

环境工程(卓越工程师教育培养计划) 专业培养方案

专业名称与代码:环境工程专业 082502

专业培养目标:培养“业务素质高、动手能力强、专业技术精、创新思维宽”的地质环境调查卓越工程师为核心目标;以基础理论学习、专业技术训练、综合素质培养、国际视野开拓为主体内容;以“学校与企事业单位联合”和“双导师制”结合的双轨培养模式为重要手段;面向国土资源系统及相关地矿行业,培养造就一批具有扎实地学基础、良好综合素质和实践能力、适应经济社会发展需要的高质量地质环境调查技术人才。

专业毕业要求:毕业生具有良好的道德文化修养,系统学习地质环境调查、监测、评价与治理设计的理论和方法,重点掌握区域地质环境、城市地质环境、矿山地质环境、生态地质环境等领域的专门知识和技术,具备从事区域、城市、矿山、工程场区的地质环境调查、评价、设计和施工管理的能力。

毕业生应获得以下几个方面的知识和能力

1. 掌握数学、物理、化学、计算机等方面的基础知识与基本原理。
2. 掌握地质基础理论、技能和工作方法。
3. 掌握水文地质、工程地质、环境地质的基本原理、实验测试方法和分析技术。
4. 掌握地质环境调查、评价、监测与治理设计的理论和方法。
5. 具备分析与解决实际地质环境问题的专业知识和能力。
6. 具备从事地质环境调查项目和工程管理能力。
7. 具备资料归纳、整理和综合分析与正确表达的能力。

毕业要求及实现途径

序号	毕业要求	实现途径(教学过程)
1	掌握数学、物理、化学、计算机等方面的基础知识与基本原理	①课堂教学:高等数学 B、线性代数 C、概率统计与数理统计 B、大学物理 C、大学化学 C、C 语言程序设计 A ②课外学习:物理实验 B、大学化学 C 实验、C 语言课程设计
2	掌握地质基础理论、技能和工作方法	①课堂教学:测量学 C、普通地质学、构造地质学 B、矿物岩石学、地貌学及第四纪地质学 ②课外学习:测量教学实习 A、地质认识实习(北戴河)、地质教学实习(周口店)B
3	掌握水文地质、工程地质、环境地质的基本原理、实验测试方法和分析技术	①课堂教学:水力学、地下水动力学 A、水文地质学基础 A、水文地球化学、包气带水文地质学、水资源开发与保护、地下水防治技术与方法、土力学 A、岩体力学、岩土测试技术、环境地质学、环境学概论、生态学 ②课外学习:地下水动力学 A 实验、水文地质学基础 A 实验、水文地球化学实验、土力学 A 实验,岩体力学实验、岩土测试技术实验

序号	毕业要求	实现途径(教学过程)
4	掌握地质环境调查、评价、监测与治理设计的理论和方法	①课堂教学:地质环境监测、地质环境调查与评价、地质环境数值模拟技术、地质环境保护与治理、GIS原理与应用、地下水污染与防治、水文地质工程地质勘察方法、环境同位素原理与技术、地质灾害防治工程、土壤污染和防治、地下水环境影响评价方法 ②课外学习:地质环境监测实验、地质环境调查与评价实验、地质环境数值模拟技术实验、地质环境保护与治理实验、GIS原理与应用实验、地下水污染与防治实验
5	具备分析与解决实际地质环境问题的专业知识和能力	①课堂教学:专业主干课程、专业选修课程、专业技能培训 ②课外学习:专业教学实习(三峡)、企业生产实践1+2(24周)
6	具备从事地质环境调查项目和工程管理能力	课外学习:企业生产实践1+2(24周),鼓励学生参加职业技能培训及资格考试
7	具备资料归纳、整理和综合分析 with 正确表达的能力	课外学习:地质认识实习(北戴河)、地质教学实习(周口店)、专业教学实习(三峡)、企业生产实践1+2、毕业设计,创新创业自主学习、社会调查、科技报告与科技竞赛等

主干学科:环境科学与工程、地下水科学与工程、地质工程。

核心课程:普通地质学、构造地质学、水文地质学基础、环境地质学、岩体力学、土力学、地下水动力学、地质环境监测、地质环境调查与评价、地质环境数值模拟技术、地质环境保护与治理、地下水污染与防治、GIS原理与应用等。

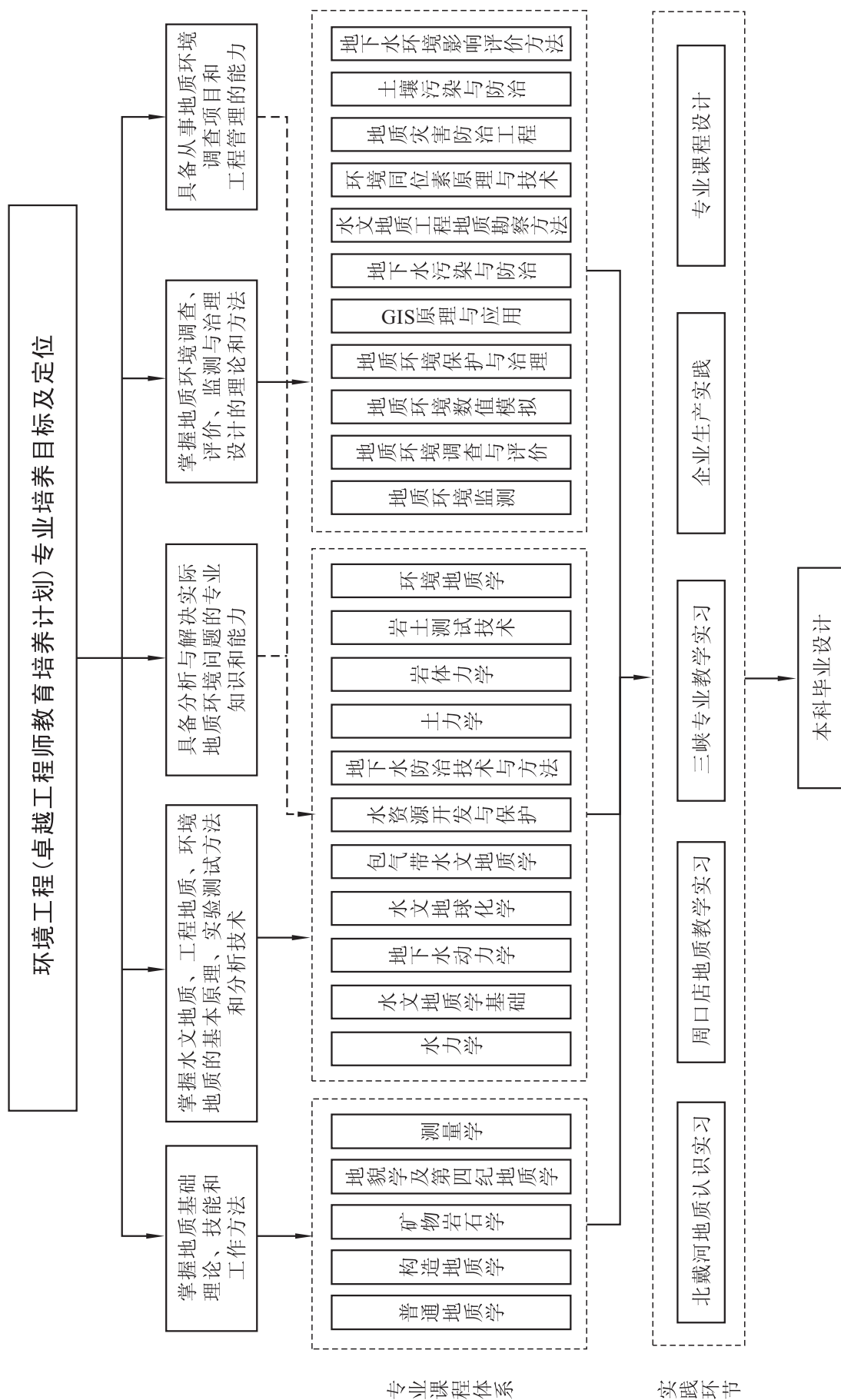
主要专业实验:水文地质学基础系列实验、水动力学实验、水化学分析实验、土质土力学实验、地质环境数值模拟实验、地质环境保护与治理实验等。

主要实践性教学环节:工程测量实习、地质认识实习(北戴河)、地质教学实习(周口店),专业教学实习(三峡)、计算机语言编程课程设计、大型专业课程设计、企业生产实践与毕业设计等。

修业年限:四年。

授予学位:工学学士。

相近专业:环境科学、地下水科学与工程、地质工程。



Program for Environmental Engineering (Excellent Engineer Training Program)

Specialty and Code: Environment Engineering 082502

Education Objective: The program aims to train excellent engineers in the field of geological environment survey, who will have high professional quality, good practical ability, skilled technology, and wide innovation perspective. Students are to learn basic theories, to practice professional technology, to train comprehensive quality, and to develop international perspective, by dual-track training mode supported by co-efforts by the university and industries. The graduates are mainly to be employed in territorial resources system and related geology-mining industries.

Graduation Requirements: The graduates must systematically study the basic theory and method on investigation, monitoring, evaluation and design of geological environment. In addition, they must master the professional knowledge and technology in the areas of regional geological environment, urban geological environment, mine geological environment and ecological geological environment. They are expected to have the ability of investigation, evaluation, design and construction management for regional, urban, mine and engineering zone geological environment.

Graduates Are Required

1. To master the fundamental knowledge and basic theories of mathematics, physics, chemistry, and computer science and so on.
2. To master fundamental principles, core technology and working methods in geology.
3. To master fundamental principles, experimental test methods and analytical technology in hydrogeology, engineering geology and environmental geology.
4. To master core theories and methods of geological environment investigation, monitoring, evaluation and design.
5. To have professional knowledge and ability to analyze and resolve geo-environmental problems.
6. To have ability to be engaged in geo-environmental survey projects and engineering management.
7. To have ability to summarize, organize, scientifically analyze and correctly interpret materials and data.

Graduation Requirements and Ways to Achieve

No.	Graduation Requirements	Ways to Achieve(Teaching Process)
1	To master the fundamental knowledge and basic theory of mathematics, physics, chemistry, and computer science and so on	①Classroom Teaching: Advanced Mathematics B, Linear Algebra C, Probability and Statistics B, College Physics C, College Chemistry C, C Language Programming ②Out-of-class Learning: Physical Experiments B, Chemical Experiments C, Course Design for C Language

No.	Graduation Requirements	Ways to Achieve(Teaching Process)
2	To master fundamental principles, core technology and working methods in geology	①Classroom Teaching: Surveying C, Physical Geology, Structural Geology B, Mineralogy and Lithology, Geomorphology and Quaternary Geology ②Out-of-class Learning: Surveying Practice A, Primary Field Training (Beidaihe), Geological Field Training (Zhoukoudian) B
3	To master fundamental principles, experimental test methods and analytical technology in hydrogeology, engineering geology and environmental geology	①Classroom Teaching: Hydraulics, The Fundamental of Hydrogeology A, Groundwater Hydraulics A, Hydro-Geochemistry, Vadose Zone Hydrogeology, Water Resources Exploitation and Protection, Groundwater Prevention Technology and Methods, Soil Mechanics A, Rock Mechanics, Rock and Soil Testing Techniques, Environmental Geology, Introduction to Environmental Science, Ecology ②Out-of-class Learning: Groundwater Hydraulics A Experiments, Fundamental of Hydrogeology A Experiments, Hydro-Geochemistry Experiment, Soil Mechanics A Experiments, Rock Mechanics Experiments, Rock and Soil Testing Techniques Experiments
4	To master core theories and methods of geological environment investigation, monitoring, evaluation and design	①Classroom Teaching: Monitoring Technology of Geological Environment, Survey and Assessment of Geological Environment, Protection and Control of Geological Environment, Numerical Simulation of Geological Environment, Principles and Applications of GIS, Groundwater Contamination and Prevention, Investigation and Survey Skills for Groundwater and Geoengineering, Environment Isotope Principles and Technology, Control Engineering for Geo-disasters, Soil Pollution and Remediation, Groundwater Environmental Impact Assessment ②Out-of-class Learning: Monitoring Technology of Geological Environment Experiments, Survey and Assessment of Geological Environment Experiments, Numerical Simulation of Geological Environment Experiments, Principles and Applications of GIS Experiments, Groundwater Contamination and Prevention Experiments
5	To have professional knowledge and ability to analyze and resolve geo-environmental problems	①Classroom Teaching: Main Specialty Courses and Specialty Elective Courses, Professional Techniques Training ②Out-of-class Learning: Professional Teaching Practice (The Three Gorges), Enterprise Production Practice 1+2 (24 Weeks)

No.	Graduation Requirements	Ways to Achieve(Teaching Process)
6	To have ability to be engaged in geo-environmental survey project and engineering management	Out-of-class Learning; Enterprise Production Practice 1+2 (24 Weeks), Encourage Students to Participate in Vocational Skills Training and Qualification Examination
7	To have ability to summarize, organize, scientifically analyze and correctly interpret materials and data	Out-of-class Learning; Primary Field Training (Beidaihe), Geological Field Training (Zhoukoudian), Professional Teaching Practice (The Three Gorges), Enterprise Production Practice 1+2(24 Weeks), Thesis Writing for Graduation. Autonomous Learning, Social Investigation, Academic Presentations and Competitions

Major Disciplines: Environmental Science and Engineering, Groundwater Science and Engineering, Geological Engineering.

Main Courses: Physical Geology, Structural Geology, The Fundamental of Hydrogeology, Environmental Geology, Rock Mechanics, Soil Mechanics, Groundwater Hydraulics, Monitoring Technology of Geological Environment, Survey and Assessment of Geological Environment, Numerical Simulation of Geological Environment, Protection and Control of Geological Environment, Groundwater Pollution and Prevention, Principles and Applications of GIS (Bilingual), etc.

Lab Experiments: Phreatic Water and Confined Water Simulation, Groundwater Flow Net Simulation, Hydrodynamics Testing, Hydrochemistry Testing, Soil Mechanics Testing, Geological Environment Simulation Testing, Geological Environment Protection and Control Testing.

Practical Work: Engineering Survey Practice, Primary Field Training (Beidaihe), Geological Field Training (Zhoukoudian), Professional Teaching Practice (The Three Gorges), Computer Program Design Practice, Course Projects, Production Practice and Design for Graduation.

Duration: four years.

Degree Granted: Bachelor of Engineering.

Related Specialties: Environmental Science, Groundwater Science and Engineering, Geological Engineering.

环境工程(卓越工程师教育培养计划) 专业课程教学计划表

Course Descriptions of Environment Engineering (Excellent Engineer Training Program)

课程类别 Course Classification	课程编号 Course 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	七 7th	八 8th			
						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 Fun- damentals of Law	3	48	48			1.5	1.5									
	113076 * 0	体育 Physical Education	4	144	144			1	1	1	1							
	109116 * 0	大学英语 College English	12	192	192			3	3	3	3							
	11918901	C 语言程序设计 A C Language Programming A	3.5	56	40	16			3.5									
	20413200	环境工程(地质环境调查)专 业导论 Introduction to Environmen- tal Engineering (Geological Environmental Survey)	1	16	16			1										
	14300100	军事理论 Military Theory	2	32	32			2										
通识教育课 Liberal Education Courses	必修 Compulsory																	
	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	46.5	824	616	16		11.5	9	8	6	0	0	0	0	0	0	0

课程类别 Course Classification	课程编号 Course 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	七 7th	八 8th															
					学科基础课 Disciplinary Fundamental Courses													212127 * 2	高等数学 B Advanced Mathematics B	10	160	160			4	6				
212130 * 2	大学物理 B College Physics B	7	112	112																	3.5	3.5								
21213202	物理实验 B Physical Experiments B	2	32															32			2									
21212802	线性代数 B Linear Algebra B	2.5	40	40																		2.5								
21213502	概率论与数理统计 B Probability and Mathematics Statistics B	2.5	40	40																		2.5								
20302403	大学化学 C College Chemistry C	4	64	50														14					4							
21120802	测量学 B Surveying B	2	32	32																2										
20114900	普通地质学 Physical Geology	3	48	48																	3									
20104002	构造地质学 B Structural Geology B	3	48	48																		3								
20113100	矿物岩石学 A Mineralogy and Lithology A	3	48	48																		3								
20115100	地貌学及第四纪地质学 Geomorphology and Quaternary Geology	2.5	40	40																			2.5							
20406000	环境学概论 Introduction to Environmental Science	2	32	32																			2							
20408400	水力学 Hydraulics	2.5	40	32														8						2.5						
	小计 Sum		46	736														682	54			6	14.5	16.5	9	0	0	0	0	0
专业主干课 Main Specialty Courses																		20400801	地下水动力学 A Groundwater Hydraulics A	4	64	40	24							4
													20409101	水文地质学基础 A The Fundamental of Hydrogeology A	4	64	40	24							4					
													20408800	水文地球化学 Hydro-Geochemistry	3	48	36	12								3				
													20403400	环境地质学 B Environmental Geology B	2	32	32						2							
													20520301	土力学 A Soil Mechanics	3.5	56	36	20							3.5					

课程类别 Course Classification	课程编号 Course 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	七 7th	八 8th	
					专业主干课 Main Specialty Courses	20517100		岩体力学 B Rock Mechanics B	2.5	40	32	8				
20419700	地质环境监测技术 Monitoring Technology of Geological Environment	2	32	24		8							2			
20419000	地质环境调查与评价 Survey and Assessment of Geological Environment	2.5	40	36		4							2.5			
20423600	地质环境数值模拟技术 Numerical Simulation of Geological Environment	2.5	40	28		12								2.5		
20419200	地质环境保护与治理 Protection and Control of Geological Environment	3	48	40		8							3			
21100700	GIS 原理与应用(双语) Principles and Applications of GIS (Bilingual)	2.5	40	30		10							2.5			
20414500	地下水污染与防治 Groundwater Pollution and Prevention	3	48	28		20								3		
20414400	水文地质工程地质勘察方法 Investigation and Survey Skills for Groundwater and Geoengineering	2.5	40	40										2.5		
小计 Sum			37	592		442	150			0	0	0	2	17.5	17.5	0
专业选修课 Specialty Elective Courses		具体见专业选修课列表	12	192												
合计 Sub-total			141.5	2344	1740	220			17.5	23.5	24.5	17	17.5	17.5	0	0
实践环节 Practical Work	44300200	军事训练 Military Training	2	2周					2							
	41919001	C 语言课程设计 A Course Design for C Language A	1.5	1.5周						1.5						
	41120902	测量教学实习 B Surveying Practice B	0.5	0.5周					0.5							
	40115200	地质认识实习(北戴河) Primary Field Training(Beidaihe)	2	2周						2						

课程类别 Course Classification	课程编号 Course 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	七 7th	八 8th		
实践环节 Practical Work	40115602	地质教学实习(周口店)B Geological Field Training (Zhoukoudian) B	4	4周								4					
	40421402	专业教学实习(三峡)B Professional Teaching Practice(The Three Gorges) B	4	4周										4			
	40423410	企业生产实践1 Enterprise Production Practice 1	16	16周													16
	40423420	企业生产实践2 Enterprise Production Practice 2	8	8周													8
	40421700	毕业设计 Bachelor Thesis	8	8周													8
	小计 Sum		46	46周					2.5	3.5	0	4	0	4	16	16	
创新创业自主学习 Autonomous Learning	ZZ35000S	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			192.5	2344 + 46周	1740	220		20	27	24.5	21	17.5	21.5	16	16		
可开出专业选修课列表 Specialty Elective Courses	20414200	水资源开发与保护 Water Resources Exploitation and Protection	1.5	24	24									1.5			
	20413600	土壤污染防治 Soil Pollution and Remediation	2.5	40	28	12								2.5			
	20405700	环境同位素原理与技术 Environment Isotope Principles and Technology	2.0	32	32								2				
	20510002	固体废物处理与处置B Solid Waste Treatment and Disposal B	2	32	32								2				
	20517200	岩土测试技术 Rock and Soil Testing Techniques	2	32	10	22								2			
	20506100	地质灾害防治工程 Control Engineering for Geodisasters	2.5	40	40								2.5				
	20414700	包气带水文地质学 Vadose Zone Hydrogeology	1.5	24	24									1.5			

课程类别 Course Classification	课程编号 Course Code	课程名称 Course Name	学分 Crs	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	二	三	四	五	六	七	八		
								1st	2nd	3rd	4th	5th	6th	7th	8th		
可开出专业选修课列表 Specialty Elective Courses	20407400	生态学 Ecology	2	32	32								2				
	20422100	专业技能培训 Professional Techniques Training	2	32	32									2			
	20401000	地下水防治技术与方法 Groundwater Prevention Technology and Methods	1.5	24	24							1.5					
	20423500	地下水环境影响评价方法 Groundwater Environmental Impact Assessment Method	1	16	16									1			

注：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。

环境工程(卓越工程师教育培养计划) 专业课程分类统计

Course Category Statistics of Environment Engineering (Excellent Engineer Training Program)

课程学分 统计	通识教育课 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 Learning	学时总计 Total Hours	学分总计 Total Credits
	必修 Compulsory	选修 Selective							
学时/学分 Hrs/Crs	632/34.5	192/12	736/46	592/37	192/12	46周/46	5	2344+46周	192.5
学分所占比例 Proportion of Credits	24.2%		23.9%	19.2%	6.2%	23.9%	2.6%		100%