

# 测控技术与仪器专业辅修培养方案

## Minor Training Program of Measurement and Control Technology and Instrument

### 一、培养目标 Objectives

立足于轨道交通装备行业，面向仪器科学与技术领域，培养德、智、体、美、劳全面发展，培养学生掌握数学、自然科学和工程科学的基础理论以及测控技术与仪器专业知识，使学生具有良好的科学、工程和人文素养、职业素质、国际视野、创新精神和社会责任感，具备综合运用知识和技能解决仪器科学与技术领域和轨道交通装备领域的复杂工程问题的能力，使学生能够成为在仪器科学与技术及轨道交通行业从事信息检测、信息处理、信息传输、故障诊断、自动控制相关技术、仪器设计制造、科研开发、系统集成、运行管理等方面工作的复合型高级工程技术人才。学生毕业后通过专业实践和学习深造，成为卓越的工程师、优秀的研究人员以及轨道交通装备领域的行业领军人才。

The training goal of this discipline is to enable students to base themselves on the rail transit equipment industry, to focus on the field of instrument science and technology; to cultivate students' all-round development of morality, intelligence, physical, beauty and labor; to enable students to master the basic theories of mathematics, natural science and engineering science as well as the professional knowledge of measurement and control technology and instruments; to enable students to have good scientific, engineering and humanistic literacy, professional quality, international vision, innovative spirit and social responsibility; to enable students to comprehensively use knowledge and skills to solve complex engineering problems in the field of instrument science and technology and rail transit equipment; to enable students to become complex senior engineering and technical talents engaged in information detection, information processing, information transmission, fault diagnosis, automatic control related technology, instrument design and manufacturing, scientific research and development, system integration, operation management and other aspects of instrument science and technology and rail transit industry. Through professional practice and study, students will become excellent engineers, excellent researchers, and industry leaders in the field of rail transit equipment after graduation.

### 二、培养要求 Requirement

1.掌握测控技术与仪器专业所需要的专业基础及专业知识，并能用于分析解决仪器

科学与技术领域中的设计、开发和应用工作中所面临的复杂工程问题。

1. Master the professional foundation and professional knowledge required by measurement and control technology and instrument, and can be used to analyze and solve the complex engineering problems faced in the design, development and application of instrument science and technology.

2. 能够应用数学、自然科学和工程科学的基本原理和方法，对仪器科学与技术领域的设计、开发、应用等技术问题进行识别、表达、分析，结合文献研究获得有效结论。

2. the Graduates can apply mathematics, natural science and engineering science, the basic principle and method of the instrument science and technology in the field of design, development, application and so on in recognition, expression, analysis of technical problems, combined with literature research to obtain valid conclusions.

3. 能够为仪器科学与技术领域的实际问题提出解决方案，设计满足需求的系统、元件，并能够在设计中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

3. Graduates can provide solutions to practical problems in the field of instrument science and technology, design systems, components to meet their needs; and embody innovative ideas in the design, taking into account social, health, safety, legal, cultural and environmental factors.

4. 能够基于科学原理并采用科学方法对仪器科学与技术领域的实际问题开展科学研究，包括实验设计、实验实施和实验数据处理与分析。

4. Graduates can conduct scientific research on practical problems in the field of instrument science and technology based on scientific principles and methods, including experimental design, experimental implementation and experimental data processing and analysis.

5. 能够针对仪器科学与技术领域的实际问题，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，对设计、开发、应用等技术问题进行预测和数值模拟，并能够理解其局限性。

5. Graduates can develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for practical problems in the field of instrument science and technology; to predict and numerically simulate design, development, application and other technical problems, and to understand their limitations.

6. 具备初步的测控技术与仪器科研思维、团队合作意识以及专业素养。

6. Have Preliminary Measurement and Control Technology and Instruments scientific research thinking, teamwork awareness and professionalism.

### **三、学分要求 Credits Requirements**

选择测控技术与仪器专业的学生应最低修满本方案规定的 37 学分即完成学习，其中必修课程 37 学分，并符合《西南交通大学本科生辅修与双学位管理办法》规定者，方可颁发本专业辅修证书。

Students minored in Measurement and Control Technology and Instruments should study core compulsory courses of 37 credits, including no less than 37 credits for compulsory. In this major, and comply with the Regulations of Southwest Jiaotong University on Minor and Dual Degree Management. Then, they can be issued their minor certificates of industrial engineering.

#### 四、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
专业基础课程 19 学分 Specialty Foundational Courses 19 Credits	信号分析与处理 Signal Analysis and Processing	必修 Compulsory	3	第 4 学期 Semester 4	机械工程学院 School of Mechanical Engineering	
	误差理论与数据处理 Error and Data Analysis	必修 Compulsory	3	第 4 学期 Semester 4	机械工程学院 School of Mechanical Engineering	
	计算机原理及应用 Computer Principles and Applications	必修 Compulsory	4	第 5 学期 Semester 5	机械工程学院 School of Mechanical Engineering	
	自动控制原理 A Principle of automatic control A	必修 Compulsory	4	第 5 学期 Semester 5	机械工程学院 School of Mechanical Engineering	
	自动控制元件 Automatic Control Element	必修 Compulsory	3	第 5 学期 Semester 5	机械工程学院 School of Mechanical Engineering	
	虚拟仪器设计 Virtual Instrument Design	必修 Compulsory	2	第 5 学期 Semester 5	机械工程学院 School of Mechanical Engineering	
专业核心课 14 学分 Specialized Core Course 14 Credits	传感器与检测仪器电路 Sensor and Detection Instrument Circuit	必修 Compulsory	3	第 5 学期 Semester 5	机械工程学院 School of Mechanical Engineering	
	测控网络技术 Measurement and Control Network Technology	必修 Compulsory	2	第 6 学期 Semester 6	机械工程学院 School of Mechanical Engineering	

	轨道交通测试与主动控制技术 Test and Active Control Technology of Rail Transit	必修 Compulsory	3	第 6 学期 Semester 6	机械工程学院 School of Mechanical Engineering	
	精密测控与系统 Precision measurement and control system	必修 Compulsory	3	第 6 学期 Semester 6	机械工程学院 School of Mechanical Engineering	
	精密仪器设计 Precision Instrument Design	必修 Compulsory	3	第 6 学期 Semester 6	机械工程学院 School of Mechanical Engineering	
<b>集中性实践教学环节 4 学分 Centralized Practical Teaching Process 4 Credits</b>	测控系统综合设计与实践 Comprehensive Design and Practice of Measurement and Control System	必修 Compulsory	2	第 7 学期 Semester 7	机械工程学院 School of Mechanical Engineering	
	仪器与信号处理设计实践 Practice of Instrument and Signal Processing Design	必修 Compulsory	2	第 7 学期 Semester 7	机械工程学院 School of Mechanical Engineering	
<b>总学分 Total Credits</b>			37			