

# 华北电力大学(留学生)英文授课

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

## 可再生能源与清洁能源二级学科博士研究生培养方案

Training Program for Doctoral Students in Second-level Discipline of Renewable Energy and  
Clean Energy

(专业代码: 0808J1 授予工学博士学位)

(Major Code: 0808J1, Degree: Doctoral Degree of Engineering)

### 一、学科简介

#### I. Brief Introduction to the Discipline

“可再生能源与清洁能源”是华北电力大学新能源学院在“电气工程”与“动力工程及工程热物理”两个一级博士学位点下，自主设立的二级交叉学科博士学位授权点。

"Renewable Energy and Clean Energy" is the second-level interdisciplinary doctoral program independently established by the School of New Energy of North China Electric Power University under the two first-level doctoral programs of "Electrical Engineering" and "Power Engineering and Engineering Thermophysics".

本学位授权点聚焦可再生能源领域的重大战略需求，为我国乃至世界培养高水平专业技术人才和科学研究人才，开展应用基础研究及关键技术研发，推动可再生能源行业技术进步。以风能、太阳能、生物质能等可再生能源为主要研究对象，揭示可再生能源发电中能量转化、传递及储存的机理、规律及现象，研究可再生能源发电侧抑制波动与智能控制的理论、技术和方法，开展新能源器件装备研制，为大规模可再生能源并网提供理论和技术基础。从可再生能源发电侧与电网侧相互影响和耦合为出发点，重点研究和突破可再生能源与清洁能源发电过程中的共性规律、现象、及应用，并开展可再生能源的储能技术研究，丰富电气工程、动力工程与工程热物理这两个一级学科的内涵和外延，为大规模可再生能源与清洁能源发电及利用奠定科学基础，培养高端研发及管理人才。

Focusing on the requirements of crucial strategies in the field of renewable energy, this program devotes to training the high-level professionals and scientific researchers for our country and other countries, and implementing the basic research for application and developing the key technologies in order to promote the science and technology in the renewable energy industry. The renewable energy, mainly including wind energy, solar energy, biomass energy etc., will be studied, the mechanism, laws and phenomena of energy conversion, transfer and storage in renewable energy power generation will be researched, the theories, technologies and methods of restraining fluctuation and intelligent control on the generation side of renewable energy will be

cultivated, and the new energy devices and equipments will be designed for providing the theoretical and technical basis for grid connection of large-scale renewable energies. From the point of mutual influence and coupling between the generation side and the grid side of renewable energies, the common laws, phenomena and applications in the power generation process of renewable and clean energies will be intensively studied, and the research on storage technology related to renewable energies will also be carried out. All the work of the program will enrich the connotation and denotation of the two first-level disciplines of Electrical Engineering, Power Engineering and Engineering Thermophysics as well as build the scientific foundation for power generation and utilization of large-scale renewable and clean energies, and the high-quality R&D and management talents are educated.

本学科以多学科交叉为基础，以立德树人为根本，已成为我国可再生能源高级人才培养基地。具有“清洁能源学”北京市高精尖学科。现拥有 60 人的专业师资队伍，现拥有专任教师 51 人，其中教授 15 人，副教授 28 人，其中：国家“万人计划”入选者 4 人，长江学者特聘教授 1 人，国家“百千万工程人才”第一层次 1 人，教育部“新世纪优秀人才支持计划”6 人，科技部重点领域创新团队 1 个，北京市教学名师 1 人。本学科拥有“新能源电力系统国家重点实验室”、“生物质发电成套设备国家工程实验室”和“能源的安全与清洁利用”北京市重点实验室。

Based on the multidisciplinary characteristics plus moral education, the discipline is important for training advanced renewable energy talents in China and the School of New Energy has become such an education base. The discipline of "Clean Energy Science" has been rated as a "High-level and Cutting-edge Discipline in Beijing". At present, there is a faculty of 60 professional teachers including 51 full-time teachers, 15 professors and 28 associate professors. 4 of the faculty are selected as members of the "Ten Thousand Talents Program" of China, 1 distinguished professor is awarded the title of the "Yangtze River Scholar", 1 person belong to at the first level of the national "Hundred, Thousand and Ten Thousand Talent Project", 6 people are supported by the "Program for New Century Excellent Talents in University" of the Ministry of Education. In addition, we have 1 innovation team in key areas of the Ministry of Science and Technology, and 1 excellent teacher in Beijing. This discipline is supported by the "State Key Laboratory of New Energy Power System", the "National Engineering Laboratory of Complete Equipment for Biomass Power Generation" and the "Beijing Key Laboratory of Energy Safety and Clean Utilization".

## 二、培养目标

### II. Training Objectives

1. 在可再生能源与清洁能源学科内掌握坚实宽广的基础理论和系统深入的专门知识，了解本学科专业的前沿动态，具有独立从事科学研究工作的能力，并要初步具有主持较大型科研、技术开发项目，或解决和探索经济、社会发展问题的能力，在科学或专门技术上做出

创造性的成果，能够胜任本学科或相近学科的科研、教学和管理工作。

1. This program aims to cultivate students for mastering firm and comprehensive theories along with in-depth and systematic knowledge of Renewable Energy and Clean Energy. Every student understands the professional and cutting-edge trends of this discipline and has the capacity of doing research independently and a preliminary ability of conducting the relatively large-scale scientific research and technology development projects or the ability to solve and explore economics and social development issues. The students should acquire creative achievements in science or expertise, and are qualified to undertake the scientific research, teaching and management of this discipline or related areas.

2. 应掌握一定程度的汉语，具备包容、认知和适应文化多样性的意识、知识、态度和技能，能够在不同民族、社会和国家之间的相互尊重、理解和团结中发挥作用。

Students shall reach a certain level of Chinese language proficiency, have the awareness, knowledge, attitude and skills to tolerate, acknowledge and adapt to cultural diversity, and play a role in mutual respect, understanding and unity among different nationalities, societies and countries.

### 三、研究方向

### **III. Research Direction**

可再生能源与清洁能源二级学科由华北电力大学新能源学院承担培养任务。

The training tasks of the second-level discipline of Renewable Energy and Clean Energy are undertaken by the School of New Energy of North China Electric Power University.

主要研究方向：

Main research directions:

1. 风力发电系统理论与技术  
1. Theory and Technology of Wind Turbine System
2. 太阳能发电理论与技术  
2. Theory and Technology of Solar Power Generation
3. 生物质能发电理论与技术  
3. Theory and Technology of Biomass Power Generation
4. 新能源材料与器件技术  
4. New Energy Material and Device Technology
5. 其它新能源理论与技术  
5. Theory and Technology of Other New Energy Sources

### 四、培养方式

### **IV. Training Method**

1. 博士生培养实行导师负责制，必要时可设副导师或组成指导小组。导师是研究生培养第一责任人，要了解掌握研究生的思想状况，将专业教育与日常教育有机融合，既作学业导师，又作人生导师，严格要求学生遵守科学道德和学术规范。

1. The training of doctoral students implements the supervisor responsibility system, if necessary, a secondary-supervisor or a steering group may be introduced. The supervisor is the first person paying responsibility for postgraduate training. The supervisor shall understand and master the ideological situation of postgraduates and organically integrate professional education with daily education both as academic mentors and life mentors. The supervisor shall also strictly require students to abide by scientific ethics and academic norms.

2. 博士生的培养以科学研究工作为主，重点是培养独立从事科学研究工作和进行创造性研究工作的能力；并根据研究需要继续深入学习一些课程，在拓宽基础、加深专业、掌握学科发展前沿的基础上学会进行创造性研究工作的方法和培养严谨的科学作风。

2. The training of doctoral students mainly depends on scientific research, which focus on cultivating the abilities of conducting study independently and creative research work; students shall continue to study some courses according to the requirements of research, learn the methods of research and cultivate rigorous scientific attitudes on the basis of broadening the foundation, deepening the specialized learning and mastering the frontier of discipline development.

3. 我校培养来华留学博士生，采用全日制培养方式，即整个培养过程均在我校完成。

3. Our university trains international doctoral students in full-time manner. That is, the whole training process is completed in our university.

4. 对于在我国获得硕士或学士学位，再次申请来我校攻读博士学位者，要求具有使用汉语生活用语和阅读本专业汉语资料的能力；对于在他国（含派遣国，下同）获得相当于我国硕士学位学术水平的学历证书者，要求具有使用汉语生活用语和阅读本专业汉语资料的初步能力。

4. Those who have obtained master's or bachelor's degrees in China and apply for doctoral or master's degrees in China are required to have the ability to use Chinese daily language and read the Chinese documents related to their majors; those who have obtained academic certificates in another country (including sending states, the same below) equivalent to the academic level of master's degrees in China are required to have the primary ability to use Chinese daily language and read the Chinese documents related to their majors.

## 五、学制与学习年限

## V. Educational System and Duration of the Program

学制 4 年，学习年限 3-8 年。

The educational system is 4 years, and the duration of the program is 3-8 years.

## 六、课程设置及学分要求

## VI. Curriculum and Credit Requirements

博士生的课程设置分学位课、必修环节和任选课三大类。学位课分公共课、基础理论课、专业核心课。攻读博士学位留学生在校期间,应修最低学分为 20 学分,其中学位课 14 学分,必修环节 6 学分。具体要求如下:

The curriculum for doctoral students consists of three categories: degree courses, required links and optional courses. Degree courses include public courses, basic theoretical courses and specialized core courses. During school, doctoral students shall obtain the minimum 20 credits, among which 14 credits are from degree courses and 6 credits are from required links. The specific requirements are as follows:

### 1. 学位课 (14 学分), 其中:

#### 1. Degree courses (14 credits), including:

公共课: 汉语综合(1): 4 学分(64 学时)

Public courses: Chinese Comprehension (1): 4 credits (64 class hours);

汉语综合(2): 4 学分(64 学时)

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

中国概况(英文): 2 学分(32 学时)

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

基础理论课: 2 学分;

Basic theoretical courses: 2 credits;

专业核心课: 2 学分。

Specialized core courses: 2 credits.

要求博士生在基础理论方面,应进一步掌握现代数学等高层次的宽厚的基础理论,为研究方法的创新提供坚实的理论基础;在专业核心课程的设置中以研究型的专业基础课程为基础,以加强博士研究生的学术理论训练为主,使学生把握本学科发展的前沿动态,培养学生发现问题、提出问题、分析问题的批判性思维能力和创新思维能力以及解决实际问题的能力。

Doctoral students are required to grasp the advanced and broad theories of modern mathematics to provide a firm theoretical basis for the innovation of research methods. The research-based courses from the core of the basic professional courses will provide the students with the opportunity to strengthen their academic theories, guide the students toward the frontiers of the discipline development, equip the students with critical and innovative thinking abilities to discover problems, to raise problems, to analyze problems and, eventually, to solve practical problems.

### 2. 必修环节 (6 学分), 包括:

#### 2. Required links (6 credits), including:

研究生科学道德与学术规范 1 学分；

Scientific Ethics and Academic Norms for Postgraduates: 1 credit;

研读专业经典名著 1 学分：博士生在学习期间，须在导师的要求与指导下，研读本专业至少 1 本经典名著，完成后记 1 学分；

Professional Classics Studying (1 credit): During the study of doctoral students, they must, under the requirements and guidance of their supervisors, study at least one classic masterpiece of this major, and they shall get 1 credit upon completion;

文献综述与选题报告 2 学分；

Literature Review and Thesis Proposal: 2 credits;

前沿讲座与专题研讨 1 学分：参加前沿讲座与专题研讨是培养博士生综合能力和进入学科前沿的重要环节。博士生在学习期间，应在导师确定的专题领域，至少参加 8 次前沿讲座与专题研讨，完成后记 1 学分；

Cutting-edge Lectures and Seminars (1 credit): Participating in cutting-edge lectures and seminars is an important link to cultivate the comprehensive ability of doctoral students and help them to enter the forefront of the discipline. During their school period, doctoral students shall attend at least 8 cutting-edge lectures and seminars in related research area determined by their supervisors. They shall get 1 credit upon completion;

博士论坛 1 学分：要求博士生至少做 2 次学术报告，完成后记 1 学分。

Doctor Forum (1 credit): Doctoral students are required to give at least 2 academic reports. They shall get 1 credit upon completion.

### 3. 任选课与补修课程

### 3. Optional courses and supplementary courses

硕士阶段非本学科的博士生应补修由导师指定的若干本学科硕士阶段主干课程。补修课程不计入总学分。

Doctoral student who are not in their own disciplines at the postgraduate stage should take several major courses of postgraduate stage of this discipline designated by their supervisors. Supplementary courses are not included in the total credit.

具体课程设置见附表。

See the Schedule for the specific curriculum.

## 七、科学研究及学位论文要求

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

进行科学研究与撰写学位论文，是对博士研究生进行科学研究训练、培养创新能力的主要途径，也是衡量研究生能否获得博士学位的重要依据之一。博士生在学期间一般要用 2 年的时间完成学位论文。博士学位论文是综合衡量博士生培养质量和学术水平的重要标志，

博士生的资格考核、学位论文选题报告、论文中期检查、学位论文预答辩、论文答辩资格审查等，是博士生培养工作的重要环节，本学科的相关具体安排与要求如下：

Conducting scientific research and writing up the doctoral dissertation are the key ways for doctoral students to accept training of scientific researches and cultivate their creativity. It is also an important threshold to measure whether the candidates are qualified for the doctorate degree. Generally, doctoral students shall consume two years to complete their dissertation. The doctoral dissertation is important to give the evidence which measures the quality of the student cultivation and academic levels of the research. The doctoral qualification examination, dissertation proposal, mid-term review, pre-defense of dissertation, etc., are important parts for the doctoral training. The specific arrangements and requirements of this discipline are as follows:

## 1. 文献综述与选题报告

### 1. Literature review and thesis proposal

博士生应在了解本研究领域国内外的现状、发展动态的基础上确定博士学位论文题目，选题要体现学科领域的前沿性和先进性。选题报告时间由博士生导师根据博士生工作进度情况确定，博士开题时间一般最迟不超过博士入学后第 4 学期，开题时间距离申请答辩日期不少于 18 个月。

Doctoral students should determine the title of doctoral dissertation on the basis of understanding the current situation and development trends in this research field at home and abroad, and the topic selection should reflect the frontier and advancement of the discipline. The time for submitting the dissertation proposal shall be determined by the supervisor according to doctoral students' research progress. Generally, it shall be no later than the 4th semester after admission and no less than 18 months before the application of thesis defense.

博士论文选题报告内容应包含文献综述、论文选题及其意义、主要研究内容、技术路线、预期成果及可能的创新点等。博士生在论文开题时须针对论文选题单独提交一份全面详细的文献综述报告（不少于 1 万字）。选题报告在二级学科范围内相对集中、公开地进行，并由以博士生导师为主体组成的考核小组进行评审。选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，以保证课题的前沿性和创新性。

The doctoral dissertation proposal shall include literature review, topic selection and its significance, main research contents, technical route, expected results and possible innovative points, etc. Doctoral students shall submit a comprehensive and detailed literature review report (no less than 10,000 words) at the dissertation proposal seminar. The dissertation proposal is carried out in a relatively centralized and public domain in the scope of related second-level disciplines, and shall be reviewed by the assessment team composed of doctoral supervisors. The topic selection meeting should be attended by relevant supervisors and postgraduates, and

supervisors of relevant disciplines should be invited to participate in the meeting for topic selection of interdisciplinary thesis. If there is a major change in the topic of the degree thesis, the dissertation proposal should be carried out once again to ensure the frontier and innovation of the topic.

博士生进行论文开题报告之前，应在指导教师的指导下，在教育部认定的科技查新工作站进行论文开题查新工作，以保证博士学位论文选题的创新性。

Before presenting the dissertation proposal, the doctoral students shall, under the guidance of their supervisors, conduct novelty search from the workstations recognized by the Ministry of Education, so as to ensure the novelty of the selected topic of the doctoral thesis.

## 2. 论文中期检查

### 2. Mid-term review of the thesis

学位论文实行中期检查制度。中期考核是检查研究生学位论文进展状况、帮助学生把握学位论文方向、提高学位论文质量的必要环节。学位论文中期检查应在开题一年后进行，考查小组应由 3-5 名教授（或具备副高职称的博导）组成，对研究生的综合能力、论文进展情况等进行全面考查。

A mid-term review system is adopted for degree thesis. The mid-term review is a necessary process to check the progress of degree dissertation, keep students in the right direction and improve the quality of their dissertation. The mid-term review shall be conducted one year after the report of the dissertation proposal. The review team shall be composed of three to five professors (or doctoral supervisors with the deputy senior title), and examine the comprehensive abilities of the postgraduates and the progress of the thesis comprehensively.

## 3. 学术论文发表或科研成果的要求

### 3. Requirements of academic papers or research achievements

博士学位论文的主要创新成果应在国内外重要学术刊物上公开发表。博士生在申请学位论文答辩前学术论文发表或科研成果的要求具体规定如下：

The main innovative findings of doctoral dissertation shall be published in important academic journals at home and abroad. The requirements for doctoral students to publish academic papers or obtain scientific research achievements before applying for thesis defense are specified as follows:

(1) 我校攻读博士学位的来华留学研究生，在完成培养计划要求的博士学位课程考试和学位论文工作的同时，博士学位论文的主要创新成果应在国内外重要学术期刊或国际会议上公开发表。来华留学博士研究生在申请学位论文答辩前以第一作者（或导师为第一作者、研究生为第二作者）且以华北电力大学的名义在所在学科顶级或权威期刊（以所在学科指定列表为准）上发表 2 篇高水平学术论文，或至少在中文核心期刊、国际期刊或国际会议（以所



在学科指定列表为准)上发表 3 篇及以上与所研究领域相关的学术论文;或作为项目主研人完成的科研成果通过省、部级以上鉴定,结论为我国先进或国际先进水平;之后,方有资格申请博士学位论文答辩。

(1) While completing the doctoral examinations and thesis required by the training program, the international doctoral students in our university shall have their main innovative results of doctoral dissertation published in important academic journals or international conferences at home and abroad. The international doctoral students in our university shall, before applying for the thesis defense, publish two high-level academic papers in the top or authoritative journals of their disciplines (subject to the designated list of their disciplines) in the name of the first author (or the supervisor as the first author and the postgraduate student as the second author) and in the name of North China Electric Power University, or at least publish 3 or more academic papers related to the research field in Chinese core journals, international journals or international conferences (subject to the designated list of their disciplines), or have the scientific research results completed as the project lead researcher and passed the appraisal at or above the provincial or ministerial level, with the conclusion of advanced in China or internationally; after that, they are eligible to apply for the doctoral dissertation defense.

(2) 博士生所发表的学术论文必须是学位论文研究工作的重要组成部分,并以华北电力大学为第一发表单位。

(2) The published academic papers for doctoral students must be the important part of the research work of the thesis, and the first published affiliation shall be North China Electric Power University.

凡不符合上述要求体现的成果,在学位申请时将一律不予考虑。

Any other achievements that do not meet the above requirements will not be considered in degree applications.

硕博连读学生在硕士期间发表的论文及取得的科研成果按以上规定同等对待。

The papers published and scientific research achievements obtained by the MD-PhD students of continuous academic program during the master stage shall be treated equally in accordance with the above provisions.

#### 4. 学位论文要求

#### 4. Degree thesis requirements

博士生在毕业前应提交博士学位论文。博士学位论文是博士生在导师指导下独立完成的、系统完整的学术研究工作的总结,论文应体现出博士生在所在学科领域所做出的创造性学术成果,应能反映出博士生已经掌握了坚实宽广的基础理论和系统深入的专门知识,并具备了独立从事科研工作的能力。

Doctoral students shall submit their doctoral dissertations before graduation. The doctoral dissertation is a summary of the systematic and complete academic research work completed independently by a doctoral student under the guidance of his/her supervisor. The dissertation shall reflect the creative academic achievements obtained by the doctoral student in his/her discipline. It shall also reflect that the doctoral student has mastered firm and broad basic theories and systematic and in-depth knowledge of the major, and had the ability to conduct scientific research independently.

博士学位论文的撰写规范参照《华北电力大学博士学位论文撰写规范及范例》。博士学位论文可以是系统完整的学术论文，也可以是若干相对独立、且又相互关联的学术论文的合体。来华留学博士生撰写学位论文可用汉语或英语撰写，但摘要部分须用汉语和英语详细书写。

For the writing norms of doctoral dissertation, please refer to the Norms and Examples for the Doctoral Dissertation Writing of North China Electric Power University. Doctoral dissertation can be systematic and complete academic thesis, or a combination of several relatively independent and interrelated academic papers. The international doctoral students in China can write their dissertations in Chinese or English, but the abstract part must be written in both Chinese and English in detail.

## 5. 学位论文预答辩

### 5. Pre-defense of dissertation

博士生在完成博士学位论文初稿，经导师审核认为符合要求的，要进行博士学位论文的预答辩。预答辩的目的在于进一步修改、完善博士学位论文。学位论文预答辩通过者，方可申请论文送审的资格审查。

If the doctoral student completes the first draft of the doctoral dissertation and the first draft is deemed to meet the requirements after review of the supervisor, the doctoral student will make a pre-defense for his/her doctoral dissertation. The purpose of pre-defense is to further revise and improve the doctoral thesis. The students who pass the pre-defense can apply for the formal defense of dissertation.

## 6. 博士研究生申请论文送审的资格审查

### 6. Qualification review of the submitted dissertation applied by doctoral students

博士论文资格审查由指导教师或博士生指导小组负责进行。博士研究生申请论文送审的基本条件：

The doctoral dissertation qualification review is carried out by the supervisor or the steering group. Basic application conditions for doctoral student dissertation submission are as below:

- (1) 修完所规定的学分要求;
- (1) Approval of the credit requirements;
- (2) 完成论文开题查新报告与论文选题报告;
- (2) Approval of the reports on novelty search and the topic-selection;
- (3) 完成论文中期检查;
- (3) Approval of the mid-term review of dissertation;
- (4) 满足学术论文发表与科研成果要求;
- (4) Approval of the requirements of academic thesis publication and scientific research achievements;
- (5) 通过学位论文的预答辩;
- (5) Approval of the pre-defense of the dissertation;
- (6) 完成学位论文的撰写并通过学位论文撰写规范审查。
- (6) Approval of the dissertation and pass the review of the dissertation.

## 7. 博士学位论文的评审与答辩

### 7. Review and defense of doctoral dissertation

学位申请者的博士学位论文的评审和答辩按照《华北电力大学学位授予工作细则》中有关条款的规定进行,答辩用汉语或英语。对论文答辩通过者,经论文答辩委员会主席签字后,交学位评定分委员会讨论审定,通过之后报送学校学位评定委员会批准授予博士学位;对论文答辩未通过、要求重新答辩者,经论文答辩委员会同意,可在 18 个月内修改论文,重新申请答辩一次。

The evaluation and defense of doctoral dissertations of the candidates shall be conducted in accordance with relevant provisions of the *Detailed Rules for Degree Awarding of North China Electric Power University*. The defense shall be conducted in Chinese or English. Those who have passed the thesis defense shall, after being signed by the Chairman of the Thesis Defense Committee, be reported to the Academic Degree Evaluation Subcommittee for discussion and approval, and then after approval, be reported to the Academic Degree Evaluation Committee for approval for the award of doctoral degrees; those who have failed the thesis defense and require another defense, with the consent of the Thesis Defense Committee, shall revise their dissertations within 18 months and re-apply for another defense.

毕业生的答辩时间一般安排在 6 月,延期毕业和提前毕业的研究生的答辩时间一般安排在 6 月或 12 月。

The defense time for graduates is generally arranged in June, while postgraduates applying for postponed and early graduation are generally arranged in June or December.

## 八、提前毕业条件

## **VIII. Conditions for Early Graduation**

特别优秀并提前完成本培养方案规定内容的博士生最多可提前 1 年毕业。提前毕业的留学博士研究生，在申请学位论文答辩前须以第一作者（或导师为第一作者、研究生为第二作者）且以华北电力大学的名义在所在学科顶级或权威期刊（以所在学科指定列表为准）上发表 3 篇高水平学术论文，或至少在中文核心期刊、国际期刊或国际会议（以所在学科指定列表为准）上发表 4 篇及以上与所研究领域相关的学术论文；或作为项目主研人完成的科研成果通过省、部级以上鉴定，结论为我国先进或国际先进水平；之后，方有资格申请博士学位论文答辩。

Doctoral students who are particularly excellent and complete the training program ahead of schedule can apply for early graduation up to one year ahead of the schedule. The international doctoral students who graduated in advance shall, before applying for the thesis defense, publish three high-level academic papers in the top or authoritative journals of their disciplines (subject to the designated list of their disciplines) in the name of the first author (or the supervisor as the first author and the graduate student as the second author) and in the name of the first affiliation of North China Electric Power University, or at least publish 4 or more academic papers related to the research field in Chinese core journals, international journals or international conferences (subject to the designated list of their disciplines), or have the scientific research results completed as the project lead researcher and passed the appraisal at or above the provincial or ministerial level, with the conclusion of advanced in China or internationally; after that, they are eligible to apply for the doctoral dissertation defense.

附表：可再生能源与清洁能源二级学科博士生培养方案（留学生）课程设置表（英语授课）

**Schedule: Curriculum (Taught in English) of Training Program for Doctoral Students  
(International Students) in Second-level Discipline of Renewable Energy and Clean Energy**

课程性质 Category	课程属性 Attribute	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 Degree courses (≥14 学分) (≥14 credits)	公共课(≥10 学分) Public courses (≥10 credits)	汉语综合(1) Chinese Comprehension (1)	64	4.0	考试 Exam	1	
		中国概况(英文) Introduction to China (English)	32	2.0	考试 Exam	1	
		汉语综合(2) Chinese Comprehension (2)	64	4.0	考试 Exam	2	
	基础理论课 Basic theoretical courses (≥2 学分) (≥2 credits)	现代数学基础与方法 Fundamentals and Methods of Modern Mathematics	32	2.0	考试 Exam	1	
			32	2.0			
	专业核心课 Specialized core courses (≥2 学分) (≥2 credits)	光伏器件原理与设计 Principle and Design of Photovoltaic Devices	32	2.0	考试 Exam	1	
		新能源材料与器件技术 New Energy Material and Device Technology	32	2.0	考试 Exam	1	
		风力发电理论与前沿技术 Theory and Cutting-edge Technology of Wind Power Generation	32	2.0	考试 Exam	1	
		生物质研究与开发前沿 Frontier of Biomass Research and Development	32	2.0	考试 Exam	1	
		可选其它专业核心课程 Other specialized core courses can be chosen	32	2.0	考试 Exam	1	
必修环节 (6 学分) Required links (6 credits)	无 None	研究生科学道德与学术规范 Scientific Ethics and Academic Norms for Postgraduates		1	考查 Review of performance		
		研读专业经典名著 Professional Classics Studying		1	考查 Review of performance		
		文献综述与开题报告 Literature Review and Thesis Proposal		2	考查 Review of performance		

		前沿讲座 Cutting-edge Lectures	8次 8 times	1	考查 Review of performan ce		
		博士论坛 Doctoral Forum	2次 2 times	1	考查 Review of performan ce		
任选课 Optional courses	无 None	补修课程 Supplementary Courses					附注 Note

附注：对非本学科入学的博士生，应补修由导师指定的本学科主干硕士课

Note: Doctoral students who are not in their own disciplines when enrolled should supplement the main courses of this discipline designated by the supervisor.