

华北电力大学（留学生）英语授课

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

动力工程及工程热物理硕士学位研究生培养方案

Training Program for Postgraduates in Power Engineering and Engineering Thermophysics

（学科代码：0807 授予工学硕士学位）

(Discipline Code: 0807, Degree: Master Degree of Engineering)

一、学科简介

I. Brief Introduction to the Discipline

动力工程及工程热物理学科依托于 1958 建校之初的动力系，为一级学科博士授权点，设有博士后流动站，第四轮学科评估中“动力工程及工程热物理”学科排名位列 A-，是学校“能源电力科学与工程”“双一流”学科核心组成部分。60 年来，为我国发电行业的发展培养了大批专业人才、产出了显著的标志性成果。

The discipline of Power Engineering and Engineering Thermophysics, relying on the Department of Power at the beginning of the establishment of the school in 1958, is the first-level discipline doctoral degree program, and has a postdoctoral program. In the fourth round of discipline evaluation, the discipline of "Power Engineering and Engineering Thermophysics" is ranked as A-, and is the core component of "Energy and Electric Power Science & Engineering", the "Double First-class" discipline. Over the past 60 years, it has trained a large number of professionals for the development of China's power generation industry and produced remarkable achievements.

二、培养目标

II. Training Objectives

在动力工程及工程热物理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。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。

Cultivate students to master solid basic theory and systematic expertise in the field of Power Engineering and Engineering Thermophysics, and be familiar with the

development trend of science and technology in the research field. Have the ability to innovate and engage in scientific research, teaching or independent technical work.

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。

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

“动力工程及工程热物理学”一级学科包含工程热物理、热能工程、动力机械及工程、流体机械及工程、制冷及低温工程、化工过程机械 6 个二级学科和能源环境工程、能源材料与装备 2 个自设二级学科。主要研究方向：

The first-level discipline of Power Engineering and Engineering Thermophysics contains six second-level disciplines including Engineering Thermophysics, Thermal Energy Engineering, Power Machinery and Engineering, Fluid Machinery and Engineering, Refrigeration and Cryogenic Engineering, Chemical Process Machinery and two self-established second-level disciplines including Energy and Environmental Engineering, Energy Material and Equipment. Main research directions:

热力学及能源高效转换与安全利用

Thermodynamics and Efficient Conversion and Safe Utilization of Energy

传热传质与多相流

Heat and Mass Transfer and Multiphase Flow

流体力学与叶轮机械

Fluid Mechanics and Impeller Machinery

动力机械及系统优化

Power Machinery and System Optimization

燃烧与污染物控制

Combustion and Pollutant Control

煤洁净利用理论与技术

Theory and Technology for Clean Utilization of Coal

电站设备状态监测、控制与运行

Condition Monitoring, Control and Operation of Power Station Equipment

清洁能源利用理论与技术

Theory and Technology of Clean Energy Utilization

制冷与空调技术

Refrigeration and Air Conditioning Technology

工程热物理及其它学科交叉

Engineering Thermophysics and other interdisciplinary researches

四、培养方式

IV. Training Method

1. 全英文授课(汉语综合课除外)。

1. Taught in English (except for Chinese Comprehension course).

2. 实行导师负责制，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。可跨学科专业或与有关研究部门、企业联合培养。跨学科或交叉学科以及与有关研究部门、企业联合培养硕士生时，应从相关学科及有关单位中聘请具有高级职称的有关人员协助指导。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。

2. The training implements the supervisor responsibility system, or form a supervisor steering group for collective cultivation. It should give full play to the role of supervisors and academic groups in guiding postgraduates. Postgraduates can be trained in interdisciplinary majors or jointly with relevant research departments and enterprises. For interdisciplinary or cross-disciplinary training or training in conjunction with relevant research departments and enterprises, relevant personnel with senior professional titles

shall be recruited from relevant disciplines and relevant units to assist in guiding. 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.

3. 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。

3. The supervisor should acknowledge the knowledge structure, academic skills, research interests, and abilities of the postgraduates according to the requirement of the training scheme, based on which to formulate a training plan for individual postgraduate and supervise the implementation according to the plan.

4. 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，又要培养研究生科学研究或独立担负技术、管理等方面工作的能力。

4. The training 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 technique and management work independently.

5. 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。

5. 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.

五、学制与学习年限

V. Educational System and Duration of the Program

留学生硕士研究生的学制 3 年，学习年限一般为 2-4 年。

The educational system for international postgraduates is 3 years, and the duration of the program is generally 2-4 years.

六、课程设置与学分

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 32 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 required credits for postgraduates in all disciplines: no less than 32 credits in total, 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. Degree courses (no less than 22 credits), of which:

(1) 公共课（10 学分）：

(1) Public courses (10 credits):

汉语综合(1): 4 学分(64 学时)

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);

(2) 数学基础课或基础理论课：不少于二门课程，4 学分。

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

(3) 学科基础课及学科专业课总学分不得少于 8 学分。

(3) The total credits of basic courses and specialized courses of disciplines shall not be less than 8 credits.

2. 必修课程与必修环节（6 学分），其中：

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

(1) 研究生科学道德与学术规范：1 学分。

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

(2) 专题课程/seminar 课程: 1 学分

(2) Program Course/Seminar Course: 1 credit.

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。

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

专题课程在研究生学位论文阶段完成。

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

(3) 实践环节: 1 学分

(3) Practice Links: 1 credit.

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。

The practice links include experimental teaching, professional production practice and teaching practice, etc. In the second and third semesters, postgraduates shall be arranged to participate in practice. For example, teach some chapters of undergraduate courses, guide curriculum design, take an internship, do experiments, supervise and answer questions, and participate in 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 shall reach 80 class hours or 10 working days.

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。

The school shall set up a series of experimental courses or experiment-based seminars with specific topics according to the characteristics of each discipline and the goal of personnel training and relying on the key laboratories and practical teaching bases of the discipline; or set up hardware and software design or system design related to the applied technologies of the discipline; or carry out engineering design, installation and debugging of experimental equipment in key laboratories and practical teaching bases of this discipline, or assist laboratory teachers to guide undergraduates to complete experimental teaching, so as to improve the practical ability of postgraduates in scientific research.

(4) 学术活动：1 学分，要求硕士生至少参加 6 次学术报告；

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

(5) 文献综述与开题报告：1 学分；

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

(6) 论文中期检查：1 学分。

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

学士阶段非本学科的硕士生应补修若干本学科学士阶段主干课程。补修课程不计入总学分。课程设置见附表。

Postgraduates who are not in their own disciplines at the bachelor stage should take several major courses of bachelor stage of the disciplines designated by their supervisors. Supplementary courses are not included in the total credit. See the Schedule for curriculum.

3. 非学位选修课：

3. Non-degree optional courses:

学生根据本人情况，可选修其他学科专业课和研究生课程目录上的课程，使总学分不少于 32 学分。

Postgraduates can take specialized courses of other disciplines and courses in the catalogue of postgraduate courses according to their own situation, and the total credits shall not be less than 32 credits.

七、科学研究及学位论文要求

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

1. Literature review and thesis proposal

硕士生入学后应在导师指导下，查阅文献资料，了解学科发展现状和动态，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课题。在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。

After the enrollment, postgraduates shall consult the literature, understand the current development situation and trends of the discipline, determine the research direction as soon as possible, and complete the topic selection of the dissertation 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 this discipline, and the selection of applied topics meeting the needs of national economic and social development is encouraged. When determining the content and workload of dissertation work, the supervisor should fully consider the knowledge structure, work abilities and training duration of postgraduates.

硕士开题由院系统一组织。硕士研究生的开题时间一般安排在入学后第 2 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。

The thesis proposal is uniformly organized by the school or department. The time for thesis proposal of postgraduates is generally arranged before the end of the second semester after enrollment, and is generally at least one academic year before the date of

application for thesis defense.

文献综述与开题报告包括的主要内容主要是：课题来源及研究背景和意义；

The main contents of the literature review and thesis proposal include: the origin of the topic, the background and significance of the research.

国内外在该方向的研究和发展情况及分析；论文的主要研究内容；研究方案及进度安排，预期达到的目标；为完成课题已具备和所需的条件和经费；预计研究过程中可能遇到的困难和问题以及解决的措施；主要参考文献。文献综述与开题报告的基本要求为：字数应在 5000 字以上；阅读的主要参考文献在 20 篇以上，其中外文文献不少于 10 篇。

The research in this direction at home and abroad and the development situation analysis; the main research contents of the dissertation; the research program and schedule, and the expected goals; the available conditions and required funds for the completion of the research task; the difficulties and problems that may be encountered in the research process and the measures to be taken to solve them; and the main references. The basic requirements of literature review and thesis proposal are as follows: the number of words should be more than 5,000 words, and there must be more than 20 main references, of which at least 10 references are in foreign languages.

对文献综述与开题报告工作的具体要求见《华北电力大学硕士研究生必修环节实施细则》。开题报告通过者给予 1 学分。

For the specific requirements of literature review and thesis proposal, please refer to the *Detailed Rules for the Implementation of Required Links for Postgraduates in North China Electric Power University*. Those whose thesis proposals meet the requirements will be given 1 credit.

2. 论文中期检查

2. Mid-term review of the thesis

硕士研究生的学位论文中期检查一般在第四学期末完成，其中申请 2 年毕业的研究生要求在第四学期的前三周内完成。按专业方向组织考核小组（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。中期检查的主要内容为：论文工作是否按开题报告预定的内容及进度进行；已完成的研究内容及结果；目前存在的或预期可能会出现的问题；论文按时完成的可能性等。

对学位论文工作中期检查的具体要求见《华北电力大学硕士研究生必修环节实施细则》。

The mid-term review of master dissertation is usually completed at the end of the fourth semester, and postgraduates applying for graduation after two-year study are required to complete it within the first three weeks of the fourth semester. Organize an assessment team (composed of 3-5 members) according to majors to conduct an all-round review of the progress of the dissertation work of the postgraduates, their work attitude and the possibility of completing the dissertation. The main contents of the mid-term review include whether the thesis work is consistent with the contents and schedule of the thesis proposal; the completed research contents and results; the existing or expected problems; and the possibility of completing the dissertation on time. For the specific requirements for the mid-term review of degree thesis work, refer to the *Detailed Rules for the Implementation of Required Links for Postgraduates in North China Electric Power University*.

论文中期检查通过者给予 1 学分。

Those who pass the mid-term review of the dissertation shall be given 1 credit.

3. 科研成果要求

3. Requirements for scientific research achievements

鼓励留学生公开发表与研究工作相关的学术论文。

International students are encouraged to publish academic papers related to their research work.

4. 学位论文撰写

4. Degree thesis writing

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《华北电力大学研究生学位论文撰写规范》。

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.

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

5. 学位论文评审与答辩

5. Review and defense of degree thesis

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。

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.

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，延期毕业的研究生的答辩时间一般安排在6月或12月。

The review and defense of master's 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 graduates is generally arranged in June, while that for graduates of postponed graduation is generally arranged in June or December.

八、提前毕业条件

VIII. Conditions for Early Graduation

硕士研究生学业优秀者可以申请2年毕业，必须符合以下条件：

Particularly outstanding postgraduates can apply for graduation after 2 years of study on the basis of meeting the following conditions:

正式发表 SCI 期刊（不含开源期刊）或一级学报论文 2 篇。国际或国内一级学会大会优秀论文奖论文，或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一项（本人排在前 5 名），或获得国内外发明专利 1 项，至多可相当于前述论文 1 篇。

They have officially published 2 papers in SCI journals (not including open access journals) or first-class journals. The thesis is granted with Excellent Thesis Award of first-class international or domestic association conference, or the work achievements of master dissertation (with North China Electric Power University as the author affiliation) win a provincial-and-ministerial-level third-class or above award (the postgraduate is in the top 5), or the postgraduate obtains a patent for invention at home and abroad, which can be equivalent to at most one of the above-mentioned theses.

附表： 动力工程及工程热物理一级学科硕士学位研究生课程设置表

Schedule: Curriculum of Postgraduates in First-level Discipline of Power Engineering and Engineering Thermophysics

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)	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		
	(No less than 4 credits) 数学基础课 Basic mathematics course	矩阵论 Matrix Theory	32	2.0	考试 Exam	1		
		数值分析 Numerical Analysis	32	2.0	考试 Exam	1		
	统筹设置，要求不少于 8 学分 Overall arrangement, requiring no less than 8 credits.	学科基础课 Basic courses of disciplines	高等传热学 Advanced Heat Transfer	32	2.0	考试 Exam	1	
			高等流体力学 Advanced Fluid Mechanics	32	2.0	考试 Exam	1	
			高等工程热力学 Advanced Engineering Thermodynamics	32	2.0	考试 Exam	1	
		课 Specialized courses of	锅炉原理与设备 Boiler Principle and Equipment	32	2.0	考试 Exam	2	
			燃气蒸汽联合循环	32	2.0	考试	2	

		Gas-steam Combined Cycle			Exam	
		热科学专题 Special Subject on Thermal Science	32	2.0	考试 Exam	2
		机械工程应用专题 Special Subject on the Application of Mechanical Engineering	32	2.0	考试 Exam	2
		固体材料结构分析 Structural Analysis of Solid Material	32	2.0	考试 Exam	2
必修课程与必修环节 Compulsory courses and required links (6学分) (6 credits)		专题课程/seminar 课程 Program Course/Seminar Course		1	考察 Examination	
		实践环节(实验、实践) Practice Links (Experiment, Practice)		1	考查 Review of performance	
		学术活动(报告、讲座6次) Academic Activities (6 Reports and Lectures)		1	考查 Review of performance	
		文献综述与选题报告 Literature Review and Thesis Proposal		1	考查 Review of performance	3
		论文中期检查 Mid-term Review of the Thesis		1	考查 Review of performance	4
		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	