

地下水科学与工程专业（中加合作办学）培养方案

专业名称：地下水科学与工程

专业培养目标：

本专业培养具有扎实自然科学知识、创新意识、实践能力、良好科学作风的水文地质、环境与生物学交叉的国际复合型人才，预计 75%的毕业生出国深造或在知名企业任职，学生毕业后能在水利、能源、交通、建筑、环境保护及生物科学等领域从事工程勘察设计施工、教育、科研、技术研发和管理等工作。

专业培养要求：

本专业学生主要学习地下水科学、环境及生物科学的基本理论和专业知识，受到野外测绘、调查、测试等方面基本训练并掌握相关专业的基本技能，培养环境科学和生物科学方面的科学素养，具有应用所学专业知识和分析解决实际问题的初步能力。

毕业生应获得以下几方面的知识和能力：

1. 掌握数学物理化学及地质基础理论、野外地质技能和工作方法；
2. 初步掌握地下水、环境及生物科学的基本原理、主要的实验、测试方法和分析技术；
3. 具备水文地质环境地质和工程地质调查、评价和综合分析的基本能力；
4. 熟悉有关水资源和环境的方针、政策和法规；具有一定的管理知识和能力；
5. 了解水资源、环境和生物科学的理论前沿、应用前景和最新发展动态；
6. 掌握专业文献检索、资料查询以及获取信息的基本方法，具有初步的科学研究和实际工作能力。

主干学科：水文地质、水利工程、环境工程，生物科学。

核心课程：地球系统科学、普通地质学、构造地质学、水力学、水文地质学基础、地下水动力学、水文地球化学、地下水污染与防治、生态学、应用微生物学、环境地质学、应用水文地质等。

主要实践性教学环节：工程测量实习、周口店地质教学实习，三峡专业教学实习、计算机语言编程课程设计、专业课程设计、毕业实习与毕业设计等约 33~34 周。

专业特色：探索建立跨学科教育教育的国际化合作办学机制，打造国际一流的地下水科学与工程本科专业，培养水文地质、环境与生物学交叉的国际复合型人才。

修业年限：4-6 年。

授予学位：中国地质大学（武汉）地下水科学与工程专业工学学士学位证书
滑铁卢大学环境科学（水专业）理学学士学位。

培养方式：与滑铁卢大学采用“2+1+1”模式联合培养

Program for Groundwater Science and Engineering

(Sino-Canadian Educational Joint Program)

Specialty: Groundwater Science and Engineering

Education Objective:

The program aims to cultivate engineers and specialists with solid knowledge of natural sciences, consciousness of innovation, abilities of practice and good scientific work style. These talents will have backgrounds in Hydrogeology, Ecology and Biology. 75% of the graduates will either continue their education in overseas countries or be employed by famous enterprises. After graduation, students will be able to engage in engineering investigation, design, construction, education, scientific research, technological research and development, and management in the fields of water conservancy, energy, transportation, architecture, environmental protection and biological science.

Education Requirements:

The students in this program will undertake basic theoretic and specialty enhanced studies in subjects including hydrogeology, ecology and biology. Basic technical trainings will be given in subjects of field mapping, surveying, testing and so on. Scientific literacy in environmental science and biology will be cultivated so the graduates will have the entry level knowledge to do scientific researching and to solve actual problems in the professional fields.

Graduation Requirements:

1. To master mathematics, physical chemistry and geological basic theories, field geological skills and working methods.
2. To have proficiency in basic experimental techniques, measurement methodology and analytical technology on groundwater resources, environmental science and bioscience.
3. To have basic ability of investigation, evaluation and comprehensive analysis of hydrogeology, environment geology and engineering geology.
4. To be familiar with policies and regulations about water resources, and sufficient knowledge and ability of management.
5. To understand the theoretical frontiers, application prospects and latest developments of water resources, environmental science and bioscience.
6. To master the basic methods of literature search and information collection, possess the essential ability of understanding, organizing, analyzing interpreting and processing of information .

Major Disciplines: Hydrogeology, Hydraulic Engineering, Environmental Engineering and Bioscience.

Main Courses: Earth System Science, General Geology, Tectonics, Hydraulics,

Hydrogeology, Groundwater Hydrodynamics, Hydro-geochemistry, Groundwater pollution and Prevention, Ecology, Applied Microbiology, Environgeology, Applied Hydrogeology, etc.

Practical Work: Engineering Survey Practice, Instructive Practice in Geology (at Zhoukoudian), Instructed Practice for Major (at the Three Gorges), Computer Program Design Practice, Course Projects, Graduation Practice and Design. (33~ 34 weeks in total).

Specialized Characteristics: Exploring the establishment of international cooperative education mechanism for interdisciplinary education and teaching, building a first-class international groundwater science and engineering undergraduate major, and cultivating international complex talents with intersecting background in hydrogeology, environment and Biology

Duration: 4-6 years.

Degree Granted: Bachelor of engineering degree in groundwater science and engineering, China University of Geosciences (Wuhan), Bachelor of Science Degree in Environmental Science (Water Science), University of Waterloo.

Training Mode: Joint training with University of Waterloo in adopting "2+1+1" mode.

地下水科学与工程专业（中加合作办学）课程教学计划表

Course Descriptions of Groundwater Sciences and Engineering (Sino-Canadian Educational Joint Program)

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crts	学时 Hrs	学时分类 Class Hours		先修课程 Prerequisite courses	学期学分分配 Semester Credits										
					讲课 Lec.	实验 Lab.		一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	六* 6th	七 7th	八 8th		
通识教育课 Liberal Education Courses	必修 Compulsory	11706200 马克思主义基本原理 Principles of Marxism	3	48	48						3							
		11706500 毛泽东思想与中国特色社会主义理论体系概论 Introduction to Mao Tse-tung Thought and the Theoretical System of Socialism with Chinese Characteristics	4	64	64							4						
		11711800 中国近现代史纲要 The Essentials of Modern Chinese History	2	32	32							2						
		120002*0 思想道德修养与法律基础 Morality Education and Fundamentals of Law	3	48	48								3					
		113027*0 体育 Physical Education	4	64	64				1	1	1	1						
		109005*0 大学英语（外教授课） English as a Second Language	18	288	288				6	6	3	3						
		11904100 Python 语言程序设计 A Python Language Programming A	3.5	56	40	16			3.5									
		14300100 军事理论 Military Theory	2	32	32				2									
	选修 Elective	总计 12 学分，含创新创业选修课学分，跨学科选修课不低于 6 学分。“形势与政策”课程作为限选课，由马克思主义学院实施。		12	192													
		小计 Sum		51.5	824	616	16		12.5	7	7	13	0	0	0	0	0	0
学科基础课 Disciplinary Fundamental Courses	212028*2 高等数学 B Advanced Mathematics B		10	160	160			5	5									
	212093*0 大学物理基础 College Physics C		3.5	56	56					3.5								
	212092*2 物理实验 B Physical Experiments B		2	32		32				2								
	20302403 大学化学 C College Chemistry (Chemistry 123/123L+120/120L)		4	64	50	14		4										
	21208803 线性代数 C Linear Algebra C		2	32	32						2							

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					讲课 Lec.	实验 Lab.		一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	六* 6th	七 7th	八 8th		
	41904300	Python 语言课程设计 Course Design for Language A	1.5	1.5 周				1.5										
	40102902	地质教学实习（周口店）B Geological Field Training B	4	4 周					4									
	40401600	专业教学实习（三峡，含地下水井流试验设计与实践） Professional Teaching Practice	5	5 周										5				
		应用水文地质学课程设计 Curriculum Design for Applied Hydrogeology	2	2 周													2	
	40400400	毕业实习 Practice for Graduation	8	8 周														8
	40400300	毕业设计 Design for Graduation	8	8 周														8
	小计 Sum		30.5	30.5 周				3.5	4	0	0	0	0	5	2	16		
创新创业自主学习学分 Freedom study	ZZ35S	社会调查 Social Investigation	2															
		其他(学科竞赛、发明创造、科研报告) Others (Contest, Invention, Innovation and Research Presentation)	3															
	小计 Sum		5															
总计 Total			212.5	2832+30.5 周	2182	202		29	33.5	25.5	27.5	7.5	13	14.5	13	16		
可开出专业选修课列表 Specialty Elective Courses	20517200	岩土测试技术 Rock and Soil Testing Techniques	2	32	24	8							2					
	20519400	钻探与成井工艺 Drilling & Well Technology	2	32	28	4							2					
	20603500	工程物探 Engineering & Geophysical Prospecting	2	32	24	8							2					
	20414700	包气带水文地质学 Vadose Zone Hydrogeology	1.5	24									1.5					
	20422100	专业技能培训	2	32									2					
	20405700	环境同位素原理与技术 Environment Isotope Principles	2	32	32												2	
	20506100	地质灾害防治工程 Control Engineering for Geo-disasters	2.5	40	40												2.5	
	20413900	环境地质学 Environmental Geology A	2	32	32												2	
	20414500	土壤污染和防治 Soil Pollution and Remediation	3	48	28	20							3					

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					讲课 Lec.	实验 Lab.		一	二	三	四	五	六	六*	七	八			
								1st	2nd	3rd	4th	5th	6th	6th	7th	8th			
	21704500	环境法规 Environmental Law	1.5	24	24														1.5
	20413800	水污染控制工程 Water Pollution Control Engineering	3	48	36	12							3						
	20510002	固体废物处理与处置 B Solid Waste Treatment and Disposal B	2	32	32								2						
	Chem 140	科学计算导论（外教授课） Introduction to Scientific Calculations	2	32	32													2	
	Earth 281	地质对人类健康影响（外教授课） Geological Impacts on Human Health	2	32	32													2	
	ERS 215	环境与可持续评价（外教授课） Environmental and Sustainability Assessment I	2	32	32													2	
	ENVE 330	实验分析与野外采样技术（外教授课） Lab Analysis and Field Sampling Techniques	2	32	32													2	
	20405302	环境评价 C Environmental Assessment B	2	32	24	8												2	
	20404901	环境监测 C Environmental Monitoring A	2	32	24	8												2	

注：1. 通识教育选修课学分和创新创业自主学习学分未列入具体学期。

2. 红色区域为第三学年在滑铁卢大学就读，一学年有三个学期，“六* 6th”表示的是滑铁卢大学的第三学期

地下水科学与工程专业（中加合作办学）课程分类统计

	通识教育课程 Liberal Education Courses		学科基础课 Disciplinary Fundamental Courses	专业主干课 Main Specialty Courses	专业选修课 Specialty Elective Courses	实践环节 Practical Work	创新创业自主学习 Autonomous Study	学时总计 Total Hours	学分总计 Total Credits
	必修	选修							
学时/学分	632/39.5	192/12	560/35	1192/74.5	256/16	30.5 周	5	2832+30.5 周	212.5
学分所占比例	24.2%		16.5%	35.1%	7.5%	14.4%	2.3%		100%