

水文与水资源工程专业培养方案

一、专业培养目标

本专业面向国家水资源开发利用与生态文明建设需求，培养德、智、体、美、劳全面发展，具备较好的人文素质、扎实的自然科学基础和较强的计算机、外语水平，掌握水文水资源、岩土工程及其赋存地质环境方面的专业知识，具备分析与解决问题能力的专业人才。毕业后可在水利、自然资源、城建、环保等部门从事勘查、规划、设计、预报、监测、评价及科研、管理等工作。经过 5 年的实际工作，能够成为专业骨干，具备工程师或与之相当的专业技术能力，并能通过不断学习适应发展。

二、毕业要求

1 工程知识：掌握数学、物理、化学、计算机以及地球科学等方面的基础知识、基本原理和基本野外工作方法，掌握解决复杂工程问题的专业基础知识；能够将数学、自然科学、工程基础和专业知识用于解决复杂水文水资源以及相关工程问题；

2 问题分析：能够应用数学、自然科学和工程科学的基本知识和原理，识别、表达水文水资源以及相关领域的复杂工程问题，能通过文献研究分析复杂工程问题，以获得有效结论；

3 设计/开发解决方案：能够针对水文水资源及相关领域复杂工程问题设计满足特定需求的解决方案，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与水资源及相关领域复杂工程问题进行研究，能够设计实验、分析与解释相关研究数据、并通过对信息的综合分析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及相关领域复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具、信息技术工具和专业软件，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：能够基于工程相关背景知识对水文水资源及相关领域具体工程问题进行合理分析，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；

7 环境和可持续发展：能够理解和评价针对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，热爱祖国，了解中国国情，自觉树立和践行社会主义核心价值观；了解与水文水资源以及相关行业和职业有关的法律、法规、国家和行业标准，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：能够理解团队的重要性以及各种角色的责任和义务，具有团队合作意识和协调能力，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：能够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。较熟练地掌握一门外语，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。

三、主干学科

水利工程

四、学制与学位

学制四年，学生修满所规定的最低毕业学分，达到培养目标规定的各项要求后，授予工学学士学位。

五、核心课程

本专业核心课程包括水文学原理、水力学、水利水电工程概论、水文统计与水文预报、水资源评价与开发利用、水文地质学基础、地下水水力学、气象与气候学、工程岩土学及实验、土力学与地基基础、工程岩体力学、水生态与水环境保护、水文地球化学基础、生态与环境水文地质学、学科前沿课程、水文与水资源工程专业英语。

主要实践环节包括北戴河地质认识实习、周口店地质教学实习、水文与水资源工程专业实习、综合课程设计等。

Undergraduate Programme in Hydrology and Water Resources Engineering

1. Academic Objectives

Focusing on the needs of water resources development and ecological civilization construction of China, the major of Hydrology and Water Resources Engineering aims to cultivate professionals that has comprehensive development of moral, intellectual, physical, aesthetic and labor; has good humanistic quality, solid foundation of natural sciences, strong computer skills and foreign language levels; to acquire the professional knowledge in hydrology and water resources, geotechnical engineering and its geological environment; has the ability to analyze and solve problems. Graduates will be qualified for working in exploration, planning, design, forecast, monitoring, evaluation, scientific research and management in hydraulic engineering, natural resources, urban construction, environmental protection and other departments. A graduate can become a professional backbone and hold a middle class professional title of engineer after five years of practical work, and can adapt to development through continuous learning.

2. Academic Requirement

1. To acquire the basic theories and knowledge of mathematics, physics, chemistry and geosciences; and have the ability using these professional and basic knowledges in solving complex engineering problems; To use mathematics, natural science, engineering foundation and professional knowledges to solve complex hydrological and water resources issues and related engineering problems;

2. To apply the basic knowledge and principles of mathematics, natural science and engineering science to identify and express complex engineering problems in hydrology and water resources and related fields, and have the ability to get effective conclusions through literature research and analysis of complex engineering problems;

3. To be able to design solutions for complex engineering problems in hydrology and water resources and related fields with specific needs, and show creative thinking in the process of design, considering social, health, safety, legal, cultural and environmental factors;

4. To be able to study complex engineering problems in hydrology, water resources and related fields using the scientific principles and methods, and can design experiments, analyze and interpret relevant research data, and get reasonable and effective conclusions through comprehensive analysis of the information;

5. To be able to develop, select and apply appropriate technologies, resources, modern engineering tools, information technology tools and professional software for solving complex engineering problems in hydrology and water resources and related fields, including the prediction and simulation of complex engineering problems considering their limitations;

6. To be able to analyze specific engineering problems in hydrology and water resources and related fields reasonably, based on basic engineering knowledges, and to evaluate the impact of engineering practice and complex engineering problem solutions on the society, health, safety, law and culture;

7. To be able to understand and evaluate the impact of engineering practice on environmental and

social sustainable development;

8. To get the quality of humanities and social sciences and love the motherland with the understanding of the China's national conditions, and to establish and practice the core socialist values; To be able to understand the laws, regulations, national and industrial standards related to hydrology and water resources and related industries and professions, to understand and abide by engineering professional ethics and norms in engineering practice, and take the responsibilities;

9. To be able to understand the importance of the teamwork, and the responsibilities and obligations of various roles, and to have the ability of cooperation and coordination in the team. To be able to play the roles of individual, team member and leader in a multidisciplinary team;

10. To be able to effectively communicate with peers in the industry and the public on complex engineering problems, including writing reports and design manuscripts, making statements, clearly expressing or responding to instructions. To grasp a foreign language, with a certain international vision, and able to communicate in a cross-cultural context;

11. To understand and grasp the engineering management principles and economic decision-making methods, and be able to apply them in a multidisciplinary environment;

12. To have the consciousness of self-learning and lifelong learning, and to be able to continuous learn and adapt to development.

3. Main disciplines

Hydraulic Engineering

4. Length of Schooling and Degree

Duration of the Program: Four years

Degree Offered: Bachelor of Engineering

5. Core Courses

The core courses include Introduction to Hydrology, Hydraulics, Introduction to Hydraulic Engineering, Hydrological statistics and hydrological forecast, Water Resources Assessment and Development, Fundamentals of Hydrogeology, Groundwater Hydraulics, Meteorology and climatology, Engineering geotechnical and experiment, Soil Mechanics and Foundation Engineering, Engineering Rockmass Mechanics, Hydroecology and Water Environment, Introduction to Hydrogeochemistry, Ecological and Environmental Hydrogeology, Frontiers of Hydrology and Water Resources Engineering, and English for Hydrology and Water Resources Engineering.

The main practice teaching includes Geological Survey Field Trip in Beidaihe, Geological Survey Field Trip in Zhoukoudian, Practice of Hydrology and Water Resources Engineering, and Integrated Course Design, etc.

六、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

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七、课程设置 (Curriculum)

1、通识教育课程 (Required Courses of General Education) : 730 学时(730 Hours), 41 学分(41Credits)

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR182022	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	48	3	48	0		考试 Exam	5	
GR181013	形势与政策 (1) Situation and Policy (1)	4	0.25	4			考查 Term paper	1	
GR181014	形势与政策 (2) Situation and Policy (2)	4	0.25	4			考查 Term paper	2	
GR181015	形势与政策 (3) Situation and Policy (3)	4	0.25	4			考查 Term paper	3	
GR181016	形势与政策 (4) Situation and Policy (4)	4	0.25	4			考查 Term paper	4	
GR181017	形势与政策 (5) Situation and Policy (5)	4	0.25	4			考查 Term paper	5	
GR181018	形势与政策 (6) Situation and Policy (6)	4	0.25	4			考查 Term paper	6	

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181019	形势与政策（7） Situation and Policy（7）	4	0.25	4			考查 Term paper	7	
GR181020	形势与政策（8） Situation and Policy（8）	4	0.25	4			考查 Term paper	8	
GR301004	大学生职业生涯规划与就业指导（1） Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	
GR303005	大学生职业生涯规划与就业指导（2） Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育（1） Mental Health（1）	16	1	16			考查 Term paper	1	
GR303006	大学生心理素质教育（2） Mental Health（2）	16	1	16			考查 Term paper	5	
GR301024	劳动教育与双创实践(1)Labor Education and Innovation and Entrepreneurship Practice(1)	16	1	16			考查 Term Paper	2	
GR303025	劳动教育与双创实践(2)Labor Education and Innovation and Entrepreneurship Practice(2)	16	1	16			考查 Term Paper	6	
GR302008	军事理论 Military Theory	36	1	36			考试 Exam	1	
GR081071	大学英语（1） College English（1）	64	4	64			考试 Exam	1	
GR081072	大学英语（2） College English（2）	32	2	32			考试 Exam	2	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2	32			考试 Exam	2	
GR141005	体育（1）（系列课程） Physical Education（1）	32	1		32		考试 Exam	1	
GR141006	体育（2）（系列课程）	32	1		32		考试	2	

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
	Physical Education (2)						Exam		
GR141007	体育(3) (系列课程) Physical Education (3)	32	1		32		考试 Exam	3	
GR141008	体育(4) (系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	16	16		考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	3	
总计 Total		730	41	492	222	16			

2、通识教育选修 (Selective Courses of General Education) : 192 学时 (192 Hours), 12 学分 (12 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类 (含在线课程) Humanities and Social Sciences Courses (Inc. Online Courses)	见附件 1	7	考查 Term paper	2-8	4 个类别中选修 7 个学分, 其中 《大学生安全教育》(1 学分) 必选。
2	自然科学类 (含在线课程) Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term paper	2-8	
3	自然文化类 Natural Culture Courses	见附件 3		考查 Term paper	2-8	

4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term paper	5-8	
5	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5-6	3	考查 Term paper	2-8	选修 3 个学分，其中《新生研讨 课》（1 学分）必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term paper	2-4	
总计 Total			12			

3、学科基础课程（Disciplinary Fundamental Courses）：928 学时(928 Hours)，58 学分(58 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR050017	水文与水资源工程专业导论 Introduction to Hydrology and Water Resource Engineering	16	1	16			考查 Term paper	1	必选
DR191001	高等数学 A（1） Advanced Mathematics A (1)	96	6	96			考试 Exam	1	
DR191010	大学化学 College Chemistry	48	3	48			考试 Exam	1	
DR191008	大学物理（1） College Physics (1)	48	3	48			考试 Exam	2	
DR011036	地球科学概论 Geosciences	64	4	32	32		考试 Exam	2	
DR191002	高等数学 A（2） Advanced Mathematics A (2)	96	6	96			考试 Exam	2	

DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR052008	水力学 Hydraulics	40	2.5	36	4		考试 Exam	3	
DR012039	综合地质学 Synthetic Geology	64	4	32	32		考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	4	
DR122001	测量学 A Surveying A	40	2.5	24	16		考试 Exam	4	
DR053007	水文地质学基础 Fundamentals of Hydrogeology	56	3.5	48	8		考试 Exam	4	
DR052075	地下水运动方程 Equations of Groundwater Hydraulics	56	3.5	56			考试 Exam	4	
SR013025	第四纪地质与地貌学 Quaternary Geology and Geomorphology	48	3	24	24		考试 Exam	4	
DR053011	水利水电工程概论 Introduction to Hydraulic Engineering	40	2.5	40			考试 Exam	5	
SR053076	水文地球化学基础 Introduction to Hydrogeochemistry	48	3	40	8		考试 Exam	5	
DR052010	水文学原理 Introduction to Hydrology	40	2.5	36	4		考试 Exam	5	
总计 Total		928	58	800	128		考试 Exam		

4、专业核心课程 (Specialized Core Courses) : 384 学时(384 Hours), 24 学分(24 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
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SR052077	工程岩土学及实验 Engineering Petrology	56	3.5	34	22		考试 Exam	4	
SR053078	土力学与地基基础 Soil Mechanics and Foundation Engineering	48	3	48			考试 Exam	5	
SR052041	气象与气候学 Meteorology and climatology	32	2	32			考试 Exam	5	
SR053079	水生态与水环境保护 Hydroecology and Water Environment	32	2	32			考试 Exam	5	
SR053082	工程岩体力学 Engineering Rock Mass Mechanics	32	2	32			考试 Exam	6	
SR053080	水文统计与水文预报 Hydrological statistics and hydrological forecast	56	3.5	40	16		考试 Exam	6	
SR053081	水资源评价与开发利用 Water Resources Assessment and Development	48	3	48			考试 Exam	6	
SR053040	地下水水力学 Groundwater Hydraulics	48	3	44		4	考试 Exam	6	
SR054030	水文与水资源工程专业英语 English for Hydrology and Water Resources Engineering	32	2	32			考试 Exam	7	
总计 Total		384	24	342	38	4			

5、专业拓展课程（Specialized Development Courses）：128 学时(128 Hours)，8 学分(8 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
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SS053083	生态与环境水文地质学 Ecology and Environmental Hydrogeology	32	2	28	4		考试 Exam	5	
SS050040	水文地质学进展 Advances in Hydrogeology	16	1				考查 Term Paper	6	六 选 一
SS050041	现代水文水资源的研究前沿 Research frontiers of modern hydrology and water resources	16	1				考查 Term Paper	6	
SS050076	土壤/地下水污染修复前沿 Advances in soil/groundwater remediation	16	1				考查 Term Paper	6	
SS014130	地球关键带研究前沿 Research Frontiers of Earth Critical Zone	16	1				考查 Term Paper	6	
SS050042	环境科学与工程学科前沿 Frontiers of Environmental Science and Engineering	16	1				考查 Term Paper	6	
SS050079	地下水模拟不确定性分析 Uncertainty Analysis for Groundwater Flow Modeling	16	1				考查 Term Paper	6	
SR053037	地质灾害与防治 Geological Hazard and Prevention	40	2.5	36	4		考试 Exam	6	
SS054084	工程经济与项目管理 Engineering Economy and Project Management	40	2.5	40			考试 Exam	7	
总计 Total		128	8	120	8				

6、课程实践（Course Practice）：29 周+232 学时(29 weeks and 232 hours)，34.5 学分(34.5 Credits)

课程代码 Course Code	课程名称 Course Name	周数 (学时) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311003	军事技能训练 Military Theory and Practice	2 周	1	考查 Term Paper	1 夏	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考试 Exam	1 夏	
PR011044	北戴河地质认识实习 Geological Survey Field Trip in Beidaihe	2 周	2	考查 Term Paper	1 夏	
PR191045	实验物理 (1) Physics Experiments (1)	24 学时	1	考试 Exam	2	
PR191047	实验化学 Chemistry Experiments	48 学时	2	考试 Exam	2	
PR012046	周口店地质教学实习 Geological Survey Field Trip in Zhoukoudian	5 周	5	考查 Term Paper	2 夏	
PR191046	实验物理 (2) Physics Experiments (2)	24 学时	1	考试 Exam	3	
PR122059	测量实习 Instructive Practice for Engineering Surveying	1 周	1	考查 Term Paper	4	
PR052069	综合课程设计 (1) Integrated Course Design (1)	16 学时	1	考查 Term Paper	5	
PR053067	AutoCAD 与水工环制图 AutoCAD and Mapping for Hydrogeology	32 学时	2	考试 Exam	6	
PR053086	GIS 基础及水工环应用 Introduction to GIS and its Application in Groundwater sciences	40 学时	2.5	考查 Term Paper	6	
PR053070	综合课程设计 (2) Integrated Course Design (2)	16 学时	1	考查 Term Paper	6	
PR052087	水文与水资源工程专业实习 Practice of Hydrology and Water Resources Engineering	7 周	7	考查 Term Paper	3 夏	

PR054066	毕业论文（论文） Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		29 周+ 232 学时	34.5			

7、课外实践（Extracurricular practice）：6 学分(6 Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等，其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

八、毕业要求与培养目标矩阵（工程教育认证类专业）

毕业要求	培养目标			
	人文素养： 德、智、体、美、劳全面发展，具备较好的人文素质	基础知识： 具备较好的人文素质、扎实的自然科学基础和较强的计算机、外语水平	专业知识：掌握水文水资源、岩土工程及其赋存地质环境方面的专业知识	专业能力： 具备分析与解决问题能力，毕业后可在水利、自然资源、城建、环保等部门从事勘查、规划、设计、预报、监测、评价及科研、管理等工作
1.工程知识		√	√	
2.问题分析		√	√	√
3.设计/开发			√	√
4.研究			√	√
5.使用现代工具			√	√
6.工程与社会			√	√

7.环境和可持续发展			√	√
8.职业规范	√		√	√
9.个人与团队	√			√
10.沟通	√			√
11.项目管理				√
12.终身学习				√

九、课程与毕业要求关系矩阵（工程教育认证专业类专业参考）

<div> <div>毕业要求</div> <div>课程名称</div> </div>	(1) 工程知识	(2) 问题分析	(3) 设计/开发解 决方案	(4) 研究	(5) 使用现代工 具	(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
思想道德与法治								H		L		
毛泽东思想和中国特色社会主义 理论体系概论								H				
中国近现代史纲要								M				
马克思主义基本原理								M			L	M
习近平新时代中国特色社会主义思想概论								M			L	M
形势与政策								H				
大学生心理素质教育								M		H	M	
大学英语										H		L
大学英语素质拓展课										H		L
体育									L			H
大学计算机			M		H							M
程序设计基础 A			L	M	H							M
大学生职业生涯规划与就业指导									M	L		H

高等数学	M	H		L								
线性代数	M	H		L								
概率论与数理统计	M	H		L								
大学物理	H	M	L	M								
大学化学	H	M		M			L					
地球科学概论						M	M					
测量学 A		M		M	H							
水文地质学基础	M	H	M	M		M	M					
水力学	H	H	M	M	L	L			L			
地下水运动方程	H	H	M	H	L		L					
综合地质学	M	H		M			L					
第四纪地质与地貌	M	H		M			L					
水利水电工程概论	H	H	L	L		M	L	M				
水文地球化学基础	M	H		M	M	L	M	L				
气象学与气候学		H	M	H	M		M					
新生研讨课	L	L	L	H	L	M	M		M	M		
专业导论课	H	H	H	H	H	H	H		M	M		
水文与水资源工程专业英语	H	H					M			H		
水文学原理	H	H	H	M	L	L	L		L			
工程岩土学及实验	H	H	H	M	M	M	L		M			
土力学与地基基础	H	H	H	M		M	L		M			

工程岩体力学	H	H	H	M	M	L	L		M			
水文统计与水文预报	H	H	H	M	M	M	L		L			
水资源评价与开发利用	H	H	H	M	M	H	H		M			
水生态与水环境保护	H	H	H	M	M	H	H	H	M		M	
地下水水力学	M	H	H	H	M	H	H		M			
学科前沿课程	H	H	H	H	M	H	H		M	M		
地质灾害与防治	H	H	H	M	L	H	H		L	L		
生态与环境水文地质学	H	H	H	M	M	H	H	H	M			
军事理论						M			H			
军事技能训练									H			
思想政治社会实践								H			M	M
实验物理		H		H								
实验化学		H		H			L					
北戴河地质认识实习	H	H	H	M	M	H	M					
周口店地质教学实习	H	H	H	M	M	H	M					
测量实习		H		M	M							
水文与水资源工程专业实习	H	H	H	H	M	H	H					
毕业论文 / 设计 (水文)	H	H	H	H	M	H	H					
AutoCAD 与土工环制图					H							
工程经济与项目管理	H	H		M		H	H	M	M		H	
综合课程设计 I	H	H	H	M			M		M			
综合课程设计 II	H	H	H	M			M		M			

GIS 基础与土工环应用	H	H	M	M	H	L	L					
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通识教育选修课课程						H	H	H	H	H	H	H
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注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。

地下水科学与工程专业培养方案

一、专业培养目标

本专业围绕国家地下水资源开发与生态文明建设需求，培养德、智、体、美、劳全面发展，具备较好的人文素质、扎实的数理基础和较强的计算机、外语水平，掌握地球科学基本理论和野外工作方法，精通地下水科学与工程的专业知识和技能，具备分析与解决问题能力的专业人才。毕业后可在自然资源、水利、城建、环保等部门从事与专业相关的勘查、规划、设计、监测、评价以及科研、管理等工作。经过 5 年的实际工作，能够成为专业骨干，具备工程师或与之相当的专业技术能力，并能通过不断学习适应发展。

二、毕业要求

1 工程知识：掌握数学、物理、化学、水力学、水文学、计算机、地质、水文地质等方面的基础知识，并能用于分析与解决地下水问题。

2 问题分析：能够应用地下水科学与工程的基本原理建立水文地质概念模型，正确描述地下水工程问题；能够通过文献研究寻求解决地下水工程问题的多种可行方案，获得有效结论。

3 设计/开发解决方案：能够设计针对不同地下水工程问题的解决方案，并能够在设计环节体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

4 研究：能够基于地下水科学与工程的基本原理并采用科学方法对地下水问题进行研究，包括设计实验、开展实验、分析与解释数据，通过综合分析得到合理有效的结论。

5 使用现代工具：掌握运用专业设备和仪器进行野外地下水调查、监测、取样及室内测试；熟悉并掌握一定专业软件，进行水化学数据分析、水文地质图件编制、地下水数值模拟等，定量分析与研究地下水科学与工程问题。

6 工程与社会：了解与地下水相关的国家法律法规和行业标准规范，能分析和评价地下水方面的工程实践对社会、健康、安全、法律、文化的影响，以及这些制约因素对项目实施的影响。

7 环境和可持续发展：理解国家生态文明建设和可持续发展的理念和内涵，能够理解和评价地下水工程对环境、社会可持续发展的影响。

8 职业规范：具有正确的价值观，能够在工程实践中理解并遵守职业道德和规范，履行责任。

9 个人和团队：具备良好的个人素养，具有良好的团队合作意识和协作精神，能够在多学科背景下的团队中根据需要承担相应的责任。

10 沟通：能够就地下水科学与工程问题撰写专业报告，能与业界同行及社会公众进行有效沟通和交流；具备一定的国际视野，能就专业问题用英语进行沟通和交流。

11 项目管理：理解并掌握地下水领域的工程管理原理、经济决策方法，并能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，能够采用合适的方法，提高自主学习能力，适应地下水科学与工程及社会发展需要的能力。

三、主干学科

地质学、地质资源与地质工程。

四、学制与学位

学制四年，学生修满所规定的最低毕业学分，达到培养目标规定的各项要求后，授予工学学士学位。

五、核心课程

核心课程：矿物学与岩石学、古生物学与地史学、构造地质学、测量学 A、第四纪地质学与地貌学、地下水科学概论、水力学、地下水运动方程、水文学原理、地下水动力学、地下水水化学、工程土质土力学、地下水数值模拟、地下水监测、地下水资源评价、污染水文地质学、工程岩体力学、地下水勘查、地下水科学专论、地下水科学与工程专业英语、生态与环境水文地质学、地质灾害与防治。

主要实践性教学环节：测量实习、水文地质调查方法设计、GIS 基础与土工环应用、毕业设计（论文）、军事理论及训练、北戴河地质认识实习、周口店地质教学实习、专业实习、地下水污染调查评价实践。

Undergraduate Program in Groundwater Science and Engineering

1. Academic Objectives

Focusing on the needs of groundwater resources development and ecological civilization construction of China, the major of Groundwater Science and Engineering aims to cultivate professionals that has comprehensive development of moral, intellectual, physical, aesthetic and labor; has good humanistic quality, solid mathematical foundation, strong computer skills and foreign language levels; grasps the basic theory of Earth Sciences and field work methods; and is proficient in professional knowledge and skills of groundwater science and engineering; has the ability to analyze and solve problems. Graduates can be qualified in exploration, planning, design, monitoring, evaluation, scientific research, management and some other works in such areas as natural resources, water conservancy, urban construction, environmental protection. A graduate can become a professional backbone and hold a middle-class professional title of engineer after five years of practical work, and can adapt to development through continuous learning.

2. Academic Requirement

1 Engineering knowledge: To master basic knowledge in mathematics, physics, chemistry, hydraulics, hydrology, computer, geology, hydrogeology, etc., and can be used to analyze and solve groundwater problems.

2 Problem analysis: To apply the basic principles of groundwater science and engineering to establish hydrogeological conceptual models and correctly describe groundwater engineering problems; find a variety of feasible schemes to solve the groundwater engineering problems through literature research, and obtain effective conclusions.

3 Design and develop solutions: To be able to design and develop solutions to resolve complex groundwater engineering problems with the sense of innovation and considering the factors of society, health, safety, law, culture, and environment.

4 Research: To be able to study groundwater problems based on the basic principles and scientific methods of groundwater science and engineering, including designing experiments, conducting experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through comprehensive analysis.

5 Using modern tools: To master the use of professional equipment and instruments for field groundwater surveys, monitoring, sampling, and indoor testing; be familiar with certain professional software for hydrochemical data analysis, hydrogeological map compilation, groundwater numerical simulation, etc., quantitatively analyze and study groundwater science and Engineering problems.

6 Engineering and society: To understand the national laws and regulations and industry standards related to groundwater, and be able to analyze and evaluate the impact of groundwater engineering practices on society, health, safety, law, and culture, as well as the impact of these constraints on project implementation.

7 Environment and sustainable development: To understand the concept and connotation of national ecological civilization construction and sustainable development, and be able to understand and evaluate the impact of groundwater engineering on the environment and sustainable development of society.

8 Occupational norms: To establish correct values, be able to understand and abide by professional ethics and norms in engineering practice, and perform responsibilities.

9 Individuals and teams: To have good personal qualities, a good sense of teamwork and collaboration spirit, be able to undertake corresponding responsibilities as needed in a team with a multi-disciplinary background.

10 Communication: To be able to write professional reports on groundwater science and engineering issues, be able to communicate effectively with industry colleagues and the public; have a certain international perspective, be able to communicate on professional issues in English.

11 Project management: To understand and master engineering management principles and

economic decision-making methods in the field of groundwater, and be able to apply them in a multidisciplinary environment.

12 Lifelong learning: To have the consciousness of self-learning and lifelong learning, be able to adopt appropriate methods to improve the ability of self-learning and adapt to the needs of groundwater science and engineering and social development.

3. Main disciplines

Geology, Geological Resources and Geological Engineering.

4. Length of Schooling and Degree

Duration of the Program: Four years

Degree Offered: Bachelor of Engineering

5. Core Courses

Core Courses: Mineralogy and Petrology, Paleontology and Historical Geology, Structural Geology, Surveying A, Quaternary Geology and Geomorphology, Introduction to Groundwater Sciences, Hydraulics, Equations of Groundwater Hydraulics, Introduction to Hydrology, Groundwater Dynamics, Groundwater Chemistry, Engineering Soil Mechanics, Groundwater Numerical Simulation, Groundwater Monitoring, Assessment of Groundwater Resources, Contaminant Hydrogeology, Engineering Rock Mass Mechanics, Investigation and Exploration of Groundwater, Special Topics of Groundwater Sciences, English for Groundwater Science and Engineering, Ecology and Environmental Hydrogeology, Geological hazards and prevention.

Practice courses: Surveying Practice, Design of Groundwater Survey, Introduction to GIS and its Application in Groundwater sciences, Undergraduate Graduation Design (Thesis), Military Theory and Training, Geological Field Practice in Beidaihe, Geological Field Practice in Zhoukoudian, Practice of Groundwater science and Engineering, Practice of Groundwater Contaminant Investigation and Evaluation.

六、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块	课程类别 Course Classification	学时数 Hours	学分 Credits	学 期 Semester										
				1	2	1 夏	3	4	2 夏	5	6	3 夏	7	8
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	730	41	11.25	9.25		8.25	5.25	1	3.25	1.25		0.25	0.25
	通识教育选修课程 Selective Courses of General Education	192	12	1										
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	896	56	10	13		13	17.5		2.5				
	专业核心课程 Specialized Fundamental Courses	448	28							12	11.5		4.5	
	专业拓展课程 Specialized Development	128	8							2	3.5		2.5	
实践教育 Practical Education	课程实践 Course Practice	30 周 +168 学时	31.5		3	4	1	1	7		3.5	7		6
	课外实践 Extracurricular practice	-	6											
必修课总学分 Required course credits				156.5										
选修课总学分 Elective course credits				26										
最低毕业总学分 Total Credits				182.5										

七、课程设置 (Curriculum)

1、通识教育课程 (Required Courses of General Education) : 730 学时(730 Hours), 41 学分(41 Credits)

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR182022	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	48	3	48	0		考试 Exam	5	
GR181013	形势与政策 (1) Situation and Policy (1)	4	0.25	4			考查 Term paper	1	
GR181014	形势与政策 (2) Situation and Policy (2)	4	0.25	4			考查 Term paper	2	
GR181015	形势与政策 (3) Situation and Policy (3)	4	0.25	4			考查 Term paper	3	
GR181016	形势与政策 (4) Situation and Policy (4)	4	0.25	4			考查 Term paper	4	
GR181017	形势与政策 (5) Situation and Policy (5)	4	0.25	4			考查 Term paper	5	
GR181018	形势与政策 (6) Situation and Policy (6)	4	0.25	4			考查 Term paper	6	
GR181019	形势与政策 (7)	4	0.25	4			考查	7	

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
	Situation and Policy (7)						Term paper		
GR181020	形势与政策 (8) Situation and Policy (8)	4	0.25	4			考查 Term paper	8	
GR301004	大学生职业生涯规划与就业指导 (1) Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	
GR303005	大学生职业生涯规划与就业指导 (2) Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育 (1) Mental Health (1)	16	1	16			考查 Term paper	1	
GR303006	大学生心理素质教育 (2) Mental Health (2)	16	1	16			考查 Term paper	5	
GR301024	劳动教育与双创实践(1)Labor Education and Innovation and Entrepreneurship Practice(1)	16	1	16			考查 Term Paper	2	
GR303025	劳动教育与双创实践(2)Labor Education and Innovation and Entrepreneurship Practice(2)	16	1	16			考查 Term Paper	6	
GR302008	军事理论 Military Theory	36	1	36			考试 Exam	1	
GR081071	大学英语 (1) College English (1)	64	4	64			考试 Exam	1	
GR081072	大学英语 (2) College English (2)	32	2	32			考试 Exam	2	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2	32			考试 Exam	2	
GR141005	体育 (1) (系列课程) Physical Education (1)	32	1		32		考试 Exam	1	
GR141006	体育 (2) (系列课程) Physical Education (2)	32	1		32		考试 Exam	2	

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR141007	体育（3）（系列课程） Physical Education（3）	32	1		32		考试 Exam	3	
GR141008	体育（4）（系列课程） Physical Education（4）	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	16	16		考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	3	
总计 Total		730	41	492	222	16			

2、通识教育选修（Selective Courses of General Education）：192 学时 (192 Hours)，12 学分 (12 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类（含在线课程） Humanities and Social Sciences Courses (Inc. Online Courses)	见附件 1	7	考查 Term paper	2-8	4 个类别中选修 7 个学分，其中 《大学生安全教育》（1 学分）必选。
2	自然科学类（含在线课程） Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term paper	2-8	
3	自然文化类 Natural Culture Courses	见附件 3		考查 Term paper	2-8	

4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term paper	5-8	
5	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5-6	3	考查 Term paper	2-8	选修 3 个学分，其中《新生研讨 课》（1 学分）必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term paper	2-4	
总计 Total			12			

3、学科基础课程（Disciplinary Fundamental Courses）：896 学时 (896 Hours), 56 学分 (56 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR191001	高等数学 A（1） Advanced Mathematics A (1)	96	6	96			考试 Exam	1	
DR191010	大学化学 College Chemistry	48	3	48			考试 Exam	1	
DR050019	地下水科学与工程导论 Introduction to Groundwater Sciences and Engineering	16	1	16			考查 Term Paper	1	
DR191002	高等数学 A（2） Advanced Mathematics A(2)	96	6	96			考试 Exam	2	
DR191008	大学物理（1） College Physics (1)	48	3	48			考试 Exam	2	
DR011036	地球科学概论 Geosciences	64	4	32	32		考试 Exam	2	

DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR012066	矿物与岩石 Mineralogy and Petrology	48	3	32	16		考试 Exam	3	
DR012002	古生物学与地史学 Paleontology and Historical Geology	32	2	32			考试 Exam	3	
DR012038	构造地质学 Structural Geology	48	3	30	18		考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistic	48	3	48			考试 Exam	4	
DR122001	测量学 A Surveying A	40	2.5	24	16		考试 Exam	4	
SR013025	第四纪地质学与地貌学 Quaternary Geology and Geomorphology	48	3	24	24		考试 Exam	4	
DR053012	地下水科学概论 Introduction to Groundwater Sciences	56	3.5	48	8		考试 Exam	4	
DR052013	水力学 Hydraulics	32	2	28	4		考试 Exam	4	
DR052075	地下水运动方程 Equations of Groundwater Hydraulics	56	3.5	56			考试 Exam	4	
DR052010	水文学原理 Introduction to Hydrology	40	2.5	36	4		考试 Exam	5	
总计 Total		896	56	774	122				

4、专业核心课程 (Specialized Core Courses) : 448 学时 (448 Hours), 28 学分 (28 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
SR053046	地下水动力学 Groundwater Dynamics	48	3	44	4		考试 Exam	5	
SR053088	地下水水化学 Groundwater Chemistry	56	3.5	40	16		考试 Exam	5	
SR053049	工程土质土力学 Engineering Soil Mechanics	48	3	38	10		考试 Exam	5	
SR053089	地下水数值模拟 Groundwater Numerical Modeling	40	2.5	28		12	考试 Exam	5	
SR054044	地下水监测 Groundwater Monitoring	32	2	24	8		考试 Exam	6	
SR053042	地下水资源评价 Assessment of Groundwater Resources	40	2.5	32		8	考试 Exam	6	
SR053045	污染水文地质学 Contaminant Hydrogeology	48	3	48			考试 Exam	6	
SR053082	工程岩体力学 Engineering Rock Mass Mechanics	32	2	32			考试 Exam	6	
SR053043	地下水勘查 Investigation and Exploration of Groundwater	32	2	32			考查 Term Paper	6	
SR054048	地下水科学专论 Special Topics of Groundwater Sciences	40	2.5	38	2		考试 Exam	7	
SR054050	地下水科学与工程专业英语 English for Groundwater Science and Engineering	32	2	32			考试 Exam	7	
总计 Total		448	28	388	40	20			

5、专业拓展课程（Specialized Development Courses）：128 学时 (128 Hours)，8 学分 (8 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上 学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
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SS053083	生态与环境水文地质学 Ecology and Environmental Hydrogeology	32	2	28	4		考试 Exam	5	
SR053037	地质灾害与防治 Geological Hazard and Prevention	40	2.5	36	4		考试 Exam	6	
SS050040	水文地质学进展 Advances in Hydrogeology	16	1				考查 Term Paper	6	六 选 一
SS050041	现代水文水资源的研究前沿 Research frontiers of modern hydrology and water resources	16	1				考查 Term Paper	6	
SS050076	土壤/地下水污染修复前沿 Advances in soil/groundwater remediation	16	1				考查 Term Paper	6	
SS014130	地球关键带研究前沿 Research Frontiers of Earth Critical Zone	16	1				考查 Term Paper	6	
SS050042	环境科学与工程学科前沿 Frontiers of Environmental Science and Engineering	16	1				考查 Term Paper	6	
SS050079	地下水模拟不确定性分析 Uncertainty Analysis for Groundwater Flow Modeling	16	1				考查 Term Paper	6	
SS054084	工程经济与项目管理 Engineering Economy and Project Management	40	2.5	40			考试 Exam	7	
总计 Total		128	8	120	8				

6、课程实践（Course Practice）：30 周 +168 学时 (30 weeks and 168 hours), 31.5 学分 (31.5 Credits)

课程代码 Code	课程名称 Courses Name	周数（学时） Week（hour）	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311003	军事技能训练 Military Theory and Practice	2 周	1	考查 Term Paper	1 夏	
PR181010	思想政治社会实践	32 学时	2	考试	1 夏	

	Political Social Practice			Exam		
PR191045	实验物理 (1) Physics Experiments (1)	24 学时	1	考试 Exam	2	
PR191047	实验化学 Chemistry Experiments	48 学时	2	考试 Exam	2	
PR192046	实验物理 (2) Physics Experiments (2)	24 学时	1	考试 Exam	3	
PR122059	测量实习 Surveying Practice	1 周	1	考查 Term Paper	4	
PR053076	水文地质调查方法设计 Design of Groundwater Survey	1 周	1	考查 Term Paper	6	
PR053086	GIS 基础与土工环应用 Introduction to GIS and its Application in Groundwater sciences	40 学时	2.5	考试 Exam	6	
PR011044	北戴河地质认识实习 Geological Field Practice in Beidaihe	2 周	2	考查 Term Paper	1 夏	
PR012046	周口店地质教学实习 Geological Field Practice in Zhoukoudian	5 周	5	考查 Term Paper	2 夏	
PR053073	专业实习 Practice of Groundwater Science and Engineering	5 周	5	考查 Term Paper	3 夏	
PR053074	地下水污染调查评价实践 Practice of Groundwater Contaminant Investigation and Evaluation	2 周	2	考查 Term Paper	3 夏	
PR054075	毕业设计 (论文) Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		30 周 +168 学时	31.5			

7、课外实践 (Extracurricular practice) : 6 学分(6Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等，其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

八、毕业要求与培养目标矩阵（工程教育认证类专业）

毕业要求	培养目标			
	人文素养：德、智、体、美、劳全面发展,具备较好的人文素质	基础知识：具备扎实的数理基础和较强的计算机、外语水平	专业知识：掌握地球科学基本理论，精通地下水科学与工程的专业知识	专业能力：掌握地球科学野外工作方法，精通地下水科学与工程的专业技能，具备分析与解决问题能力，并能通过不断学习适应发展
1.工程知识		√	√	
2.问题分析		√	√	√
3.设计/开发		√	√	√
4.研究		√	√	√
5.使用现代工具		√	√	√
6.工程与社会			√	
7.环境和可持续发展			√	
8.职业规范	√			
9.个人与团队	√			
10.沟通	√			
11.项目管理				√
12.终身学习				√

大学物理	H											
大学化学	H											
新生研讨												M
专业导论												M
地球科学概论	H											
概率论与数理统计	M											
线性代数	M											
矿物学与岩石学	M											
古生物学与地史学	M											
构造地质学	M											
测量学 A	M											
第四纪地质学与地貌学	M											
地下水科学概论	H	H	M	H	H					M		
水力学	M			M								
地下水运动方程	M		M									
水文学原理	M			M								
地理信息系统	M				H							
地下水动力学	H		M		M							
地下水水化学	H		M	H				L				
工程土质土力学	M	M		M								

地下水数值模拟	M				H							
地下水监测			H		M	L	L					L
地下水资源评价			H					L	L			L
污染水文地质学			H			L						
工程岩体力学	M	M		M								
地下水勘查		M	H			M	M					L
地下水科学专论		M	M	H	M					M		
地下水科学与工程专业英语										H		
生态与环境水文地质学	M						H					
地质灾害与防治			M				L		L	L		L
学科前沿课										M		H
工程经济与项目管理						H					H	
实验物理	L			M								
实验化学	L			M								
思想政治社会实践									L			
测量实习	M											
水文地质调查方法设计	M	H	H			H			M			
毕业设计（论文）		H	H	H	H	H	H	H		H	H	H
军事理论						M			H			
军事技能训练									H			

北戴河地质认识实习	L								M			
周口店地质教学实习	H						H	L	M	M		M
专业实习		H	H			H	H	M	H	H		M
地下水污染调查评价实践	H	H		H	H	M	M	M	H	H	M	
通识教育选修课程						H	H	H	H	H	H	H

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。

环境工程专业培养方案

一、专业培养目标

本专业面向国家生态文明建设重大需求，培养德、智、体、美、劳全面发展，具备较好的人文素质、扎实的数理化与工程基础和较强的计算机、外语水平，掌握水、土、气、声、固体废物等污染防治和环境规划与资源保护等方面的知识，具备污染控制工程的设计、施工、研发及运营管理能力的专业人才。毕业后可在环境保护相关企事业单位从事污染防治、环境规划和环境管理等工作。经过 5 年的实际工作，能够成为专业骨干，具备工程师或与之相当的专业技术能力，并能通过不断学习适应发展。

二、毕业要求

1 工程知识：掌握数学、物理、化学、计算机、环境科学与工程等方面的基础知识、基本原理和基本工作方法；具备分析和解决复杂环境工程问题的知识储备。

2 问题分析：能够应用工程科学的基本原理，进行识别、表达科学问题，并通过中外文文献资料查询、文献检索的基本方法，了解本专业的发展动态；具有一定开展实验设计，创造实验条件，归纳、整理、分析实验结果的能力，能够分析复杂工程问题，以获得有效结论。

3 设计/开发解决方案：能够设计针对不同环境问题的解决方案，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、土、气、声、固体废物等污染问题进行研究，包括设计实验、分析与解释数据、通过信息综合得到合理有效的结论；初步具备撰写论文，参与学术交流的能力。

5 使用现代工具：能够针对水、土、气、声、固体废物等污染问题，利用新理论、新技术对其进行有效处理，实时追踪环境监测、评价、规划与管理等方面的新理论、新思想、新举措。

6 工程与社会：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水、土、气、声、固体废物等污染防治方案对社会、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、土、气、声、固体废物等污染防治方案对环境、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：通过实践教学环节、大学生创新实验计划项目以及毕业设计（论文）等，使学生懂得团队的重要性以及各种角色的责任和义务，培养学生的团队合作与协调意识，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：能够就水、土、气、声、固体废物等污染防治方案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。较熟练地掌握一门外语，达到国家四级水平，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：理解并掌握环境工程领域的工程管理原理、经济决策方法，并能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。

三、主干学科

主干学科为环境科学与工程。

四、学制与学位

学制四年，学生修满所规定的最低毕业学分，达到培养目标规定的各项要求后，授予工学学士学位。

五、核心课程

核心课程包括：给水处理工程、水污染控制工程、土壤与地下水污染控制工程、大气污染控制工程、固体废物处理处置工程、物理学污染控制工程、环境学、环境化学、环境微生物学、水文与水文地质学、水文地球化学、环境评价、环境规划与管理、环境生态学、环境监测、流体力学与流体机械、化工原理、管道工程学、环境工程设计施工与技术经济。

主要实践性教学环节包括：环境工程综合实验、《水质工程学》课程设计、《大气污染控制工程》课程设计、《固体废物处理处置工程》课程设计、《环境评价》课程设计、城镇给排水管网设计、建筑给排水设计、泵站设计、测量实习、北戴河地质实习、金工实习、认识实习、生产实习（环境工程综合实习1）、毕业实习（环境工程综合实习2）和毕业论文/设计（环境工程）等。

Undergraduate Program in Environmental Engineering

1. Academic Objectives

Focusing on the major needs of ecological civilization construction of China, the major of Environmental Engineering aims to cultivate professionals that has comprehensive development of moral, intellectual, physical, aesthetic and labor; has good humanistic quality, solid mathematical foundation, strong computer and foreign language levels; has knowledge of pollution prevention and control of water, soil, gas, sound and solid waste, environmental planning and resource protection; has the ability of design, construction, R&D and operation management of pollution control projects. Graduates can work in environmental protection-related enterprises and institutions on pollution prevention and control, environmental planning and resource protection. A graduate can become a professional backbone and hold a middle class professional title of engineer after five years of practical work, and can adapt to development through continuous learning.

2. Academic Requirement

1 Engineering knowledge: To master basic knowledge, basic principles and basic working methods in mathematics, physics, chemistry, computer, environmental science and engineering; Have the knowledge reserve to analyze and solve complex environmental engineering problems.

2 Problem analysis: To be able to apply the basic principles of engineering science, identify and express scientific problems, and pass the basic methods of Chinese and foreign literature inquiry and literature retrieval; Understand the development trend of this major; Have the ability to carry out experimental design, create experimental conditions, summarize, sort out and analyze experimental results, and analyze complex engineering problems to obtain effective conclusions.

3 Design and develop solutions: To be able to design solutions to different environmental problems, and embody innovative consciousness in the design process, considering social, health, safety, legal, cultural and environmental factors.

4 Research: To be able to study water, soil, gas, sound, solid waste and other pollution problems based on scientific principles and scientific methods, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis; Have the ability to write papers and participate in academic exchanges.

5 Using modern tools: To have the ability to effectively deal with water, soil, gas, sound, solid waste and other pollution problems by using new theories and technologies, and track new theories, ideas and measures in environmental monitoring, evaluation, planning and management in real time.

6 Engineering and society: To be able to make reasonable analysis based on the relevant background knowledge of the project, evaluate the impact of professional engineering practice and pollution prevention and control schemes of water, soil, gas, sound and solid waste on society, health, safety, law and culture, and understand the responsibilities.

7 Environment and sustainable development: To be able to understand and evaluate the impact of prevention and control schemes for water, soil, gas, sound, solid waste and other pollution problems on the sustainable development of the environment and society.

8 Professional norms: To have humanistic and social science literacy, social responsibility, be able to understand and abide by engineering professional ethics and norms in engineering practice, and fulfill responsibilities.

9 Individuals and teams: To understand the importance of team and the responsibilities and obligations of various roles, cultivate students' awareness of team cooperation and coordination, and

undertake the roles of individual, team member and person in charge in the team under multidisciplinary background through practical teaching, college students' innovative experimental program and graduation design (thesis).

10 Communication: To be able to effectively communicate and exchange with peers in the industry and the public on the prevention and control schemes of pollution problems such as water, soil, gas, sound and solid waste, including writing reports and design manuscripts, making statements, expressing clearly or responding to instructions. Proficient in mastering a foreign language, reaching the national level 4, having a certain international perspective, and being able to communicate and communicate under the cross-cultural background.

11 Project management: To understand and master the engineering management principles and economic decision-making methods in the field of environmental engineering, and be able to apply them in multidisciplinary environments.

12 Lifelong learning: To have the consciousness of autonomous learning and lifelong learning, and have the ability of continuous learning and adapting to development.

3. Main disciplines

The main discipline is Environmental Science and Technology.

4. Length of Schooling and Degree

Duration of the Program: Four years

Degree Offered: Bachelor of Engineering

5. Core Courses

Core Courses: Feed Water Treatment Engineering, Water Pollution Control Engineering, Soil and Ground Water Pollution Control Engineering, Air Pollution Control Engineering, Solid Waste Treatment and Disposal Engineering, Physics pollution control engineering, Environmentology, Environmental Chemistry, Microbiology for Environmental Engineering, Hydrology and Hydrogeology, Hydrogeochemistry, Environmental Assessment, Environmental Planning and Management, Environmental Ecology, Environmental Monitoring, Hydrodynamics and Hydromachine, Principles of Chemical Engineering, Pipeline Engineering, Environmental Engineering Design-Construction and Economy-Technology.

Major Practice Teaching: Environmental Engineering Comprehensive Experiment, Water Quality Engineering Course Design, Air Pollution Control Engineering Course Design, Solid Waste Treatment and Disposal Engineering, Environmental Assessment Course Design, Design of Municipal Mains Network, Design of Water Supply and Drainage Systems for Building, Design of Bump Station, Surveying Practice, Geological Survey Field Trip in Beidaihe, Metalworking Practice, Cognition Practice, Production Practice (Environmental Engineering Comprehensive Practice I), Graduation Practice (Environmental Engineering Comprehensive Practice II), Undergraduate Dissertation or Project (Environmental Engineering), etc.

六、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块	课程类别 Course Classification	学时数 Hours	学分 Credits	学 期 Semester										
				1	2	1 夏	3	4	2 夏	5	6	3 夏	7	8
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	730	41	11.2 5	9.25		8.25	5.25	1	3.25	1.25		0.25	0.25
	通识教育选修课程 Selective Courses of General Education	192	12											
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	872	54.5	12	10		13	9.5		7.5	2.5			
	专业核心课程 Specialized Fundamental Courses	432	30					6		8	9		4	
	专业拓展课程 Specialized Development	192	12		4			2	6					
实践教育 Practical Education	课程实践 Course Practice	38 周+128 学时	37		3	8	1	4	3	2		5	3	9
	课外实践 Extracurricular practice		6											
必修课总学分 Required course credits				162.5										
选修课总学分 Elective course credits				30										
最低毕业总学分 Total Credits				190.5 (192.5)										

七、课程设置 (Curriculum)

1、通识教育课程 (Required Courses of General Education) : 730 学时(730 Hours), 41 学分(41 Credits)

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical System of the Chinese Characteristic Socialism	32	2	32			考试 Exam	4	
GR182022	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	48	3	48	0		考试 Exam	5	
GR181013	形势与政策 (1) Situation and Policy (1)	4	0.25	4			考查 Term paper	1	
GR181014	形势与政策 (2) Situation and Policy (2)	4	0.25	4			考查 Term paper	2	
GR181015	形势与政策 (3) Situation and Policy (3)	4	0.25	4			考查 Term paper	3	
GR181016	形势与政策 (4) Situation and Policy (4)	4	0.25	4			考查 Term paper	4	
GR181017	形势与政策 (5) Situation and Policy (5)	4	0.25	4			考查 Term paper	5	
GR181018	形势与政策 (6) Situation and Policy (6)	4	0.25	4			考查 Term paper	6	

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181019	形势与政策（7） Situation and Policy（7）	4	0.25	4			考查 Term paper	7	
GR181020	形势与政策（8） Situation and Policy（8）	4	0.25	4			考查 Term paper	8	
GR301004	大学生职业生涯规划与就业指导（1） Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	
GR303005	大学生职业生涯规划与就业指导（2） Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育（1） Mental Health（1）	16	1	16			考查 Term paper	1	
GR303006	大学生心理素质教育（2） Mental Health（2）	16	1	16			考查 Term paper	5	
GR301024	劳动教育与双创实践(1)Labor Education and Innovation and Entrepreneurship Practice(1)	16	1	16			考查 Term Paper	2	
GR303025	劳动教育与双创实践(2)Labor Education and Innovation and Entrepreneurship Practice(2)	16	1	16			考查 Term Paper	6	
GR302008	军事理论 Military Theory	36	1	36			考试 Exam	1	
GR081071	大学英语（1） College English（1）	64	4	64			考试 Exam	1	
GR081072	大学英语（2） College English（2）	32	2	32			考试 Exam	2	
GR081067	大学英语素质拓展课 Competence-oriented Education for College English	32	2	32			考试 Exam	2	
GR141005	体育（1）（系列课程） Physical Education（1）	32	1		32		考试 Exam	1	

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR141006	体育（2）（系列课程） Physical Education（2）	32	1		32		考试 Exam	2	
GR141007	体育（3）（系列课程） Physical Education（3）	32	1		32		考试 Exam	3	
GR141008	体育（4）（系列课程） Physical Education（4）	32	1		32		考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	16	16		考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	3	
总计 Total		730	41	492	178	16			

2、通识教育选修（Selective Courses of General Education）：192 学时 (192 Hours)，12 学分 (12 Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类（含在线课程） Humanities and Social Sciences Courses (Inc. Online Courses)	见附件 1	7	考查 Term paper	2-8	4 个类别中选修 7 个学分，其中 《大学生安全教育》（1 学分）必 选。
2	自然科学类（含在线课程） Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term paper	2-8	
3	自然文化类 Natural Culture Courses	见附件 3		考查 Term paper	2-8	

4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term paper	5-8	
5	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5-6	3	考查 Term paper	2-8	选修 3 个学分，其中《新生研讨 课》（1 学分）必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term paper	2-4	
总计 Total			12			

3、学科基础课程（Disciplinary Fundamental Courses）：872 学时 (872 Hours), 54.5 学分 (54.5 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR191003	高等数学 B(1) Advanced Mathematics B (1)	96	6	96			考试 Exam	1	
DR191011	无机化学 Inorganic Chemistry	48	3	48			考试 Exam	1	
DR021002	工程图学 Engineering Graphics	48	3	48			考试 Exam	1	
DR191002	高等数学 A(2) Advanced Mathematics A (2)	96	6	96			考试 Exam	2	
DR191008	大学物理(1) College Physics (1)	48	3	48			考试 Exam	2	
DR050018	环境工程专业导论 Introduction to Environmental Engineering	16	1	16			考查 Term Paper	2	必选 1 学分

DR192005	线性代数 Linear Algebra	32	2	32			考试 Exam	3	
DR192017	物理化学 B Physical Chemistry B	48	3	48			考试 Exam	3	
DR042127	电工电子技术 B Electrical and Electronic Technology B	48	3	18	14	16	考试 Exam	3	16 学时 线上
DR192009	大学物理 (2) College Physics (2)	48	3	48			考试 Exam	3	
DR052004	流体力学与流体机械 Hydrodynamics and Hydromachine	32	2	32			考试 Exam	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistics	48	3	48			考试 Exam	4	
DR052001	分析化学 (环境工程类) Analytical Chemistry (For Environmental Engineering)	32	2	24	8		考试 Exam	4	
DR122001	测量学 A Surveying A	40	2.5	24	16		考试 Exam	4	
DR052091	环境工程原理 Principles of Environmental Engineering	32	2	32			考试 Exam	4	
DR052002	有机化学 (环境类) Organic Chemistry (For Environmental Engineering)	32	2	32			考试 Exam	5	
DR053006	环境生态学 Environmental Ecology	32	2	32			考试 Exam	5	
DR021029	工程力学 Engineering Mechanics	56	3.5	52	4		考试 Exam	5	
DR053092	土建项目管理与技术经济 Civil engineering project management and Economy-Technology	40	2.5	40			考试 Exam	6	
总计 Total		872	54.5	814	42				

4、专业核心课程 (Specialized Core Courses) : 432 学时 (432 Hours), 30 学分 (30 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
PR052096	环境工程基础实验 Environmental Engineering basic Experiment	2 周	2		2 周		考查 Term Paper	5	
SR052017	管道工程学 Pipeline Engineering	32	2	32			考试 Exam	4	
SR052024	环境监测 Environmental Monitoring	32	2	32			考试 Exam	4	
SR053020	环境学 Environmentology	32	2	32			考试 Exam	4	
SR053021	环境化学 Environmental Chemistry	32	2	32			考试 Exam	5	
SR053014	给水处理工程 Water Supply Treatment Engineering	32	2	32			考试 Exam	5	
SR053026	环境管理 Environmental Management	32	2	32			考试 Exam	5	
SR053260	专业英语(环境类) Specialized English for Environmental Engineering	32	2	32			考试 Exam	5	
SR053028	物理性污染控制 Physical Pollution Control	32	2	32			考试 Exam	6	
SR053093	环境科学与工程前沿	16	1	16			考查 Term Paper	5	
SR053015	水污染控制工程 Water Pollution Control Engineering	48	3	48			考试 Exam	6	在环境 微生物 学后开 课
SR053018	大气污染控制工程 Air Pollution Control Engineering	32	2	32			考试 Exam	6	
SR053022	环境微生物学 Microbiology for Environmental Engineering	32	2	32			考试 Exam	6	

SR054025	环境评价 Environmental Assessment	32	2	32			考试 Exam	7	
SR054019	固体废物处理处置工程 Solid Waste Treatment and Disposal Engineering	32	2	32			考试 Exam	7	
总计 Total		432	30	432					

5、专业拓展课程（Specialized Development Courses）：192 学时 (192 Hours), 12 学分 (12 Credits)

课程代码 Course Code	课程名称 Course Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
DR011036	地球科学概论 Introduction to Earth Science	64	4	32	32		考试 Exam	2	必选
SS053094	水文与水文地质学（环境工程类） Hydrology and Hydrogeology (For Environmental Engineering)	48	3	48			考试 Exam	6	必选
DR054005	水文地球化学（环境类） Hydrogeochemistry (For Environmental Engineering)	32	2	32			考试 Exam	5	必选
SR053016	土壤与地下水污染控制工程 Soil and Groundwater Pollution Control Engineering	32	2	32			考试 Exam	6	在水质 工程学 II后开 课, 必选
SS050040	水文地质学进展 Advances in Hydrogeology	16	1				考查 Term Paper	6	六选一
SS050041	现代水文水资源的研究前沿 Research frontiers of modern hydrology and water resources	16	1				考查 Term Paper	6	
SS050076	土壤/地下水污染修复前沿 Advances in soil/groundwater remediation	16	1				考查 Term Paper	6	

SS014130	地球关键带研究前沿 Research Frontiers of Earth Critical Zone	16	1				考查 Term Paper	6	
SS050042	环境科学与工程学科前沿 Frontiers of Environmental Science and Engineering	16	1				考查 Term Paper	6	
SS050079	地下水模拟不确定性分析 Uncertainty Analysis for Groundwater Flow Modeling	16	1				考查 Term Paper	6	
总计 Total		192	12	144	32				

6、课程实践 (Course Practice) : 38 周 +128 学时 (38 weeks and 128 hours), 37 学分 (37 Credits)

课程代码 Code	课程名称 Courses Name	周数(学时) Week(hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311003	军事技能训练 Military Theory and Practice	2 周	1	考查 Term Paper	1 夏	
PR181010	思想政治社会实践 Political Social Practice	32 学时	2	考试 Exam	1 夏	
PR011044	北戴河地质实习 Geological Survey Field Trip in Beidaihe	2 周	2	考查 Term Paper	1 夏	
PR051095	专业认识实习 Major Introductory Practice	2 周	2	考查 Term Paper	1 夏	
PR022152	金工实习 (2) Metalworking Practice	1 周	1	考查 Term Paper	2 夏	
PR052096	环境工程基础实验 Environmental Engineering basic Experiment	2 周	2	考查 Term Paper	2 夏	
PR191045	实验物理 (1) Physics Experiments (1)	24 学时	1	考试 Exam	2	
PR191047	实验化学 Chemistry Experiments	48 学时	2	考试 Exam	2	
PR192046	实验物理 (2) Physics Experiments (2)	24 学时	1	考试 Exam	3	

PR053097	环境工程专业实验 Environmental Engineering Professional Experiment	2 周	2	考查 Term Paper	3 夏	
PR053098	环境工程特色实验 Environmental Engineering characteristic Experiment	1 周	1	考查 Term Paper	3 夏	
PR053099	生产实习（环境工程综合实习 1） Production Practice (Environmental Engineering Comprehensive Practice 1)	2 周	2	考查 Term Paper	3 夏	
PR052054	建筑给排水设计 Building Water Supply and Drainage Design	1 周	1	考查 Term Paper	4	
PR052055	城镇给水管网设计 Design of Municipal Mains Network	1 周	1	考查 Term Paper	4	
PR052056	泵站设计 Design of Pump Station	1 周	1	考查 Term Paper	4	
PR122059	测量实习 Surveying Practice	1 周	1	考查 Term Paper	4	
PR053057	《给水处理工程》课程设计 Water Supply and Treatment Course Design	2 周	2	考查 Term Paper	5	
PR054058	《大气污染控制工程》课程设计 Air Pollution Control Engineering Course Design	1 周	1	考查 Term Paper	7	
PR054059	《固体废物处理处置工程》课程设计 Solid Waste Treatment and Disposal Engineering Course Design	1 周	1	考查 Term Paper	7	
PR054060	《环境评价》课程设计 Environmental Assessment Course Design	1 周	1	考查 Term Paper	7	
PR054263	毕业实习（环境工程综合实习 2） Graduation Practice (Environmental Engineering Comprehensive Practice II)	3 周	3	考查 Term Paper	8	
PR054064	毕业设计（论文） Graduation Design (Thesis)	12 周	6	考查 Term Paper	8	
总计 Total		38 周 +128 学时	37			

7、课外实践（Extracurricular practice）：6 学分(6Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等，其学分的认定按照教务处相关规定执行。

Extracurricular practice include Theme Education, Social Practice, Volunteer Service, Work-study Program, Discipline Competition, Cultural and Sports Activities, Innovative and Entrepreneurial Activities, Labor Practice and so on. The recognition of the credits for extracurricular practice shall be implemented according to the regulations of Academic Affairs Office.

八、毕业要求与培养目标矩阵

毕业要求	培养目标			
	人文素养：德、智、体、美、劳全面发展，具备较好的人文素质	基础知识：具备扎实的数理化和工程基础和较强的计算机、外语水平	专业知识：掌握水、土、气、声、固体废物等污染防治和环境规划与资源保护等方面的知识	专业能力：具备污染控制工程的设计、施工、研发及运营管理能力，并能通过不断学习适应发展
1. 工程知识		√	√	
2. 问题分析		√	√	√
3. 设计 / 开发		√	√	√
4. 研究		√	√	√

5. 使用现代工具		√	√	√
6. 工程与社会		√	√	√
7. 环境和可持续发展		√	√	√
8. 职业规范	√	√		√
9. 个人与团队	√	√		√
10. 沟通	√		√	√
11. 项目管理				√
12. 终身学习				√

九、课程与毕业要求关系矩阵

<div>毕业要求</div> <div>课程名称</div>	(1) 工程知识	(2) 问题分析	(3) 设计/开发 解决方案	(4) 研究	(5) 使用现代 工具	(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
思想道德与法治								H		L		H
毛泽东思想和中国特色社会主义理论体系概论								H				H
中国近现代史纲要								L				L
马克思主义基本原理								M			L	M
习近平新时代中国特色社会主义思想概论							H					H
思想政治社会实践				H						M		
形势与政策								M		M		
大学生心理素质教育									H	L		L
大学英语										H		L
大学英语素质拓展课										H		L
体育									L			H
大学计算机		H	M		H					M	H	
程序设计基础		M	H		L							
大学生职业发展与就业指导									M			M
新生研讨课									L			

军事技能训练									H			
军事理论						M			M			
高等数学		H		L								
线性代数		M		L								
概率论与数理统计		H		L								
大学物理		M		L								
无机化学	H											
分析化学（环境工程类）	H											
有机化学（环境工程类）	H											
物理化学	H											
工程图学					M							
电工电子技术				L								
测量学	L				H							
工程力学				M								
环境工程原理	H			M								
流体力学与流体机械	M											
环境生态学	M						M					
专业导论课									L			
土建项目管理与技术经济			M									
给水处理工程	H		H			L	L					
水污染控制工程	H		H			H	M					

管道工程学	M					M						
大气污染控制工程	H		M			H	M					
固体废物处理处置工程	M		M				M					
环境学	M					L						
环境化学	M					L						
环境微生物学	M					L						
环境监测	M					L						
环境评价	M					L						
环境管理	M					L						
物理性污染控制	M					L						
环境科学与工程学科前沿	L											
环境工程专业英语										M		M
水文与水文地质学（环境工程类）	M	H	M	M		M	M					
水文地球化学	M	H		M	M	L	M	L				
地球科学概论	H											
土壤与地下水污染控制工程	H											
金工实习						L			L			
环境工程基础实验、专业实验、特色实验	H					H						
建筑给排水设计					M	H			L			
城镇给排水管网设计	H				M	H						
泵站设计	M				M	M						
《给水处理工程》课程设计	M		H									

《大气污染控制工程》课程设计	M		H									
《固体废物处理处置工程》课程设计	M		H									
《环境评价》课程设计	M		H									
军事理论及训练									L			
北戴河地质实习						M			L			
专业认识实习						L			L			
测量实习						L			L			
生产实习（环境工程综合实习 I）									L			
毕业实习（环境工程综合实习 II）									L			
毕业论文 / 设计（环境工程）	M											
思想政治社会实践						H		L				L
实验物理	L											
实验化学	L											
通识教育选修课程						H	H	H	H	H	H	H

注：H 表示课程对毕业要求指标支撑度高；M 表示课程对毕业要求指标支撑度中等；L 表示课程对毕业要求指标支撑度低。

环境生态工程专业培养方案

一、专业培养目标

本专业面向国家生态文明建设重大需求，培养德、智、体、美、劳全面发展，具备较高人文素养、扎实数理基础和较强计算机与外语水平，掌握生态学、环境科学及环境工程等学科基本理论和工程治理基础知识，熟悉我国生态环境保护方针、政策和法规，具备环境生态工程的设计、施工、研发及运营管理能力，同时具备创新意识和创新能力，满足社会主义现代化建设需要的环境生态工程领域高素质复合型人才。毕业后能够在企事业、科研单位和教育等相关部门从事生态环境研究、规划与设计、保护与修复及管理、研究和教育等工作。经过 5 年的实际工作，能够成为专业骨干，具备工程师或与之相当的专业技术能力，并能通过不断学习适应发展。

二、毕业要求

1. **工程知识：**掌握数学、物理、化学、计算机、环境科学、生态学与工程学等方面的基础知识、基本原理和基本技术方法；具备分析和解决复杂环境生态工程问题的知识储备。
 - 1.1 具备解决环境生态工程问题的数学、物理、化学、计算机等方面的基础知识。
 - 1.2 具备解决环境生态工程问题的环境科学、生态学与工程学等方面的基础知识。
 - 1.3 具备分析和解决环境生态工程问题的知识储备。
2. **问题分析：**能够应用环境科学、生态学和工程学的基本原理，识别和正确描述环境生态工程问题；能够通过中外文文献资料查询、文献检索等基本方法，了解本专业的发展动态，寻求解决环境生态工程问题的多种可行方案，以获得有效结论。
 - 2.1 能够应用环境科学、生态学和工程学的基本原理，识别和判断环境生态工程问题的关键环节，正确表达环境生态工程问题。
 - 2.2 能够通过中外文文献资料查询、文献检索等基本方法，了解环境生态工程的发展动态，寻求解决环境生态工程问题的多种可行方案，获得有效结论。
3. **设计/开发解决方案：**能够设计针对不同环境生态问题的解决方案，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、文化以及环境生态等因素；具有一定开展实验设计，创造实验条件，归纳、整理、分析实验结果的能力，能够分析复杂的环境生态工程问题，以获得有效结论。

- 3.1 能够设计针对不同环境生态问题的解决方案，体现创新意识，考虑社会、健康、安全、法律、文化以及环境生态等因素。
- 3.2 具有一定开展实验设计，创造实验条件，归纳、整理、分析实验结果的能力，能够分析复杂的环境生态工程问题，以获得有效结论。
- 4. **研究：**在问题分析的基础上，能够基于科学原理并采用科学方法对不同的环境生态问题进行研究，包括设计实验、分析与解释数据，通过信息综合得到合理有效的结论，探讨解决问题的方法；初步具备撰写论文，参与学术交流的能力。
 - 4.1 能够基于科学原理并采用科学方法对不同的环境生态问题进行研究，包括设计实验、分析与解释数据，通过信息综合得到合理有效的结论，探讨解决问题的方法。
 - 4.2 初步具备撰写论文，参与学术交流的能力。
- 5. **使用现代工具：**能够针对环境生态问题，利用新理论、新技术对其进行有效处理，实时追踪环境生态监测、评价、规划、管理、技术方法等方面的新理论、新思想、新举措。
 - 5.1 能够针对环境生态问题，利用新理论、新技术对其进行有效处理。
 - 5.2 实时追踪环境生态监测、评价、规划、管理、技术方法等方面的新理论、新思想、新举措。
- 6. **工程与社会：**了解与环境生态相关的国家法律法规和行业标准规范，能够基于环境生态工程相关背景知识分析和评价环境生态方面的工程方案对社会、健康、安全、法律以及文化的影响，以及这些制约因素对工程项目实施的影响，并理解应承担的责任。
 - 6.1 了解与环境生态相关的国家法律法规和行业标准规范，理解社会文化对工程活动的影响。
 - 6.2 能分析和评价环境生态工程实践对社会、健康、安全、法律以及文化的影响，以及这些制约因素对项目实施的影响，并理解应承担的责任。
- 7. **环境和可持续发展：**能够理解和评价环境生态保护与修复方案对环境、社会可持续发展的影响。
 - 7.1 能够理解和评价环境生态保护与修复方案对环境、社会可持续发展的影响。
 - 7.2 在具体工程设计中，具有环境生态保护意识，并考虑社会可持续发展的因素。
- 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。
 - 8.1 具备正确的人生观、价值观和良好的人文素养。
 - 8.2 在工程实践中，理解并遵守工程职业道德和规范，具有工程安全意识，能够认真履行职责，具有社会责任感。
- 9. **个人和团队：**通过实践教学环节、大学生创新实验计划项目以及毕业设计（论文）等，使学生懂得团队的重要性以及各种角色的责任和义务，

培养学生的团队合作与协调意识，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。

9.1 具有良好的团队合作意识和协作精神。

9.2 能够在多学科背景下的团队中根据需要承担相应的责任。

10. **沟通：**能够就环境生态保护与修复方案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。较熟练地掌握一门外语，达到国家四级水平，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 能够就环境生态保护与修复方案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。

10.2 了解专业领域的国际发展趋势、研究前沿和热点。

10.3 较熟练地掌握一门外语，达到国家四级水平，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：**理解并掌握环境生态工程领域的工程管理原理、经济决策方法，并能在多学科情景中应用工程项目管理的理论和方法。

11.1 理解并掌握环境生态工程领域的工程管理原理、经济决策方法。

11.2 能够在多学科情景中正确应用工程项目管理的理论和方法。

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。

12.1 具有自主学习和终身学习的意识。

12.2 能够采用合适的方法，提高自主学习能力，适应环境生态工程及社会发展需要的能力

三、主干学科

主干学科为环境科学与工程。

四、学制与学位

学制四年，学生修满所规定的最低毕业学分，达到培养目标规定的各项要求后，授予工学学士学位。

五、核心课程

核心课程包括：环境学、环境生态监测与评价、水文与生态水文学、环境生态规划与管理、环境生态工程原理、生态毒理与环境风险、环境土壤学、环境微生物学、污染生态学、专业英语（环境类）、生态修复工程和矿山污染修复等。

主要实践性教学环节包括：物理实验，化学实验，北戴河野外实习、专业认识实习、环境遥感应用与制图、测量实习、环境生态监测与评价设计、环境生态规划与管理设计、环境生态工程设计、环境生态工程综合实践、环境生态工程生产实习、毕业实习、金工实习等。

Undergraduate Program in

Environmental and Ecological Engineering

1. Academic Objectives

To meet the main needs of ecological civilization construction of China, the major of Environmental and Ecological Engineering aims to cultivate professionals that have comprehensive development of moral, intellectual, physical, aesthetic and labor; have good humanistic quality, solid mathematical foundation, strong computer and foreign language levels; have knowledge in ecology, environmental science and engineering, and pollution prevention and management; are familiar with the policy, regulation, laws in ecological and environmental protection in China; have the ability of design, construction, R&D and operation management of projects in fields of environmental and ecological engineering; and have the innovation consciousness and innovation ability. Graduates can work in enterprises, institutions and other related agencies on ecological environment research, environmental planning and design, resource protection, remediation and management, and education. The graduates are expected to become professional backbones who are able to hold middle-class professional titles of engineers after five years of practical work and can adapt to the development through continuous learning.

2. Academic Requirements

1 Engineering knowledge: To master basic knowledge, basic principles, and basic working methods in mathematics, physics, chemistry, computer, environmental science, ecology and engineering; Have the knowledge to analyze and solve complex environmental and ecological engineering problems.

1.1 Possess the basic knowledge in mathematics, physics, chemistry and computer for solving complex environmental and ecological engineering problems.

1.2 Possess the basic knowledge in environmental science, ecology and engineering for solving the complex environmental and ecological engineering problems.

1.3 Possess professional knowledge for analyzing and solving complex environmental and ecological engineering problems.

2 Problem analysis: To be able to apply the basic principles of environmental science, ecology and engineering, identify and precisely describe environmental

and ecological engineering problems, and effectively follow the development trend in environmental and ecological engineering by using the methodology in literature inquiry and literature retrieval; To be able to seek a variety of feasible solutions to solve environmental and ecological engineering problems and make effective conclusions.

2.1 To be able to apply the basic principles in environmental science, ecology and engineering, identify the key processes and precisely describe environmental and ecological engineering problems

2.2. To be able to effectively follow the scientific advances in environmental and ecological engineering by using the methodology in literature inquiry and literature retrieval; To be able to seek a variety of feasible solutions to solve environmental and ecological engineering problems and make effective conclusions

3 Design and develop solutions: To be able to design solutions for different environmental and ecological engineering problems, and embody innovative consciousness in the design process, with considering social, health, safety, legal, cultural and environmental factors; Have the ability to perform the experimental design, to set up experimental conditions, to summarize, sort out and analyze experimental results, and to analyze complex environmental and ecological engineering problems in order to make effective conclusions.

3.1 To be able to design solutions for different environmental and ecological problems, and embody innovative consciousness in the design process with considering social, health, safety, legal, cultural and environmental factors; Have the ability to perform experimental design, set up experimental conditions, summarize, sort out and analyze experimental results, and analyze complex environmental and ecological engineering problems in order to make effective conclusions.

3.2 Have the ability to perform experimental design, set up experimental conditions, summarize, sort out and analyze experimental results, and analyze complex environmental and ecological engineering problems in order to make effective conclusions

4 Research: To be able to research environmental and ecological problems based on scientific principles with scientific methods, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis; Have the ability to write scientific papers and participate in academic exchanges.

4.1 To be able to research environmental and ecological problems based on scientific principles with scientific methods, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis

4.2 Have the ability to write scientific papers and participate in academic exchanges

5 Using modern tools: To have the ability to effectively deal with environmental and ecological engineering problems by using new theories and technologies, and to track new theories, ideas and measures in environmental monitoring, evaluation, planning and management in real-time.

5.1 To have the ability to effectively deal with environmental and ecological engineering problems by using new theories and technologies

5.2 To be able to track new theories, ideas and measures in environmental monitoring, evaluation, planning and management in real-time

6 Engineering and society: To understand the national laws, regulations and industry standards related to environment and ecology; To analyze and evaluate the impact of environmental and ecological engineering practices on society, health, safety, law and culture, as well as the impact of these constraints on project implementation, and understand the corresponding responsibilities that should be undertaken.

6.1 To understand the national laws, regulations, and industry standards related to the environment and ecology, and understand the potential impacts of social culture on engineering practices.

6.2 To be able to analyze and evaluate the impact of environmental and ecological engineering practices on society, health, safety, law and culture, as well as the impact of these constraints on project implementation, and understand the corresponding responsibilities that should be undertaken.

7 Environment and sustainable development: To be able to understand and evaluate the impact of protection and remediation schemes for environmental and ecological problems on the sustainable development of the environment and society.

7.1 To be able to understand and evaluate the impact of protection and remediation schemes for environmental and ecological problems on the sustainable development of the environment and society.

7.2 In the practical engineering designs, possess environmental and ecological protection consciousness and consider the factor of the social sustainable development.

8 Professional norms: To have humanistic, social science literacy and social responsibility, be able to understand and abide by engineering professional ethics and norms in engineering practice, and fulfill responsibilities.

8.1 Have the correct outlook on life, values and good humanistic attainment.

8.2 In engineering practice, understand and comply with the engineering ethics and norms, possess engineering safety consciousness, be able to earnestly perform their duties, and have a social sense of responsibility.

9 Individuals and teams: To understand the importance of a team and the responsibilities and obligations of various roles, cultivate students' awareness of team cooperation and coordination, and undertake the roles of the individual, team member and person in charge of the team under multidisciplinary background through practical teaching, college students' innovative experimental program and graduation design (thesis).

9.1 Have a good team cooperation consciousness and cooperation spirit.

9.2 Be able to assume corresponding responsibility as required in a team with multi-subject backgrounds.

10 Communication: To be able to effectively communicate and exchange with peers in the industry and the public on the protection and remediation schemes for environmental and ecological engineering, including writing reports and designing manuscripts, making statements, expressing clearly or responding to instructions. Proficient in mastering a foreign language, reaching the national level 4, having a certain international perspective, and being able to communicate and communicate under a cross-cultural background.

10.1 To be able to effectively communicate and exchange with peers in the industry and the public on the protection and remediation schemes for environmental and ecological engineering, including writing reports and designing manuscripts, making statements, expressing clearly or responding to instructions.

10.2 To understand the international development trends, scientific advances, and hot topics in the environmental and ecological engineering field

10.3 Proficient in mastering a foreign language, reaching the national level 4, having a certain international perspective, and being able to communicate and communicate under a cross-cultural background.

11 Project management: To understand and master the engineering management principles and economic decision-making methods in the field of environmental and ecological engineering, and be able to apply them in multidisciplinary environments.

11.1 Understand and master the principle of Engineering Management.

11.2 Be able to apply to multi subjects.

12 Lifelong learning: To have the consciousness of autonomous learning and lifelong learning, and have the ability to continue learning and adapting to development.

12.1 Have the awareness of autonomous learning and lifelong learning.

12.2 Be able to use appropriate methods to improve the abilities of autonomous learning, and adapting to the environment and ecological engineering and social development.

3. Main disciplines

The main discipline is Environmental Science and Technology.

4. Length of Schooling and Degree

Duration of the Program: Four years

Degree Offered: Bachelor of Engineering

5. Core Courses

Core Courses: Environmentology, Environmental Ecological Monitoring and Assessment, Hydrology and Ecological Hydrology, Environmental Ecological Planning and Management, Principles of Environmental and Ecological Engineering, Ecological Toxicology and Environmental Risk, Environmental Edaphology, Environmental Microbiology, Pollution Ecology, Specialized English for Environmental and Ecological Engineering, Ecological Remediation Engineering, Mine Pollution Remediation

Major Practice Teaching: Physics Experiments (1), Chemistry Experiments, Physics Experiments (2), Surveying Practice, Design of Environmental Ecological Monitoring and Assessment, Design of Environmental Ecological Planning and Management, Fundamentals of GIS and its Application in Water and Environmental Engineering, Design of Environmental and Ecological Engineering, Military Theory and Practice, Social Practice of Ideology and Politics, Geological Survey Field Trip in Beidaihe, Major Introductory Practice, Metalworking Practice, Environmental and Ecological Engineering Practice Composite, Environmental and Ecological Engineering Experiments, Environmental and Ecological Engineering Production Practice, Environmental Remote Sensing Application and Drawing, Graduation Practice, Undergraduate Dissertation or Project, etc.

六、最低毕业总学分要求及学分分配 (Minimum Required Credits and Distribution)

课程模块 Module	课程类别 Course	学时数 Hour	学分 Credit	学 期 Semester											
				1	2	1	3	4	2	5	6	3	7	8	
通识教育 Liberal Education	通识教育必修课程 Required Courses of General Education	648	41	11	9		8	4		2	1			2	
	通识教育选修课程 Elective Courses of General Education	224	12												
专业教育 Professional Education	学科基础课程 Disciplinary Fundamental Courses	800	48.5	13	10.5		8.5	10.5		5.5	2				
	专业核心课程 Specialized Fundamental Courses	512	25.5					6		13	8		5		
	专业拓展课程 Specialized Development	192	15.5		4						6	2			

实践教育 Practical Education	课程实践 Course Practice	38 周 +168 学 时	39.5		3	6	3	3	6	1	1	3	2	9
	课外实践 Extracurricular Practice		6											
必修课总学分 Required course credits				154.5										
选修课总学分 Elective course credits				33.5										
最低毕业总学分 Total Credits				186 (188)										

七、课程设置 (Curriculum)

1、通识教育课程 (Required Courses of General Education) : 730 学时(730 Hours), 41 学分(41 Credits)

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181009	思想道德与法治 Ideological Morality and Rule of Law	48	3	40	8		考试 Exam	1	
GR181008	中国近现代史纲要 Essentials of Modern Chinese History	48	3	40	8		考试 Exam	2	
GR182014	马克思主义基本原理 Fundamental Principles of Marxism	48	3	40	8		考试 Exam	3	
GR182024	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thoughts and Theoretical	32	2	32			考试 Exam	4	

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
	System of the Chinese Characteristic Socialism								
GR182022	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thoughts on Socialism with Chinese Characteristics in the New Era	48	3	48	0		考试 Exam	5	
GR181013	形势与政策（1） Situation and Policy（1）	4	0.25	4			考查 Term paper	1	
GR181014	形势与政策（2） Situation and Policy（2）	4	0.25	4			考查 Term paper	2	
GR181015	形势与政策（3） Situation and Policy（3）	4	0.25	4			考查 Term paper	3	
GR181016	形势与政策（4） Situation and Policy（4）	4	0.25	4			考查 Term paper	4	
GR181017	形势与政策（5） Situation and Policy（5）	4	0.25	4			考查 Term paper	5	
GR181018	形势与政策（6） Situation and Policy（6）	4	0.25	4			考查 Term paper	6	
GR181019	形势与政策（7） Situation and Policy（7）	4	0.25	4			考查 Term paper	7	
GR181020	形势与政策（8） Situation and Policy（8）	4	0.25	4			考查 Term paper	8	
GR301004	大学生职业生涯规划与就业指导（1） Career Planning and Employment Guidance for University Students (1)	20	1	16	4		考试 Exam	2	
GR303005	大学生职业生涯规划与就业指导（2） Career Planning and Employment Guidance for University Students (2)	18	1	12	6		考试 Exam	6	
GR301005	大学生心理素质教育（1） Mental Health（1）	16	1	16			考查 Term paper	1	

课程代码 Course Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lecture	实验学时 Experiment	线上学时 Online	考核方式 Assessment	开课学期 Semester	备注 Notes
GR303006	大学生心理素质教育(2) Mental Health (2)	16	1	16			考查 Term paper	5	
GR302008	军事理论 Military Theory	36	1	36			考试 Exam	1	
GR081071	大学英语(1) College English (1)	64	4	64			考试 Exam	1	
GR081072	大学英语(2) College English (2)	32	2	32			考试 Exam	2	
GR141005	体育(1)(系列课程) Physical Education (1)	32	1		32		考试 Exam	1	
GR141006	体育(2)(系列课程) Physical Education (2)	32	1		32		考试 Exam	2	
GR141007	体育(3)(系列课程) Physical Education (3)	32	1		32		考试 Exam	3	
GR141008	体育(4)(系列课程) Physical Education (4)	32	1		32		考试 Exam	4	
GR301024	劳动教育与双创实践(1)Labor Education and Innovation and Entrepreneurship Practice(1)	16	1	16			考查 Term Paper	2	
GR303025	劳动教育与双创实践(2)Labor Education and Innovation and Entrepreneurship Practice(2)	16	1	16			考查 Term Paper	6	
GR041001	大学计算机 College Computer	32	2	16	16		考试 Exam	1	
GR041003	程序设计基础 A Fundamentals of Programming A	64	4	24	24	16	考试 Exam	3	
总计 Total		730	41	492	222	16			

2、通识教育选修课程（Selective Courses of General Education）：224 学时(hours)，12 学分(Credits)

序号 No.	课程类别 Courses Classification	课程名称 Courses Name	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
1	人文社科类（含在线课程） Humanities and Social Sciences Courses (Inc. Online Courses)	见附件 1	7	考查 Term paper	2-8	4 个类别中选修 7 个学分，其中《大学生安全教育》（1 学分）必选。
2	自然科学类（含在线课程） Natural Science Courses (Inc. Online Courses)	见附件 2		考查 Term paper	2-8	
3	自然文化类 Natural Culture Courses	见附件 3		考查 Term paper	2-8	
4	体育与健康类 Sports and Health Courses	见附件 4		考查 Term paper	5-8	
5	创新创业教育类（含在线课程） Innovation and Entrepreneurship Courses (Inc. Online Courses)	见附件 5-6	3	考查 Term paper	2-8	选修 3 个学分，其中《新生研讨课》（1 学分）必选。
6	审美与艺术类 Aesthetics and Art Courses	见附件 7	2	考查 Term paper	2-4	

总计 Total		12			
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3、学科基础课程（Disciplinary Fundamental Courses）：776 学时(hours)，48.5 学分(Credits)

课程 代码 Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lec.	实验 学时 Exp.	线上 学时 Online	考核方式 Assessment	开课 学期 Semester	备注 Notes
DR051100	环境生态工程导论 Introduction to Environmental and Ecological Engineering	16	1	16			考查 Term Paper	1	必选 1 学分
DR191001	高等数学 A1 Advanced Mathematics (A1)	96	6	96			考试 Examination	1	
DR191011	无机化学 College Chemistry	48	3	48			考试 Examination	1	
DR021002	工程图学 Engineering Graphics	48	3	48	0		考试 Examination	1	
DR191002	高等数学 A2 Advanced Mathematics (A2)	96	6	96			考试 Examination	2	
DR191008	大学物理(1) College Physics (1)	48	3	48			考试 Examination	2	
DR192005	线性代数	32	2	32			考试	3	

	Linear Algebra						Examination		
DR192009	大学物理(2) College Physics (2)	48	3	48			考试 Examination	3	
DR192006	概率论与数理统计 Probability and Mathematics Statistics	48	3	48			考试 Examination	3	
DR122001	测量学 A Surveying A	40	2.5	24	16		考试 Examination	4	
DR052300	普通生物学 General Biology	48	3	48			考试 Examination	4	
DR052301	生态学基础 Fundamentals of Ecology	48	3	48			考试 Examination	4	
DR052261	分析化学(环境类) Analytical Chemistry	32	2	32			考试 Examination	4	
DR053262	有机化学(环境类) Organic Chemistry	32	2	32			考试 Examination	5	
DR021029	工程力学 Engineering Mechanics	56	3.5	52	4		考试 Examination	5	

DR053092	土建项目管理与技术经济 Civil engineering project management and Economy-Technology	32	2.5	32			考试 Examination	6	
总计 Total		800	48.5	780	20				

4、专业核心课程（Specialized Core Courses）：408 学时(hours)，25.5 学分(Credits)

课程 代码 Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lec.	实验 学时 Exp.	线上 学时 Online	考核 方式 Assessment	开课 学期 Semester	备注 Notes
SR053020	环境学 (Environmentology)	32	2	32			考试 Examination	4	
SR052201	环境生态监测与评价 Environmental Ecological Monitoring and Assessment	32	2	32			考试 Examination	4	
SR052202	水文与生态水文学 (Hydrology and Ecological Hydrology)	48	3	48			考试 Examination	4	
SR053203	环境生态规划与管理 (Environmental Ecological Planning and Management)	32	2	32			考试 Examination	5	
SR053204	环境生态工程原理 (Principles of Environmental and Ecological Engineering)	32	2	32			考试 Examination	5	
SR053205	生态毒理与环境风险 (Ecological Toxicology and Environmental Risk)	32	2	32			考试 Examination	5	
SR053206	环境土壤学 (Environmental Edaphology)	32	2	32			考试 Examination	5	

SR053022	环境微生物学 (Environmental Microbiology)	32	2	32			考试 Examination	5	
SR053207	污染生态学 (Pollution Ecology)	32	2	32			考试 Examination	6	
SR053260	专业英语 (环境类) (Specialized English for Environmental and Ecological Engineering)	32	2	32			考试 Examination	6	
SR124144	生态修复工程 (Ecological Remediation Engineering)	40	2.5	32	8		考查 Term Paper	7	
SR054208	矿山污染修复 (Mine Pollution Remediation)	32	2	32			考试 Examination	7	
总计 Total		408	25.5	400	8				

5、专业拓展课程 (Specialized Development Courses) : 184 学时(hours), 11.5 学分(Credits)

课程 代码 Code	课程名称 Courses Name	总学时 Hours	学分 Credits	讲课学时 Lec.	实验 学时 Exp.	线上 学时 Online	考核 方式 Assessment	开课 学期 Semester	备注 Notes
DR011036	地球科学概论 (Introduction to Earth Science)	64	4	32	32		考试 Exam	2	必选
DR053007	水文地质学基础 (Fundamentals of Hydrogeology)	56	3.5	48	8		考试 Examination	4	必选
DR054005	水文地球化学 (Hydrogeochemistry)	32	2	32				5	
SR053016	土壤与地下水污染控制工程 (Soil and Groundwater Pollution Control Engineering)	32	2	32				6	
总计 Total		184	11.5	144	40				

6、课程实践 (Course Practice) : 38 周+ 168 学时(38 weeks and 168 hours), 39.5 学分(Credits)

课程代码 Code	课程名称 Courses Name	周数 (学时) Week (hour)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR191045	实验物理一 Physics Experiments (1)	24	1	考试 Examination	2	
PR191047	实验化学 (Chemistry Experiments)	48	2	考试 Examination	2	
PR192046	实验物理二 Physics Experiments (2)	24	1	考试 Examination	3	
PR122059	测量实习 (Surveying Practice)	1 周	1	考查 Term Paper	4	
PR052251	环境生态监测与评价设计 (Design of Environmental Ecological Monitoring and Assessment)	1 周	1	考查 Term Paper	4	
PR053252	环境生态规划与管理设计 (Design of Environmental Ecological Planning and Management)	1 周	1	考查 Term Paper	5	
PR053086	GIS 基础及水工环应用 (Fundamentals of GIS and its Application in Water and Environmental Engineering)	40	2.5	考查 Term Paper	6	
PR054253	环境生态工程设计 (Design of Environmental and Ecological Engineering)	2 周	2	考查 Term Paper	7	
PR311003	军事技能训练 (Military Theory and Practice)	2 周	1	考查 Term Paper	1	
PR183006	思想政治社会实践 (Social Practice of Ideology and Politics)	32	2	考试 Exam	1 夏	

PR011044	北戴河地质实习 (Geological Survey Field Trip in Beidaihe)	2 周	2	考查 Term Paper	1 夏	
PR051095	专业认识实习 (Major Introductory Practice)	2 周	2	考查 Term Paper	1 夏	
PR022099	金工实习 (Metalworking Practice)	1 周	1	考查 Term Paper	2 夏	
PR052254	环境生态工程综合实践 Environmental and Ecological Engineering Practice Composite	3 周	3	考查 Term Paper	2 夏	
PR052255	环境生态工程综合实验一 Environmental and Ecological Engineering Experiments Composite 1	2 周	2	考查 Term Paper	2 夏	
PR053256	环境生态工程生产实习 (Environmental and Ecological Engineering Production Practice)	2 周	2	考查 Term Paper	3 夏	
PR053257	环境生态工程综合实验 2 Environmental and Ecological Engineering Experiments Composite 2	2 周	2	考查 Term Paper	3 夏	
PR053258	环境遥感应用与制图 (Environmental Remote Sensing Application and Drawing)	2 周	2	考查 Term Paper	3 夏	
PR0542-63	毕业实习 (Graduation Practice)	3 周	3	考查 Term Paper	8	
PR054064	毕业论文/设计 (环境工程) (Undergraduate Dissertation or	12 周	6	考查 Term Paper	8	

	Project)					
总计 Total		38 周+168 学时	39.5			

7、课外实践（Extracurricular practice）：6 学分(6Credits)

包括主题教育活动、社会实践、志愿服务、勤工助学、学科竞赛、文体活动、创新创业活动、劳动实践等。

包括社会实践、科研训练和创新创业活动 3 大类。每位学生在校期间须完成 6 学分方可毕业。其中，社会实践 2 学分，包括志愿者、勤工俭学、暑期社会实践等；科研训练 2 学分；创新创业活动 2 学分。

创新创业活动学分的认定按照教务处相关规定执行。

八、毕业要求与培养目标矩阵

毕业要求	培养目标			
	人文素养：德、智、体、美、劳全面发展，具备较好的人文素质	基础知识：具备扎实的数理化与工程基础和较强的计算机、外语水平	专业知识：掌握生态学、环境科学及环境工程等学科基本理论和工程治理基础知识	专业能力：具备环境生态工程的设计、施工、研发及运营管理能力，具备创新意识和创新能力
1. 工程知识		√	√	
2. 问题分析		√	√	√
3. 设计 / 开发		√	√	√

4. 研究		√	√	√
5. 使用现代工具		√	√	√
6. 工程与社会		√	√	√
7. 环境和可持续发展		√	√	√
8. 职业规范	√	√		√
9. 个人与团队	√	√		√
10. 沟通	√		√	√
11. 项目管理				√
12. 终身学习				√

九、课程与毕业要求关系矩阵（工程教育认证专业类专业参考）

<div>毕业要求</div> <div>课程名称</div>	(1) 工程知识	(2) 问题分析	(3) 设计/开 发解决方 案	(4) 研究	(5) 使用现代 工具	(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
思想道德与法治								H		L		H
毛泽东思想和中国特色社会 主义理论体系概论								H				H
中国近现代史纲要								L				L
马克思主义基本原理								M			L	M
习近平新时代中国特色社会主义思想概论							H					H
思想政治社会实践				H						M		
形势与政策								M		M		
大学生心理素质教育									H	L		L
大学英语										H		L
体育									L			H

大学计算机		H	M		H					M	H	
程序设计基础		M	H		L							
大学生职业发展与就业指导									M			M
新生研讨课									L			
军事技能训练									H			
高等数学		H		L								
线性代数		M		L								
概率论与数理统计		H		L								
大学物理		M		L								
大学化学	H											
分析化学（环境类）	H											
有机化学（环境类）	H											
工程图学					M							
测量学	L				H							
工程力学				M								
普通生物学	M			M								
生态学基础	M			M								
专业导论课									L			
土建项目管理与技术经济			M									
环境生态工程原理	H		H	M		L	L					
水污染控制工程	H		H	M		H	M					

生态毒理与环境风险	M			M		M	M					
环境土壤学	H			M		M	M					
固体废物处理处置工程	M		M				M					
环境学	M					L						
环境微生物学	M					L						
环境生态监测与评价	M					L						
环境生态规划与管理	M					L						
生态修复工程（土科）	M		L			L						
矿山污染修复	M		L			L						
土壤/地下水污染修复前沿	L											M
环境科学与工程前沿	L											M
专业英语（环境类）										M		M
水文地质学基础	H											
地球科学概论	H											
水文地球化学（环境类）	H											
水文与生态水文学	H											
土壤与地下水污染控制工程	H											
水生态与水环境保护	M											
水土保持学（土科）	M											

土地生态学（土科）	M											
金工实习						L			L			
环境生态工程综合实验	H					H						
环境生态监测与评价设计	H		M		M	H			L			
环境生态规划与管理设计	H		M		M	H			L			
GIS 基础及水工环应用	H		H		M	H			L			
环境生态工程设计	H		H						L			
环境生态工程综合实践	M		H						L			
环境遥感应用与制图	H		H		M	H						
军事理论及训练									L			
北戴河地质实习						M			L			
专业认识实习						L			L			
测量实习						L			L			
生产实习									L			
毕业实习（环境生态工程综合实习 II）									L			
毕业论文 / 设计（环境生态工程）	M											
思想政治社会实践						H		L				L
实验物理	L											
实验化学	L											

通识教育选修课程						H	H	H	H	H	H	H
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