

华北电力大学（留学生）英语授课

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

数学学科硕士学位研究生培养方案

Training Program for Postgraduates in Mathematics

（学科代码：0701 授予理学硕士学位）

(Discipline Code: 0701 Degree: Master Degree of Science)

一、学科简介

I. Brief Introduction to the Discipline

本学科目前有系统分析、运筹与控制博士学位二级学科授权点，数学硕士学位一级学科授权点，应用统计硕士专业学位授权点，信息与计算科学和数据科学与大数据技术 2 个本科专业。

At present, the discipline has the doctoral degree program of System Analysis, Operation Research and Control (second-level discipline), the master's degree program of Mathematics (first-level discipline), professional master's degree program of Applied Statistics, two bachelor's degree programs of Information and Computing Science and Data Science and Big Data Technology.

二、培养目标

II. Training Objectives

在数学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。

身心健康。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。

The program aims to cultivate students to master solid basic theory and systematic expertise in the field of mathematics, 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 technical work independently.

Students should keep in good health physically and mentally, master a certain degree of Chinese, have the awareness, knowledge, attitude and skills of tolerating, cognizing and adapting to cultural diversity, and be able to play a role in mutual respect, understanding and unity among different nationalities, societies and countries.

三、学科研究方向

III. Research Direction of the Discipline

主要研究方向:

Main research directions:

1. 计算方法及其应用
 2. 微分方程理论与计算
 3. 优化方法及其应用
 4. 大数据与工程计算
1. Calculation Method and Its Application
 2. Computation and Theory in Differential Equations
 3. Optimization Method and Its Application
 4. Big Data and Engineering Calculation

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。跨学科或交叉学科培养硕士生时，应从相关学科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 composes the steering group for collective cultivation. It should give full play to the role of supervisors and academic groups to guide postgraduates. Joint training of cross-disciplinary majors with related research institutes and enterprises can also be applied, for training postgraduates of interdisciplinary or cross disciplines, relevant personnel with senior titles should be employed from corresponding disciplines to offer guidance. 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. 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 personalized-training plan for postgraduates 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 technology 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 dissertation, carefully review the dissertation, and ensure the training quality of postgraduates.

6. 将留学生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，引导留学生研究生积极参与各种公益活动。

6. The academic atmosphere education shall be accompanied with the whole cultivation process of international postgraduates. Teachers shall strengthen the work of teaching and educating people, and guide the international postgraduates to actively participate in various public welfare activities.

五、学制与学习年限

V. Educational System and Duration of the Program

学制3年，学习年限2-4年。

中国政府奖学金生若延期毕业，需向国家留学基金管理委员会和所在国驻中国大使馆申请延长奖学金资格，否则需自费学习。

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

If the international students subsidized by Chinese government scholarship postpone their graduation, they must apply to the China Scholarship Council and the embassy of their countries in China to extend their periods for scholarship qualification; otherwise they will have to study at their own expense.

六、课程设置与学分

VI. Curriculum and Credit Requirements

1. 攻读硕士学位留学生的课程总学分应不少于31学分，其中学位课不少于22学分，包括：

1. The total credits of courses for international postgraduates should be no less than 31 credits, of which 22 credits or above are for degree courses, including:

(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) 学科基础课及学科专业课总学分不得少于 8 学分。

(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) Total credits of basic courses and specialized courses of the discipline 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) 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。

(1) Program course/seminar course: 1 credit

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.

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

(2) 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, 或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一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。总工作量应达到 80 学时或 10 个工作日。

(2) Practice links: 1 credit

The practice links include experimental teaching, professional production practice and teaching practice, etc. In the second and third semesters, postgraduates are arranged to participate in practice, such as teach some chapters of undergraduate courses, guide curriculum design, take an internship, do experiment, 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, or set up a series of experimental courses or experiment-based seminars with specific topics 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. The total workload should reach 80 class hours or 10 working days.

(3) 学术活动: 1 学分, 要求硕士生至少参加 6 次学术报告;

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

(4) 文献综述与开题报告: 1 学分;

(4) Literature review and thesis proposal: 1 credit;

(5) 论文中期检查: 1 学分。

(5) 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 for postgraduate.

七、科学研究及学位论文要求

VII. Requirement 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。

1. Literature review and thesis proposal

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 shall generally be combined with the research direction and scientific research projects of the discipline and the selection of topics meeting the needs of national economic and social development are encouraged. When determining the content and workload of degree thesis work, the supervisor shall fully consider the knowledge structure, work abilities, training duration and other characteristics of postgraduates.

硕士开题由学院统一组织。硕士生开题时间一般在第二学期末完成。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. The thesis proposal of postgraduates is generally completed at the end of the second semester, and the time for thesis proposal is generally not less than one academic year before the date of application for 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；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 main contents of literature review and thesis proposal include: topic source and the background and significance of the research; the research, development and analysis in the direction at home and abroad; the main research contents of the paper; the research program and schedule, and the expected goals; the conditions and funds that are available and necessary for the completion of the topic; the difficulties and problems that may be encountered in the research process and the measures to solve them; the main references and so on. The basic requirements of literature review and thesis proposal include: more than 5,000 words; more than 20 main references, including no less than 10 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

硕士研究生的学位论文中期检查一般在第四学期末完成，提前 2 年毕业的研究生要求在第三学期末完成。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》。

论文中期检查通过者给予 1 学分。

2. Mid-term review of the thesis

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 at the end of the third semester. The main contents of the mid-term review: 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; the possibility of completing the dissertation on time. For the specific requirements of mid-term review of the thesis work, please refer to the Detailed Rules for the Implementation of Required Links for Postgraduates in North China Electric Power University.

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

3. 学术论文发表与科研成果要求

3. Publication of academic papers and requirements of scientific research achievements

硕士研究生在学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。需满足以下要求之一：

During their school period, postgraduates shall actively participate in the academic exchange activities at home and abroad of their disciplines, write and publish academic papers. They shall meet one of the following requirements:

(1) 硕士研究生在论文答辩前应以第一作者身份（导师署名不计在内）撰写一篇及以上与研究课题相关的学术论文，在正式刊物上公开发表（含正式接收）或进行学术会议交流。申请提前毕业的研究生应以第一作者身份（导师署名不计在内）发表 SCI 检索论文 1 篇及以上或及以上或 3 区检索论文 2 篇及以上与研究课题相关的期刊论文。论文第一署名单位必须是华北电力大学。

(1) Write one or more academic papers related to the research topic in the name of the first author (excluding the supervisor's signature), and publish such papers in official publications (including formal acceptance) or exchange in academic conferences before the thesis defense. Postgraduates who apply for early graduation should publish 1 or more papers indexed by SCI, or 2 or more papers related to the research topic indexed by SCI Zone 3 as the first author (excluding the supervisor's signature). The first author affiliation of the paper must be North China Electric Power University.

(2) 研究生的学位论文工作成果(署名华北电力大学)获得省部级及以上奖励 1 项(本人排名前五), 或获得国内外发明专利 1 项(本人排名前二), 或作为主研人完成的科研成果通过省、部级及以上鉴定 1 项(本人排名前三)。

(2) The work achievements of master dissertation (with North China Electric Power University as author affiliation) win one award at the provincial and ministerial level or above (the postgraduate is in the top five), or the postgraduate obtains a patent for invention at home and abroad (the postgraduate is in the top two), or the scientific research achievements which are completed by the postgraduate as the lead researcher have passed one appraisal at provincial and ministerial levels or above (the postgraduate is among the top three).

(3) 作为主研人参加与学位论文工作相关的科技项目(学校正式立项, 且人均经费 5 万元以上), 项目成果获得实际应用, 且以第一作者或第二作者(导师必须是第一作者)身份在正式刊物上公开发表(或网络见刊)反映学位论文工作成果的学术论文, 且第一署名单位必须是华北电力大学。

(3) The postgraduate, as the lead researcher, participates in the scientific and technological program related to the degree thesis work (the school officially has established the program, and the fund per person is more than RMB 50,000), the program achievements have been applied in practice, and the academic paper reflecting the work achievements of the degree thesis are published on journals (or published on the Internet) by the postgraduate as the first author or the second author (the supervisor must be the first author), and the first author affiliation must be North China Electric Power University.

4. 学位论文撰写

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》。

4. Degree thesis writing

Master dissertation is a comprehensive summary of postgraduates' scientific research work, is an important academic literature that describes their research achievements and reflects their research level, and is the basis for applying for and awarding master's degrees. Dissertation 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 for the Master Dissertation Writing of North China Electric Power University*.

5. 学位论文评审与答辩

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》等相关规定执行。

5. Review and defense of degree thesis

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.

八、提前毕业条件

VIII. Conditions of 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：

Postgraduates who are particularly excellent applying for 2-year graduation should meet the following conditions:

1. 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》等相关规定执行。

1. 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 for Degree Awarding of North China Electric Power University.

2. 硕士研究生在学期间应达到本学科硕士研究生在学期间学术论文发表或成果的要求，方可审议学位。

2. Postgraduates shall meet the requirements of publishing academic papers or achievements before applying for degrees.

3. 申请提前毕业的研究生，由本人提出申请，由学位委员会对其研究成果和研究生学术水平进行考核，决定是否准许答辩。

3. Postgraduates who apply for early graduation shall submit their applications, and the Academic Degree Evaluation Committee shall assess their research achievements and academic levels, and then decide whether to allow them to make the defense or not.

附表：数学学科学术学位硕士研究生培养方案（留学生）课程设置表（英语授课）

**Schedule:Curriculum (Taught in English) of Training Program for Postgraduates
(International Student) in Mathematics**

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		
	基础理论课 (不少于4学分) Basic theoretical 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		
		现代数学基础方法 Fundamental Methods of Modern Mathematics	32	2	考试 (Exam)	1		
	统筹设置, 要求不少于8学分 Overall arrangement requires no less than 8 credits	学科基础课 Basic courses of the disciplines	多元统计分析 Multivariate Statistical Analysis	48	3	考试 (Exam)	1	
			非线性数值分析 Nonlinear Numerical Analysis	32	2	考试 (Exam)	2	
			最优化理论与方法 Optimization Theory and Methods	48	3	考试 (Exam)	1	
			微分方程稳定性方法 Stability Methods for Differential Equations	32	2	考试 (Exam)	2	
学科专业课 Specialized courses of the disciplines		常用数学软件选讲 Topics on Common Mathematical Software	48	3	考查 (Review of performance)	1		
	非参数统计 Non-parameter Statistics	48	3	考查 (Review of performance)	1			

			偏微分方程数值解法 Numerical Methods for Partial Differential Equations	48	3	考查 (Review of performan ce)	1	
			时间序列分析 Time Series Analysis	48	3	考查 (Review of performan ce)	2	
			不确定规划 Uncertain Programming	32	2	考查 (Review of performan ce)	2	
非学位课 Non-degree courses	必修课 程与 必修环 节 (6 学分) Compul sory courses and required links (6 credits)		研究生科学道德与学术规范 Scientific Ethics and Academic Norms for Postgraduates		1	考查 (Review of performan ce)		
			专题课程/seminar 课程 Program Course/Seminar Course		1	考查 (Review of performan ce)		
			实践环节 (实验、实践) Practice Links (Experiment, Practice)		1	考查 (Review of performanc e)		
			学术活动 (报告、讲座 6 次) Academic Activities (6 Reports and Lectures)		1	考查 (Review of performan ce)		
			文献综述与选题报告 Literature Review and Thesis Proposal		1	考查 (Review of performan ce)	3	
			论文中期检查 Mid-term Review of the Thesis		1	考查 (Review of performan ce)	4	
	选修课 Optiona l courses	可在学校研究生开课目录中任意选择课程，总学分不少于 31 学分 Students can choose courses in the catalogue of postgraduate course of the school on their own, with the total credits no less than 31 credits.						