

重庆大学学术学位研究生培养方案

(学科名称：电气工程 学科代码：080800)

一、培养目标与基本要求

I. Training objectives and basic requirements

(一) 培养目标

(I) Training Objectives

培养了具有良好的科研道德，严谨求实的科学态度，开阔的国际化视野与较强创新意识的电气工程专业高层次创新型研究人才，能够从事电气工程相关的教学、科研、设计、管理或相关工程技术工作，能够在本学科或专门技术上做出突出的创新性成果。

The program aims to cultivate high-level innovative research talents who can make outstanding and innovative achievements in this discipline or expertise with good scientific research ethics, rigorous and realistic scientific attitude, broad international vision and strong innovation consciousness, capable of engaging in teaching, research, design, management or Engineering and technical work related to electrical engineering.

(二) 基本要求

(II) Basic Requirements

(1) 具有良好的科研道德、为科学献身的精神、科学发展的理念、严谨求实的科学态度、勇于创新的工作作风，崇尚科学，追求卓越；

(1) Have a good scientific research ethics, a spirit of dedication to science, a concept of scientific development, a rigorous and realistic scientific attitude, a courageous and innovative work style, advocate to science, and pursue excellence;

(2) 具备电气工程坚实宽广的基础理论、系统深入的专门知识、丰富的人文科学知识，具备积极面对困难与矛盾的良好心理素质；

(2) With a solid and broad basic theory of electrical engineering, systematic and in-depth expertise, rich knowledge of humanities, and a good psychological quality that actively faces difficulties and contradictions;

(3) 具有独立的科研能力、较强的学术鉴别能力、强烈的创新意识，具备在学科前沿重大需求课题中开展深入研究的能力，并取得创新性的成果；

(3) With independent scientific research ability, strong academic identification ability, strong sense of innovation, and the ability to carry out in-depth research in the major needs of the frontier of the discipline, and achieve innovative results;

(4) 具备较强的专业写作、表达与学术交流能力。

(4) Armed with strong professional writing, expression and academic communication skills.

二、研究方向

II. Research Track

(1) 高电压绝缘与配合方向

(1) High voltage insulation and matching track

主要研究复杂大气环境中输配电装备外绝缘放电机理及其数学物理模型和电气特性与故障防御、雷云放电机理及雷电屏蔽模型、电力系统过电压传播机理与实时监测及故障防御和接地技术等。

Mainly studies the external insulation discharge mechanism of transmission and distribution equipment in complex atmospheric environment as well as its mathematical physical model, electrical characteristics and fault defense, lightning cloud discharge mechanism and lightning shielding model, power system overvoltage propagation mechanism and real-time monitoring as well as fault defense and grounding technology etc.

(2) 电气设备在线监测与故障诊断方向

(2) Online monitoring and troubleshooting of electrical equipment

主要研究输配电装备故障的产生和传播规律、智能传感及其抗干扰技术、输配电设备绝缘系统多因素老化变化规律、剩余寿命预测的方法和判据、多因素故障模型建模与故障诊断及状态维修策略等。

Mainly studies the generation and propagation of faults in transmission and distribution equipment, intelligent sensing and anti-jamming technology, multi-factor aging change law of transmission and distribution equipment insulation system, residual life prediction method and criterion, multi-factor failure modeling and Fault diagnosis and status maintenance strategies etc.

(3) 新型电工绝缘材料与新技术方向

(3) New electrical insulation materials and new technology track

主要研究新型绿色环保纳米植物绝缘油制备及其老化机理与寿命模型、纳米绝缘纸制备及其放电与老化机理、固态微/纳秒复合脉冲技术及其高端医疗装备、高功率脉冲产生与测量技术及应用等。

Mainly studies the preparation of new ecological and environmental nano-plant insulating oil and its aging mechanism as well as life model, nano-insulating paper preparation and its discharge and aging mechanism, solid micro/nanosecond composite pulse technology and its high-end medical equipment, high-power pulse generation and measurement technology and applications etc.

(4) 电磁场理论与应用方向

(4) Electromagnetic field theory and its application track

主要研究理论与计算、电磁测量及应用、电磁兼容及其应用、磁探测及应用、电力信号检测与分析等。

Mainly studies theory and calculations, electromagnetic measurement and its application, electromagnetic compatibility and its applications, magnetic detection and its application, power signal detection and analysis etc.

(5) 生物电工学方向

(5) Bio-Electrology track

主要研究医学与生命科学中的理论与应用、磁场在生物和环境科学中的理论与应用等。

Mainly studies the theory and application in medicine and life science, and the theory and application of magnetic field in biology and environmental science etc.

(6) 电力系统规划与可靠性方向

(6) Power system planning and reliability evaluation

主要研究电源和输电网规划及可靠性评估理论和模型，涉及高渗透、高比例新能源下电源和输电网协同规划，计及新能源随机性的电力系统概率风险评估模型。

Mainly studies the theory and model of power supply and transmission network planning as well as reliability assessment, the coordinated programming of power supply and transmission grid under high-permeability and high new energy proportion, and the power system probabilistic risk assessment model considering the randomness of new energy.

(7) 电力系统保护与控制方向

(7) Power system protection and control track

主要研究电力系统经济调度、稳定控制、继电保护和电力系统自动化方面的相关技术，涉及交直流混联系统运行特性分析、含新能源电网运行控制、故障分析方法研究、继电保护方案等。

Mainly studies related technologies of power system economic dispatching, stability control, relay protection and power system automation, the analysis of operational characteristics of AC/DC hybrid systems, operation control of grids with new energy, research on fault analysis methods, and relay protection schemes etc.

(8) 新型电机及其控制系统方向

(8) New motor and its control system track

针对新型电机及其系统，研究该类电机的电磁设计原理、方法；研究该类电机的相关驱动控制技术；从一体化角度研究电机的设计与控制系统的相互影响，并针对新型电机及其驱动控制系统在相关领域的应用，展开研究。

For new types of motor and their system, the electromagnetic design principle and method of the motor are studied; the related drive control technology of the motor is studied; the interaction between the design and control system of the motor from the perspective of integration, and the application of new-type motor and its drive control systems in related fields are studied.

(9) 新型发电及其系统分析方向

(9) Newly-kind power generation and its system analysis track

研究新能源发电系统及其接入电网特性, 主要围绕新能源发电机的设计与系统控制展开研究, 同时包含新型发电系统接入电网后的相互影响等方面的研究。

Studies the new energy power generation systems and the characteristics of their access to power grids, mainly focusing on the design and system control of new energy generators, simultaneously including the interaction of new power generation systems after accessing the power grid.

(10) 电力电子变流技术方向

(10) Power electronic converter technology track

该方向致力于电力电子变流器拓扑及控制技术的研究, 包括: 新型变换器拓扑、新型电力电子器件、电能质量及控制、电力电子变换器可靠性、新能源发电并网控制、特种电源等方面。

This track is devoted to the research of power electronic converter topology and control technology, including: new converter topology, new power electronics, power quality and its control, power electronic converter reliability, new energy generation grid-connected control, special power supply etc.

(11) 电气传动技术方向

(11) Electric drive technology track

该方向致力于电气传动技术的控制及应用研究, 包括: 交直流调速系统理论、电动汽车动力驱动系统以及能源管理系统、现代控制理论在电气传动中的应用等方面。

This track is devoted to the control and application research of electric drive technology, including: AC and DC speed control system theory, electric vehicle power drive system and energy management system, and the application of modern control theory in electric drive.

(12) 工业与民用电气系统运行与节能方向。

(12) Industrial and civil electrical systems operation and energy saving track

以满足工业与民用电气系统高效、优质、节能需求为目的, 研究中低压配电系统的供用电智能化技术、供用电安全技术、供电质量分析与改善技术、建筑物电气设备的网络化控制技术等。

To meet the requirements of high efficiency, high quality and energy saving for industrial and civil electrical systems, research on the intelligent power supply technology for medium and low voltage distribution system, the power supply safety technology, the power supply quality analysis and improvement technology, and the networking control technology of electrical equipment in buildings etc.

三、学制、学习年限与毕业学分

一、学制及授予学位

III. Academic system and degree conferment

(一) 学制: 4 年

(I) Academic system: 4 Years

(二) 学位名称及类别: 电气工程 学术学位博士

(II) Degree name and category: Electrical Engineering academic degree doctor

(三) 培养环节及学分要求

() Training links and credit requirements

培养环节 Training links	课程 (必修) Courses (Compulsory)	其它环节 Other links	学位论文 Thesis	毕业学分 (Total credits)
学分 Credit	≥13 (9)	≥3	25	≥41

四、课程及环节设置

Curriculum

表 1、电气工程一级学科学术学位研究生培养方案课程设置表

课程类别	课程编号	课程名称(中文/英文)	学时	学分	考核形式	开课学期	备注 (修课要求)
必修课 Common compulsory course	G95004	Basic Chinese 基础汉语	64	4	考试 By exam	1	必修 Compulsory
	G97004	China Panorama (English) 中国概况 (英文授课)	32	2	考试 By exam	2	必修 Compulsory
	G06003	Mathematical statistics 应用数理统计	40	2.5	考试 By exam	1	必修 Compulsory (二选一, Choose one course)
	G06000	Numerical Analysis 数值分析	45	2.5	考试 By exam	1	
	专业必修课 Professional	B11087	Modeling and Control of Power Electronics System 电力电子系统建模与控制	32	2	考查 By exam	1

	compulsory course	EB11000	Computational Intelligence 计算智能	32	2	考查 By exam	1	y one courses	
		G98058	学术规范与研究生论文写作指导/ Academic Norm and Postgraduate Thesis Writing	16	1	考查 By exam	2 (必修)		
		BS11148	多物理场分析与计算(博士) Multi-physics Fields Analysis and Calculation	32	2	考查 By exam	2		
选修课 Elective Courses	公共选修课 Common Elective Courses	ZG300001	初级汉语 /Elementary Chinese	64	4	考试	2	必修 Compulsory	
		专业选修 Professional elective course	B11016	Renewable energy power generation and smart grid 可再生能源发电与智能电网	32	2	考查 By exam	1	任选1门 Choose one course arbitrarily
			ZS11036	Systems Health Monitoring and Fault Diagnosis 系统状态监测与故障诊断	16	1	考查 By exam	1	
其它环节 (必修) Other links(Compulsory)			Opening Report 文献综述与选题报告		1			必修 Compulsory	
			Academic Activity & Academic Report 学术活动和学术报告	8次(听) 1次(做) 8 times	1			必修, 其中1/3 需要为跨学科的学术报告	

			(listening) 1 time (doing)				或博士学位论文答辩 Compulsory, One third of them need to answer interdisciplinary academic reports or doctoral thesis
		Phd. comprehensive examination 博士综合考试		1			必修 Compulsory
		Phd. international academic communication 博士国际学术交流		1			须参加学院认定的高水平国际会议 Must attend the high-level international conference recognized by the college
学位论文和答辩 (Thesis and Competitive examination)		Phd. academic dissertation 博士学位论文		25			必修 Compulsory

五、培养指导方式

Training guidance

1. 博士研究生的培养均实行导师负责制，也可实行以导师为主的指导小组负责制；研究生的培养指导计划由研究生所在系集体研究，指导教师（组）负责具体指导。

1. The training of doctoral students is based on the tutor responsibility system, and the guidance group responsibility system based on the tutor can also be implemented; the postgraduate training guidance program is studied collectively by the graduate department, and the instructor (group) is responsible for specific guidance.

2. 导师（组）负责研究生日常管理、学风和学术道德教育，并制定合理科学的学习计划，加强研究生创造性思维能力的培养，提高研究生的自学、动手、表达、写作、创新等综合能力。

2. The tutor (group) is responsible for the daily management, academic style and academic ethics education of graduate students, formulates reasonable and scientific study plans, strengthens the cultivation of graduate students' creative thinking ability, and improves the comprehensive ability of graduate students' self-study, hands-on, expression, writing and innovation.

3. 导师（组）根据实际情况规定、组织研究生参加必要的学术讲座、学术报告、研讨会、社会实践等活动，以拓宽研究生的知识结构，培养和提高其分析和解决实际问题的能力。

The tutor (group) organizes graduate students to participate in necessary academic lectures, academic reports, seminars, social practice and other activities according to actual conditions, in order to broaden the knowledge structure of graduate students, and to cultivate and improve their ability to analyze and solve practical problems.

4. 学院负责对研究生培养环节的监督，包括研究生的选题报告、综合考试、中期考核等。

The college is responsible for the supervision of postgraduate training, including postgraduate selection reports, comprehensive examinations, and mid-term assessments.

5. 博士研究生在课程学习结束后，学位论文开始之前对博士生进行的一次综合考核，是博士生培养过程中的一个重要环节。考核的主要内容包括：

After the completion of the course, the doctoral student's comprehensive assessment of the doctoral students before the dissertation begins is an important part of the doctoral student training process. The main contents of the assessment include:

(1) 审核博士生培养计划的执行情况以及课程考试成绩。特别注意基础外语及专业外语的掌握情况，要求有必要的外语笔试和口试。

(1) Review the implementation of the doctoral program and the results of the course test. Pay special attention to the basic foreign language and professional foreign language mastery, and ask for necessary foreign language written and oral tests.

(2) 考核博士生对本学科研究领域的了解情况。要求博士生在阅读 80 至 100 篇有关参考文献的基础上, 结合研究方向做文献综述。综述应对本学科相关领域的近期国内外研究动态, 包括这些领域的主要进展、前沿课题及主要研究方法和手段等给出详尽的介绍。

(2) Evaluate the doctoral students' understanding of the study area of the subject. PhD students are required to read the literature on the basis of reading 80 to 100 references, completing literature review combined with study track. The review should provide a detailed introduction to recent domestic and international research trends in related fields of the certain subject, including major advances in these fields, cutting-edge topics, and major research methods and tools.

(3) 考核博士生独立从事科研工作的能力、科研素质以及科研作风; 考察其政治思想表现、学习和工作态度等。

(3) Evaluate the ability to independently engage in scientific research, the scientific research quality and scientific research style of doctoral students; examine their political and ideological performance, learning and work attitude etc.

综合考试是开题报告的必要准备, 可以结合开题报告进行, 但两者是培养过程中的不同环节, 不能相互替代。

The comprehensive examination is a necessary preparation for the opening report, and can be combined with the opening report, but the two are different links in the cultivation process and cannot replace each other.

6. 博士研究生的综合考试由专门的考试委员会组织, 考试委员会由三至五名本学科具有高级职称的教师组成, 设考试委员会主席 1 人, 主持考试工作。指导该生的博士生导师可以参加考试委员会, 但不得担任负责人。凡综合考试未通过者, 可在半年内申请重考一次, (最迟不得超过第四学期), 仍未通过者, 终止论文工作, 按学校有关规定淘汰分流制进行。

The comprehensive examination for doctoral students is organized by a special examination committee consisting of three to five teachers with senior professional titles in the subject, and set a chairman for the examination committee, presiding over the examination. The doctoral tutor who directs the student can take part in the examination committee, but not the person in charge. Those who fail to pass the comprehensive examination may apply for re-examination within half a year (no later than the fourth semester). If the applicant has not passed, the paper will be terminated and the distribution system will be eliminated according to the relevant regulations of the school.

六、学位论文要求

Thesis Requirements

1. 博士生的论文工作时间一般应不少于 2 年, 论文工作开始时间从通过开题报告开始计。

选题报告会专家成员由博士生学位论文研究方向相关的副教授及以上职称教师组成, 其中正高级职称不少于 3 人, 选题报告会成员不少于 5 人。通过选题报告的博士研究生, 开始学位论文工作。未通过开题报告的博士研究生推迟 4 个月再次申请学位论文开题报告; 对于已通过开题, 但因故更换选题的博士研究生, 应在导师的安排下重新组织选题报告会, 选题报告会

要求同上。

1. The working hours of doctoral students' papers should generally be no less than 2 years, and the starting time of the papers should be counted from the opening of the report.

The members of the topic selection meeting will be composed of teachers with associate professor title or above related to the research direction of doctoral thesis. Among them, there are no less than 3 senior titles and no less than 5 members in all in the meeting committee. Ph.D. students whose opening report has passed can begin to work towards the thesis. Those whose opening report did not pass will be postponed to apply again for the thesis opening report for 4 months. Those who have passed the opening question but changed the topic for any reason should reorganize the topic selection report meeting under the arrangement of the tutor and the requirements are the same as above.

2. 博士学位论文应围绕学科或相关领域内亟待解决的问题开展研究，论文选题具有一定的创新性、前瞻性以及可行性，具有重要的理论意义与工程价值。

2. The doctoral thesis should focus on the issues that need to be solved urgently in the subject or related fields. The topic selection of the thesis has certain innovation and feasibility, be forward-looking and has important theoretical significance and engineering value.

3. 博士学位论文文献综述全面、深入，能准确的提炼出关键问题；学位论文工作量饱满，书写规范、结构合理、层次分明、版式规范、图表清晰。

The doctoral dissertation literature review should be comprehensive and in-depth, and can accurately extract key issues; the thesis has a full workload, written specifications, reasonable structure, clear hierarchy, typographic norms, and clear charts.

4. 博士学位论文的研究工作应取得突出的创新性成果，论文主要创新点应公开发表，主要形式包括在国内外相关学术刊物发表论文、参加国际或国内学术会议进行交流、申请各类专利或标准、申报各级别科技成果奖励等。

The research work of doctoral thesis should achieve outstanding and innovative results. The main innovations of the thesis should be published. The main forms include publishing papers in relevant academic journals at home and abroad, participating in international or domestic academic conferences, and applying for various patents, standards, awards for scientific and technological achievements at all levels.

七、学位论文评阅与答辩

Thesis review and defense

学位论文的评阅与答辩等要求参照《重庆大学学位授予实施细则》、《重庆大学学术学位研究生申请硕士、博士学位发表学术论文基本要求》、《重庆大学博士学位论文送评管理办法》、《重庆大学研究生涉密学位论文审批及管理办法》等有关文件执行。

The review and defense of thesis are required to refer to the “Detailed Rules for the Implementation of Degrees in Chongqing University”, “Basic Requirements for Thesis for Postgraduate Application for Master and PhD Degrees of Science in Chongqing University”, “Administrative Measures for the Evaluation of Doctoral Thesis in Chongqing University”, “Methods for Examination and Management of Secret Thesis for Postgraduate in Chongqing University” and some relevant documents

八、毕业及学位授予

Graduation and degree award

修满规定培养环节学分，并通过论文答辩者，则准予毕业，并发给毕业证书。经院学位评定分委员会审核，报校学位评定委员会讨论通过后方可授予博士/硕士学位，并发给学位证书。

Those who get the required training credits and pass the thesis reply will be allowed to graduate and a diploma will be issued. The examination of the Academic Degrees Sub-committee shall be carried out. After the discussion and approval of the Academic Degree Evaluation Committee, the doctor's/master's degree will be awarded and the degree certificate shall be issued.

九、文献阅读经典书目及相关重要学术期刊

Classic bibliography for literature reading and related important academic journals

表 2、电气工程一级学科研究生文献阅读经典书目和重要期刊目录

Classic bibliography for literature reading of postgraduate student and important journal catalogue in first-level discipline

【表格内文字格式：宋体，五号，单倍行距】

序号 No.	著作或期刊的名称 The name of the book or journal	作者或出版单位 Author or publishing unit	备注（必读或选读） Remarks (compulsory or optional)
1	High Voltage Engineering - Fundamentals (Second Edition)	E.Kuffel, W.S.Zaengl, J.Kuffel	选读 optional

2	Power Electronics-Converters Applications and Design	N Mohan , TM Undeland , WP Robbins	选读 optional
3	Fundamentals of Power Electronics	Publisher: Kluwer Academic	选读 optional
4	Electromagnetic Field Theory Fundamentals Second edition	Bhag Singh Guru , Huseyin R.Hiziroglu 著 周克定 译。	选读 optional
5	Discrete-time Signal Processing	清华大学出版社 Tsinghua University Press	选读 optional
6	电磁场与电磁波 Electromagnetic field and electromagnetic wave	机械工业出版社 Mechanical Industry Press	选读 optional
7	《交流电机及其系统分析》 AC motor and its system analysis	科学出版社 Science Press	选读 optional
8	《现代电力系统分析》 Modern power system analysis	科学出版社 Science Press	选读 optional
9	《中国电机工程学报》期刊 Journal of China Electrical Engineering		必读 compulsory
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11	《高电压技术》 High voltage technology		选读 optional
12	《电力系统自动化》 Automation of Electric Power Systems		选读 optional
13	《电网技术》 Power grid technology		选读 optional
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29	Risk Assessment of Power Systems	Wenyuan Li	选读 optional

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