution control engineering, solid waste treatment and disposal, environmental planning and management, and environmental impact assessment. The Environmental Engineering program meets the needs of national, regional, and ethnic minorities' economic and social development, it aim to equip students with good ideological morality, humanistic quality, professional ethics and professionalism, and systematically masters the basic knowledge of environmental engineering and pollution control engineering, resource utilization, and environmental restoration. And to train students with theoretical and practical skills, innovative consciousness and continuous learning ability, constantly adapt to the scientific and technological progress of the industry, and be able to engage in environmental protection undertakings such as the design and operation of environmental pollution control projects, environmental management, environmental monitoring, water and soil

environmental protection and restoration technology research and development. The trained students with the above professional talents will grown into the backbone talents who have taken root in local areas, especially in ethnic areas. This undergraduate program has a four years of schooling. Enrollment is based on the major categories of environmental science and engineering. Science students are recruited. If they meet the degree-granting conditions upon graduation, they will be awarded a bachelor's degree in engineering.

资源循环科学与工程专业

资源循环科学与工程专业是为解决国民经济发展面临的资源短缺和环境污染两大根本问题，于 2010 年经教育部批准设置的新兴交叉学科专业，2011 年被批准为国家首批战略性新兴产业急需特色本科专业。

本专业本着“宽口径、厚基础、重能力、求创新”的人才培养思路，通过组织多种教学活动，形成小班教学、“导师”引领和实践创新三者有机融合的特色人才培养模式。现开设资源加工过程与装备、化工原理、冶金原理、分离工程、固体废物处置与资源化、清洁生产与循环经济、环境工程学、工程测量学、画法几何&工程制图、程序设计语言（Python）等专业基础理论课程。本专业培养符合国家和区域低碳循环经济产业发展战略需求的，具有“资源-产品-再生资源-产品”的资源开发和循环可持续利用理念，具备一次资源加工、二次资源综合利用、清洁生产与循环经济、资源规划与管理等专业基础知识理论，系统掌握从“资源开发-高效利用-循环再生”各环节实现“环境源头保护”的科学方法，同时兼具实践和创新能力的高级专业人才。本科，学制四年，按环境科学与工程大类招生，招收理科生，毕业时若符合学位授予条件，即授予工学学士学位。

The major of Resources Circulation Science and Engineering is an emerging interdisciplinary major, which was set up by the Ministry of Education in 2010 to solve the two fundamental problems of resource shortage and environmental pollution faced by national economic development. In 2011, this major was further approved as the first batch of specialties urgently needed major for the national strategic emerging industries.

The idea of talent cultivation in this major is "broad-caliber, thick foundation, emphasis on ability, and pursuit of innovation". Through a variety of teaching activities, the major has formed a unique talent cultivation model with the organic integration of small class teaching, "mentor" leadership and practical innovation. Professional basic theory courses such as Resource Processing and Equipment, Chemical Engineering, Metallurgical Engineering, Separation Engineering, Disposal and Reuse of Solid Waste, Recycling Economy and Clean Production, Environmental

Engineering, Engineering Surveying, Descriptive Geometry & Engineering Drawing, Resource Microbiology, Biochemistry, and Chemical Reaction Engineering are offered by this major. This major is designed to cultivate professional senior talents who meet the strategic needs of national and regional low-carbon circular economy industry development, fulfil the concept of the multi-directional resource development, cycling and sustainable utilization of "resources-products-renewable resources-products", master the professional knowledge system of development of natural primary resources, comprehensive utilization of secondary resources, cleaner production and circular economy, and resource recycling planning and management, acquire the ability to solve the science and engineering problems of comprehensive utilization of resources and environmental protection, can accomplish the work in the field of resource recycling science and engineering, such as scientific research, engineering technology development, process design, industrial management and management planning, et al. Bachelor's degree, four years' duration, enrolled in environmental science and engineering category, admission students of science, the bachelor's degree of engineering will be awarded if the graduation requirements are met.

水文与水资源工程专业

水文与水资源工程是国民经济基础产业——水利中的重要专业领域之一，是水资源开发利用和管理中的一门重要的工程技术学科。

本专业开设自然地理学、气象学、水力学、水文学原理、水文统计、水文测验、水文预报、水文分析与计算、水利计算、水资源利用、水环境保护、地下水水文学、地理信息系统等课程。本专业培养适应国家经济社会发展需要，德、智、体、美、劳全面发展，具有良好的思想品德、人文素养、职业道德和敬业精神，具备扎实的基础知识，富有创新精神的水文与水资源工程专业高级专门人才。学生毕业后，能够在水利（水务）、国土、能源、交通、城建、农林、环保、地矿等部门从事水文、水资源、水环境及水生态领域的勘测、评价、规划、设计、预测预报、管理和科学研究等方面的工作。本科，学制四年，招理科生，毕业时若符合学位授予条件，即授予工学学士学位。

Hydrology and water resources engineering is one of the important professional fields in water conservancy, which is the basic industry of the national economy, and an important engineering technology discipline in the development, utilization and management of water resources.

This major offers courses in Physical Geography, Meteorology, Hydraulics, Principles of

Hydrology, Hydrological Statistics, Hydrometry, Hydrological Forecasting, Hydrological Analysis and Computation, Water Conservancy Computation, Water Resources Utilization, Protection of Water Environment, Groundwater Hydrology, Geographic Information System and so on. This major is designed to cultivate senior engineering professionals who meet the needs of economic and social development of the country, region or ethnic minority, have good moral education, humanistic quality, professional ethics and professionalism, solid basic knowledge and innovative spirit. After graduation, students can be engaged in surveying, evaluating, planning, designing, predicting and forecasting, managing and researching in the fields of hydrology, water resources, water environment and hydroecology in the departments of water conservancy (water affairs), land, energy, transportation, urban construction, agriculture and forestry, environmental protection, geology and mineral. This major is undergraduate, educational system for four years, recruiting science students. The student will be awarded a bachelor's degree in engineering after meeting meet the qualifications of the degree.

专业大类构成表

大类名称	专业名称	所属专业门类	大类培养时间
环境科学与工程	环境科学	理学-环境科学与工程类	第 1 学期至第 2 学期
	环境工程	工学-环境科学与工程类	
	资源循环科学与工程	工学-化工与制药类	
	水文与水资源工程	工学-水利类	

环境科学专业本科培养方案

Undergraduate Program for Environmental Science

一、培养目标

Ⅰ Educational Objectives

本专业培养德智体美劳全面发展，具有扎实的基础知识，系统掌握环境科学的基本理论与基本技能，熟悉污染物在环境介质中的迁移转化与控制治理，具备从事环境监测、环境影响评价、环境咨询与管理以及科学研究的能力，能在政府、企业与教学科研单位从事环境保护相关工作的创新型高级技术骨干和管理人才。

The students will develop in all-around way of moral, intellectual, physical, aesthetics and labour education, have a solid foundation of basic knowledge, master basic theories and knowledge relevant to environmental science, be familiar with the migration and transformation as well as control and management of pollutants in various ambient medium, and be skilled in monitoring, assessing, consulting and managing of environmental pollution as well as scientific research. They are qualified to take jobs related to environmental protection in governments, enterprises, colleges and scientific institutes, and grow up to be innovative senior talents in technology and management.

二、培养规格

Ⅱ Cultivation Standards

I）学制

Length of Schooling

修业年限：4 年

Duration:　4 years

II）学位

Degree

授予学位：理学学士学位

Degrees conferred:　Bachelor of Science

III）人才培养基本要求

Basic requirements for Cultivation

本专业学生主要学习环境科学的基本理论和基础知识，接受环境科学专业技能的基本训练，培养系统地识别、分析与解决环境问题的素质和能力。

1、具有宽厚的自然科学基础知识、良好的思想品德与人文素养；

2、掌握全面扎实的环境科学专业的基本理论与基础知识；

3、掌握环境科学专业的基本实验方法和操作技能，初步具备环境监测、环境影响评价以及环境咨询与管理的能力；

4、熟悉国家环境保护、资源利用、可持续发展等方面的相关政策、法律法规、标准和规范；

5、具备较强的获取知识和综合运用知识的能力，初步具备创新性开展科学研究的能力。

The students of this major will learn basic theories and knowledge of environmental science, and take part in basic professional skill training. They are qualified to be skilled in recognizing, analyzing and resolving environmental problems.

1. Possess generous knowledge of basic natural science, have a good quality of thought and morality as well as humanity.

2. Master basic theories and knowledge of environmental science comprehensively and solidly.

3. Master basic skills of experiments and operation in environmental science, have the primary ability in monitoring, assessing, consulting and managing of environmental pollution.

4. Be familiar with the policy, laws and regulations, standards and norms in relation to environmental protection, resource utilization, sustainable development, and etc.

5. Possess a strong ability in knowledge acquisition and comprehensive application, and have the primary innovation ability in scientific research.

三、毕业要求实现矩阵

Ⅲ Graduation requirement realization matrix

课程及毕业要求	毕业要求 1	毕业要求 2	毕业要求 3	毕业要求 4	毕业要求 5
军事理论	**H**				
军事技能训练	**H**				
国家安全教育	**H**				
劳动教育	**H**				
英语 1	**H**				
体育 1	**H**				
思想道德与法治	**H**				
形势与政策	**H**				
中华民族共同体概论	**H**				
英语 2	**H**				
体育 2	**H**				
中国近现代史纲要	**H**				
英语 3	**H**				
体育 3	**H**				

马克思主义基本原理	**H**				
毛泽东思想和中国特色社会主义理论体系概论	**H**				
英语 4	**H**				
体育 4	**H**				
体育素质	**H**				
就业指导	**M**				
无机化学（B）Z	**H**				
无机化学实验（C）			**H**		
分析化学（B）	**H**				
分析化学实验（B）			**H**		
高等数学 A(1)	**H**				
线性代数	**H**				
高等数学 A(2)	**H**				
大学物理 B(1)	**H**				
大学物理 B(1)实验			**H**		
工程测量学	**H**		**M**		
画法几何&工程制图		**H**	**H**		
概率论与数理统计	**H**				
大学物理 B(2)	**H**				
大学物理 B(2)实验			**H**		
有机化学(C)	**H**				
有机化学实验(B)			**H**		
物理化学（B）	**H**				
物理化学实验 Z			**H**		
环境学	**M**	**H**			
环境工程 CAD			**H**		**M**
环境微生物学	**M**	**H**			**M**
环境微生物学实验			**H**		**M**
现代环境分析	**M**	**H**			**H**
现代环境分析实验			**H**		**H**
环境化学		**H**			**M**
环境化学实验			**H**		**M**
环境监测（A）		**H**		**M**	
环境监测实验（A）			**H**		**H**
环境土壤学		**H**			**M**
环境土壤学实验			**H**		**M**
环境工程学（A）		**H**		**M**	
环境工程学实验			**H**		
环境生态学（A）	**M**	**H**			**M**
环境影响评价		**H**	**H**	**H**	
环境规划与管理	**M**	**H**		**H**	

环境科学综合实验			**H**		**H**
环境数据分析方法			**H**		**H**
物理性污染控制工程		**H**	**M**		
固体废物处理与处置		**H**	**M**		
环境毒理学		**H**	**M**		
环境样品前处理技术		**M**	**H**		**M**
清洁生产与循环经济		**H**		**H**	
环境科学专业英语	**M**	**H**			**M**
环境纳米材料	**M**	**M**			**M**
地理信息系统 B	**M**	**H**	**M**		
水环境保护		**H**			
污染控制微生物工程			**M**		
环境信息系统		**H**			
环境经济学	**M**	**H**		**M**	
环境法学	**M**			**H**	
区域生态环境质量评价与生态功能区划			**H**		**M**
环境监测设备及应用			**M**		
水土保持		**H**			
文献检索及科技论文写作		**H**			**M**
高级氧化技术		**H**			**M**
生态水文学		**M**			
膜处理技术			**M**		
给水处理			**L**		
给排水与环境工程施工			**M**		
环境影响评价课程设计			**H**		**H**
工程训练		**M**			**M**
工程测量学实习		**H**			**M**
环境监测实习			**H**		**H**
认识实习	**M**	**H**			
生产（或毕业）实习			**H**	**M**	**H**
毕业设计（论文）			**M**		**H**
创新实践					**M**
创业实践					**M**

四、核心课程

Ⅳ Core Courses

环境学 Environmental Science、环境化学 Environmental Chemistry、现代环境分析 Modern Environmental Analysis、环境监测 Environmental Monitoring、环境影响评价 Environmental Impact and Assessment、环境生态学 Environmental Ecology、环境微生物学 Environmental Microbiology、环境土壤学 Environmental Soil Science、环境工程学 Environmental Engineering

环境规划与管理 Environmental Plans and Management

五、主要实践性教学环节

Ⅴ Main Internship and Practical Training

认识实习 Knowledge Acquirement、环境监测实习 Environmental Monitoring Practice、环境影响评价课程设计 Environmental Impact and Assessment: Course Design、生产（或毕业）实习 Factory （or Graduation） Practice、毕业设计（论文）Graduation Project (Thesis)

现代环境分析实验 Experiments of Modern Environmental Analysis、环境化学实验 Experiments of Environmental Chemistry、环境微生物学实验 Experiments of Environmental Microbiology、环境监测实验 Experiments of Environmental Monitoring、环境土壤学实验 Experiments of Environmental Soil Science、环境工程学实验 Experiments of Environmental Engineering、环境科学综合实验 Comprehensive Experiments

六、学时与学分

Ⅵ Hours/Credits

学时学分构成表

Table of Hours and Credits

<table>
<tr><th colspan="2" rowspan="2">课程类别
Courses Classified</th><th rowspan="2">学时/周数
Period/Weeks</th><th colspan="2">学分
Credits</th><th rowspan="2">学分比例
Proportion of Credits</th></tr>
<tr><th>理论
Theory</th><th>实践
Practice</th></tr>
<tr><td rowspan="2">通识课程平台
General Courses Platform</td><td>通必
General Compulsory</td><td>698</td><td>27</td><td>10.5</td><td>22.1%</td></tr>
<tr><td>通选
General Elective</td><td>192</td><td>12</td><td></td><td>7.1%</td></tr>
<tr><td rowspan="2">学科基础课程平台
Basic Courses Platform</td><td>必修
Compulsory</td><td>912</td><td>38</td><td>7</td><td>26.5%</td></tr>
<tr><td>选修
Elective</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">专业课程平台
Major Courses Platform</td><td>必修
Compulsory</td><td>624</td><td>21</td><td>9</td><td>17.6%</td></tr>
<tr><td>选修
Elective</td><td>376</td><td>20.5</td><td>1.5</td><td>12.9%</td></tr>
<tr><td rowspan="2">实践教学平台
Practical Teaching Platform</td><td>必修
Compulsory</td><td>18.5W</td><td></td><td>18.5</td><td rowspan="2">10.9%</td></tr>
<tr><td>选修
Elective</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">创新创业平台
InnovationandEntrepreneurshipPlatform</td><td colspan="2">创新学分 Innovation Credits</td><td colspan="2">3</td><td rowspan="2">2.9%</td></tr>
<tr><td colspan="2">创业学分 Entrepreneurship Credits</td><td colspan="2">2</td></tr>
<tr><td rowspan="2">小计
Amount</td><td>必修学分总数
Compulsory Credits</td><td>136</td><td>选修学分总数
Elective Credits</td><td>34</td><td>选修学分比例
Proportion ofElectiveCredits</td><td>20%</td></tr>
<tr><td>理论学分总数
Theory Credits</td><td>118.5</td><td>实践学分总数
Practice Credits</td><td>46.5</td><td>实践教学环节比例
Proportion of Internship andPractical Training</td><td>25%</td></tr>
<tr><td colspan="3">最低毕业学分
The Lowest Graduate Credits</td><td colspan="3">170</td></tr>
</table>

学期学分分配表

Credits for Each Term

各学期学分分配 Creditsfor Each Term 课程类别 Courses Classified		学期 Term							
		一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
通识课程平台 General Courses Platform	通必 General Compulsory	9	10	6	6	5	1	0.5	
	通选（建议） General Elective（suggestive）		2	2	2	2	2	2	
学科基础课程平台 Basic Courses Platform	必修 Compulsory	12.5	12.5	15.5	4.5				
	选修 Elective								
专业课程平台 Major Courses Platform	必修 Compulsory				7.5	16.5	6		
	选修 Elective				4		15	3	
实践教学平台 Practical Teaching Platform	必修 Compulsory		0.5		1	2	2	3	10
	选修 Elective								
小计 Amount		21.5	25	23.5	25	25.5	26	8.5	10
创新创业平台 InnovationandEntrepreneurshipPlatform	创新学分 Innovation Credits	3							
	创业学分 Entrepreneurship Credits	2							
最低毕业学分 The Lowest Graduate Credits		170							

注① 学分比例：各教学平台或教学环节占最低毕业学分的比例。

②实践教学环节，包括集中性实践教学环节和实验教学（不含体育）。集中性实践教学环节，包括培养方案内集中实施的实践、实习、课程设计、毕业设计、毕业论文、社会调查等；实验教学，包括课内实验和独立开设实验。

③学期学分分配表中，选修课须规定每学期最少修读的学分。

④必修学分总数=通必学分+基必学分+专必学分+实践（必修）学分+创新创业学分；

选修学分总数=通选学分+基选学分+专选学分+实践（选修）学分；

理论学分总数=所有平台理论学分之和；

实践学分总数=所有平台实践学分之和（不包括创新创业学分）；

最低毕业学分=必修学分+选修学分=理论学分+实践学分+创新创业学分。

七、教学进程计划表 /Ⅶ Teaching Schedule Form

表一：通识课程平台 / Form Ⅰ: General Course Platform

表一（A）：通识必修课程（通必课）/Form I (A):General Compulsory Courses(General Required)

课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
				理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
109100000418	军事理论 Military Theory	2	36	36				1	1-18
109110000318	军事技能训练 Military Skill Training	2	36			36		1	1-2
109100000818	国家安全教育 National Security Education	1	16	16				1	/
112110010718	劳动教育 Labor Education	0/1	32			32		1	1-16
20W100000613	英语 1 English 1	2	32	32				1	4-11
218110000313	体育 1 Physical Education 1	0/1	26			26		1	4-15
217100014918	思想道德与法治 Moral Education and Rule of Law	2.5/0.5	52	40		12		2	4-17/1-14
217100015218	形势与政策 Situation and Policy	2	32	16		16		2	1-16
225100000118	中华民族共同体概论 Education of Chinese Minzu Community Consciousness	1.5/ 0.5	36	24		12		2	1-8
20W100000713	英语 2 English 2	2	32	32				2	1-8/ 9-16
218110000213	体育 2 Physical Education 2	0/1	32			32		2	1-16
2171000122	中国近现代史纲要 Essentials of China Modern and Contemporary History	2.5/ 0.5	52	40		12		3	1-14
20W100000813	英语 3 English 3	2	32	32				3	1-8/ 9-16
218110000413	体育 3 Physical Education 3	0/1	32			32		3	1-16
217100012318	马克思主义基本原理 Basis Principles of Maxism	2.5/0.5	52	40		12		4	1-14
2171000121	毛泽东思想和中国特色社会主义理论体系概论 Introduction to MAO Zedong Thought and Socialist Theoretical System with Chinese Characteristics	4/1	88	64		24		5	1-16
20W100000913	英语 4 English 4	2	32	32				4	1-8/ 9-16

218110000113	体育 4 Physical Education 4	0/1	32			32		4	1-16
218110012718	体育素质	0/0.5	0			0		7	1-16
115100000113	就业指导 Employment Guidance	1	16	16				6	1-8/ 9-16
学分要求：学分: 37.5 Demand of Credits: Credits: 37.5									

注：大学英语扩展课程包括①20W100000813 英语 3②20W100000913 英语 4③20W100001018 学术英语阅读与写作④20W100001318 高级媒体英语视听说⑤20W100001518 英语国家社会与文化⑥20W100001818 中国民族传统文化（英文），要求在第 3,4 学期完成 4 学分即可。

表一（B）：通识选修课程（通选课）/Form I (B): General Elective Courses

模块 **Module**	**学分** **Crs.**
心理健康与安全 Psychological Health and Safety	2
人文素养与写作 Humanistic Accomplishment and Writing	2
艺术体验与审美 Art Appreciation and Aesthetics	2
科学技术与科普 Science and Technology & Science Popularization	2
当代中国与世界 Contemporary China and the World	2
中华文化与文明 Chinese Culture and Civilization	1
运动锻炼与健康 Exercise and Health	1

表二：学科基础课程平台

Form II. Basic Course Platform

课程类别 Course Classified	课程编号 Courses Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
学科基础必修 Basic CoursesRequired	213100035618	无机化学（B）Z Inorganic Chemistry (B) Z	3	48	48				1	
	213110035818	无机化学实验（C） Inorganic Chemistry Experiments (C)	0.5	16		16			1	
	213103005213	分析化学（B） Analytical Chemistry (B)	2	32	32				1	
	213110036418	分析化学实验（B） Analytical Chemistry Experiments (B)	1	32		32			1	
	2101000113	高等数学 A(1) Higher Mathematics A (1)	4	80	64			16	1	
	2101000118	线性代数 Linear Algebra	2	48	32			16	1	
	210102000413	高等数学 A(2) Higher Mathematics A (2)	5	96	80			16	2	
	211100011118	大学物理 B(1) College Physics B (1)	3	56	48			8	2	
	211112000113	大学物理 B(1)实验 University Physics B(1) Experiments	0.5	16		16			2	
	2241000067	工程测量学 Engineering Surveying	2	32	32				2	
	224100000913	画法几何&工程制图 Descriptive Geometry & Engineering Drawing	2	32	32				2	
	2101000112	概率论与数理统计 Probability Theory and Mathematical Statistics	2.5	56	40			16	3	
	211100011218	大学物理 B(2) College Physics B (2)	2	40	32			8	3	

课程类别 Course Classified	课程编号 Courses Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
学科基础必修 Basic CoursesRequired	211112000213	大学物理 B(2)实验 University Physics B(2) Experiments	0.5	16		16			3	
	213100035218	有机化学（C） Organic Chemistry (C)	3	48	48				3	
	213110036118	有机化学实验（B） Organic Chemistry Experiments (B)	1	32		32			3	
	213100034518	物理化学（B） Physical chemistry (B)	3.5	56	56				3	
	213110034618	物理化学实验 Physical Chemistry Experiments	1	32		32			3	
	224100017818	环境学 Environmental Science	2	32	32				3	
	224110022018	环境工程 CAD Environmental Engineering CAD	0/2	64		64			4	
	214103026713	环境微生物学 Environmental Microbiology	2	32	32				4	
	214113026613	环境微生物学实验 Experiments of Environmental Microbiology	0.5	16	0	16			4	
学分要求：学分: 45 其中必修 45 学分，选修 0 学分 Demand of Credits: Credits:45 Required: 45 Elective: 0										

表三：专业课程平台

Form III: Major Courses Platform

课程类别 Course Classified	课程编号 CourseCode	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业必修 Required Courses	2241000073	现代环境分析 Modern Environmental Analysis	2	32	32				4	
	2241100074	现代环境分析实验 Experiments of Modern Environmental Analysis	1	32	0	32			4	
	224100017918	环境化学 Environmental Chemistry	3	48	48				4	
	213113018813	环境化学实验 Experiments of Environmental Chemistry	1.5	48		48			4	
	213103022413	环境监测（A） Environmental Monitoring (A)	3	48	48				5	
	213113023713	环境监测实验（A） Experiments of Environmental Monitoring (A)	1.5	48		48			5	
	213103016013	环境土壤学 Environmental Soil Science	2	32	32				5	
	213113031313	环境土壤学实验 Experiments of Environmental Soil Science	1	32		32			5	
	224100018018	环境工程学（A） Environmental Engineering (A)	4	64	64				5	
	224110022518	环境工程学实验 Experiments of Environmental Engineering	2	64		64			5	
	224100018118	环境生态学（A） Environmental Ecology (A)	3	48	48				5	
	224100003213	环境影响评价 Environmental Impact and Assessment	2	32	32				6	
	213103029713	环境规划与管理 Environmental Plans and Management	2	32	32				6	
	224110004113	环境科学综合实验 Comprehensive Experiments	2	64		64			6	
专业选修 Elective courses	224100022818	环境数据分析方法 Methods of Environmental Data Analysis	1.5/0.5	40	24	16			4	专业选修总学分 22 分。第四学期至少选修 4 学分；第六学期至少选修 15 学分；第七学期至少选修 3 学分。
	2241000124	物理性污染控制工程 Physical Pollution Control	2	32	32				4	
	224100014918	固体废物处置与资源化 Disposal and Reuse of Solid Waste	2	32	32				6	
	213103022013	环境毒理学 Environmental Toxicology	2	32	32				6	
	213103020913	环境样品前处理技术 Pre-treating Methods for Environmental Samples	1.5	24	24				6	
	224101006013	清洁生产与循环经济 Cleaner Production and Circular Economy	1.5	24	24				6	

课程类别 Course Classified	课程编号 CourseCode	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业选修 Elective courses	213103022613	环境科学专业英语 Specialized English	1.5	24	24				6	
	224100022618	环境纳米材料 Environmental nanomaterials	2	32	32				6	
	213103030113	地理信息系统 B Geographic Information System B	2/0.5	48	32	16			6	
	213103017313	水环境保护 Protection of Water Environment	2	32	32				6	
	213103018913	污染控制微生物工程 Pollution Control Microbiology Engineering	1.5	24	24				6	
	213103019313	环境信息系统 Environmental Information Systems	1.5	24	24				6	
	213103021713	环境经济学 Environmental Economy	1.5	24	24				6	
	224100022418	环境法学 Environmental Laws	2	32	32				6	
	224100001413	区域生态环境质量评价与生态功能区划 Regional Ecological Environmental Quality Assessment and Ecological Function Regionalization	1.5	24	24				7	
	224100019618	环境监测设备及应用 Environmental Monitoring Instruments and Application	1.5	24	24				7	
	213103014813	水土保持 Water and Soil Conservation	1.5	24	24				7	
	2241000078	文献检索及科技论文写作 Document Retrieval and Scientific Paper Writing	1/0.5	32	16	16			7	
	213103023613	高级氧化技术 Advanced Oxidizing Technology	1.5	24	24				7	
	213103021413	生态水文学 Ecological Hydrology	1.5	24	24				7	
	213103024313	膜处理技术 Membrane Treatment Technology	1.5	24	24				7	
	213103021013	给水处理 Treatment of Water Supply	1.5	24	24				7	
	213103020613	给排水与环境工程施工 Water/Wastewater & Environmental Construction	1.5	24	24				7	
学分要求：学分: 52 其中必修 30 学分，选修 22 学分 Demand of Credits: Credits: 52 Required: 30 Elective: 22										

表四：实践教学平台

Form IV: Practical Teaching Platform

课程类别 CourseClassified		课程编号 CourseCode	实践教学名称 Course Names	学分 Crs.	周数 Total Period	学时类型 PeriodClassified		开课学期 Semester	地点 Place
						实验 Exp.	实习 Pra.		
教学实践 TeachingPractice	社会实践 Social Practice								
	课程设计 Project Design	224110001113	环境影响评价课程设计 Environmental Impact and Assessment: Course Design	2	2			6	
	小计 Amount			2					
教学实习 Teaching Exercitation	教学实习 Teaching Exercitation	701110000118	工程训练 A Engineering Practice	1	1			5	
		2241100080	工程测量学实习 Engineering Surveying Practice	0.5	0.5			2	
		224110018818	环境监测实习 Environmental Monitoring Practice	1	1			5	
		224110006213	认识实习 Knowledge Acquirement	1	1			5	
	毕业实习 Graduation Practice	224110000313	生产（或毕业）实习 Production (or Graduation) Practice	3	3			7	
	毕业论文（设计） Graduation Thesis (Project)	224110000113	毕业设计（论文） Graduation Project（Thesis）	10	10			8	
	小计 Amount			16.5					
总计 Amount			学分 Credits 18.5　学时 Period 18.5 周 Weeks						

表五：创新创业平台

Form V: Innovation &Entrepreneurship Platform

课程类别 **Course Classified**	**学分** **Crs.**
创新学分 Innovation Credits	3
创业学分 Entrepreneurship Credits	2
总计 Amount	5

环境工程专业本科培养方案

Undergraduate Program for Environmental Engineering

一、培养目标

Ⅰ**Educational Objectives**

本专业培养符合国家、区域经济和社会发展需要，具备良好的思想品德、人文素养、职业道德和敬业精神，系统掌握环境工程专业基础知识和污染控制工程、资源利用及环境修复等方面的理论与实践技能，具备创新意识和持续学习能力，不断适应行业科学与技术进步，能够**从事环境污染控制工程的设计及运营、环境管理、环境监测和水土环境保护及修复技术研发等**环境保护事业的高级专门人才，**成长为扎根地方尤其是民族地区从事环境保护的骨干人才。**

具体培养目标可以归纳为以下四方面内容：

目标 1（知识能力）：能够掌握环境工程专业相关技术在民族资源与环境保护中的应用与发展现状，融会贯通工程数理基础知识和环境工程专业知识，针对复杂环境工程项目提供整体解决方案。

目标 2（实践能力）：具备系统思维和可持续发展理念，能将知识有效运用到环境污染控制工程的设计及运营、环境管理、环境监测和民族地区水土环境保护及修复技术研发的实践中，并具备一定的创新能力。

目标 3（职业素养）：身心健康，具有社会责任感和职业道德修养，拥有团队精神、有效的沟通、表达能力和工程项目管理能力。

目标 4（发展潜能）：具备较强的获取知识和综合运用知识的能力，能及时了解环境工程专业最新理论、技术及国际前沿动态，有效地持续自主学习以适应社会和行业的多样性发展。

This specialty aims to train the talents with complex engineering skills who are in accordance with national, regional or ethnic minority economic and social development needs, who have the good ideology and morality, humanistic quality, professional ethics and professional dedication, who master the basic knowledge and practical skills of environmental engineering systematically, who have the ability to innovate and continue learning, who adapt to the industry science and technology progress constantly, who can bear the environmental engineering projects and environmental protection management and who can solve the problem of complex environmental projects. Graduates can be engaged in the work of environmental management, design, research

and development for environmental pollution prevention and control projects in government departments, environmental protection companies, industrial and mining enterprises, scientific research institutes and other units. Meanwhile, the graduates can grow into the backbone talents rooted in local, especially in ethnic areas for environmental protection and achieve the following goals:

Goal 1 (knowledge capability): Able to grasp the development status of technologies in environmental engineering, master the basic knowledge of engineering, mathematics and professional knowledge of environmental engineering and provide integrated solutions for complex environmental engineering projects.

Goal 2 (practical ability): Have the systematic thinking and idea of sustainable development, can effectively apply knowledge to the practice of design, construction and operation management, environmental planning and management as well as the environmental monitoring and assessment and have the innovation ability.

Goal 3 (professional quality): Have correct environmental ethics, noble sense of social responsibility and professional ethics, able to communicate effectively with team members, industry peers and publics under the context of globalization and able to coordinate the teams and manage engineering projects.

Goal 4 (potential for development): Have the consciousness of lifelong learning and ability to criticize and reflect, able to keep abreast of the latest theories, technologies and international cutting-edge developments in environmental engineering and can study independently, effectively and continuously to adapt to the diverse development of society and industry.

二、培养规格

Ⅱ Cultivation Standards

I）学制

Length of Schooling

修业年限：4 年

Duration:　4 years

II）学位

Degree

授予学位：工学学士学位

Degrees conferred:　Bachelor of Engineering

III）人才培养基本要求

Basic requirements for Cultivation

根据我校环境工程专业培养目标的要求，通过人文社会科学课程、工程基础课、专业基础课、专业课的课堂教学、讲座、社会活动、文化活动、各种竞赛、实践、辅导、座谈等教学环节，使环境工程专业毕业生能力达到如下基本要求：

1.工程知识：能够利用数学、物理、化学等自然科学和工程科学的基本原理及环境工程专业知识来解决环境污染治理工程的设计、运行和管理等复杂环境工程问题。

1.1 能将数学、工程数学的基本知识运用到工程问题的恰当表述之中。

1.2 理解物理、化学等自然科学知识的原理及在识别环境污染问题基本应用。

1.3 能够将工程制图、工程力学、流体力学、环境工程微生物、化工原理等环境工程基础知识应用环境污染治理单元的设计、运行和管理。

1.4 能将水、气、固及物理性污染控制等环境工程专业知识用于环境污染防治工艺的设计、系统的控制和改进中。

2.问题分析：能够利用数学、自然科学和环境工程相关的基础理论和知识以及文献资料对环境污染问题进行识别、表达和分析，以获得有效结论。

2.1 能够运用数学、自然科学和环境工程的基本原理和专业知识，识别和判断复杂环境工程问题的关键点和参数。

2.2 能通过数学、自然科学和环境工程专业的概念、原理、方法，分析环境污染防治工程的关键环节和参数，并给予表述。

2.3 能够运用环境工程相关的基础理论和知识结合文献分析环境污染防治过程的影响因素及采用相关技术，并获得有效结论。

3.设计/开发解决方案：能够应用水污染控制、大气污染控制及固体废物处理处置与资源化、土壤及地下水修复的基本原理和方法开发、设计满足环境防治要求的污染治理工艺流程与处理单元，并能够在设计中体现创新意识，综合考虑社会、健康、安全、法律文化及环境等因素。

3.1 能够根据环境污染的特征和防治要求提出复杂环境工程问题的解决方案。

3.2 能够对所提技术方案及工艺流程的可行性进行初步分析与论证。

3.3 能够进行污染治理工艺系统及处理单元的设计，并在设计中综合考虑社会、健康、安全、法律、文化等因素，且体现创新意识，进而优化设计方案。

4.研究：能够基于科学原理并采用科学方法，开展试验研究，预测、分析环境污染防治技术和工程中的问题，为解决环境污染防治实践中的复杂工程问题提供合理有效的结论；

4.1 掌握现代分析方法，能够识别复杂工程问题中的各种制约条件，分析研究对象的基本特征；

4.2 能够基于环境工程专业理论，根据环境污染对象特征，选择合适的研究路线、设计可行的研究方案；

4.3 能正确采集、整理研究数据，对研究结果进行关联、分析处理，获取合理有效的结

论。

5.现代工具的使用：能够针对复杂环境工程问题，开发、选择与使用恰当的环境工程专业领域相关的计算机辅助设计、计算机模拟仿真等技术、资源和工具，熟练使用现代分析检测仪器，具备预测、模拟及优化环境污染防治实践中的复杂工程问题的能力，并能够理解其局限性；

5.1 能够基于复杂环境工程问题的技术背景，选择、使用和开发恰当的计算机语言程序、计算机辅助设计软件等现代工具；

5.2 能够运用环境工程仿真软件和现代分析检测仪器，预测、模拟和评价复杂环境工程问题，明确各种方法的局限性。

6.工程与社会：能基于环境工程相关背景知识，在解决复杂工程问题的同时，分析和评价设计方案对社会、健康、安全、法律及文化的影响，并理解其承担的责任；

6.1 熟悉环境工程领域相关的技术规范、法律法规和民族区域政策，能客观评价环境污染防治过程对社会、健康、安全、法律以及文化的影响，能理解环境污染防治过程中应承担的责任；

6.2 具有环境工程实习和实践经历，有较强的工程和社会意识。

7.环境和可持续发展：能够理解和评价环境污染防治工程实践对环境、社会可持续发展的影响；

7.1 理解环境保护和社会可持续发展的内涵和意义，熟悉环境保护的相关政策和法律法规；

7.2 能针对实际的环境污染防治工程项目中的生产、运行和维护相关环节中正确理解并评价工程实践对环境、社会可持续发展的影响。

8.职业规范：具有人文社会科学素养、社会责任感，能够在环境工程实践中理解并遵守工程职业道德和规范，履行责任；

8.1 具有科学的世界观、正确的人生观、价值观和爱国精神，具有人文社会科学素养和社会责任感；

8.2 理解工程伦理的核心理念，熟悉环保工程师的职业性质和责任，在工程实践中能自觉遵守职业道德和规范，履行责任。

9.个人和团队：具有在科学研究、工程设计与实践的多学科背景团队中团结互助的合作精神、一定的组织管理协调能力及在工作中对不同角色的适应能力；

9.1 能在多学科背景下的团队合作中承担自己的角色，听取不同意见，具有一定组织管理能力，能够综合团队成员的建议，并进行合理决策；

9.2 具有较强的团队协作和人际交往能力，能同其他成员进行有效交流，并妥善处理组织内外关系。

10.沟通：具备良好的文字及语言表达能力、辩论能力、倾听能力、外语应用能力，并

能就复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。注重与民众的沟通，尤其是在民族地区民汉之间的顺畅沟通与交流，并具备一定的国际视野，能够在跨文化背景下进行沟通和交流；

10.1 具备良好的文字及语言表达能力、辩论能力、倾听能力；

10.2 能够通过图纸、报告等形式表达自己的想法和见解，就复杂工程问题与业界同行及社会公众进行有效沟通和交流；

10.3 能够运用外语了解环境工程专业及相关领域的国际发展动态，能够在跨文化背景下进行沟通和交流。

11.项目管理：能够理解和掌握工程管理原理与经济决策方法，并能在多学科环境中应用；

11.1 理解和掌握环境工程实践活动中涉及的工程管理原理与经济决策方法；

11.2 能够将工程管理的原理和经济决策的方法用于应用到多学科环境中。

12.终身学习：具有自主学习和终身学习的意识，有不断学习、自我提高和适应发展的能力；

12.1 能认识不断探索和学习的必要性，具有自主学习和终身学习的意识；

12.2 掌握自主学习的方法和拓展知识、提高能力的途径，具备为适应发展而自我提高的能力。

According to the requirements for cultivation of environmental engineering specialty in our university, we make the graduates in specialty of environmental engineering reach the basic requirements through the study of humanistic and social science, basic engineering, professional basic and professional courses as well as the lectures, social activities, culture activities, competitions, practices, lessons and discussions. The requirements are listed as follow:

1) Engineering Knowledge: Able to use the rationales of natural science and engineering science such as mathematics, physics and chemistry as well as professional knowledge of environmental engineering to solve the complex problems of environmental engineering such as the design, operation and management of treatment for environmental pollutions;

1.1 Able to use the fundamental knowledge of mathematics and engineering mathematics to the expression of engineering problems;

1.2 Understand the rationales of natural science such as physics and chemistry as well as its fundamental applications to recognize problems of environmental pollution;

1.3 Able to apply the fundamental knowledge of lessons in environmental engineering specialty such as the engineering drawing, engineering mechanics, fluid mechanics, environmental engineering microbiology and principles of chemical engineering into the design of environmental pollution control units;

1.4 Able to use the professional knowledge of water, air, solid and physical contamination control to the design, systematic control and improvement.

2) Problem Analysis: Able to apply the rationales, knowledge and references of mathematics, natural science and environmental engineering to recognize, explain and analyze for requiring effective conclusions;

2.1 Able to use the rationales and professional knowledge of mathematics, natural science and environmental engineering to recognize complex problems of environmental engineering;

2.2 Able to use the concepts, rationales and methods of mathematics, natural science and environmental engineering to analyze and explain the key links and parameters of environmental pollution prevention and control projects;

2.3 Able to use the basic theory and knowledge of environmental engineering as well as references to analyze the factors and related technologies in the process of environmental pollution prevention and make effective conclusions.

3) Designing/developing solutions: Able to use the rationales and methods of water pollution control, air pollution control as well as treatment, disposal and recycling of solid waste to develop and design the technological process and treatment units;

3.1 Able to put forward solutions of complex problems of environmental engineering according to characterizations and prevention requirements of environmental pollution;

3.2 Familiarize and grasp the technical standards, intellectual properties as well as policies and regulations of industry and can do feasibility studies to designing schemes through techno-economic appraisal under the constraint condition of reality;

3.3 Able to design the technology system of pollution control and treatment units, take the factors of society, health, security, law and culture into the design, reflect the sense of innovation and then optimize the design scheme.

4) Research: Able to use the scientific methods and treatments based on principles of environmental engineering to forecast and analyze the problems in technologies of environmental pollution treatments and engineering and provide proper conclusion for solving the complex engineering problems in the practices of environmental pollution treatments;

4.1 Grasp modern analytical method, can recognize the constraint conditions in the complex engineering problems and analyze the basic characterizations of research objects;

4.2 Able to choose proper research routes and design feasible research projects based on professional theories of environmental engineering as well as the characterizations of polluted objects;

4.3 Able to collect and clear up the research data correctly, analyze and deal with the research

results and obtain the proper conclusions.

5) Usage of modern tools: Able to develop, choose and use correct technologies and tools of computer aided design in the area of environmental engineering, expertly use modern analytical instruments and able to forecast, simulate and optimize complex engineering problems in the practices of environmental pollution prevention;

5.1 Able to choose, use and develop correct modern tools such as the computer language programs and software of computer aided design;

5.2 Able to use modern analytical instruments, forecast, simulate and evaluate complex engineering problems, and make clear the boundedness of methods.

6) Engineering and society: Able to solve complex engineering problems based on background knowledge of environmental engineering while simultaneously analyze and evaluate the influences of designing project to society, health, safety, law and culture and understand the responsibility;

6.1 Have practice experiences of environmental engineering and senses of engineering and society;

6.2 Be familiar with the relevant technical regulations, laws and ethnic regional policies in the area of environmental engineering, able to evaluate the influences to society, health, security, law and culture in the process of prevention for environmental pollutions, and understand the responsibilities in the process of prevention for environmental pollutions.

7) Environment and sustainable development: able to understand and evaluate the influences of engineering practices of environmental pollutions prevention to the sustainable progress of environment and society;

7.1 Understand the connotation and meaning of environmental protection and sustainable development of society and know the relevant policies and laws of environmental protection well;

7.2 Able to correctly understand and evaluate the impacts of engineering practices on sustainable development of environment and society in the process of production, operation and maintenance for environmental pollution prevention and control project.

8) Professional norms: have the literacy of humanity and social science as well as responsibility for society, able to understand and comply with the professional ethics and regulations in projects and fulfill the duty;

8.1 Have the scientific world outlook, correct view of life, values and patriotism and have the literacy of humanity and social science as well as responsibility for society;

8.2 understand the core idea of engineering ethics, be familiar with the profession and responsibility of environmental engineer, can comply with the professional ethics and regulations

in projects and fulfill the duty.

9) Individuals and teams: have the team spirit in the multi-disciplinary teams of science research, engineering design and practices, ability for organization, management and coordination as well as the adaptive capacities for different roles in the work;

9.1 Able to undertake the roles in the multi-disciplinary teams, Listen to different opinions, have certain ability of organization and management, able to sum up the conclusions of team members and make a proper decision;

9.2 Have strong team work and interpersonal skills, can communicate with other members effectively and properly deal with internal and external relationships of the organization.

10) Communication: have great writing and communicating skills, debate competences, listening skills, application ability for language, able to effectively communicate with industry peers and publics for complex engineering problems, have a certain international vision and able to communicate in a cross-cultural context;

10.1 Have good abilities for writing, communicating and listening;

10.2 Able to express ideas and opinions orally or in writing and effectively communicate with industry peers and publics for complex engineering problems;

10.3 Able to study the international developments of environmental engineering and relevant areas and can have a communication in a cross-cultural context.

11) Project management: able to understand and grasp the principles of engineering management and methods of economic decision and apply the professional knowledge of environmental engineering into the design, operation and management of projects for prevention of environmental pollutions;

11.1 Understand and grasp the principles of engineering management and methods of economic decision in the practices of environmental projects;

11.2 Able to apply the principles of engineering management and methods of economic decision to the design, operation and management of projects for prevention of environmental pollutions.

12) Lifelong learning: have the sense of independent study and lifelong learning as well as the ability for self-improvement and adaptive development;

12.1 Able to realize the necessity of continuous discovery and study as well as the senses of independent study and lifelong learning;

12.2 Grasp the methods of independent study and pathway to expand knowledge and improve ability as well as the ability for self-improvement.

三、毕业要求实现矩阵

Ⅲ Graduation requirement realization matrix

表 3 课程体系与毕业要求关联度矩阵

毕业要求	一级	1)工程知识				2）问题分析			3）设计/开发解决方案			4）研究			5）现代工具使用		6）工程与社会		7）环境和可持续发展		8）职业规范		9）个人和团队		10）沟通			11）项目管理		12）终身学习	
	二级	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
思想道德与法治																					H										
中华民族共同体概论																		H									H				
其他通识类课程																					H									H	
就业指导																					M			H							
英语																											H				
语言程序设计															H																
分析化学		H				H																									
分析化学实验												H																			
无机化学		M			H																										
无机化学实验												H																			
有机化学		M			H																										
有机化学实验												H																			
物理化学		H			H																										
物理化学实验												H																			
现代环境分析		H				H																									
现代环境分析实验												H				H															
大学物理		H																													
大学物理实验												H																			
高等数学	H																														
线性代数	M																														

毕业要求	一级	1)工程知识				2）问题分析			3）设计/开发解决方案			4）研究			5）现代工具使用		6）工程与社会		7）环境和可持续发展		8）职业规范		9）个人和团队		10）沟通			11）项目管理		12）终身学习	
	二级	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
概率论与数理统计		M																													
画法几何&工程制图				H											L															
工程测量学				H		M																									
工程测量学实习						M																		H							
资源与环境导论										M								H											L	
环境工程 CAD				M											H															
环境工程微生物学				H		H																									
环境工程微生物学实验												H	L																		
流体力学				H			M																								
流体力学实验												H		L																	
工程力学				H			L																								
电子电工学				H																											
电子电工学实验				M																											
土建工程基础							H															M									
工程项目管理																							M					H	H		
环境保护法规											H								H												
环境监测						H	M						M																		
环境监测实验												H				H															
环境工程原理				H			H																								
大气污染控制工程					H			H	H																						
物理性污染控制工程					H			M	M																						
水污染控制工程（A1）					H																							H	H		
水污染控制工程（A2）					H			H	H																						

毕业要求	一级	1)工程知识				2）问题分析			3）设计/开发解决方案			4）研究			5）现代工具使用		6）工程与社会		7）环境和可持续发展		8）职业规范		9）个人和团队		10）沟通			11）项目管理		12）终身学习	
	二级	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
环境工程概预算																		L											H		
固体废物处理与处置					H			H	H																						
大气污染控制工程实验													M	H																	
水污染控制工程实验													H	H																	
固体废物处理与处置实验													M	H																	
环境工程原理实验												H				H															
环境工程综合实验																							H							M	H
大气污染控制工程课程设计										H															H						
水污染控制工程课程设计										H															H				H		
环境工程原理课程设计										H															H						
固体废物处理与处置课程设计										H															H			M			
环境规划与管理										H								H	H												
环境工程专业英语																											H				M
土壤及地下水污染修复					H			L	L																						
环境工程设备											H																				
废水处理工程设计											H															H					
环境影响评价																		H		H											
军事理论与训练																								H							
金工实习																	M														
认识实习																	H									M					

毕业要求	一级	1)工程知识				2）问题分析			3）设计/开发解决方案			4）研究			5）现代工具使用		6）工程与社会		7）环境和可持续发展		8）职业规范		9）个人和团队		10）沟通			11）项目管理		12）终身学习	
	二级	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7.1	7.2	8.1	8.2	9.1	9.2	10.1	10.2	10.3	11.1	11.2	12.1	12.2
生产实习																	H			H		H				H					
毕业实习																				H		H				H					H
毕业设计（论文）											H		H	H									H		H		H				H
说明：1）课程与毕业要求的关联度的高低分别用“H(强)”、“M(中)”、“L(弱)”表示。																															

四、核心课程

Ⅳ Core Courses

环境工程微生物学 Microbiology of Environmental Engineering、环境监测（B）Environmental Monitoring（B）、环境工程原理 Environmental Engineering Principle、物理性污染控制工程 Physical Pollution Control Engineering、大气污染控制工程 Air Pollution Control Engineering、水污染控制工程（A1）Water Pollution Control Project (A1)、环境规划与管理 Environmental Planning and Management、水污染控制工程（A2）Water Pollution Control Project (A2)、固体废物处理与处置 Solid Waste Treatment and Disposal、环境影响评价 Environmental Impact Assessment.

五、主要实践性教学环节

Ⅴ Main Internship and Practical Training

环境工程原理实验 Principle Experiments of Environmental Engineering、环境监测实验 Experiments of Environmental Monitoring、环境工程微生物学实验 Experiments of Environmental Engineering Microbiology、水污染控制工程实验 Experiments of Water Pollution Control Engineering、固体废物处理与处置实验 Experiments of Solid Waste Treatment and Disposal、环境工程原理课程设计 Course Design of Environmental Engineering Principles、大气污染控制工程课程设计 Course Design of Air Pollution Control Engineering、水污染控制工程课程设计 Course Design of Water Pollution Control Engineering、固体废物处理与处置课程设计 Course Design of Treatment and Disposal of Solid Wastes、工程测量学实习 Engineering Surveying Practice、金工实习 Metalworking Practice、认识实习 Cognition Practice、生产实习 Production Practice、毕业实习 Graduation Practice、毕业设计（论文）Graduation Design (Thesis)。

六、学时与学分

Ⅵ Hours/Credits

学时学分构成表

Table of Hours and Credits

<table>
<tr><th colspan="2" rowspan="2">课程类别
Courses Classified</th><th rowspan="2">学时/周数
Period/Weeks</th><th colspan="2">学分
Credits</th><th rowspan="2">学分比例
Proportion of Credits</th></tr>
<tr><th>理论
Theory</th><th>实践
Practice</th></tr>
<tr><td rowspan="2">通识课程平台
General Courses Platform</td><td>通必
General Compulsory</td><td>698</td><td>27</td><td>10.5</td><td>22.06%</td></tr>
<tr><td>通选
General Elective</td><td>192</td><td>12</td><td></td><td>7.06%</td></tr>
<tr><td rowspan="2">学科基础课程平台
Basic Courses Platform</td><td>必修
Compulsory</td><td>1064</td><td>46.5</td><td>10</td><td>33.24%</td></tr>
<tr><td>选修
Elective</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">专业课程平台
Major Courses Platform</td><td>必修
Compulsory</td><td>616</td><td>26.5</td><td>6</td><td>19.12%</td></tr>
<tr><td>选修
Elective</td><td>96</td><td>6.0</td><td></td><td>3.53%</td></tr>
<tr><td rowspan="2">实践教学平台
Practical Teaching Platform</td><td>必修
Compulsory</td><td>20.5W</td><td></td><td>20.5</td><td rowspan="2">12.06%</td></tr>
<tr><td>选修
Elective</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">创新创业平台
InnovationandEntrepreneurshipPlatform</td><td colspan="2">创新学分 Innovation Credits</td><td colspan="2">3</td><td rowspan="2">2.94%</td></tr>
<tr><td colspan="2">创业学分 Entrepreneurship Credits</td><td colspan="2">2</td></tr>
<tr><td rowspan="2">小计
Amount</td><td>必修学分
总数
Compulsory Credits</td><td>152</td><td>选修学分
总数
Elective Credits</td><td>18</td><td>选修学分比例
Proportion ofElectiveCredits</td><td>10.59%</td></tr>
<tr><td>理论学分
总数
Theory Credits</td><td>118</td><td>实践学分
总数
Practice Credits</td><td>47</td><td>实践教学环节比例
Proportion of Internship andPractical Training</td><td>25.29%</td></tr>
<tr><td colspan="3">最低毕业学分
The Lowest Graduate Credits</td><td colspan="4">170</td></tr>
</table>

学期学分分配表

Credits for Each Term

各学期学分分配 Creditsfor Each Term / 课程类别 Courses Classified		学期 Term							
		一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
通识课程平台 General Courses Platform	通必 General Compulsory	9	10	6	6	5	**1**	0.5	
	通选（建议） General Elective （suggestive）		4	5	3				
学科基础课程平台 Basic Courses Platform	必修 Compulsory	12.5	12.5	16	14	1.5			
	选修 Elective								
专业课程平台 Major Courses Platform	必修 Compulsory					16.5	14	2.0	
	选修 Elective				1.5		3	1.5	
实践教学平台 Practical Teaching Platform	必修 Compulsory		0.5		2	2	2	2	12
	选修 Elective								
小计 Amount		26.5	27	27	26.5	25	20	6.0	12
创新创业平台 InnovationandEntrepreneurshipPlatform	创新学分 Innovation Credits	3							
	创业学分 Entrepreneurship Credits	2							
最低毕业学分 The Lowest Graduate Credits		**170**							

注① 学分比例：各教学平台或教学环节占最低毕业学分的比例。

②实践教学环节，包括集中性实践教学环节和实验教学（不含体育）。集中性实践教学环节，包括培养方案内集中实施的实践、实习、课程设计、毕业设计、毕业论文、社会调查等；实验教学，包括课内实验和独立开设实验。

③学期学分分配表中，选修课须规定每学期最少修读的学分。

④必修学分总数=通必学分+基必学分+专必学分+实践（必修）学分+创新创业学分；

选修学分总数=通选学分+基选学分+专选学分+实践（选修）学分；

理论学分总数=所有平台理论学分之和；

实践学分总数=所有平台实践学分之和（不包括创新创业学分）；

最低毕业学分=必修学分+选修学分=理论学分+实践学分+创新创业学分。

七、教学进程计划表 /Ⅶ Teaching Schedule Form

表一：通识课程平台 / Form Ⅰ: General Course Platform

表一(A):通识必修课程(通必课)/Form I (A):General Compulsory Courses(General Required)

课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
				理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
109100000418	军事理论 Military Theory	2	36	36				1	1-18
109110000318	军事技能训练 Military Skill Training	2	36			36		1	1-2
109100000818	国家安全教育 National Security Education	1	16	16				1（理）	/
112110010718	劳动教育 Labor Education	0/1	32			32		1	1-16
20W100000613	英语 1 English 1	2	32	32				1	4-11
218110000313	体育 1 Physical Education 1	0/1	26			26		1	4-15
217100014918	思想道德与法治 Moral Education and Rule of Law	2.5/0.5	52	40		12		2（理）	1-14
217100015218	形势与政策 Situation and Policy	2	32	32				2	1-16
225100000118	中华民族共同体概论 Education of Chinese Minzu Community Consciousness	1.5/0.5	36	24		12		2	1-8
20W100000713	英语 2 English 2	2	32	32				2	1-8/9-16
218110000213	体育 2 Physical Education 2	0/1	32			32		2	1-16
2171000122	中国近现代史纲要 Essentials of China Modern and Contemporary History	2.5/0.5	52	40		12		3（理）	1-14
20W100000813	英语 3 English 3	2	32	32				3	1-8/9-16
218110000413	体育 3 Physical Education 3	0/1	32			32		3	1-16
217100012318	马克思主义基本原理 Basis Principles of Maxism	2.5/0.5	52	40		12		4（理）	1-14

2171000121	毛泽东思想和中国特色社会主义理论体系概论 Introduction to MAO Zedong Thought and Socialist Theoretical System with Chinese Characteristics	4/1	88	64		24		5（理）	1-16
20W100000913	英语 4 English 4	2	32	32				4	1-8/ 9-16
218110000113	体育 4 Physical Education 4	0/1	32			32		4	1-16
218110012718	体育素质	0/0.5	0			0		7	1-16
115100000113	就业指导 Employment Guidance	1	16	16				6	1-8/ 9-16
学分要求：学分: 37.5 Demand of Credits:Credits: 37.5									

注：大学英语扩展课程包括①20W100000813 英语 3②20W100000913 英语 4③20W100001018 学术英语阅读与写作④20W100001318 高级媒体英语视听说⑤20W100001518 英语国家社会与文化⑥20W100001818 中国民族传统文化（英文），要求在第 3,4 学期完成 4 学分即可。

表一（B）：通识选修课程（通选课）/Form I (B): General Elective Courses

模块 **Module**	**学分** **Crs.**
心理健康与安全 Psychological Health and Safety	2
人文素养与写作 Humanistic Accomplishment and Writing	2
艺术体验与审美 Art Appreciation and Aesthetics	2
科学技术与科普 Science and Technology & Science Popularization	2
当代中国与世界 Contemporary China and the World	2
中华文化与文明 Chinese Culture and Civilization	1
运动锻炼与健康 Exercise and Health	1

表二：学科基础课程平台

Form II. Basic Course Platform

课程类别 Course Classified	课程编号 Numbers of courses	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra..	习题 Ueb		
学科基础必修 Require Basic Courses	213100035618	无机化学 Inorganic Chemistry	3	48	48				1	
	213110035818	无机化学实验 Inorganic Chemistry Experiments	/0.5	16		16			1	
	213103005213	分析化学 Analytical Chemistry	2	32	32				1	
	213110036418	分析化学实验 Analytical Chemistry Experiments	1	32		32			1	
	2101000113	高等数学 A(1) Higher Mathematics A (1)	4	80	64			16	1	
	2101000118	线性代数 Linear Algebra	2	48	32			16	1	
	224100000913	画法几何&工程制图 Descriptive Geometry & Engineering Drawing	2	32	32				2	
	210102000413	高等数学 A(2) Higher Mathematics A (2)	5	96	80			16	2	
	211100011118	大学物理 B(1) College Physics B (1)	3	56	48			8	2	
	211112000113	大学物理 B(1)实验 University Physics B(1) Experiments	0.5	16		16			2	
	2241000067	工程测量学 Engineering Surveying	2	32	32				2	
	2101000112	概率论与数理统计 Probability Theory and Mathematical Statistics	2.5	56	40			16	3	
	211100011218	大学物理 B（2）	2.0	40	32			8	3	
	211112000213	大学物理 B（2）实验	0.5	16		16			3	
	213100047518	有机化学(D) Organic Chemistry	2	32	32				3	
	213110036118	有机化学实验(B) Organic Chemistry Experiments	1	32		32			3	
	213100047118	物理化学(C) Physical chemistry	2.5	40	40				3	
	213110034618	物理化学实验 Physical Chemistry Experiments	1	32		32			3	

课程类别 Course Classified	课程编号 Numbers of courses	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra..	习题 Ueb		
学科基础必修 Require Basic Courses	224110023218	环境工程 CAD 实验 AutoCAD for Environment Engineering (Computer practice)	2.0	64		64			3	
	212100018318	电子电工学 Electronic Engineering	2.0	32	32				3	
	2241100071	电子电工学实验 Electronics and Electrotechnics Experiments	0.5	16		16			3	
	2241000073	现代环境分析 Modern Environmental analysis	2	32	32				4	
	2241100074	现代环境分析实验 Modern Environmental Analysis Experiments	1	32		32			4	
	213103016813	流体力学 Fluid Mechanics	3.0	48	48				4	
	213113016913	流体力学实验 Experiments of Fluid Mechanics	0.5	16		16			4	
	2241000133	环境工程微生物学 Microbiology of Environmental Engineering	2	32	32				4	
	2241100132	环境工程微生物学实验 Environmental Engineering Microbiology Experiments	0.5	16		16			4	
	224100021518	工程力学 Engineering Mechanics	2.0	32	32				4	
	209100030818	语言程序设计（Python）Ⅰ Python Language Programming Ⅰ	1/1	48	16		32		4	
	224100022218	土建工程基础 Foundation of Civil Engineering	1.0	16	16				4	
	213103012113	工程项目管理 Project Management	1.5	24	24				5	
学分要求：学分:56.5 Demand of Credits:Credits: 56.5										

表三：专业课程平台

Form III: Major Courses Platform

课程类别 Course Classi-fied	课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业必修 Required Courses	213103017113	环境工程原理 Environmental Engineering Principle	4	64	64				5	
	213113016213	环境工程原理实验 Principle Experiments of Environmental Engineering	1	32		32			5	
	213103011313	大气污染控制工程 Air Pollution Control Engineering	3	48	48				5	
	2241100127	大气污染控制工程实验 Experiments of Air Pollution Control Engineering	0.5	16		16			5	
	213103021513	环境监测（B） Environmental Monitoring (B)	2	32	32				5	
	213113023813	环境监测实验（B） Environmental Monitoring Experiments (B)	1	32		32			5	
	2241000124	物理性污染控制工程 Physical Pollution Control Engineering	2	32	32				5	
	224100023018	环境规划与管理 Environmental Planning and Management	1.5	24	24				5	
	213103018313	水污染控制工程（A1） Water Pollution Control Project (A1)	1.5	24	24				5	
	213103018613	水污染控制工程（A2） Water Pollution Control Project (A2)	3.5	56	56				6	1-14 周
	214113019613	水污染控制工程实验 Water Pollution Control Engineering Experiments	1	32		32			6	
	213103018013	废水处理工程设计 Wastewater Treatment Engineering Design	1.5	24	24				6	
	224100021918	环境工程设备 Environmental Engineering Equipment	1.5	24	24				6	
	224100005113	环境影响评价 Environmental Impact Assessment	1.5	24	24				6	
	2241000137	固体废物处理与处置 Solid Waste Treatment and Disposal	2.5	40	40				6	
	2241100136	固体废物处理与处置实验 Solid Waste Treatment and Disposal Experiments	0.5	16		16			6	
	213113018513	环境工程综合实验 Comprehensive Experiments of Environmental Engineering	2	64		64			7	1-4

课程类别 Course Classi-fied	课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业必修 Required Courses	2241000077	土壤及地下水污染修复 Remediation of Soil and Groundwater Pollution	2	32	32				6	
专业选修 Elective courses	2241000075	环境工程专业英语 English for Environmental Engineering	1.5	24	24				6（限选）	至少修读 6.0 学分，第 4 学期修 1.5 学分，第六学期修读 3.0 学分，第 7 学期修读 1.5 学分
	2241000128	环境保护法规 Environmental Protection Regulations	1.5	24	24				4（限选）	
	2241000131	环境工程概预算 Budget Estimates For Environmental Engineering	1.5	24	24				6（限选）	
	224101006013	清洁生产与循环经济 Cleaner Production and Circular Economy	1.5	24	24				6	
	213103018913	污染控制微生物工程 Microbial Engineering for Pollution Control	1.5	24	24				6	
	213103023613	高级氧化技术 Advanced oxidation technology	1.5	24	24				6	
	213103020613	给排水与环境工程施工 Water Supply and Drainage and Environmental Engineering Construction	1.5	24	24				7	
	213103021013	给水处理 Treatment of Water Supply	1.5	24	24				7	
	213103014513	水化学 Hydrochemistry	1.5	24	24				7	
	213103021413	生态水文学 Ecohydrology	1.5	24	24				7	
	213103022213	环境生态学（B） Environmental Ecology (B)	1.5	24	24				7	
	213103008413	GIS 与环境模型 GIS and Environmental Modelling	1.5	24	24				7	
	2241000078	文献检索及科技论文写作 Document Retrieval and Scientific Paper Writing	1.5	32	16	16			7	
学分要求：学分: 38.5 其中必修 32.5 学分，选修 6.0 学分 Demand of Creditx:Credits: 38.5 Required: 32.5 Elective: 6.0										

表四：实践教学平台

Form IV: Practical Teaching Platform

课程类别 CourseClassified		课程编号 CourseCode	实践教学名称 Course Names	学分 Crs.	周数 Total Period	学时类型 PeriodClassified		开课学期 Semester	地点 Place
						实验 Exp.	实习 Pra.		
教学实践 TeachingPractice	社会实践 Social Practice								
	课程设计 Project Design	2241100079	环境工程原理课程设计 Course Design of Environmental Engineering Principles	1.0	1.0W			5	校内 At School
		213113026613	大气污染控制工程课程设计 Course Design of Air Pollution Control Engineering	1.0	1.0W			5	校内 At School
		2241100135	固体废物处理与处置课程设计 Course Design of Treatment and Disposal of Solid Wastes	1.0	1.0W			6	校内 At School
		213113028013	水污染控制工程课程设计 Course Design of Water Pollution Control Engineering	1.0	1.0W			6	校内 At School
	小计 Amount			4.0	4.0W				
教学实习 Teaching Exercitation	教学实习 Teaching Exercitation	2241100080	工程测量学实习 Engineering Surveying Practice	0.5	0.5W			2	校内 At School
		224110000213	工程训练 Engineering Training	1	1W			5	
		224110006213	认识实习 Cognition Practice	1	1W			4	
		2241100130	生产实习 Production Practice	2	2W			7	
	毕业实习 Graduation Practice	2241100134	毕业实习 Graduation Practice	2	2W			8	
	毕业论文（设计） Graduation Thesis (Project)	224110000113	毕业设计（论文） Graduation Project （Thesis）	10	10W			8	
	小计 Amount			16.5	16.5W				
总计 Amount			学分 Credits 20.5 学时 Period 周 Weeks 20.5						

表五：创新创业平台

Form V: Innovation &Entrepreneurship Platform

课程类别 **Course Classified**	**学分** **Crs.**
创新学分 Innovation Credits	3
创业学分 Entrepreneurship Credits	2
总计 Amount	5

资源循环科学与工程专业本科培养方案

Undergraduate Program for the Specialty of Resources Circulation Science and Engineering

一、培养目标

I Educational Objectives

本专业旨在培养具有扎实的资源循环科学与工程的理论和实践基础，具备“资源-产品-再生资源-产品”的多向式资源开发循环和可持续利用理念，掌握一次资源开发、二次资源综合利用、清洁生产与循环经济、资源循环规划与管理等专业基础知识体系，具有解决资源综合利用和环境保护的科学与工程的能力，能在资源循环科学与工程领域从事科学研究、工程技术开发、工艺设计、产业经营和管理规划等工作的跨学科高级工程技术及管理人才。毕业生能在政府部门、规划管理部门、环保部门、设计单位、化工企业、冶金企业、环保企业、工矿企业、科研院所和学校等，从事资源循环科学与工程领域管理、规划、设计、工程建设、产业经营、制造、研发和教育等工作，也可以选择国内外相近学科的科研机构或高校继续深造。

The program is designed to graduate cross-disciplined senior engineers for engineering technology and engineering management who will have firmer theories and practice foundation of Resources Circulation Science and Engineering, fulfil the concept of the multi-directional resource development, cycling and sustainable utilization of “resources-products-renewable resources-products”, master the professional knowledge system of development of natural primary resources, comprehensive utilization of secondary resources, cleaner production and circular economy, and resource recycling planning and management, acquire the ability to solve the science and engineering problems of comprehensive utilization of resources and environmental protection, can accomplish the work in the field of resource recycling science and engineering, such as scientific research, engineering technology development, process design, industrial management and management planning, et al. Graduates can be engaged in the work of management, planning, design, engineering construction, manufacturing, scientific research and education in the field of the Resources Circulation Science and Engineering in government departments, management planning departments, environmental protection departments, design departments, Chemical enterprises, metallurgical enterprises, environmental protection enterprises, industrial and mining enterprises, scientific research institutes, and universities and so on. Also the graduates can go further study in domestic and foreign scientific research institutions or universities of similar disciplines.

二、培养规格

II Cultivation Standards

I）学制

Length of Schooling

修业年限：四年

Duration: 4 years

II）学位

Degree

授予学位：工学学士学位

Degrees conferred: Bachelor of Engineering

III）人才培养基本要求

Basic requirements for Cultivation

根据我校资源循环科学与工程专业培养目标及培养特色的要求，通过人文社会科学课程、工程基础课程、专业基础课程、专业课程的课堂教学、讲座、社会活动、文化活动、各种竞赛、实践、辅导、座谈等教学环节，使学生毕业时应满足本专业的 12 项毕业要求：

（1）工程知识：掌握必要的资源循环科学与工程专业的基本理论与基础知识，具有运用解决本专业复杂工程问题工作所需的相关数学、自然科学、工程基础知识的能力。能在资源循环科学与工程领域从事科学研究、工程技术开发、工艺流程设计、产业经营管理和政策咨询等方面的工作。

（2）问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达、并通过文献研究分析本专业复杂工程问题，以获得有效结论。

（3）设计/开发解决方案：能够设计针对本专业领域复杂工程问题的解决方案；具备设计本专业领域满足特定需求的系统、部件和工艺流程的能力，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

（4）研究：掌握资源循环的科学原理和工程理论，掌握资源循环的分析方法和构建方法，能够对本专业复杂工程问题进行研究；具备设计、实施本专业领域工程实验的能力，并在对实验数据进行分析与解释的基础上得到合理有效的结论。

（5）使用现代工具：能够针对本专业复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。

（6）工程与社会：能够基于资源循环相关背景知识进行合理分析，评价本专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

（7）环境和可持续发展：针对复杂工程问题，能够理解和评价本专业工程实践对资源、环境、社会可持续发展的影响。

（8）职业规范：有较好的人文科学素养，较强的社会责任感，能够在本专业相关工程实践中理解并遵守工程职业道德和规范，履行相应责任。

（9）个人和团队：能够在多学科（化工、冶金、环境、矿业和材料）背景下的团队中承担个体、团队成员以及负责人的角色。

（10）沟通：能够就本专业复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

（11）项目管理：理解并掌握工程管理原理与经济决策方法，并能在多学科（化工、冶金、环境、矿业、材料）中应用。

（12）终身学习：对终身学习有正确认识，具有不断学习和适应发展的能力。

According to the requirements of the educational objectives and characteristics of Resource Circulation Science and Engineering, the graduates should meet the following 12 outcomes after the training program of the humanities and social science courses, engineering foundation courses, professional foundations, major courses, lectures, social activities, cultural activities, competitions, practice, teaching, counseling, seminars and other teaching activities:

（1）Engineering Knowledge: Master the necessary basic theories and basic knowledge of Resource Circulation Science and Engineering, and have the ability to apply the needed basic knowledge of mathematics, natural science and engineering to solve complex engineering problems. Can be engaged in the work of scientific research, engineering technology development, process design, industrial management and policy consulting in the field of Resource Circulation Science and Engineering.

（2）Problem Analysis: Apply the basic principles of mathematics, natural science and engineering science to identify, express, and analyze the complex engineering problems of this major. Obtain impactful conclusions after literature research.

（3）Design/Development Solutions: Has the ability to design solutions for the complex engineering problems in this field; acquire the ability to design a system solution, components and processes that meet specific needs in this area which should take consideration of factors of society, health, safety, law, culture, environment and so on with innovative ideas.

（4）Research: Master the scientific principle and engineering theory of resource recycling, acquire the analysis method and construction method of resource recycling, and be able to study the complex engineering problems of this specialty; have the ability to design and implement engineering experiments in this specialty field, and get impactful and reasonable conclusion based on the analysis and interpretation of experimental data.

（5）Modern Tools Usage: Develop, select and use appropriate technology, resources, modern engineering tools and information technology tools to solve the complex engineering problems, including prediction and simulation of complex engineering problems, and understand their limitations.

（6）Engineering and Society: Has the ability to conduct a reasonable analysis based on the

background knowledge of resource recycling, evaluate the impact of engineering practice and solutions for complex engineering problem on society, health, safety, law and culture, and understand the bearing responsibilities.

（7）**Environment and Sustainable Development:** Understand and evaluate the impact of engineering practices for complex engineering problems on the sustainable development of resource, environment and society.

（8）**Professional Norms:** Has good humanities literacy, strong sense of social responsibility, Understand and abide the engineering professional ethics and norms in the relevant engineering practice, and fulfill the corresponding responsibilities.

（9） **Individuals and Teams:** Act as individuals, team members and leaders in a multidisciplinary team, such as chemistry, metallurgy, environment, mining, materials and information.

（10） **Communication:** Has the ability to effectively communicate with colleagues and the public on complex engineering issues, including writing and designing reports, presenting speeches, clearly expressing or responding to instructions. Communicate with different persons who have cross-cultural background in an international perspective.

（11）**Project management:** Understand and master the principles of engineering management and economic decision-making methods, and apply that in multi-disciplinary, such as chemistry, metallurgy, environment, mining and materials.

（12）**Lifelong learning:** Has a correct understanding of lifelong learning and the ability to continuously learn and adapt to the development of society.

三、毕业要求实现矩阵

III Graduation requirement realization matrix

毕业要求	1）工程知识	2）问题分析	3)设计/开发解决方案	4）研究	5）现代工具使用	6）工程与社会	7）环境和可持续发展	8）职业规范	9）个人和团队	10）沟通	11）项目管理	12）终身学习
思想道德修养与法律基础								H				
中华民族共同体概论						H				H		
其他通识类课程								H				H
就业指导								M	H			
英语										H		
分析化学	H	H										
分析化学实验				H								
无机化学	M		H									
无机化学实验												
有机化学	M			H								
有机化学实验												
物理化学	H		H									
物理化学实验				H								
现代环境分析	H			H								
现代环境分析实验				H	H							
大学物理	H											
大学物理实验				H								
高等数学	H											

毕业要求	1）工程知识	2）问题分析	3)设计/开发解决方案	4）研究	5）现代工具使用	6）工程与社会	7）环境和可持续发展	8）职业规范	9）个人和团队	10）沟通	11）项目管理	12）终身学习
线性代数	M											
概率论与数理统计	M											
画法几何&工程制图	H				M							
工程测量学	H	M										
工程测量学实习		M							H			
资源与环境导论			M			H	M					
电子电工学	H											
电子电工学实验				H								
语言程序设计					H							
化工原理	H											
化工原理实验				H								
化学反应工程	H											
矿石学	H											
化工 CAD	H											
化工 CAD 实验					H							
资源加工过程与装备	H											
资源加工过程与装备实验				H	M							
化工热力学	H											
冶金原理	H											
固体废物处置与资源化	H						H					
固体废物处置				H	L							

毕业要求	1）工程知识	2）问题分析	3)设计/开发解决方案	4）研究	5）现代工具使用	6）工程与社会	7）环境和可持续发展	8）职业规范	9）个人和团队	10）沟通	11）项目管理	12）终身学习
与资源化实验												
环境工程学	H						M					
环境工程学实验				H								
资源微生物学	H											
资源微生物学实验				H								
化工原理程设计		H	H			M						
资源循环科学与工程课程设计		H	H			M	M					
工程测量学实习		H							H		L	
认识实习						H		L	M	L		
金工实习						H			H	L		
生产（或毕业）实习		H						L		H	L	
毕业设计（论文）		H	H	H		M				M		M
创新训练		H	H	H					M		L	M
创业训练		H	H			M		H	H		H	H

注① 不同学期的同一门课程只需填写一次，如“形势与政策”；

②所有的课程和教学活动都要列入表格，包括集中实践性环节；

③表格要清晰展示每门课程与“毕业要求”中每项具体要求达成的关联度情况，关联度强的用“H” 表示，关联度中等的用“M”表示，关联度弱的用“L”表示。

四、核心课程

IV Core Courses

无机化学、分析化学、有机化学、物理化学、资源加工过程与装备、化工原理、冶金原理、分离工程、固体废物处置与资源化、循环经济与清洁生产、环境工程学、工程测量学、画法几何&工程制图、资源微生物学、化学反应工程。

Inorganic Chemistry, Analytical Chemistry, Organic Chemistry, Physical Chemistry, Resource Processing and Equipment, Chemical Engineering, Metallurgical Engineering, Separation Engineering, Disposal and Reuse of Solid Waste, Recycling Economy and Clean Production, Environmental Engineering, Engineering Surveying, Descriptive Geometry & Engineering Drawing, Resource Microbiology, Chemical Reaction Engineering.

五、主要实践性教学环节

V Main Internship and Practical Training

化工原理实验、资源循环科学与工程专业实验、化工原理课程设计、资源循环科学与工程课程设计、认识学习、工程训练、生产实习、毕业（设计）论文和创新创业训练。

Experiments of Chemical Engineering, Experiments of Resource Recycling Science and Engineering, Chemical Engineering Principle Design, Resource Recycling Science and Engineering Design, Knowledge Acquirement, Engineering Training, Producing Practice, Graduation Project, Innovation & Entrepreneurship.

六、学时与学分

VI Hours/Credits

学时学分构成表

Table of Hours and Credits

<table>
<tr><th colspan="2" rowspan="2">课程类别
Courses Classified</th><th rowspan="2">学时/周数
Period/Weeks</th><th colspan="2">学 分
Credits</th><th rowspan="2">学分比例
Proportion of Credits</th></tr>
<tr><th>理 论
Theory</th><th>实 践
Practice</th></tr>
<tr><td rowspan="2">通识课程平台
General Courses Platform</td><td>通 必
General Compulsory</td><td>714</td><td>27</td><td>10.5</td><td>22.06%</td></tr>
<tr><td>通 选
General Elective</td><td>224</td><td>12</td><td></td><td>7.06%</td></tr>
<tr><td rowspan="2">学科基础课程平台
Basic Courses Platform</td><td>必 修
Compulsory</td><td>992</td><td>40</td><td>8.5</td><td>28.53%</td></tr>
<tr><td>选 修
Elective</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">专业课程平台
Major Courses Platform</td><td>必 修
Compulsory</td><td>640</td><td>26.5</td><td>7.5</td><td>20.00%</td></tr>
<tr><td>选 修
Elective</td><td>600</td><td>9</td><td>0.5</td><td>5.59%</td></tr>
<tr><td rowspan="2">实践教学平台
Practical Teaching Platform</td><td>必 修
Compulsory</td><td>23.5W</td><td></td><td>23.5</td><td rowspan="2">13.82%</td></tr>
<tr><td>选 修
Elective</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">创新创业平台
Innovation and Entrepreneurship Platform</td><td colspan="2">创新学分 Innovation Credits</td><td colspan="2">3</td><td rowspan="2">2.94%</td></tr>
<tr><td colspan="2">创业学分 Entrepreneurship Credits</td><td colspan="2">2</td></tr>
<tr><td rowspan="2">小 计
Amount</td><td>必修学分总数
Compulsory Credits</td><td>148.5</td><td>选修学分总数
Elective Credits</td><td>21.5</td><td>选修学分比例
Proportion of Elective Credits</td><td>12.65%</td></tr>
<tr><td>理论学分总数
Theory Credits</td><td>119.5</td><td>实践学分总数
Practice Credits</td><td>41.5</td><td>实践教学环节比例
Proportion of Internship and Practical Training</td><td>24.41%</td></tr>
<tr><td colspan="3">最低毕业学分
The Lowest Graduate Credits</td><td colspan="3">170</td></tr>
</table>

学期学分分配表

Division of Credits of Each Term

各学期学分分配 Division of Credits of Each Term / 课程类别 Courses Classified		学期 Term							
		一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
通识课程平台 General Courses Platform	通 必 General Compulsory	9	10	6	6	5	1	0.5	
	通 选（建议） General Elective （suggestive）	5	3	1	3				
学科基础课程平台 Basic Courses Platform	必 修 Compulsory	12.5	12.5	18.5	5				
	选 修 Elective								
专业课程平台 Major Courses Platform	必 修 Compulsory				10.5	14	9.5		
	选 修(建议) Elective					2	5.5	2	
实践教学平台 Practical Teaching Platform	必 修 Compulsory		0.5	1	1	2	2	3	14
	选 修 Elective								
小计 Amount		26.5	26	26.5	25.5	23	18	5.5	14
创新创业平台 Innovation and Entrepreneurship Platform	创新学分 Innovation Credits	3							
	创业学分 Entrepreneurship Credits	2							
最低毕业学分 The Lowest Graduate Credits		**170**							

注① 学分比例：各教学平台或教学环节占最低毕业学分的比例。

②实践教学环节，包括集中性实践教学环节和实验教学（不含体育）。集中性实践教学环节，包括培养方案内集中实施的实践、实习、课程设计、毕业设计、毕业论文、社会调查等；实验教学，包括课内实验和独立开设实验。

③学期学分分配表中，选修课须规定每学期最少修读的学分。

④必修学分总数=通必学分+基必学分+专必学分+实践（必修）学分+创新创业学分；

选修学分总数=通选学分+基选学分+专选学分+实践（选修）学分；

理论学分总数=所有平台理论学分之和；

实践学分总数=所有平台实践学分之和（不包括创新创业学分）；

最低毕业学分=必修学分+选修学分=理论学分+实践学分+创新创业学分。

七、教学进程计划表 /VII Teaching Schedule Form

表一：通识课程平台 / Form I:General Course Platform

表一（A）：通识必修课程（通必课）/Form I (A):General Compulsory Courses (General Required)

课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
				理论 The.	实验 Exp.	实践 Pra..	习题 Ueb		
109100000418	军事理论 Military Theory	2	36	36				1	1-18
109110000318	军事技能训练 Military Skills Training	0/2	36			36		1	1-2
109100000818	国家安全教育 National Security Education	1	16	16				1（理）	/
112110010718	劳动教育 Labor Education	0/1	32			32		1	1-16
20W100000613	英语 1 English 1	2	32	32				1	4-11
218110000313	体育 1 Physical Education 1	0/1	26			26		1	4-15
217100014918	思想道德与法治 Moral Education and Rule of Law	2.5/0.5	52	40		12		2（理）	4-17/1-14
217100015218	形势与政策 Situation and Policy	2	32	32				2	1-16
225100000118	中华民族共同体概论 Education of Chinese Minzu Community Consciousness	1.5/0.5	36	24		12		2	1-8
20W100000713	英语 2 English 2	2	32	32				2	1-8/9-16
218110000213	体育 2 Physical Education 2	0/1	32			32		2	1-16
2171000122	中国近现代史纲要 Essentials of China Modern and Contemporary History	2.5/0.5	52	40		12		3（理）	1-14
20W100000813	英语 3 English 3	2	32	32				3	1-8/9-16
218110000413	体育 3 Physical Education 3	0/1	32			32		3	1-16

课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
				理论 The.	实验 Exp.	实践 Pra..	习题 Ueb		
217100012318	马克思主义基本原理 Marxist Fundamentals	2.5/0.5	52	40		12		4	1-14
20W100000913	英语 4 English 4	2	32	32				4	1-8/9-16
218110000113	体育 4 Physical Education 4	0/1	32			32		4	1-16
2171000121	毛泽东思想和中国特色社会主义理论体系概论 Introduction to MAO Zedong Thought and Socialist Theoretical System with Chinese Characteristics	4/1	88	64		24		5	1-16
115100000113	就业指导 Employment Guidance	1	16	16				6	1-8/9-16
218110012718	体育素质	0/0.5	16			16		7	1-16
学分要求：学分: 37.5 Demand of Credits: Credits: 37.5									

注：大学英语扩展课程包括①20W100000813 英语 3 ②20W100000913 英语 4 ③20W100001018 学术英语阅读与写作 ④20W100001318 高级媒体英语视听说 ⑤20W100001518 英语国家社会与文化 ⑥20W100001818 中国民族传统文化（英文），要求在第 3,4 学期完成 4 学分即可。

表一（B）：通识选修课程（通选课）/Form I (B): General Elective Courses

模块 Module	学分 Crs.
心理健康与安全 Psychological Health and Safety	2
人文素养与写作 Humanistic Accomplishment and Writing	2
艺术体验与审美 Art Appreciation and Aesthetics	2
科学技术与科普 Science and Technology & Science Popularization	2

模块 **Module**	**学分** **Crs.**
当代中国与世界 Contemporary China and the World	2
中华文化与文明 Chinese Culture and Civilization	1
运动锻炼与健康 Exercise and Health	1

表二：学科基础课程平台

Form II. Basic Course Platform

课程类别 Course Classi-fied	课程编号 Numbers of courses	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
学科基础必修 Require Basic Courses	213100035618	无机化学（B）Z Inorganic Chemistry (B) Z	3	48	48				1	
	213110035818	无机化学实验（C） Inorganic Chemistry Experiments (C)	0/0.5	16		16			1	
	213103005213	分析化学（B） Analytical Chemistry (B)	2	32	32				1	
	213110036418	分析化学实验（B） Analytical Chemistry Experiments (B)	0/1	32		32			1	
	2101000113	高等数学 A(1) Higher Mathematics A (1)	4	80	64			16	1	
	2101000118	线性代数 Linear Algebra	2	48	32			16	1	
	210102000413	高等数学 A(2) Higher Mathematics A (2)	5	96	80			16	2	
	211100011118	大学物理 B(1) College Physics B (1)	3	56	48			8	2	
	211112000113	大学物理 B(1)实验 University Physics B(1) Experiments	0/0.5	16		16			2	
	2241000067	工程测量学 Engineering Surveying	2	32	32				2	
	224100000913	画法几何&工程制图 Descriptive Geometry & Engineering Drawing	2	32	32				2	
	2101000112	概率论与数理统计 Probability Theory and Mathematical Statistics	2.5	56	40			16	3	
	211100011218	大学物理 B(2) College Physics B (2)	2	40	32			8	3	
	211112000213	大学物理 B(2)实验 University Physics B(2) Experiments	0/0.5	16		16			3	
	213100035218	有机化学（C） Organic Chemistry (C)	3	48	48				3	
	213110036118	有机化学实验（B） Organic Chemistry Experiments (B)	0/1	32		32			3	
	213100034518	物理化学（B） Physical chemistry (B)	3.5	56	56				3	

课程类别 Course Classi-fied	课程编号 Numbers of courses	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
学科基础必修 Require Basic Courses	213110034618	物理化学实验 Physical Chemistry Experiments	0/1	32		32			3	
	212100018318	电子电工学 Electronic Engineering	2	32	32				3	
	2241100071	电子电工学实验 Electronics and Electrotechnics Experiments	0/0.5	16		16			3	
	224100014318	化工 CAD Chemical CAD	1	16	16				3	
	224110014418	化工 CAD 实验 Experiments of Chemical CAD	0/1.5	48			48		3	
	2241000073	现代环境分析 Modern Environmental Analysis	2	32	32				4	
	2241100074	现代环境分析实验 Experiments of Modern Environmental Analysis	0/1	32		32			4	
	209100030818	语言程序设计（Python）Ⅰ Python Language Programming Ⅰ	1/1	48	16		32		4	
学分要求： 学分: 48.5 其中必修 48.5 学分， 选修 0 学分 Demand of Credits: Credits: 48.5 Required: 48.5 Elective: 0										

表三：专业课程平台

Form III: Major Courses Platform

课程类别 Course Classi-fied	课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业必修 Required Courses	224100013818	化工原理（A1） Chemical Engineering（A1）	3	48	48				4	
	224110014018	化工原理实验（A1） Experiments of Chemical Engineering（A1）	0/1	32		32			4	
	224100019818	化学反应工程 Chemical Reaction Engineering	2	32	32				4	
	224100019918	矿石学 Ore Science	1.5	24	24				4	
	224100020818	资源微生物学 Resource Microbiology	2	32	32				4	
	224110015318	资源微生物学实验 Experiments of Resource Microbiology	0/1	32		32			4	
	224100013918	化工原理（A2） Chemical Engineering（A2）	3	48	48				5	
	224110014118	化工原理实验（A2） Experiments of Chemical Engineering（A2）	0/1	32		32			5	
	224100014518	资源加工过程与装备 Resource Processing Process and Equipment	3	48	48				5	
	224110014618	资源加工过程与装备实验 Experiments of Resource Processing Process and Equipment	0/1	32		32			5	
	224100014718	化工热力学 Chemical Engineering Thermodynamics	3	48	48				5	
	224100014818	冶金原理 Metallurgical Principle	3	48	48				5	
	224100014918	固体废物处置与资源化 Disposal and Reuse of Solid Waste	2	32	32				6	
	224110015018	固体废物处置与资源化实验 Experiments of Disposal and Reuse of Solid Waste	0/1	32		32			6	

课程类别 Course Classi-fied	课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业必修 Required Courses	224100015118	环境工程学（B） Environmental Engineering	2	32	32				6	
	213113019613	环境工程学实验 Experiments of Environmental Engineering	0/1	32		32			6	
	224100015418	分离工程 Separation Engineering	2	32	32				6	
	224101006013	清洁生产与循环经济 Clean Production and Recycling Economy	1.5	24	24				6	
专业选修 Elective courses	213103021513	环境监测（B） Environmental Monitoring (B)	2	32	32				5	共选修 9.5 个学分，其中第 5 学期最少选修 2 个学分，6 学期总计最少选修 5.5 个学分，第 7 学期最少选修 2 个学分
	224100019518	资源循环科学与工程专业英语 Professional English for Resource Recycling Science and Engineering	1.5	24	24				6	
	213103029713	环境规划与管理 Environmental Plans and Management	2	32	32				6	
	224100018318	生物化学 Biochemistry	2	32	32				6	
	224100015718	固废处理与生态材料 Solid Waste Disposal and Ecological Materials	1.5	24	24				6	
	224100015818	化工设备机械基础 Fundamental Chemical Process Equipment	2	32	32				6	
	224100021018	遥感技术与应用 Remote Sensing Technology and Application	2	32	32				6	
	224100015918	结晶学与工业结晶 Crystallography and Industrial Crystallization	2	32	32				6	
	224100015518	化工安全与环保 Chemical Safety and Environmental Protection	2	32	32				6	
	224100022118	文献检索及科技论文写作 Literature Retrieval and Scientific Paper Writing	0.5/0.5	24	8	16			7	

课程类别 Course Classi-fied	课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classification				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业选修 Elective courses	2241000095	计算机在资源循环科学与工程中的应用 Application of Computer in Resource Circulation Science and Engineering	2	32	32				7	
	224100020918	生态学 Ecology	2	32	32				7	
	224100016118	资源循环加工工厂设计 Resource Recycling Processing Plant Design	1.5	24	24				7	
	224100016218	化工工艺学 Chemical technology	2	32	32				7	
	224100016318	生化分离工程 Biochemical Separation Engineering	1.5	24	24				7	
	2241000100	高分子化学与物理 Polymer Chemistry and Physics	2	32	32				7	
	2241000098	废弃机电电子电器资源化利用技术 Recycling Technology of Waste Electrical and Electronic Equipment	2	32	32				7	
	2241000105	生物质转化与利用 Biomass Conversion and Utilization	2	32	32				7	
	224100016518	生物冶金原理与技术 Principle and Technology of Biological Metallurgy	2	32	32				7	
	224100016618	再生金属冶金学 Regenerated Metal Metallurgy	2	32	32				7	

学分要求： 学分: 43.5 其中必修 34 学分； 选修 9.5 学分

Demand of Credits: Credits: 43.5 Required: 34 Elective: 9.5

表四：实践教学平台

Form IV: Practical Teaching Platform

类别 Category		课程编号 Course Code	实践教学名称 Practical Teaching Name	学分 Crs.	周数 Total Period	学时类型 Type of Period		开课学期 Semester	地点 Place
						实验 Exp.	实习 Pra.		
教学实践 Teaching Practice	课程设计 Project Design	2241100111	化工原理程设计 Chemical Engineering Principle Design	2	2W			5	
		2241100109	资源循环科学与工程课程设计 Resource Recycling Science and Engineering Design	2	2W			6	
	小计 Preliminary			4	4W				
教学实习 Teaching Exercitation	教学实习 Teaching Exercitation	2241100080	工程测量学实习 Engineering Surveying Practice	0.5	0.5W			2	
		224110006213	认识实习 Cognition Practice	1	1W		√	3	
		701110000118	工程训练 A Engineering Training A	1	1W		√	4	
	小计 Preliminary			2.5	2.5W				
	毕业实习 Graduation Practice	224110000313	生产（或毕业）实习 Production (or Graduation) Practice	3	3W		√	7	
	毕业论文（设计） Graduation Project（Thesis）	224110017718	毕业设计（论文） Graduation Project（Thesis）	14	14W			8	
	小计 Amount			17	17W				
总计 Amount			学分 Credits 23.5		学时 Period 23.5W			周 Weeks 23.5	

表五：创新创业平台

Form V: Innovation & Entrepreneurship Platform

类别 Category	学分 Crs.
创新学分 Innovation Credits	3
创业学分 Entrepreneurship Credits	2
总计 Amount	5

水文与水资源工程专业本科培养方案

Undergraduate Program for Hydrology and Water Resources Engineering

一、培养目标

Ⅰ Educational Objectives

本专业培养适应国家经济社会发展需要，德、智、体、美、劳全面发展，具有良好的思想品德、人文素养、职业道德和敬业精神，具备扎实的基础知识，富有创新精神的水文与水资源工程专业高级专门人才。学生毕业后 5 年左右，能够在水利（水务）、国土、能源、交通、城建、农林、环保、地矿等部门从事水文、水资源、水环境及水生态领域的勘测、评价、规划、设计、预测预报、管理和科学研究等方面的工作，并达到以下目标：

目标 1（知识能力）：能够掌握水文与水资源工程专业相关技术发展现状，融会贯通工程数理基础知识和水文与水资源工程专业知识，具备独立发现、研究与解决复杂工程问题的能力。

目标 2（实践能力）：具备系统思维和可持续发展理念，能将知识有效运用到水文、水资源、水环境和水生态相关的勘测评价、规划设计、预测预报的实践中，并具备一定的创新能力。

目标 3（职业素养）：具备家国情怀、高尚的职业道德、社会责任感和良好的人文科学素养，具有与主管部门、业界同行、相关专业的配合和协调能力，具有一定的国际视野和文化交流能力。

目标 4（发展潜能）：具有终身学习的能力，具有一定的批判性思维能力，能及时了解水文与水资源工程专业最新理论、技术及国际前沿动态，有效地持续自主学习以适应社会和行业的多样性发展。

This major is designed to cultivate senior engineering professionals who meet the needs of economic and social development of the country, region or ethnic minority, have good moral education, humanistic quality, professional ethics and professionalism, solid basic knowledge and innovative spirit. After graduating 5 years, students can be engaged in surveying, evaluating, planning, designing, predicting and forecasting, managing and researching in the field of hydrology, water resources, water environment and hydroecology in the departments of water conservancy, water affairs, land, energy, transportation, urban construction, agriculture and forestry, environmental protection, geology and mineral and achieve the following goals:

Goal 1 (knowledge capability): Able to grasp the development status of technologies in hydrology and water resources engineering, master the basic knowledge of engineering, mathematics and professional knowledge, and have the ability to discover, research and solve complex engineering problems independently.

Goal 2 (practical ability): Have the systematic thinking and idea of sustainable development, can effectively apply knowledge to the practice of surveying and evaluating, planning and designing, predicting and forecasting, and have the innovation ability.

Goal 3 (professional quality): Posses family and country feelings, noble professional ethics, social responsibility and good humanities literacy, have the ability to cooperate and coordinate with competent authorities, industry peers, and related majors, and have certain international vision and cultural exchange ability.

Goal 4 (potential for development): Have the ability of lifelong learning and certain critical thinking skills, able to keep abreast of the latest theories, technologies and international cutting-edge developments in hydrology and water resources engineering, and can study independently, effectively and continuously to adapt to the diverse development of society and industry.

二、培养规格

Ⅱ Cultivation Standards

I）学制

Length of Schooling

修业年限：4 年

Duration: 4 years

II）学位

Degree

授予学位：工学学士学位

Degrees conferred: Bachelor of Engineering

III）人才培养基本要求

Basic requirements for Cultivation

本专业学生学习数学、自然科学和水文水资源、水生态环境等方面的基本知识和基础理论，受到工程测量、科学运算、实验和测试等方面的基本训练，能够运用数学、自然科学和水文水资源、水生态环境方面的基础理论和基本技能，分析解决本专业及相关领域实际问题，具有从事本专业及相关领域科学研究和管理工作的基本能力。

毕业生应获得以下几方面的知识、能力和素养：

1. 工程知识：能够将数学、自然科学、工程基础知识和水文、水资源、水环境、水生态专业知识用于解决复杂工程问题。

2. 问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达、并通过文献研究分析水文、水资源、水环境及水生态有关的复杂工程问题，获得有效结论。

3. 设计/开发解决方案：能够设计针对水文、水资源、水环境及水生态有关的复杂工程

问题的解决方案，设计满足特定需求的系统、单元或工艺流程，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

4. 研究：能够基于科学原理并采用科学方法，对水文、水资源、水环境及水生态有关的复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

5. 使用现代工具：能够针对水文、水资源、水环境及水生态有关的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟。

6. 工程与社会：熟悉国家和地方涉水的政策和法律法规，能够基于工程相关背景知识进行合理分析，评价专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

7. 环境和可持续发展：能够理解和评价针对水文水资源复杂工程问题的工程实践对环境、社会可持续发展的影响。

8. 职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

9. 个人和团队：能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。

10. 沟通和表达：能够就水文、水资源、水环境及水生态有关的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

11. 项目管理：理解并掌握工程管理原理和经济决策方法，并能够在多学科环境中应用。

12. 终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

Students in this major study basic knowledge and basic theories in mathematics, natural sciences, hydrology and water resources, water ecological environment, etc., and are trained in engineering surveying, scientific calculations, experiments and tests, and can use basic theories and basic skills to analyze and solve practical problems in this profession and related fields, and have basic ability to engage in scientific research and management in this field and related fields.

Graduates should acquire the following knowledge, abilities and qualities:

1. Engineering knowledge: Apply knowledge of mathematics, science, hydrology, water resources, water environment and hydroecology to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, research literature and analyse complex engineering problems concerned with hydrology, water resources, water environment and hydroecology, reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

3. Design / Develop solutions: Design solutions for complex engineering problems concerned

with hydrology, water resources, water environment and hydroecology and design systems, components or processes that meet specified needs and be able to embody innovative awareness with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

4. Research: Conduct investigations of complex problems concerned with hydrology, water resources, water environment and hydroecology using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

5. Apply modern tools: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities concerned with hydrology, water resources, water environment and hydroecology.

6. Engineering and societal: Familiar with national and local policies and laws and regulations, and apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

7. Environment and sustainable development: Understand and evaluate the impact of engineering practice solving complex engineering problems in hydrology and water resources in environmental and societal sustainable development.

8. Professional standards: Have humanity and social science literacy and social responsibility, being able to understand and abide by professional ethics and standards responsibly in engineering practice.

9. Individual and teams: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

10. Communication: Communicate effectively on complex engineering activities concerned with hydrology, water resources, water environment and hydroecology with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions, and communicate in cross-cultural contexts with international perspective.

11. Project management: Demonstrate knowledge and understanding of engineering and management principles and apply these in multidisciplinary environments.

12. Life-long learning： Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

三、毕业要求实现矩阵

Ⅲ Graduation requirement realization matrix

课程及毕业要求	毕业要求 1	毕业要求 2	毕业要求 3	毕业要求 4	毕业要求 5	毕业要求 6	毕业要求 7	毕业要求 8	毕业要求 9	毕业要求 10	毕业要求 11	毕业要求 12
军事理论								H				H
军事技能训练								H				H
国家安全教育								H				H
劳动教育								H				H
英语										H		
体育								M				M
计算机基础					H							
思想道德与法治								H				
形势与政策							M	H				H
中华民族共同体概论						H				H		
中国近现代史纲要								H				H
马克思主义基本原理								H				H
毛泽东思想和中国特色社会主义理论体系概论								H				H
就业指导								M	H			
体育素质								H				H
民族资源与环境保护导论			M			H						
无机化学	M	H										

课程及毕业要求	毕业要求1	毕业要求2	毕业要求3	毕业要求4	毕业要求5	毕业要求6	毕业要求7	毕业要求8	毕业要求9	毕业要求10	毕业要求11	毕业要求12
无机化学实验				H								
分析化学	H	H										
分析化学实验				H								
高等数学	H											
线性代数	M											
大学物理	H											
大学物理实验				H								
工程测量学	H	M										
画法几何&工程制图	H				L							
概率论与数理统计	M											
程序设计语言（C）					H							
程序设计语言（Matlab）					H							
自然地理学	M	L		L			L					
气象学	M	L		L								
水利工程概论	H		H	H		M					L	
水利工程 CAD	M				H							
水力学	H	M	L	L								
水力学实验				H	M							
工程力学	H	M										
水文学原理	L	H	L	M	M							
水文学原理实验	M	M		H								
水文统计	L		M	L	L							

课程及毕业要求	毕业要求1	毕业要求2	毕业要求3	毕业要求4	毕业要求5	毕业要求6	毕业要求7	毕业要求8	毕业要求9	毕业要求10	毕业要求11	毕业要求12
水文测验	L	L	H									
水文测验实验				H								
水环境监测	M	M		M			L					
水环境监测实验				H	H							
水文预报			H	M								
水文预报实验			M		H							
水文分析与计算	M	M	H		M	L	L					
地下水水文学	M	H	M	L								
河流动力学	M	H	M	H								
水动力学实验				H				L				
水利经济	M	M		M							H	
水环境化学	M	M					M					
水环境化学实验		M		M								
水利计算		M	H	M	M	L	L					
水资源利用			H	M							M	
水环境保护				M		L	M	L				
地理信息系统	M	M										L
地理信息系统实验					H							
地下水污染与防治	M	M		L			L					
地下水污染与防治实验	H	M		M			L					
水文测验课程设计		M	M	H						H		

课程及毕业要求	毕业要求1	毕业要求2	毕业要求3	毕业要求4	毕业要求5	毕业要求6	毕业要求7	毕业要求8	毕业要求9	毕业要求10	毕业要求11	毕业要求12
水文预报课程设计		M	M		M					H		
地下水水文学课程设计	M	M	M	M			M					
水文分析与计算课程设计		H	H	M	M					H		
水利计算课程设计		H	H	M	M					H		
水资源利用课程设计		M	H							H	H	
水环境保护课程设计	M	M		H			M			H		
工程测量学实习		M							H			
认识实习						H			M	M		
工程训练			H			M						
生产（或毕业）实习						H	H	H	M	H		H
毕业设计（论文）			H	H	M				H	H		H

注：表格中的 H、M、L 表示课程与毕业要求达成的关联度情况，“H”表示关联度强，“M”表示关联度中等，“L”表示关联度弱。

四、核心课程

Ⅳ Core Courses

自然地理学 Physical Geography、气象学 Meteorology、水力学 Hydraulics、水文学原理 Principles of Hydrology、水文统计 Hydrological Statistics、水文测验 Hydrometry、水文预报 Hydrological Forecasting、水文分析与计算 Hydrological Analysis and Computation、水利计算 Water Conservancy Computation、水资源利用 Water Resources Utilization、水环境保护 Protection of Water Environment、地下水水文学 Groundwater Hydrology、水环境化学 Aqueous Environmental Chemistry、地理信息系统 Geographic Information System

五、主要实践性教学环节

Ⅴ Main Internship and Practical Training

水力学实验 Hydraulics Experiments、水文测验实验 Hydrometry Experiments、水文学原理实验 Experiments for Principles of Hydrology、水文预报实验 Experiments of Hydrological Forecasting、水环境化学实验 Experiments of Aqueous Environmental Chemistry、水环境监测实验 Experiments of Water Environmental Monitoring、水动力学实验 Experiments of Water Dynamics、地理信息系统实验 Experiments of Geographic Information System、地下水污染与防治实验 Experiments of Groundwater Contamination and Protection、水文测验课程设计 Project Design for Hydrometry、水文预报课程设计 Project Design for Hydrological Forecasting、地下水水文学课程设计 Project Design for Groundwater Hydrology、水文分析与计算课程设计 Project Design for Hydrological Analysis and Computation、水利计算课程设计 Project Design for Water Conservancy Computation、水资源利用课程设计 Project Design for Water Resources Utilization、水环境保护课程设计 Project Design for Protection of Water Environment、工程训练 Engineering Training、认识实习 Cognition Practice、生产（或毕业）实习 Production (or Graduation) Practice、毕业设计（论文）Graduation Project (Thesis)

六、学时与学分

Ⅵ Hours/Credits

学时学分构成表

Table of Hours and Credits

<table>
<tr><th colspan="2" rowspan="2">课程类别
Courses Classified</th><th rowspan="2">学时/周数
Period/Weeks</th><th colspan="2">学分
Credits</th><th rowspan="2">学分比例
Proportion of Credits</th></tr>
<tr><th>理论
Theory</th><th>实践
Practice</th></tr>
<tr><td rowspan="2">通识课程平台
General Courses Platform</td><td>通必
General Compulsory</td><td>698</td><td>27</td><td>10.5</td><td>22.1%</td></tr>
<tr><td>通选
General Elective</td><td>192</td><td>12</td><td>0</td><td>7.1%</td></tr>
<tr><td rowspan="2">学科基础课程平台
Basic Courses Platform</td><td>必修
Compulsory</td><td>968</td><td>43</td><td>6</td><td>28.8%</td></tr>
<tr><td>选修
Elective</td><td>0</td><td>0</td><td>0</td><td>0.0%</td></tr>
<tr><td rowspan="2">专业课程平台
Major Courses Platform</td><td>必修
Compulsory</td><td>656</td><td>31</td><td>5</td><td>21.2%</td></tr>
<tr><td>选修
Elective</td><td>104</td><td>5.5</td><td>0.5</td><td>3.5%</td></tr>
<tr><td rowspan="2">实践教学平台
Practical Teaching Platform</td><td>必修
Compulsory</td><td>24.5W</td><td>0</td><td>24.5</td><td rowspan="2">14.4%</td></tr>
<tr><td>选修
Elective</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td rowspan="2">创新创业平台
Innovation and Entrepreneurship Platform</td><td colspan="2">创新学分 Innovation Credits</td><td colspan="2">3</td><td rowspan="2">2.9%</td></tr>
<tr><td colspan="2">创业学分 Entrepreneurship Credits</td><td colspan="2">2</td></tr>
<tr><td rowspan="2">小计
Amount</td><td>必修学分总数
Compulsory Credits</td><td>152</td><td>选修学分总数
Elective Credits</td><td>18</td><td>选修学分比例
Proportion of Elective Credits</td><td>10.6%</td></tr>
<tr><td>理论学分总数
Theory Credits</td><td>118.5</td><td>实践学分总数
Practice Credits</td><td>46.5</td><td>实践教学环节比例
Proportion of Internship and Practical Training</td><td>25.0%</td></tr>
<tr><td colspan="3">最低毕业学分
The Lowest Graduate Credits</td><td colspan="4">170</td></tr>
</table>

学期学分分配表

Credits for Each Term

各学期学分分配 Credits for Each Term / 课程类别 Courses Classified		学期 Term							
		一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th
通识课程平台 General Courses Platform	通必 General Compulsory	9	10	6	6	5	1	0.5	
	通选（建议） General Elective（suggestive）	2	2	2	2		2	2	
学科基础课程平台 Basic Courses Platform	必修 Compulsory	12.5	12.5	17.5	6.5				
	选修 Elective								
专业课程平台 Major Courses Platform	必修 Compulsory				8.5	14	13.5		
	选修 Elective					2	1.5	2.5	
实践教学平台 Practical Teaching Platform	必修 Compulsory		0.5		2	4	3	3	12
	选修 Elective								
小计 Amount		23.5	25	25.5	25	25	21	8	12
创新创业平台 Innovation and Entrepreneurship Platform	创新学分 Innovation Credits	3							
	创业学分 Entrepreneurship Credits	2							
最低毕业学分 The Lowest Graduate Credits		**170**							

注① 学分比例：各教学平台或教学环节占最低毕业学分的比例。

②实践教学环节，包括集中性实践教学环节和实验教学（不含体育）。集中性实践教学环节，包括培养方案内集中实施的实践、实习、课程设计、毕业设计、毕业论文、社会调查等；实验教学，包括课内实验和独立开设实验。

③学期学分分配表中，选修课须规定每学期最少修读的学分。

④必修学分总数=通必学分+基必学分+专必学分+实践（必修）学分+创新创业学分；

选修学分总数=通选学分+基选学分+专选学分+实践（选修）学分；

理论学分总数=所有平台理论学分之和；

实践学分总数=所有平台实践学分之和（不包括创新创业学分）；

最低毕业学分=必修学分+选修学分=理论学分+实践学分+创新创业学分。

七、教学进程计划表 /Ⅶ Teaching Schedule Form

表一：通识课程平台 / Form Ⅰ: General Course Platform

表一（A）：通识必修课程（通必课）/Form I (A):General Compulsory Courses (General Required)

课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
				理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
109100000418	军事理论 Military Theory	2	36	36				1	1-18
109110000318	军事技能训练 Military Skill Training	2	36			36		1	1-2
109100000818	国家安全教育 National Security Education	1	16	16				1	/
112110010718	劳动教育 Labor Education	0/1	32			32		1-7	1-16
20W100000613	英语 1 English 1	2	32	32				1	4-11
218110000313	体育 1 Physical Education 1	0/1	26			26		1	4-15
217100014918	思想道德与法治 Moral Education and Rule of Law	2.5/0.5	52	40		12		2	1-14
217100015218	形势与政策 Situation and Policy	2	32	16		16		2	1-16
225100000118	中华民族共同体概论 Education of Chinese Minzu Community Consciousness	1.5/0.5	36	24		12		2	1-8
20W100000713	英语 2 English 2	2	32	32				2	1-8/9-16
218110000213	体育 2 Physical Education 2	0/1	32			32		2	1-16
2171000122	中国近现代史纲要 Essentials of China Modern and Contemporary History	2.5/0.5	52	40		12		3	1-14
20W100000813	英语 3 English 3	2	32	32				3	1-8/9-16
218110000413	体育 3 Physical Education 3	0/1	32			32		3	1-16
217100012318	马克思主义基本原理 Basis Principles of Maxism	2.5/0.5	52	40		12		4	1-14
20W100000913	英语 4 English 4	2	32	32				4	1-8/9-16

218110000113	体育 4 Physical Education 4	0/1	32			32		4	1-16
2171000121	毛泽东思想和中国特色社会主义理论体系概论 Introduction to MAO Zedong Thought and Socialist Theoretical System with Chinese Characteristics	4/1	88	64		24		5	1-16
115100000113	就业指导 Employment Guidance	1	16	16				6	1-8/ 9-16
218110012718	体育素质	0/0.5	0			0		7	1-16
学分要求：学分: 37.5 Demand of Credits: Credits: 37.5									

注：大学英语扩展课程包括①20W100000813 英语 3②20W100000913 英语 4③20W100001018 学术英语阅读与写作④20W100001318 高级媒体英语视听说⑤20W100001518 英语国家社会与文化⑥20W100001818 中国民族传统文化（英文），要求在第 3,4 学期完成 4 学分即可。

表一（B）：通识选修课程（通选课）/Form I (B): General Elective Courses

模块 **Module**	**学分** **Crs.**
心理健康与安全 Psychological Health and Safety	2
人文素养与写作 Humanistic Accomplishment and Writing	2
艺术体验与审美 Art Appreciation and Aesthetics	2
科学技术与科普 Science and Technology & Science Popularization	2
当代中国与世界 Contemporary China and the World	2
中华文化与文明 Chinese Culture and Civilization	1
运动锻炼与健康 Exercise and Health	1

表二：学科基础课程平台

Form II. Basic Course Platform

课程类别 Course Classified	课程编号 Courses Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
学科基础必修 Basic Courses Required	213100035618	无机化学（B）Z Inorganic Chemistry (B) Z	3	48	48				1	
	213110035818	无机化学实验（C） Inorganic Chemistry Experiments (C)	0.5	16		16			1	
	213103005213	分析化学（B） Analytical Chemistry (B)	2	32	32				1	
	213110036418	分析化学实验（B） Analytical Chemistry Experiments (B)	1	32		32			1	
	2101000113	高等数学 A(1) Higher Mathematics A (1)	4	80	64			16	1	
	2101000118	线性代数 Linear Algebra	2	48	32			16	1	
	210102000413	高等数学 A(2) Higher Mathematics A (2)	5	96	80			16	2	
	211100011118	大学物理 B(1) College Physics B (1)	3	56	48			8	2	
	211112000113	大学物理 B(1)实验 University Physics B(1) Experiments	0.5	16		16			2	
	2241000067	工程测量学 Engineering Surveying	2	32	32				2	
	224100000913	画法几何&工程制图 Descriptive Geometry & Engineering Drawing	2	32	32				2	
	2101000112	概率论与数理统计 Probability Theory and Mathematical Statistics	2.5	56	40			16	3	
	211100011218	大学物理 B(2) College Physics B (2)	2	40	32			8	3	

课程类别 Course Classified	课程编号 Courses Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
学科基础必修 Basic Courses Required	211112000213	大学物理 B(2)实验 University Physics B(2) Experiments	0.5	16		16			3	
	209100031218	程序设计语言（C）II Programming Language (C) II	2/1	64	32	32			3	
	209100031518	程序设计语言（Matlab） Programming Language (Matlab)	1/0.5	32	16	16			3	9-16
	224100003313	自然地理学 Physical Geography	2	36	32	4			3	
	224100016718	气象学 Meteorology	2	36	32	4			3	
	213103015513	水利工程概论 An Introduction to Water Conservancy Engineering	2	32	32				3	
	224100022918	水利工程 CAD Water Conservancy Engineering CAD	1/1	48	16	32			3	上机
	213103015913	水力学 Hydraulics	4	64	64				4	
	213113015113	水力学实验 Hydraulics Experiments	0.5	16		16			4	
	224100021518	工程力学 Engineering Mechanics	2	32	32				4	
学分要求：学分: 49 其中必修 49 学分，选修 0 学分 Demand of Credits: Credits: 49 Required: 49 Elective: 0										

表三：专业课程平台

Form III: Major Courses Platform

课程类别 Course Classified	课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业必修 Required Courses	213103014913	水文学原理 Principles of Hydrology	4	64	64				4	
	224110020518	水文学原理实验 Experiments for Principles of Hydrology	0.5	16		16			4	
	224100020118	水文统计 Hydrological Statistics	1.5	24	24				4	
	224100017018	水文测验 Hydrometry	2	32	32				4	
	224110017118	水文测验实验 Hydrometry Experiments	0.5	16		16			4	
	224100016818	水环境监测 Water Environmental Monitoring	1	16	16				5	
	224110016918	水环境监测实验 Experiments of Water Environmental Monitoring	0.5	16		16			5	
	2241000120	水文预报 Hydrological Forecasting	3	48	48				5	
	2241100121	水文预报实验 Experiments of Hydrological Forecasting	0.5	16		16			5	
	2241000113	水文分析与计算 Hydrological Analysis and Computation	2	32	32				5	
	224100017218	地下水水文学 Groundwater Hydrology	2.5	40	40				5	
	213103017013	河流动力学 River Dynamics	2	32	32				5	
	2241100118	水动力学实验 Experiments of Water Dynamics	0.5	16		16			5	
	213103015613	水利经济 Economics of Water Conservancy	2	32	32				5	
	213103016413	水环境化学 Aqueous Environmental Chemistry	2	32	32				6	
	213113019013	水环境化学实验 Experiments of Aqueous Environmental Chemistry	0.5	16		16			6	
	2241000114	水利计算 Water Conservancy Computation	2	32	32				6	

课程类别 Course Classified	课程编号 Course Code	课程名称 Course Names	学分数 Crs.	总学时 Hrs.	学时类型 Period Classified				开课学期 Semester	备注 Notes
					理论 The.	实验 Exp.	实践 Pra.	习题 Ueb		
专业必修 Required Courses	213103032313	水资源利用 Water Resources Utilization	2	32	32				6	
	213103017313	水环境保护 Protection of Water Environment	2	32	32				6	
	224100020718	地理信息系统 Geographic Information System	1	16	16				6	
	224110002513	地理信息系统实验 Experiments of Geographic Information System	1	32		32			6	
	213103032213	地下水污染与防治 Groundwater Contamination and Protection	2	32	32				6	
	224110020618	地下水污染与防治实验 Experiments of Groundwater Contamination and Protection	1	32		32			6	24 学时硬件类、8 学时软件类
专业选修 Elective courses	2241000122	水文地球化学 Hydro-geochemistry	2	32	32				5	要求选修 6 学分，其中第 5 学期最少选修 2 学分，第 6 学期最少选修 1.5 学分，第 7 学期最少选修 2.5 学分
	213103024513	环境生态学（B） Environmental Ecology (B)	2	32	32				5	
	224100019718	水文地质勘察 Hydrogeological Survey	1.5	24	24				6	
	213103021413	生态水文学 Ecological Hydrology	1.5	24	24				6	
	213103029813	水文水资源专业英语 Professional English for Hydrology and Water Resources	1.5	24	24				7	
	213103017413	水灾害防治 Water-related Disaster Prevention and Control	1.5	24	24				7	
	224100022118	文献检索及科技论文写作 Literature Retrieval and Scientific Paper Writing	0.5/0.5	24	8	16			7	
	224100021718	流域水文模型 Hydrological Model of Watershed	0.5/0.5	24	8	16			7	
学分要求：学分: 42 其中必修 36 学分，选修 6 学分 Demand of Credits: Credits: 42 Required: 36 Elective: 6										

表四：实践教学平台

Form IV: Practical Teaching Platform

课程类别 Course Classified		课程编号 Course Code	实践教学名称 Course Names	学分 Crs.	周数 Total Period	学时类型 Period Classified		开课学期 Semester	地点 Place
						实验 Exp.	实习 Pra.		
教学实践 Teaching Practice	课程设计 Project Design	213113031413	水文测验课程设计 Project Design for Hydrometry	1	1W			4	
		2241100129	水文预报课程设计 Project Design for Hydrological Forecasting	1	1W			5	
		2241100115	水文分析与计算课程设计 Project Design for Hydrological Analysis and Computation	1	1W			5	
		224110023118	地下水水文学课程设计 Project Design for Groundwater Hydrology	1	1W			5	
		2241100116	水利计算课程设计 Project Design for Water Conservancy Computation	1	1W			6	
		213113029513	水资源利用课程设计 Project Design for Water Resources Utilization	1	1W			6	
		224110000813	水环境保护课程设计 Project Design for Protection of Water Environment	1	1W			6	
	小计 Amount			7	7W				
教学实习 Teaching Exercitation	教学实习 Teaching Exercitation	2241100080	工程测量学实习 Engineering Surveying Practice	0.5	0.5W		√	2	校内 At School
		224110006213	认识实习 Cognition Practice	1	1W		√	4	校外 Out of School
		701110000118	工程训练 A Engineering Training	1	1W		√	5	校外 Out of School
	毕业实习 Graduation Practice	224110000313	生产（或毕业）实习 Production (or Graduation) Practice	3	3W		√	7	校外 Out of School
教学实习 Teaching Exercitation	毕业论文（设计） Graduation Thesis (Project)	224110017618	毕业设计（论文） Graduation Project (Thesis)	12	12W			8	校内 At School
	小计 Amount			17.5	17.5W				
总计 Amount			学分 Credits 24.5　学时 Period 24.5W　周 Weeks 24.5						

表五：创新创业平台

Form V: Innovation &Entrepreneurship Platform

课程类别 **Course Classified**	**学分** **Crs.**
创新学分 Innovation Credits	3
创业学分 Entrepreneurship Credits	2
总计 Amount	5