

电气工程及其自动化专业辅修学士学位培养方案

Undergraduate Minor Degree Program of Electrical Engineering and Its Automation

一、培养目标 Objectives

面向国家轨道交通与电力系统需求，培养具有社会主义核心价值观、优良的人文素养和职业道德，具有系统的专业知识、综合的工程实践和专业表达能力，具有自主学习能力和国际化视野，能够在轨道交通和电力系统等领域从事工程/产品设计、技术开发、工程施工/试验、产品制造/测试、运营维护、技术管理、教学科研等方面工作的卓越工程技术人才。

Facing the needs of national rail transit and power system, this major is committed to cultivating the outstanding engineering and technical talents in the field of electrical engineering and automation, who are with socialist core values, excellent humanistic quality and professional ethics, with systematic professional knowledge, comprehensive engineering practice and professional expression ability, with independent learning ability and international vision, can work in engineering / product design, technology development, engineering construction / testing, product manufacturing / testing, operation and maintenance, technology management, teaching and research.

本专业学生在毕业 5 年左右，经过行业实践和自身学习能达到以下具体目标：

About 5 years after graduation, students of this major can achieve the following specific goals after industry practice and their own learning:

1. 德智体美劳全面发展，具备社会责任感和使命感，坚守职业道德规范，在工程实践、科学研究中坚持国家和人民利益优先；（职业道德）

Graduates have all-round development of the morality, intelligence, physique, beauty and labor, and have a sense of social responsibility and mission, and adhere to the professional ethics, and adhere to the interests of the country and the people in engineering practice and scientific research; (professional ethics)

2. 具有应用专业技能以及职业相关的安全法规和技术标准，理解、认识、

分析和解决电气工程及其自动化领域复杂工程问题的能力，以提升系统和装备质量，并有利于改善环境、促进可持续发展；（专业技术能力）

Graduates have the ability to apply professional skills and career-related safety regulations and technical standards, to understand, analyze and solve complex engineering problems in the field of electrical engineering and automation, to improve the quality of systems and equipment, and to improve the environment and promote sustainable development; (professional and technical capabilities)

3. 能够通过多种学习方式提升专业持续发展能力，更新和调整专业知识能力，以胜任电气工程及其自动化领域技术的快速发展；（持续学习能力）

Graduates can improve their professional sustainable development ability, update and adjust their professional knowledge and ability through various learning methods, so as to be competent for the rapid development of technology in the field of electrical engineering and automation; (continuous learning ability)

4. 具有创新思维，以及从事电气工程及其自动化领域装备研发、技术革新和工程科学研究的能力；（创新能力）

Graduates have the innovative thinking, and the ability to engage in equipment research and development, technical innovation and engineering scientific research in electrical engineering and automation fields; (innovation ability)

5. 体现较强的语言表达、人际沟通、团队协作、组织管理能力，成为具有独立工作和团队协作能力的技术或管理骨干人才；（沟通协作能力）

Graduated students can show strong ability of language expression, interpersonal communication, teamwork, organization and management, and become the technical or managerial backbone talents with independent work and team cooperation ability; (communication and cooperation ability)

6. 拥有全球化意识和国际视野，能够开展跨学科跨文化学习，并积极主动适应不断变化的国内外形势和环境，参与国际合作与竞争。（适应能力）

Graduates can have a global awareness and international vision, carry out the interdisciplinary and cross-cultural learning, actively adapt to the changing situation and environment at home and abroad, and participate in international cooperation and competition. (adaptive faculty)

二、 毕业要求 Graduation Requirements

1.工程知识：掌握数学、自然科学、工程基础和专业基础知识，能够用于解决电气工程领域的复杂工程问题。

Engineering Knowledge: Master and apply knowledge of mathematics, natural science, engineering fundamentals and engineering specializations to the solution of complex electrical engineering problems.

2.问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达、并通过文献研究分析电气工程领域的复杂工程问题，以获得有效结论。

Problem Analysis: Identify, formulate, research literature and analyse complex electrical engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

3.设计/开发解决方案：能够设计针对电气工程领域的复杂工程问题的解决方案，设计满足特定需求的系统、单元（部件），并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

Design/ development of solutions: Design solutions for complex electrical engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

4.研究：能够基于科学原理并采用科学方法对复杂电气工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

Investigation: Conduct investigations of complex electrical engineering problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

5.使用现代工具：能够针对电气工程领域的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。

Modern Tool Usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex electrical engineering problems, with an understanding of the limitations.

6.工程与社会：能够基于电气工程专业背景知识进行合理分析，评价电气工

程领域相关复杂工程项目和工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

The Engineer and Society: Apply reasoning informed by electrical engineering contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional electrical engineering practice and solutions to complex electrical engineering problems.

7.环境和可持续发展：能够理解和评价针对电气工程领域相关复杂工程问题的工程实践对环境、社会可持续发展的影响。

Environment and Sustainability: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex electrical engineering problems in societal and environmental contexts

8.职业规范：具有人文社会科学素养、社会责任感，能够在电气工程实践中理解并遵守工程职业道德和规范，具备正确履行自己责任的能力。

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of electrical engineering practice.

9.个人和团队：能够在多学科背景下的工程项目或技术开发团队中承担个体、团队成员以及负责人的角色。

Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

10.沟通：能够就电气工程领域相关复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。并具备一定的国际视野，能够在跨文化背景下进行沟通和交流。

Communication: Communicate effectively on complex electrical engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11.项目管理：理解并掌握工程管理原理与经济决策方法，并能在多学科环境中应用。

Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

12.终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

三、 学分要求 Credits Requirements

选本专业为辅修学位的学生应修本专业核心课程，符合《西南交通大学本科生辅修专业修读及辅修学位授予管理办法》相关规定，方可授予辅修学士学位。

The students taking part in the minor degree studies of Electrical Engineering and Its Automation should learn the main course and meet the requirements of “Measures for the administration of undergraduate minor studies and minor degree awarding in Southwest Jiaotong University” before receiving the degree.

四、 学位 Degree

辅修工学学士

Minor Degree of Engineering

五、 课程设置 Course Programs

课程类型 Course Type	课程名称 Course Name	课程性质 Nature of Course	学分 Credits	开课学期 Semester	开课学院 School	备注 Notes
学科基础课程 必修 20 学分	电路分析 AI (含实验) Electric Circuits AI	必修 Compulsory	4	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	电路分析 AII (含实验) Electric Circuits AII	必修 Compulsory	4	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	信号与系统 (含实验) Signals and Systems	必修 Compulsory	3	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	工程电磁场 Engineering Electromagnetic Fields	必修 Compulsory	3	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	自动控制原理 (含实验) Principles of Automatic Control	必修 Compulsory	4	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	

	电气测量技术 (含实验) Electrical Measurement Technology	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
专业基础课 必修 I 课程组 16 学分 II 课程组 18 学分 III、IV 课程组 20 学分	电力电子技术 (含实验) Power Electronics (Including Experiments)	必修 Compulsory	4	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	MCU 原理及现代电子系统 (含实验) MCU Principals and Modern Electronic System (Including Experiments)	必修 Compulsory	3	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	电机学 B (I/II 课程组选) Electrical Machinery B	必修 Compulsory	4	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	电机学 B 实验 (I/II 课程组选) Electrical Machinery B Experiments	必修 Compulsory	1	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	电机学 AI (III/IV 课程组选) Electrical Machinery AI	必修 Compulsory	4	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	电机学 AI 实验 (III/IV 课程组选) Electrical Machinery AI Experiments	必修 Compulsory	1	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	电机学 AII(含实验) (III/IV 课程组选) Electrical Machinery AII Experiments	必修 Compulsory	2	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	电力系统分析 (含实验) Power System Analysis	必修 Compulsory	4	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	计算机网络 (含实验) (II/III/IV 课程组选) Computer Networks	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
专业课 必修 16 学分 第 I 课程组 (轨道交通供电及其自动化)	高电压技术 (含实验) High Voltage Technology	必修 Compulsory	3	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	电力系统继电保护原理 (含实验) Power System Protective Relaying	必修 Compulsory	3	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	接触网工程(含实验) Engineering of Overhead Contact System	必修 Compulsory	3	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	供电系统 (含实验) Power Supply System	必修 Compulsory	3	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	

	远动监控技术（含实验） Remote Supervisory and Control Technology	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	供变电技术 Power Supply and Substation Techniques	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
专业课 必修 11 学分 第 II 课程组 （电力系统及其自动化）	高电压技术（含实验） High Voltage Technology	必修 Compulsory	3	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	电力系统继电保护原理（含实验） Power System Protective Relaying	必修 Compulsory	3	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	发电厂电气部分（含实验） Electrical Parts of Power Plant	必修 Compulsory	3	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	电力系统暂态分析（含实验） Power System Transient Analysis	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
专业课 必修 8 学分 第 III 课程组 （电力电子与传动控制）	电力牵引传动与控制（含实验） Electric Traction Drive and Control (&Experiments)	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	先进列车运行控制技术 Advanced control technology of train operation	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	电力电子装置与控制 Power Electronic Equipment and Its Control	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	牵引电机与系统 Traction Motor and System	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
专业课 必修 11 学分 第 IV 课程组 （城轨与磁浮交通电气化）	城轨交通供电系统及其自动化（含实验） Power Supply System and Automation for Urban Rail Transit	必修 Compulsory	3	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	磁浮理论与控制（含实验） Electromagnetic Suspension Theory and Control	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	电力牵引传动与控制（含实验） Electric Traction Drive and Control (&Experiments)	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	

	牵引电机与系统 Traction Motor and System	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	城轨综合监控技术 Urban Rail Integrated Monitoring Technology	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
实践环节 必修 4 学分 第 I 课程组 (轨道交通供电及其自动化)	轨道交通供电及其自动化综合设计 Comprehensive Design of Rail Transit Power Supply and Its Automation	必修 Compulsory	4	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
实践环节 必修 3 学分 第 II 课程组 (电力系统及其自动化)	电力系统及其自动化综合设计 Comprehensive Design of Power System and Its Automation	必修 Compulsory	3	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
实践环节 必修 6 学分 第 III 课程组 (电力电子与传动控制)	电力牵引系统课程设计 Design Project of Electric Traction System	必修 Compulsory	1	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	电力电子与电力传动实训 Power Electronics and Electrical Drive Systems Design and Experiments	必修 Compulsory	2	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	计算机辅助电机设计实训 Computer Aided Motor Design and Experiments	必修 Compulsory	2	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
	电力电子装置综合设计 Power Electronic Equipment Integrated Design	必修 Compulsory	1	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
实践环节 必修 5 学分 第 IV 课程组 (城轨与磁浮交通电气化)	城轨交通供电系统课程设计 Design Project of Power Supply System for Urban Rail Transit Design and Experiments	必修 Compulsory	1	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	电力电子与电力传动实训 Power Electronics and Electrical Drive Systems Design and Experiments	必修 Compulsory	2	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	磁浮列车悬浮系统课程设计 Project on Maglev Suspension System	必修 Compulsory	1	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	
	电力电子装置综合设计 Power Electronic Equipment Integrated Design	必修 Compulsory	1	秋季学期 Fall Semester	电气工程学院 School of Electrical Engineering	

毕业设计 (论文) 必修 8 学分	毕业设计(论 文) Graduation Dissertation	必修 Compulsory	8	春季学期 Spring Semester	电气工程学院 School of Electrical Engineering	
总学分 Total Credits			第 I 课程组 (轨道交通供电及其自动化): 64 第 II 课程组 (电力系统及其自动化): 60 第 III 课程组 (电力电子与传动控制): 62 第 IV 课程组 (城轨与磁浮交通电气化): 64			