华北电力大学（留学生）英语授课

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

控制科学与工程一级学科硕士学位研究生培养方案

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

（学科代码：0811　　授予工学硕士学位）

(Discipline Code: 0811, Degree: Master Degree of Engineering)

一、学科简介

I. Brief Introduction to the Discipline

华北电力大学自动化学科始建于 1958 年，是国内最早建立的热工量测及其自动化专业，为我国培养电厂热工检测与自动化领域的专门人才。本学科紧密联系我国电力工业发展的需求，在人才培养、科学研究、科技成果转化等方面取得了显著的成绩。经过半个多世纪的发展，具备了完善的控制科学与工程人才培养体系。拥有“控制科学与工程”一级科士授权点、“控制科学与工程”博士后流动站，是北京市一级重点学科。

The Automation discipline of North China Electric Power University, founded in 1958, is the earliest major of thermal measurement and automation in China, cultivating professionals of thermal detection and automation of power plants in China. The discipline is closely related to the needs of the development of China's electric power industry, and has made remarkable achievements in personnel training, scientific research and the transformation of scientific and technological achievements. After more than half a century of development, it has formed a sophisticated personnel training system of Control Science and Engineering. As a Beijing Municipal Primary Key Discipline, it has been authorized to award doctoral degrees of the first-level discipline of Control Science and Engineering, and has a post-doctoral research program of Control Science and Engineering.

二、培养目标

II. Training Objectives

1． 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. 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.

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。具有国际视野，具备良好的学术表达和交流能力。

2. Have the ability to innovate and engage in scientific research, teaching or independent technical work. Students should have an international vision, with good academic expression and communication skills.

三、研究方向

III. Research Direction

本学科下设四个二级学科：控制理论与控制工程、检测技术与自动化装置、系统工程、模式识别与智能系统。本学科按一级学科培养，主要研究方向包括：

The discipline consists of four second-level disciplines: Control Theory and Control Engineering, Detection Technology and Automation Devices, Systems Engineering, and Pattern Recognition and Intelligent System. The candidates of this discipline are all cultivated in the first-level discipline, and the main research directions include:

1.先进控制理论及应用

Theory and Application of Advanced Control

2.智能发电系统分析与优化

Analysis and Optimization of Intelligent Power Generation System

3.发电过程建模、仿真与控制

Modeling, Simulation and Control of Power Generation Process

4.智能仪表与智能系统

Intelligent Instrument and Intelligent System

5.网络化控制技术与系统

Networked Control Technology and System

6.故障诊断技术与应用

Fault Diagnosis Technology and Application

7.现代测控技术与信息处理

Modern Measurement and Control Technology and Information Processing

8.系统工程理论与方法

Theory and Method of System Engineering

9.计算机视觉与模式识别

Computer Vision and Pattern Recognition

四、培养方式

IV. Training Method

1．硕士生的培养方式为导师负责制，导师是研究生培养第一责任人，要了解掌握研究生的具体状况，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。提倡按二级学科组成导师指导小组集体培养。对跨学科或交叉学科以及与有关研究部门、企业联合培养研究生时，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进入导师指导小组协助指导。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。

1. The training of postgraduates implements supervisor responsibility system, the supervisor is the person of primary responsibility for postgraduate training. The supervisor shall understand and master the specific condition of postgraduates and organically integrate professional education with daily education both as academic mentors and life mentors. The supervisor should also strictly require students to abide by scientific ethics and academic norms. Advocate composing the supervisor steering group for collective cultivation according to the second-level disciplines. 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 supervisor steering groups. 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 postgraduates according to the requirement of the training scheme, based on which to formulate a training plan for individual postgraduates 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 theory 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.

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。

The educational system is 3 years, and 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 31 学分，其中学位课不少于 25 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 31 credits in total, including no less than 25 credits for degree courses. The curriculum framework is as follows:

1．学位课（不少于 **25** 学分），其中：

1. Degree courses (no less than 25 credits), of which:

(1) 公共课：10 学分。汉语综合(1)：4 学分(64 学时)

(1) Public courses: 10 credits. 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：不少于两门课程，4 学分。

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

(3) 学科基础课及学科专业课：两项学分和不少于 11 学分。

(3) Basic courses and specialized courses of disciplines: The total credits of the two shall be no less than 11 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 postgraduate 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 postgraduate thesis.

(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。

The practice links include experimental teaching, professional production practice and teaching practice, etc. In the second and third semesters, schools (departments) and supervisors shall arrange postgraduates 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.

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 31 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 31 credits.

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

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.

具体课程设置见附表。

For the specific curriculum, please refer to the Schedule.

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

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。

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 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 the degree thesis work, the supervisor should fully consider the knowledge structure, work abilities and training duration of postgraduates.

硕士开题由学院统一组织。全日制学术型硕士研究生的开题时间一般安排在硕士生入学后第 2 学期的期末前进行。

The thesis proposal is uniformly organized by the school. For full-time academic postgraduates, the time for submitting thesis proposal is generally arranged before the end of the second semester after admission.

对文献综述与开题报告工作的具体要求见《华北电力大学学术学位硕士研究生必修环节实施细则》。

For the specific requirements of literature review and thesis proposal, please refer to the Detailed Rules for the Implementation of Required Links for Postgraduates with Academic Degrees in North China Electric Power University.

2.论文中期检查

2. Mid-term review of the thesis

全日制学术型硕士研究生的学位论文中期检查一般在第四学期末前完成，2 年毕业的全日制学术型研究生要求在第四学期的前三周内完成。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。

The mid-term review of full-time academic postgraduates' theses is usually completed at the end of the fourth semester, and full-time academic postgraduates applying for graduation after two-year study are required to complete it within the first three weeks of the fourth semester. 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.

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.

对中期检查的具体要求见《华北电力大学学术型硕士研究生必修环节实施细则》。

For the specific requirements of mid-term review, please refer to the Detailed Rules for the Implementation of Required Links for Postgraduates with Academic Degrees in North China Electric Power University.

3．学术论文发表与科研成果要求

3. Requirements of academic papers and research achievements

学术学位硕士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。学术学位硕士研究生在申请学位论文答辩前，应在国内外学术期刊或会议上至少公开发表或录用一篇学术论文，或由导师出具其参加了省部级及以上科研项目的证明。

During their school period, postgraduates with academic degrees shall actively participate in the academic exchange activities at home and abroad of their disciplines, write and publish academic papers. Before applying for the thesis defense, a postgraduate with academic degree shall have at least one paper published in or accepted by academic journals and conferences at home and abroad, or have the proofs of participation in the scientific research projects at the provincial and ministerial level or above issued by his/her supervisor.

4．学位论文要求

4. Degree thesis requirements

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》。

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 Writing of Academic Master Dissertation in 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 postgraduate thesis 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，延期毕业和提前毕业的研究生的答辩时间一般安排在 12 月。

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 graduates is generally arranged in June, while that for postgraduates applying for postponed and early graduation are generally arranged in December.

八、提前毕业条件

VIII. Conditions for Early Graduation

特别优秀的硕士研究生，在满足下列条件的基础上可申请两年答辩。

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

1．已按照培养方案的规定修满应修学分，完成所有必修环节，第一学年的课程成绩排名在本专业的前 20%；

1. Students have completed the required credits and all required links specified in the training program, and ranked in the top 20% of the major for the course grades for the first academic year;

2.答辩前以第一作者身份（如果是第二作者，其导师必须是第一作者）在 SCI 二区及以上（以中科院分区为准）刊物上至少发表（正式出版或网络在线出版）一篇与学位论文研究内容相关的学术论文；

2. The students have published (official publication or online publication) one or more academic papers related to the research contents of their dissertation in the name of the first author (or the supervisor as the first author and the graduate student as the second author) in journals in SCI Zone 2 and above (subject to the zoning of the Chinese Academy of Sciences);

3. 毕业前 1 年完成开题，且中期考核成绩为优秀，硕士学位论文盲审为 A。

3. The students completed their thesis proposals one year before graduation, had excellent results in the mid-term review, and got A in the blind review of the master dissertation.

4. 答辩申请经导师同意，并由学院学位评定分委员会审议通过。

4. Their applications for defense have been approved by their supervisors and approved by the Academic Degree Evaluation Subcommittee of the School after deliberation.

附表：控制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（英语授课）

Schedule:Curriculum (Taught in English) of Training Program for Postgraduates (International Student) in First-level Discipline of Control 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25学分）Degree courses (no less than 25 credits)	公共课 Public courses 10学分 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	
	数学基础课 Basic mathematics course ≥4学分 ≥4 credits	矩阵论 Matrix Theory	48	3	考试 Exam	1	
		数值分析 Numerical Analysis	48	3	考试 Exam	1	
	学科基础课及学科专业课 Basic courses and specialized courses of disciplines ≥11学分 ≥11 credits	线性系统理论 Linear System Theory	32	2	考试 Exam	1	
		优化理论与应用 Optimization Theory and Application	32	2	考试 Exam	1	
		智能控制 Intelligent Control	32	2	考试 Exam	2	
		现代传感技术 Modern Sensing Technology	32	2	考试 Exam	2	
		检测过程数值模拟 Numerical Simulation of Detection Process	32	2	考试 Exam	2	
		模式识别与机器学习 Pattern Recognition and Machine Learning	32	2	考试 Exam	2	
		人工智能与知识工程 Artificial Intelligence and Knowledge Engineering	32	2	考试 Exam	2	
非学位课 Non-degree courses	必修课程与必修环节 Compulsory courses and required links 6学分 6 credits	研究生科学道德与学术规范 Scientific Ethics and Academic Norms for Postgraduates		1	考察 Examination	1	
		控制科学与工程专题课程/seminar课程 Program Course /Seminar Course in Control Science and Engineering		1	考查 Review of performance	2	
		实践环节（实验、实践） Practice Links (Experiment, Practice)		1	考查 Review of performance	答辩前 Before thesis defense	

		学术活动（报告、讲座 6 次） Academic Activities (6 Reports and Lectures)		1	考查 Review of performance	答辩前 Before thesis defense	
		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	