

水文与水资源工程专业培养方案

一、专业简介

水文与水资源工程专业是以地球科学基本理论为基础，以水资源为主要研究对象，系统学习水资源的形成、分布、运动和变化等方面的专业知识和技能，兼顾地质灾害及其赋存地质环境与水相互作用的基础知识，并将其应用于水资源的勘查、评价、开发、管理，水利工程的勘查、设计、施工，地质灾害及其赋存地质环境的勘察、评价、监测、预测预报和治理。本专业学生既具备较扎实的基础理论知识又具有较宽的专业知识和技能，从业的适应面广，可在国土资源、水利、农林、城建、交通、铁路、环保等部门相关领域从事科研、教学、设计、生产和管理等方面的工作。

二、培养目标

本专业主要培养学生具有良好的思想品德、社会公德和职业道德，具有良好的体魄和健康的身心，达到国家规定的大学生体育和军事训练合格标准，培养具有扎实的自然科学知识，较好的人文科学知识，较强的计算机、外语、管理等方面的应用能力，较强的水文水资源、岩土工程及其赋存地质环境方面的专业基础知识的专业人才。能够在国土、水利、农林、城建、交通、铁路、环保等部门从事水文、水资源、地质灾害及其赋存地质环境开发与保护方面的勘查、规划、设计、预测预报、管理、监测、评价以及教学和科学研究等方面的工作，能够通过继续教育或其他终身学习的途径不断学习，增加知识、提升能力。学生毕业五年左右，基本具备胜任工程师或相应职称的专业技术能力和条件，能成长为水文地质、环境地质、水利及相关领域的高级专门人才，为国内外水利及相关事业服务。

三、培养要求

本专业学生主要学习水资源的形成、分布、运动、变化规律的专业基础知识，在此基础上，能够合理地对水资源进行开发、利用和保护，同时学习与水相关的地质灾害及其赋存地质环境的勘察、评价、监测、预测预报和治理等方面的专业基础知识，接受运算、实验、测试、制图等方面的基本训练，具有运用所学专业知识和解决实际问题、科学研究、组织管理的基本能力。毕业生应获得以下几方面的知识和能力：

(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；具备解决复杂工程问题的知识储备。

(2) 问题分析：能够应用地球科学和工程科学的基本原理，进行识别、表达，并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；具有开展实验设计的能力，创造实验条件，归纳、整理、分析实验结果，分析复杂工程问题，以获得有效结论。

(3) 设计 / 开发解决方案：其赋存地质环境的勘察、稳定性评价、预测、合理开发利用和保护、治理等方面的基本知识和野外工作方法，在此基础上能够设计针对复杂水文及水资源工程问题的解决方案，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，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复杂工程问题的专业工程实践对环境、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：通过野外实践教学环节、全国大学生创新实验计划项目、全国大学生水利创新设计大赛以及毕业设计（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，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：理解并掌握工程管理原理，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。

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

专业核心课程：水文与水资源工程专业英语、工程岩土学、土力学、工程岩体力学、地基与基础、水文水利计算、水资源开发利用与保护、地质灾害与防治、专门工程地质学、水文地球化学基础、地下水水力学、气象与气候学。

实践课程：北戴河地质认识实习、周口店地质教学实习、测量实习、专业实习、AutoCAD 与水工环制图、GIS 及其在水文中的应用实践、综合课程设计、土工实验、毕业设计（论文）。

Undergraduate Program in Hydrology and Water Resources Engineering

1. Major Introduction

Hydrology and Water Resources Engineering focuses on the study of water resources based on the fundamental theories of geosciences. Undergraduates are required to make a systematic study of the formation, distribution, movement and change of water resources, as well as geological hazards and the interactions between the geological environment and water. Graduates should be capable of applying their knowledge in the surveying, assessment, development and management of water resources; the surveying, designing and construction of hydraulic projects; and the investigation, assessment, monitoring, forecasting and controlling of geological hazards and their geological environment. With solid theoretical knowledge and comprehensive skills, graduates are competent for a wide range of positions, including research, teaching, designing, manufacturing and management in fields related to land resources, water conservancy, agriculture, forestry, urban construction, transportation, railways and environmental protection.

2. Academic Objectives

Students should love our country, support the leadership of the Communist Party of China, love work and labor, obey the law, and have good moral, and social morality and professional ethics. Students should be both physically and mentally healthy, have the necessary military training, and meet the requirements of the national college sports and military training standards.

On completing their 4-year study, students should acquire solid knowledge of natural sciences (especially in hydrology and water resources, geotechnical engineering and geological environment), and skills in management, computer science and a foreign language. They will be qualified for working in the fields of hydrology, water resources, geological hazards and the development and protection of geological environments, as well as in government departments, academic institutes or industries. They will be qualified engineers and will have the corresponding titles in five years after graduation. They will become senior specialists in hydrogeology, environmental geology, hydrology and relevant fields.

3. Academic Requirements

Students mainly study the formation, distribution, movement and changes of water resources for reasonable development, utilization and protection of water resources. They also have to possess basic knowledge of water-related geological hazards and the investigation, evaluation, monitoring, forecasting and control of their geological environments, and practice calculation, experimentation, testing and mapping. They learn to do research and solve practical problems independently.

After the four-year courses, the students should acquire the following knowledge and abilities:

(1) Engineering knowledge

Students will master the basic knowledge and basic principles in mathematics, physics, chemistry and computer. They will also master the basic field work methods, and will possess the knowledge reserves for solving complex engineering problems.

(2) Problem analysis

Students will be able to identify and describe scientific problems by applying the basic principles of engineering science. They will know about the development trends of the specialty by inquiring about and doing research on Chinese and foreign literature. Students will possess the ability to design experiments, to carry on experiments and to analyze the results of experiments. They will learn how to analyze complex engineering problems and draw valid conclusions.

(3) Designing and Developing Solutions

Students will grasp the basic knowledge and principles of hydrology, the formation, distribution, movement and changes of water resources, basic theories and methods of hydrology and water environment prediction and assessment; they will learn the basic knowledge and field work methods for water resource exploration, assessment, management, exploitation and utilization. They will grasp the basic characteristics and mechanisms of water-related geological hazards, the basic knowledge and field work methods for geological hazard investigation, stability evaluation, forecasting, rational exploitation and utilization, protection and management and their geological environments. They will learn to design and develop solutions to complex problems related to hydrology and water resources engineering with the sense of innovation and with considerations of society, health, safety, law, culture and the environment.

(4) Research

They will do research on complex engineering problems based on scientific principles by designing experiments, analyzing and interpreting data, and drawing reasonable and effective conclusions through information integration. They will gain the initial ability of writing papers and participating in academic meetings.

(5) Using modern tools

They will be able to develop, select and use appropriate technology, resources, modern engineering tools and informational technology to solve complex engineering problems, including the prediction and simulation of complex engineering problems, and they will be able to understand their limitations.

(6) Engineering and society

Students will be able to make reasonable analysis with engineering knowledge, and evaluate the effects of engineering practice and pollution prevention schemes on society, health, safety, law, and culture, and they will understand relevant responsibilities.

(7) Environment and sustainable development

Students will be able to understand and evaluate the effects of engineering practice for complex engineering problems upon the environment and social sustainable development.

(8) Career development

Students will have a sound understanding of social sciences, a strong sense of social responsibilities, and a healthy body. They should abide by professional ethics and norms, and fulfill professional duties in the engineering practice.

(9) Individuals and teams

Students will get to know the importance of teamwork as well as responsibilities and obligations of various roles through participating in practices, National College Students' innovation experiment projects, graduation projects, and thesis writing, etc. Teachers will train students' awareness of team cooperation and coordination, and each student should be able to work in inter-disciplinary settings. Students will develop some good personal qualities and teamwork spirit. They will be able to assume corresponding responsibilities as required in a team with multi-disciplinary backgrounds.

(10) Communication

Students will be able to communicate effectively with their counterparts and the public about complex engineering problems through writing papers and reports, delivering speeches at conferences or talking personally. Students will master a foreign language up to the national level Four. They will acquire communication skills of the foreign language, will develop certain international visions, and will be able to communicate with professionals of different cultural backgrounds.

(11) Project management

Students will understand and master principles of engineering management and will be able to apply the principles in multi-disciplinary fields.

(12) Lifelong learning

Students will have the awareness of autonomous, lifelong learning and will have the ability to learn continuously to adapt to new developments of environment engineering and society.

4. Length of Schooling and Degree

The length of schooling is four years of full-time study. Students will be awarded the Bachelor Degree of Engineering when they have completed the required minimum credits and have met all other requirements.

5. Core Course

Specialized Core Courses : Specialty English for Hydrology and Water Resources Engineering, Engineering Petrology, Soil Mechanics, Mechanics of Engineering Rock Mass, Ground and Foundation, Hydrologic and Water Conservancy Calculation, Water Resources Development and Conservation, Geological Hazard and Control, Professional Engineering Geology, Introduction to Hydrogeochemistry, Groundwater Hydraulics, Meteorology and Climatology.

Practice Courses: Geological Survey Field Trip in Beidaihe, Geological Survey Field Trip in Zhoukoudian, Surveying Practice, Professional Practice, AutoCAD and Mapping for Hydrogeology, Application of GIS to Hydrology, Integrated Course Design, Soil Test, Graduation Design (Thesis).

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

课程类别 Course Classification	学时 Hours	学分 Credits	学期 Semester											
			1	2	2夏	3	4	4夏	5	6	6夏	7	8	
通识教育必修课程 Required Courses of General Education	680	39	13	12		3	4		5					2
学科基础课程 Disciplinary Fundamental Courses	936	58.5	9	11		16	13.5		9					
专业核心课程 Specialized Core Courses	448	28					2		7		13		6	
实践教学 Practice Courses	29周 +232学时	35		3	4	1	2		5		3		1	6
通识教育选修课程 Selective Courses of General Education	256	16							----					
创新创业实践 Innovation and Entrepreneurship	----	6							----					
必修课 Required Courses														
选修课 Selective Courses														
最低毕业总学分 Total Credits														182.5

七、课程设置 (Curriculum)

1、通识教育必修课程 (Required Courses of General Education) : 680 学时 (680 Hours), 39 学分 (39 Credits)

课程代码 Course Code	课程名称 Course Name	学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	考核方式 Assessment	开课学期 Semester	备注 Notes
GR181001	思想道德修养与法律基础 Ethics and Fundamentals of Law	48	3	48		考试 Exam	1	
GR182002	中国近现代史纲要 Essentials of Modern Chinese History	32	2	32		考试 Exam	3	
GR182003	马克思主义基本原理 Principles of Marxism	48	3	48		考试 Exam	4	
GR183004	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	64	4	64		考试 Exam	6	
GR180005	形势与政策 Situation and Policies	32	2	32		考查 Term Paper	1-8	
GR301001	大学生心理素质教育 Mental Health	16	1	16		考查 Term Paper	1	
GR081001	大学英语 (1-2) College English (1-2)	96	6	96		考试 Exam	1	
GR081002	大学英语 (3-4) College English (3-4)	96	6	96		考试 Exam	2	

课程代码 Course Code	课程名称 Course Name	学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	考核方式 Assessment	开课学期 Semester	备注 Notes
GR141001	体育 (1) Physical Education (1)	30	1		30	考试 Exam	1	
GR141002	体育 (2) Physical Education (2)	30	1		30	考试 Exam	2	
GR142003	体育 (3) Physical Education (3)	30	1		30	考试 Exam	3	
GR142004	体育 (4) Physical Education (4)	30	1		30	考试 Exam	4	
GR041001	大学计算机 College Computer	32	2	16	16	考试 Exam	1	
GR041002	计算机语言程序设计 Computer Language Programming	64	4	32	32	考试 Exam	2	
GR301002	大学生职业生涯规划与就业指导 (1) Career Planning and Employment Guidance for University Students (1)	16	1	16		考试 Exam	2	
GR303003	大学生职业生涯规划与就业指导 (2) Career Planning and Employment Guidance for University Students (2)	16	1	16		考试 Exam	6	

2、学科基础课程 (Disciplinary Fundamental Courses): 936 学时 (936 Hours), 58.5 学分 (58.5 Credits)

课程代码 Course Code	课程名称 Course Name	学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	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	
DR191004	高等数学 B (2) Advanced Mathematics B (2)	64	4	64		考试 Exam	2	
DR192006	线性代数 Linear Algebra	32	2	32		考试 Exam	3	
DR192018	概率论与数理统计 Probability and Mathematics Statistic	48	3	48		考试 Exam	3	
DR191003	复变函数与积分变换 Complex Variable Functions and Integral Transforms	48	3	48		考试 Exam	4	
DR191008	大学物理 (1) College Physics (1)	48	3	48		考试 Exam	2	
DR192009	大学物理 (2) College Physics (2)	48	3	48		考试 Exam	3	
DR191010	大学化学 College Chemistry	48	3	48		考试 Exam	1	
DR011036	地球科学概论 Geosciences	64	4	32	32	考试 Exam	2	

课程代码 Course Code	课程名称 Course Name	学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	考核方式 Assessment	开课学期 Semester	备注 Notes
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	5	
DR052008	水力学 Hydraulics	40	2.5	36	4	考试 Exam	4	
DR053009	地下水运动方程 Equations of Subsurface Hydraulics	48	3	48		考试 Exam	5	
DR012066	矿物学与岩石学 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	
SR013025	第四纪地质学与地貌学 Quaternary Geology and Geomorphology	48	3	24	24	考试 Exam	4	
DR052010	水文学原理 Introduction to Hydrology	40	2.5	36	4	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	

3、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	学时 Hours	学分 Credits	讲课时 Lecture	实验学时 Experiment	考核方式 Assessment	开课学期 Semester	备注 Notes
SR054030	水文与水资源工程专业英语 Specialty English for Hydrology and Water Resources Engineering	32	2	32		考试 Exam	7	
SR053031	工程岩土学 Engineering Petrology	32	2	32		考试 Exam	5	
SR053032	土力学 Soil Mechanics	40	2.5	40		考试 Exam	5	
SR053033	工程岩体力学 Mechanics of Engineering Rock Mass	40	2.5	40		考试 Exam	6	
SR054034	地基与基础 Ground and Foundation	32	2	32		考试 Exam	7	
SR053035	水文水利计算 Hydrologic and Water Conservancy Calculation	32	2	26	6	考试 Exam	6	
SR053036	水资源开发利用与保护 Water Resources Development and Conservation	32	2	32		考试 Exam	6	
SR053037	地质灾害与防治 Geological Hazard and Control	40	2.5	36	4	考试 Exam	6	
SR054038	专门工程地质学 Professional Engineering Geology	32	2	32		考试 Exam	7	
SR053039	水文地球化学基础 Introduction to Hydrogeochemistry	40	2.5	40		考试 Exam	5	
SR053040	地下水水力学 Groundwater Hydraulics	48	3	44	4	考试 Exam	6	
SR052041	气象与气候学 Meteorology and climatology	32	2	28	4	考试 Exam	4	
	学科前沿课 Discipline Frontiers	16	1	16		考查 Term Paper	6	全院任选 Optional

4、实践教学环节 (Practice Courses): 29 周 +232 学时 (29 Weeks and 232 Hours), 35 学分 (35 Credits)

课程代码 Course Code	课程名称 Course Name	周 (学时) Weeks (Hours)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR311001	军事理论及训练 Military Theory and Training	2	2	考查 Term Paper	2 夏	
PR183006	思想政治社会实践 Political Social Practice	2	2	考试 Exam	6	
PR191045	实验物理 (1) Physics Experiments (1)	24	1	考试 Exam	2	
PR192046	实验物理 (2) Physics Experiments (2)	24	1	考试 Exam	3	
PR191047	实验化学 Chemistry Experiments	48	2	考试 Exam	2	
PR011044	北戴河地质认识实习 Geological Survey Field Trip in Beidaihe	2	2	考查 Term Paper	2 夏	
PR012046	周口店地质教学实习 Geological Survey Field Trip in Zhoukoudian	5	5	考查 Term Paper	4 夏	
PR122059	测量实习 Surveying Practice	1	1	考查 Term Paper	4	
PR053065	专业实习 Professional Practice	5	5	考查 Term Paper	6 夏	

课程代码 Course Code	课程名称 Course Name	周(学时) Weeks (Hours)	学分 Credits	考核方式 Assessment	开课学期 Semester	备注 Notes
PR053067	AutoCAD 与水文环制图 AutoCAD and Mapping for Hydrogeology	32	2	考试 Exam	5	
PR053068	GIS 及其在水文中的应用实践 Application of GIS to Hydrology	32	2	考查 Term Paper	5	
PR052069	综合课程设计 (1) Integrated Course Design (1)	16	1	考查 Term Paper	4	
PR053070	综合课程设计 (2) Integrated Course Design (2)	16	1	考查 Term Paper	6	
PR054071	综合课程设计 (3) Integrated Course Design (3)	16	1	考查 Term Paper	7	
PR053072	土工实验 Soil Tests	24	1	考查 Term Paper	5	
PR054066	毕业设计 (论文) Graduation Design (Thesis)	12	6	考查 Term Paper	8	

5、通识教育选修课程 (Selective Courses of General Education): 16 学分 (16 Credits)

序号 No.	课程名称 Course Name	学分 Credits	备注 Notes
1	人文社科类 (含在线课程) Humanities and Social Sciences Courses (Inc. Online Courses)	6	附件 1
2	自然科学类 (含在线课程) Natural Science Courses (Inc. Online Courses)	6	附件 2
3	创新创业类 Innovation and Entrepreneurship Courses	专业导论课 Professional Introduction Courses	1 附件 3
		新生研讨课 Freshman Seminar	1 附件 4
		系列创业课 (含在线课程) Entrepreneurial Courses (Inc. Online Courses)	2 附件 5

6、创新创业实践 (Innovation and Entrepreneurship): 6 学分 (6 Credits)

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。

Innovation and Entrepreneurship includes three categories: social practice, scientific research training, and innovation and entrepreneurship activities. Each student is required to complete 6 credits in the university before graduation. There are two credits for social practice, including working as a volunteer, having the work-study program and social practice in summer vacation, etc. There are two credits for scientific research training and two for innovation and entrepreneurship activities.

The recognition of the credits for innovation and entrepreneurship shall be implemented according to the regulations of Academic Affairs Office.