

# 华北电力大学（留学生）英语授课

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

## 计算机科学与技术一级学科硕士学位研究生培养方案

Training Program for Postgraduates in First-level Discipline of Computer Science and  
Technology

(学科代码: 0812 授予工学硕士学位)

(Discipline Code: 0812, Degree: Master Degree of Engineering)

### 一、学科简介

#### I. Brief Introduction to the Discipline

华北电力大学计算机专业创建于 1976 年，是中国较早的计算机专业之一，具有近 40 年的专业建设和学生培养的历史，具备完整的硕士学位研究生培养体系，培养了大批计算机专业的优秀人才，为国家、电力行业的信息技术的发展和进步做出了重要贡献。我校计算机学科建设坚持计算机科学与技术理论与计算机应用技术研究并重的原则，体现电力行业特色。多年来，围绕能源互联网、人工智能、大数据、网络信息安全、物联网等方面形成了稳定的研究方向，建成了多个国家级、省部级科研平台，拥有一支实力雄厚、结构合理的师资队伍，产出了包括国家科技进步奖励等一大批标志性成果，形成了完善的计算机科学与技术人才培养体系，为培养具有独立从事相关科学研究和工程实践能力、适应计算机产业发展要求的现代化人才提供了有力支撑。

The computer major of North China Electric Power University, founded in 1976, is one of the earliest computer majors in China, with a history of nearly 40 years of specialty construction and student training, and a complete postgraduate training system for master's degrees. It has cultivated a large number of excellent talents majoring in computer science and made significant contributions to the development and progress of information technology in China and the electric power industry. The construction of computer discipline in our university adheres to the principle of attaching equal importance to the theoretical research of computer science and technology and the research of computer application technology, which embodies the characteristics of the electric power industry. Over the years, it has formed a stable research direction around the energy Internet, artificial intelligence, big data, network information security, Internet of things and other aspects, and built a number of scientific research platforms at national, provincial and ministerial levels. With a strong and reasonably structured team of teachers, it has produced a large number of landmark achievements including National Prize for Progress in Science and Technology, and formed a sophisticated personnel training system of computer science and technology, providing

strong support for training modern talents who can independently engage in relevant scientific research and engineering practice and meet the development requirements of computer industry.

## 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. 在计算机科学与技术学科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。并熟练掌握汉语。

2. Master solid basic theory and systematic expertise in the field of Computer Science and Technology Discipline, 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. Proficient in Chinese.

## 三、研究方向

### III. Research Direction

计算机科学与技术一级学科下设三个二级学科：计算机系统结构、计算机软件与理论及计算机应用技术。主要研究方向有：

There are three second-level disciplines under the first-level discipline of Computer Science and Technology: Computer Architecture, Computer Software and Theory, and Computer Applications Technology. Main research directions are as follows:

1. 计算机网络及应用
1. Computer Network and Application
2. 数据库与信息系统
2. Database and Information System
3. 智能机器人技术
3. Intelligent Robot Technology
4. 信息安全
4. Information Security
5. 智能软件技术
5. Intelligent Software Technology
6. 多媒体信息处理

6. Multimedia Information Processing

7. 大数据技术及应用

7. Big Data Technology and Application

8. 微处理器与嵌入式系统

8. Microprocessor and Embedded System

9. 物联网技术及应用

9. Technology and Application of Internet of Things

10. 图形、图像与虚拟现实

10. Graphics, Images and Virtual Reality

#### 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 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 postgraduates 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 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。

(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：不少于二门课程，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开发等实践工作，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。

The practice links include experimental teaching, professional production practice and teaching practice, etc. In the second and third semesters, postgraduates should be arranged to participate in practice. For example, teach some chapters of undergraduate courses, guide curriculum design, practice, 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 rely on the key laboratory of the discipline, practical teaching bases, etc., to set up a series of experimental courses with specific topics or special courses based on experiments; or

participate in the hardware, software design or system design related to the applied technology of the discipline; or carry out engineering design, installation and debugging of experimental equipment in the key laboratory and practical teaching bases of the discipline, or assist laboratory teachers to guide undergraduates to complete experimental teaching and other experimental work. The total workload should reach 80 class hours or 10 working days.

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

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；该方向国内外研究发展现状及分析；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 the literature review and thesis proposal include: origin of the topic and the research background and significance; the research in this direction at home and abroad and the development situation analysis; the main research contents of the thesis; 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; the main references and so on. 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 with Academic Degrees 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。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. 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 with Academic Degrees 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. 学术论文发表与科研成果要求**

### **3. Requirements of academic papers and research achievements**

硕士生在校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 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**

我校来华留学硕士生申请硕士学位,必须撰写学位论文。论文工作必须有一定工作量,在论文题目确定后,实际用于硕士学位论文工作的时间一般不少于 1 个学年。

International undergraduate students in our university must write degree theses before applying for master's degrees. Certain time and effort must be taken for the thesis. After

determining the topic, the actual time spent on the master dissertation generally shall not be less than 1 academic year.

学位论文应表明作者对所研究的课题有独立见解、并反映作者在本门学科上掌握坚实的基础理论和系统的专门知识,具有从事科学研究工作或综合运用基础理论和专门知识解决实际问题的能力。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》。

The academic thesis shall show that the author has independent opinions on the subject studied, and reflect that the author has mastered solid basic theories and systematic specialized knowledge in his/her discipline, and has the ability to engage in scientific research or solve practical problems upon comprehensive application of basic theories and specialized knowledge. 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

### 5. Review and defense of degree thesis

硕士研究生在申请论文答辩前,必须达到所在学科对研究生的学术论文发表与科研成果的基本要求。

Before applying for thesis defense, postgraduates must meet basic requirements of the discipline for the publication of postgraduates' academic papers and scientific research achievements.

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。

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 for Early Graduation

特别优秀的全日制硕士研究生,在满足下列条件的基础上可申请2年毕业。

Particularly outstanding full-time 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、或中国计算机学会推荐的 B 类及以上国际学术刊物、或中国计算机学会推荐的 B 类及以上国际学术会议上至少发表（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), or international academic journals / conferences of Category B and above recommended by the Chinese Computer Federation;

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：计算机科学与技术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 Computer Science and Technology**

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	
学位课 (不少于25学分) Degree courses (no less than 25 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≥4 学分 Basic mathematics courses ≥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
	学科基础课及学科 专业课≥11 学分 Basic courses and specialized courses of disciplines ≥ 11 credits	高级计算机系统结构 Advanced Computer Architecture	32	2	考试 Exam	1
		高级嵌入式系统设计 Design of Advanced Embedded System	32	2	考试 Exam	1
		网络信息安全 Network Information Security	32	2	考试 Exam	1
		高级计算机网络 Advanced Computer Network	32	2	考试 Exam	2
		计算机视觉 Computer Vision	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
		数据仓库与数据挖掘 Data Warehouse and Data Mining	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-de gree courses	研究生科学道德与学术规范 Scientific Ethics and Academic Norms for Postgraduates		1	考查 Review of perfor mance		
	计算机科学新技术专题课程/seminar 课程 Program Course / Seminar Course in New Technologies in Computer Science		1	考查 Review of perfor mance		
	实践环节（实验、实践） Practice Links (Experiment, Practice)		1	考查 Review of perfor mance	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 perfor mance	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 perfor mance	3
		论文中期检查 Mid-term Review of the Thesis		1	考查 Review of perfor mance	4