

# 华北电力大学（留学生）英语授课

North China Electric Power University (International Student) Taught in English

## 环境科学与工程一级学科硕士研究生培养方案

Training Program for Postgraduates in First-level Discipline of Environmental Science and Engineering

(学科代码: 0830 授予工学硕士学位)

(Discipline Code: 0830 Degree: Master Degree of Engineering)

### 一、学科简介

#### I. Brief Introduction to the Discipline

环境科学与工程是基于自然科学、工程科学与社会科学而发展起来的综合性交叉新兴学科，是一门研究人与环境相互作用及其调控规律的学科。环境科学与工程一级学科包括环境科学与环境工程两个二级学科。其中，环境科学专业涉及环境的自然科学、技术科学与人文社会科学领域，主要研究环境演化规律、揭示人类活动同自然生态系统的相互作用关系以及探索人类与环境和谐共处的途径与方法。环境工程专业则涉及环境领域里的工程和技术问题，主要研究各环境介质（水、土、气）污染防治、固体废物处置与资源化、物理性污染防治等。“环境科学与工程”学术型硕士研究生主要是培养掌握环境科学与工程领域扎实的基础理论和系统的专门知识，熟悉本学科科学技术发展方向，具有一定创新能力、良好职业素养的高层次研究型、学术型专门人才。

华北电力大学环境科学与工程学科现已发展成为国内同类高校中具有较高水平、鲜明能源电力特色的学校“双一流”重点建设学科，拥有国家级“一流专业”和省部级重点实验室等优良的教学科研平台，形成了一支结构合理、教学经验丰富，创新氛围浓厚的高水平师资队伍，为高水平创新型人才培养创造了良好的条件。

Environmental Science and Engineering is a new comprehensive interdisciplinary subject based on natural science, engineering science and social science. It is also a subject that studies the interaction between human and environment and its regulation law. The first-level discipline of Environmental Science and Engineering includes two second-level disciplines of Environmental Science and Environmental Engineering. Among them, the major of Environmental Science involves the natural science, technical science, humanities and social science of the environment, mainly focusing on the rule of environmental evolution, the interaction between human activities and natural ecosystem, and the exploration of the harmonious coexistence between human and the

environment. The major of Environmental Engineering focuses on the engineering and technical problems in the field of environment, involving in the prevention and control of pollution caused by various environmental media (water, soil and atmosphere), the disposal and recycling of solid waste, and the prevention of physical pollution. The "Environmental Science and Engineering" academic postgraduate is mainly to cultivate high-level research and academic professionals who have a solid basic theoretical and systematic expertise in the field of environmental science and engineering, and are familiar with the development direction of science and technology in this discipline, and have certain innovative ability and good professional quality.

The discipline of Environmental Science and Engineering in North China Electric Power University has now developed into a "double-first-class" key construction discipline with high level and distinctive energy and power characteristics among similar domestic universities. It has excellent teaching and research platforms such as national "first-class specialty" and provincial and ministerial key laboratories, and has formed a high-level teaching team with reasonable structure, rich teaching experience and strong innovation atmosphere, which has created favorable conditions for the cultivation of high-level innovative talents.

## 二、培养目标

### II. Training Objectives

1. 在环境科学与工程领域内掌握坚实的基础理论和系统的专门知识，熟悉所从事的研究领域中科学技术的发展动向。

2. 具有创新能力和从事科学研究、教学工作或独立承担专门技术工作的能力。

3. 熟练掌握汉语。培养对中国有良好认知，理解中国社会主流价值观，具有相应的中文语言能力，具备一定跨文化和全球胜任力，在所在学科具有相当专业知识和学术能力的国际化人才。

1. Students should master solid basic theoretical and systematic expertise in the field of Environmental Science and Engineering, and be familiar with the development trend of science and technology in their research field.

2. Upon completion, students will possess the abilities of innovation and the abilities to engage in scientific research, teaching or undertake specialized technical work independently.

3. Students should also be proficient in Chinese. The discipline aims to cultivate international talents who have a good understanding of China, understand the mainstream values of Chinese society, have corresponding Chinese language skills, have certain cross-cultural and global competencies, and have considerable professional knowledge and academic abilities in their disciplines.

## 三、研究方向

### III. Research Direction

1. 大气污染与控制
2. 水资源与水污染控制
3. 固体废物处理与资源化
4. 污染检测与控制技术
5. 能源环境化学
6. 环境污染生态与修复
7. 环境规划与管理
8. 物理性污染控制

1. Air Pollution and Control
2. Water Resources and Water Pollution Control
3. Solid Waste Treatment and Resource Utilization
4. Pollution Detection and Control Technology
5. Energy Environmental Chemistry
6. Environmental Pollution, Ecology and Restoration
7. Environmental Planning and Management
8. Physical Pollution Control

### 四、培养方式

#### IV. Training Method

1. 硕士生的培养方式为导师负责制，或组成指导小组集体培养。充分发挥导师、学术群体指导研究生的作用。导师指导小组要负责审查研究生的文献综述与选题报告、论文中期检查以及论文预答辩等培养环节的工作完成情况。

1. The training implements supervisor responsibility system, or composes the steering group for collective cultivation. It should give full play to the role of supervisors and academic groups to guide postgraduates. The supervisor steering group is responsible to inspect the student's completion status of the literature review and thesis proposal, mid-term review and pre-defense of dissertation.

2. 导师应根据培养方案的要求，多方面了解所指导的硕士生的知识结构、学术特长、研究兴趣、能力基础等具体情况，据此制定出研究生个人培养计划，并督促检查其实施情况。

2. The supervisor should acknowledge the knowledge structure, academic skills, research interests, and abilities of the master candidates according to the requirement of the training scheme, based on which to formulate a training plan for individual graduate student and supervise the implementation according to the plan.

3. 硕士研究生的培养采用课程学习与科学研究并重的方式。既要使硕士生掌握坚实的基础理论和系统的专业知识,又要培养研究生掌握科学研究或独立担负设计、管理等方面工作的能力。

3. The training of postgraduates adopts the way of attaching equal importance to course learning and scientific research. It is necessary to make postgraduates master solid basic theories and systematic professional knowledge and cultivate postgraduates' ability to undertake scientific research or design and management work independently.

4. 导师应指导研究生学习有关课程,指导学位论文选题,检查科学研究进展情况,帮助解决科研中的困难,适时地指导研究生撰写论文,认真审阅学位论文,切实把好研究生的培养质量关。

4. The supervisor should guide postgraduates to study relevant courses, guide the topic selection of the degree thesis, check the progress of scientific research, help them solve the difficulties in scientific research, timely guide postgraduates to write the thesis, carefully review the degree thesis, and ensure the training quality of postgraduates.

5. 将硕士研究生的学风教育贯穿到研究生培养的全过程,要加强教书育人的工作。

5. Involve the ideological and political education and education of moral learning for postgraduate into the training. Strengthen the work of imparting knowledge and educating postgraduates.

## 五、学制与学习年限

### V. Educational System and Duration of the Program

学制3年,学习年限一般为2-4年。

The educational system is 3 years. The duration of the program is 2-4 years.

## 六、课程设置与学分要求

### VI. Curriculum and Credit Requirements

硕士生的课程学习实行学分制。要求各学科硕士生应修满的学分数为:总学分应不少于28学分,其中学位课不少于22学分。课程体系框架如下:

The course study of postgraduates implements credit system. The total credits should be no less than 28 credits, including no less than 22 credits for degree courses. The curriculum framework is as follows:

1. 学位课(不少于22学分),其中:

(1) 公共课:10学分。

汉语综合(1):4学分(64学时)

汉语综合(2):4学分(64学时)

中国概况(英文): 2 学分(32 学时)

(2) 数学基础课或基础理论课: 不少于二门课程, 4 学分。

(3) 学科基础课: 按一级学科设置, 不少于 4 学分。

(4) 学科专业课: 按二级学科设置, 不少于 4 学分。

1. Degree courses (no less than 22 credits), of which:

(1) Public courses: 10 credits.

Chinese Comprehension (1): 4 credits (64 class hours)

Chinese Comprehension (2): 4 credits (64 class hours)

Introduction to China (English): 2 credits (32 class hours)

(2) Basic mathematics or basic theoretical courses: No less than 2 courses, 4 credits.

(3) Basic courses of disciplines: Set by first-level discipline, no less than 4 credits.

(4) Specialized courses of disciplines: Set by second-level discipline, no less than 4 credits.

2. 必修课程与必修环节 (6 学分), 其中:

(1) 研究生科学道德与学术规范: 1 学分。

(2) 专题课程/seminar 课程: 1 学分。

专题课程/seminar 课程结合本领域学术前沿和研究生学位论文的选题进行设置。课程可采用教师讲授与研究生研讨相结合的方法进行学习。

专题课程在研究生学位论文阶段完成。

(3) 实践环节: 1 学分

实践环节包括实验教学、专业生产实践以及教学实践等。在第二、第三学期各院(系)及导师应安排研究生参加实践,如讲授大学本科课程的部分章节,参与指导课程设计、实习、实验、辅导答疑、课堂讨论等教学环节,或结合科研课题到生产单位参加调研或项目研发等实践工作,总工作量应达到 80 学时或 10 个工作日。

学院根据各学科特点和人才培养目标,依托本学科重点实验室、实践教学基地等开设具有特定主题的系列实验课或以实验为主的专题课;或与学科应用技术相关的硬件、软件设计或系统设计;或在本学科重点实验室、实践教学基地等进行工程设计、实验设备安装调试或协助实验室教师指导本科生完成实验教学等实验工作,以提高研究生的科研实践能力。

(4) 学术活动: 1 学分, 要求硕士生至少参加 6 次学术报告。

(5) 文献综述与开题报告: 1 学分。

(6) 论文中期检查: 1 学分。

2. Compulsory courses and required links (6 credits), of which:

(1) Scientific Ethics and Academic Norms for Postgraduates: 1 credit

(2) Program Course/Seminar Course: 1 credit

Program course/seminar course should be set up in combination with the academic frontiers in this field and the topic of postgraduate degree thesis. The courses can be conducted by the combination of professor teaching with postgraduate discussion.

The program course should be completed in the process of master dissertation.

(3) Practice Links: 1 credit

The practice links include experimental teaching, professional production practice and teaching practice, etc. In the second and third semesters, the colleges (departments) and supervisors should arrange postgraduates to participate in practice, such as teaching some chapters of undergraduate courses, and participate in guiding curriculum design, internship, experiment, supervising and answering questions, classroom discussion and other teaching links, or participate in practical work such as research or project research and development in the production unit in combination with scientific research tasks. The total workload should reach 80 class hours or 10 working days.

According to the characteristics of each discipline and the goal of talent cultivation, the school provides a series of experimental courses with specific themes or special subjects based on the key laboratories and practice teaching bases of the discipline. Or the hardware, software or system design related to the subject application technology; or in the discipline of the key laboratory, practice teaching base for engineering design, experimental equipment installation and debugging, or to assist laboratory teachers to guide undergraduates to complete experimental teaching and other experimental work, in order to improve scientific research practice abilities of the postgraduates.

(4) Academic Activities: 1 credit, postgraduates are required to participate in at least 6 academic reports;

(5) Literature Review and Thesis Proposal: 1 credit;

(6) Mid-term Review of the Thesis: 1 credit.

具体课程设置见附表。

See the Schedule of course settings.

## 七、科学研究与学位论文要求

### **VII. Requirements for Scientific Research and Degree Thesis**

科学研究与学位论文工作是研究生培养的重要组成部分，是培养硕士研究生独立思考、勇于创新的精神和从事科学研究或担负专门技术工作能力的重要手段。硕士研究生应在导师指导下独立完成硕士学位论文工作。

Scientific research and degree thesis are important parts of postgraduate training, and important ways to cultivate postgraduates' independent thinking, innovative spirit and the ability to undertake scientific research or specialized technical work. Postgraduates should independently

complete the master dissertation under the guidance of their supervisors.

### 1. 文献综述与开题报告

硕士生入学后应在导师指导下，查阅文献资料，了解学科现状和动态，尽早确定课题方向，完成论文选题。学位论文的选题一般应结合本学科的研究方向和科研项目，鼓励面向国民经济和社会发展的需要选择应用型课题。确定学位论文工作的内容和工作量时应全面考虑硕士研究生的知识结构、工作能力和培养年限等方面的特点。

硕士开题由学院（系）统一组织。开题时间一般安排在硕士生入学后第二学期的期末前进行。开题时间距离申请答辩日期一般不少于一学年。

文献综述与开题报告应不少于 5000 字（不含图表），主要内容包括：课题的意义，国内外研究现状及发展趋势，论文的基本构思，研究方法，计划进度，预期目标及成果，主要参考文献资料等。文献综述的主要参考文献应在 30 篇以上，其中外文文献不少于 10 篇。开题报告在二级学科范围内相对集中、公开地进行，并由以硕士生导师为主体组成的审查小组评审。开题报告会应吸收有关导师和研究生参加，跨学科的论文选题应聘请相关学科的导师参加。若学位论文课题有重大变动，应重做选题报告。评审通过的开题报告，应以书面形式交学院备案。开题报告通过者给予 1 学分。对文献综述与开题报告工作的其他具体要求见《华北电力大学学术学位硕士研究生必修环节实施细则》。

### 1. Literature review and thesis proposal

After the enrollment, postgraduates should consult the literature, understand the current situation and trends of the discipline, determine the research direction as soon as possible, and complete the topic selection of the thesis under the guidance of their supervisors. The topic selection of degree thesis should generally be combined with the research direction and scientific research projects of the discipline and the selection of applied topics meeting the needs of national economic and social development are encouraged. When determining the content and workload of degree thesis work, the supervisor should fully consider the knowledge structure, work abilities and training duration of postgraduates.

The thesis proposal is uniformly organized by the colleges (departments). It is required to be completed before the end of the second semester and at least one academic year before the thesis defense.

Literature review and thesis proposal should be no less than 5,000 words (excluding charts), and it mainly includes: the significance of the subject, the current research situation and development trend at home and abroad, the basic idea of the paper, research methods, planning progress, expected objectives and results, main reference materials, etc. The main references for literature review should be more than 30, of which no less than 10 are in foreign languages. The thesis proposal is conducted in a relatively centralized and open manner within the second-level

discipline, and is reviewed by a review group composed of master supervisors. The thesis proposal meeting should be attended by relevant supervisors and postgraduates, and the topic selection of interdisciplinary papers should be attended by supervisors from relevant disciplines. If there is a major change in the dissertation topic, the topic selection report should be redone. The thesis proposal approved by the evaluation shall be submitted to the college in written for the record. The students who pass the thesis proposal can get one credit. For other specific requirements of literature review and thesis proposal, please refer to the Detailed Rules for the Implementation of Compulsory Links for Postgraduates with Academic Degrees in North China Electric Power University.

## 2. 论文中期检查

学位论文实行中期检查制度。论文中期检查一般在第四学期内进行。2 年毕业的全日制学术型研究生学位论文中期检查要求在第三学期期末完成。按二级学科组织考核小组（3-5 人组成）对研究生的论文工作进展以及工作态度、论文完成的可能性等进行全方位的考查。论文中期检查通过者给予 1 学分。

## 2. Mid-term review of the thesis

The degree thesis adopts the mid-term review system. The mid-term review of the thesis is usually conducted in the fourth semester. The mid-term review of full-time academic graduate thesis for 2-year graduation is required to complete at the end of the third semester. According to the second-level discipline organization assessment group (3-5 members) to conduct an all-round examination of the postgraduate thesis work progress, work attitude and the possibility of completing the thesis. The students who pass the mid-term review can get 1 credit.

## 3. 学术论文发表与科研成果要求

学术学位硕士生在学习期间应积极参加本学科的国内外学术交流活动，撰写和发表学术论文。硕士研究生在申请学位论文答辩前必须达到以下条件之一，方可参加学位论文答辩：

（1）以第一作者身份（如果是第二作者，其导师必须是第一作者），在 SCI/EI 收录期刊（源刊）、或北大中文核心期刊上公开发表（正式录用或网络见刊）1 篇及以上学术论文。

（2）研究生的学位论文工作成果（署名华北电力大学）获得省部级三等及以上奖励 1 项，或获得国内外发明专利（实审或授权）1 项。

（3）在全国“挑战杯”等全国范围内举办的大型课外科技作品或学术竞赛中获国家级三等奖及以上奖励一项。

（4）在省（市）级课外科技作品竞赛中获一等奖（排名前 3）或二等奖 1 项（排名前 2）。

（5）获学校科研成果一、二等奖 1 项，本人排名在前 3 名。

(6) 研究生参与的政策建议获地市级以上政府采纳（需提供相关证明材料）。

所有申请学位人员，在学期间所发表的与学位论文相关的学术论文，其署名第一单位必须是华北电力大学或华北电力大学（保定）。

### 3. Academic paper publication and research achievement requirements

Academic degree postgraduates should actively participate in domestic and foreign academic exchange activities in the discipline, write and publish academic papers. Postgraduates must meet one of the following conditions before applying for dissertation defense:

(1) Finishing one or more academic papers in this discipline as the first author (If it is the second author, its supervisor must be the first author) and publishing them (If the paper is not published, a formal employment notice must be provided) in SCI/EI indexed journals (source journals) or Peking University core journals.

(2) The work achievements of the master dissertation (signed by North China Electric Power University) have won one third-prize of provincial or ministerial grade or above award, or one invention patent (real examination or authorization) at home and abroad.

(3) Achieving the national third-prize or above award in the national "challenge cup" and other large-scale extra-curricular scientific and technological works or academic competitions held in the country.

(4) Achieving the first prize (top 3) or the second prize (top 2) in the provincial (city) extracurricular science and technology works competition.

(5) Won the first prize or the second prize of the school's scientific research achievements, and ranked in top 3.

(6) The policy suggestions of postgraduates' participation have been adopted by prefectural-level or above governments (relevant certification materials are required).

All applicants for a degree must sign their academic papers related to the degree papers published during their studies by the North China Electric Power University or the North China Electric Power University (Baoding).

### 4. 学位论文要求

硕士学位论文是硕士生科学研究工作的全面总结，是描述其研究成果、反映其研究水平的重要学术文献资料，是申请和授予硕士学位的基本依据。学位论文撰写是硕士生培养过程的基本训练之一，必须按照规范认真执行，具体要求见《华北电力大学学术硕士学位论文撰写规范及范例》。

### 4. Degree thesis requirements

Master dissertation is a comprehensive summary of postgraduates' scientific research work, is an important academic literature that describes their research results and reflects their research level, and is the basis for applying for and awarding master's degrees. Degree thesis writing is one

of the basic training in the training process of postgraduates, which must be carried out conscientiously in accordance with the norms. For specific requirements, please refer to Norms and Examples for the Master Dissertation Writing of North China Electric Power University.

#### 5. 学位论文评审与答辩

学校集中进行硕士研究生论文的评审与答辩工作。研究生在论文工作完成后，须向所在院系提交论文答辩申请，相关部门要对研究生的答辩资格进行审查，审查通过方可进入论文评审与答辩程序。未通过答辩资格审查的硕士生不得进行论文答辩。

硕士学位论文的评审与答辩按照《华北电力大学研究生学位论文评审和答辩的有关规定》、《华北电力大学学位授予工作细则》等相关规定进行。毕业生的答辩时间一般安排在 6 月 15 日之前，延期毕业和提前毕业的研究生的答辩时间一般安排在 12 月 15 日之前。

#### 5. Review and defense of degree thesis

The review and defense of master dissertation shall be conducted in an intensive manner. Postgraduates should submit the application for thesis defense to their departments after the completion of the thesis work, and the relevant departments shall examine the postgraduates' defense qualification and they are allowed to enter the thesis review and defense procedure only after they pass the examination. Postgraduates who fail to pass the examination of their qualification for defense shall not defense to their theses.

The review and defense of master dissertation shall be carried out in accordance with the Relevant Provisions on the Review and Defense of Master Dissertation of North China Electric Power University and the Detailed Rules of Degree Awarding of North China Electric Power University. The defense time for master dissertation is generally arranged before June 15, while the defense time for postgraduates of postponed graduation and early graduation is generally arranged before December 15.

### 八、提前毕业条件

#### **VIII. Conditions of Early Graduation**

学术型硕士研究生基础学业年限一般为三年，但符合一定条件可以申请提前一年或半年毕业。为进一步规范研究生提前毕业工作的管理，确保研究生培养的质量，结合我校实际，申请提前毕业的研究生应满足以下条件：

The basic academic years of academic postgraduates are generally three years, but they can apply to graduate one or six months ahead of schedule if they meet certain conditions. In order to further standardize the management of postgraduates' early graduation work and ensure the quality of postgraduates training, in combination with the actual situation of our school, postgraduates applying for early graduation should meet the following conditions:

1. 已按研究生培养方案的要求修完全部课程，课程成绩排名位于专业前 25%，学分达

到毕业要求，完成培养过程的所有环节。

1. All courses have been completed according to the requirements of the postgraduate training plan, with the course scores ranking in the top 25% of the majors, credits reaching the graduation requirements, and all links of the training process completed.

2. 以第一作者身份（如果是第二作者，其导师必须是第一作者）在本专业权威性刊物上发表 1 篇及以上与学位论文研究内容相关的 SCI 收录（源刊）论文。

2. As the first author (If it is the second author, its supervisor must be the first author), publish one or more SCI-included (source) papers related to the research content of degree papers in authoritative journals of this specialty.

3. 经导师同意，向学院学位分委员会提交提前毕业书面申请，院学位分委员会委托成立考核委员会对申请提前毕业研究生进行考核，根据论文工作实际进展情况做出是否允许申请提前毕业的决定。

3. With the consent of the supervisor, submit a written application for early graduation to the Academic Degrees Sub-Committee of the College. The Academic Degrees Sub-Committee entrusts the establishment of an assessment committee to assess the postgraduates applying for early graduation, and decides whether to allow the application for early graduation according to the actual progress of the thesis work.

4. 申请提前毕业研究生的学位论文评阅采用盲评形式。

4. Blind evaluation is adopted for the evaluation of degree theses of postgraduates who apply for early graduation.

5. 申请提前毕业学生必须满足其它毕业答辩资格审查条件，进行公开答辩。答辩委员会成员不包括该研究生的导师。

5. Students applying for early graduation must meet other qualification requirements for graduation defense and make public defense. The defense committee should not include the supervisor.

附表：环境科学与工程一级学科学术学位硕士研究生培养方案（留学生）课程设置表（英语课）

**Schedule:Curriculum (Taught in English) of Training Program for Postgraduates  
(International Student) in First-level Discipline of Environmental Science and Engineering**

类别 Category	课程名称 Course name	学时 Class hour	学分 Credit	考核方式 Assessment mode	开课学期 Semester of the course	备注 Remarks	
学位课 (不少于22学分) Degree courses (no less than 22 credits)	公共课(10学分) Public courses (10 credits)	中国概况 (英文) Introduction to China (English)	32	2.0	考试 (Exam)	1	
		汉语综合 (1) Chinese Comprehension (1)	64	4.0	考试 (Exam)	1	
		汉语综合 (2) Chinese Comprehension (2)	64	4.0	考试 (Exam)	2	
	数学基础课 (不低于4学分) Basic mathematics courses (no less than 4 credits)	矩阵论 Matrix Theory	32	2	考试 (Exam)	1	
		数值分析 Numerical Analysis	32	2	考试 (Exam)	1	
	学科基础课 (不低于4学分) Basic courses of disciplines (no less than 4 credits)	环境化学 Environmental Chemistry	48	3	考查 (Review of performance)	1	
		环境工程 Environmental Engineering	48	3	考试 (Exam)	1	
		高等分析化学 Advanced Analytical Chemistry	48	3	考试 (Exam)	1	
	学科专业课 (不低于4学分) Specialized courses of disciplines (no less than 4 credits)	应用化学 Applied Chemistry	48	3	考试 (Exam)	1	
		能源技术 Energy Technology	48	3	考试 (Exam)	1	
		光谱分析 Spectroscopy Analysis	48	3	考试 (Exam)	1	
		空气污染控制理论 Principles of Air Pollution Control	32	2	考试 (Exam)	2	

必修课程与必修环节 Compulsory courses and required links	研究生科学道德与学术规范 Scientific Ethics and Academic Norms for Postgraduates		1	考查 (Review of performa nce)	
	专题课程/seminar 课程 Program Course /Seminar Course		1	考查 (Review of performa nce)	
	实践环节（实验、实践） Practice Links (Experiment, Practice)		1	考查 (Review of performa nce)	
	学术活动（报告、讲座 6 次） Academic Activities (6 Reports and Lectures)		1	考查 (Review of performa nce)	
	文献综述与选题报告 Literature Review and Thesis Proposal		1	考查 (Review of performa nce)	
	论文中期检查 Mid-term Review of the Thesis		1	考查 (Review of performa nce)	