

测控技术与仪器专业培养方案

专业名称与代码：测控技术与仪器 080401（080301）

专业培养目标：本专业以培养信息技术领域测量控制与仪器仪表类的专门人才为目标。主要培养具备测量与控制方面基础知识与应用能力，能从事测量、测试、控制工程，智能仪器仪表、计算机软件和硬件、工程检测、建筑质量检测、环境检测和监测以及工业生产控制网络领域等有关的技术、仪器与系统的设计制造、科研开发、应用研究、运行管理等方面工作，有创新精神和实践能力、社会责任感和敬业精神、身心健康、德智体全面发展的综合型专业人才高级工程应用型人才及管理人才。

专业培养要求：本专业学生要求在学习数学、电子学、物理学、计算机与信息科学的基础知识和检测与控制基本理论和方法的基础上，培养运用现代检测技术和仪器解决实际生产问题的能力，掌握设计、研制与开发智能仪器仪表系统与工业测控网络的基本方法和技能。

毕业生应获得以下几方面的知识和能力：

1. 具有较扎实的自然科学基础、较好的人文、管理、艺术和社会科学基础及正确运用本国语言、文字的表达能力；
2. 系统地掌握本专业领域宽广的技术理论基础知识，主要包括机械学、电子学、物理学、测量与控制、计量学、误差理论与数据处理、质量管理的基础理论、基本知识和基本技能；
3. 掌握物理、机、电、计算机相结合的当代测控技术和实际研究能力，具有本专业物理探测与检测技术、仪器与系统的设计、开发能力；
4. 具有应用计算机进行工程设计、自动测试、数据处理和应用软件开发的初步能力；
5. 掌握一门外语，具有较强的外语应用能力，外语能力达到国家四级或四级以上水平；
6. 具有较强的自学能力、创新意识和较高的综合素质。

主干学科：仪器科学与技术，控制科学与工程。

核心课程：电路分析、模拟电子技术基础、数字电路与逻辑设计、自动控制原理、单片机原理与应用、信号与系统、数字信号处理、计量误差理论、传感器原理及应用、微机原理与接口技术、智能仪器设计基础、测控软件技术、检测理论与应用、光电检测技术、现代可编程逻辑器件、DSP、虚拟仪器、嵌入式系统、无线传感网络（物联网）技术等。

主要专业实验：电子电路、现代可编程逻辑器件、DSP、微机接口技术、智能仪器设计基础、计算机软件技术、虚拟仪器、嵌入式系统、传感器技术等。

主要实践性教学环节：C语言课程设计、电子技术课程设计、电路综合实习、检测技术教学实习、生产实习、毕业实习与毕业设计等。

修业年限：四年。

授予学位：工学学士。

相近专业：电气工程及其自动化、电子信息工程、电子科学与技术。

Program for Measuring & Control Technology and Instrument

Specialty and Code: Measuring & Control Technology and Instrument 080401 (080301)

Education Objective: Our program will develop top qualified engineering talents who are all round developed in morality, intelligence and physique, and have a wide basic knowledge and practical ability, with highly creative and practical capability. All of them will be able to engage in the following subjects: engineering exploration, detection of construction quality, environmental investigation and monitoring, technology related with operational attitude of industry equipment and controlling field, designing and manufacturing of instruments and systems, scientific development, application study, operational management.

Education Requirements: The students are required to learn the courses of electronics, physics, mechanics and computer science, as well as the basic theory and method in measurement and controlling, to acquire up-to-date physical inspection and detection skills as well as instrument application. Also they should possess the skillful measuring and control technique, the ability of designing and developing the instrument system.

Graduates Are Required:

1. To grasp the knowledge of natural science, humanity, management, arts and social science basis, as well as domestic language and character.
2. To systematically master the wide basic techniques and theories of the major, mainly including mechanics, electronics, surveying and controlling, the error theory of measuring and data processing, basic theory of quality management, fundamental learning and techniques.
3. To master the current measuring and controlling technology integrated with physics, electronics and computer science, and having a good command of practical ability in researching, as well as possessing the ability of physical exploration and detective approaches, designing and developing of instruments and systems.
4. To possess the preliminary ability of engineering design with computer, automatic test, data processing and applied software development.
5. To have the ability of reading, listening, speaking and writing in a foreign language fluently.
6. To acquire the ability of independent study, fostering creativity and comprehensive qualities.

Major Disciplines: Instrument Science and Technology, Control Science and Engineering.

Main Courses: Basis of Circuit Analysis, Analog Circuit, Digital Circuit, Automatic Control Principle, Practices of Microcontroller Unit, Signal and System, Computation Error Theory, Sensor Theory & Application, Principle and Interface of Computer, the Basis of Intelligent

Instrument Design, Introduction to Measuring and Controlling Software Design, Inspecting System Design & Application, Modern Programming Logic Device, DSP, Virtual Instrument etc.

Lab Experiments: Modern Programming Logic Device, DSP, Measuring and Controlling Software Design Principle and Interface of Computer, Virtual Instrument etc.

Practical Work: C language course Experiments, Electronic Technology Practice, Electronic Circuit Training, Respecting Technology Training, Production Training, Bachelor Thesis etc.

Duration: Four years.

Degree Granted: Bachelor of Engineering.

Related Specialties: Electrical Engineering and Automation; Electronic Information Engineering; Electronic Science and Technology.

测控技术与仪器专业课程教学计划表
Course Descriptions of Measuring & Control Technology and Instrument

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 CrS	学时 Hrs	学时分类 Class Hours		学期学分分配 Semester Credits											
					讲课 Lec.	实验 Lab.												
							一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th				
通识教育课程 Liberal Education Courses	必修 Compulsory	11706200	马克思主义基本原理 Principles of Marxism	3	48	48			3									
		11711800	中国近现代史纲要 The Essentials of Modern Chinese History	2	32	32				2								
		11706500	毛泽东思想和中国特色社会主义理论体系 Mao Tse-tung Thought and Introduction to the Theoretical System of Socialism with Chinese Characteristics	4	64	64			4									
		120002*0	思想道德修养与法律基础 Morality Education & Fundamentals of Law	3	48	48		1.5	1.5									
		113027*0	体育 Physical Education	6	96	96		1.5	1.5	1.5	1.5							
		109005*0	大学英语 College English	12	192	192		2.5	2.5	3.5	3.5							
		11904100	计算机高级语言程序设计(C) Computer High-level Language(C)	3.5	56	40	16		3.5									
		14300100	军事理论 Military Theory	2	32	32		2										
		20714100	电子信息学科导论 Introduction to Electrical information Science	1.5	24	24		1.5										
	选修 Elective	TX35000Z	自然科学类 Natural Science	2	32													
		TX35000G	工程技术类 Engineering	2	32													
		TX35000S	社会科学类 Social Science	2	32													
		TX35000R	人文艺术类 Humanities & Arts	2	32													
		TX35000J	经济管理类 Economy & Management	2	32													
		其他类 Other Courses	2	32														
	小计 Sum		49	784	576	16	9	13	8	7								
学科基础课 Fundamental Courses	20714200	工程制图 Engineer Drawing	2.5	40	36	4		2.5										
	212028*1	高等数学 A Advanced Mathematic A	12.5	200	200		5.5	7										
	21208803	线性代数 C Linear Algebra C	2.5	40	40		2.5											
	212093*0	大学物理 C College Physics C	7	112	112			3.5	3.5									

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crts	学时 Hrs	学时分类 Class Hours		学期学分分配 Semester Credits										
					讲课 Lec.	实验 Lab.	一	二	三	四	五	六	七	八			
							1st	2nd	3rd	4th	5th	6th	7th	8th			
	212092*2	物理实验 B Physical Experiment B	3.5	56		56		2	1.5								
	21202400	概率统计与随机过程 Probability Statistics and Stochastic Processes	3.5	56	56					3.5							
	21201901	复变函数与积分变换 A Complex Function and the Integral Transformation A	3.5	56	56					3.5							
	20702700	电路分析 Theory of Circuitry	4.5	72	64	8		4.5									
	20708801	模拟电路技术基础 A Introductory Analog Electronics A	4	64	50	14				4							
	20710701	数字电路技术基础 A Digital Electronics A	4	64	50	14				4							
	20701901	单片机原理及应用 A Single Chip Computer and Application A	3.5	56	46	10					3.5						
	21109700	信号与系统 Signals and Systems	3.5	56	48	8					3.5						
	小计 Sum		54.5	872	762	110		10.5	17	16.5	10.5						
专业主干课 Main Specialty Courses	20712902	自动控制原理 B Automatic Control B	4	64	56	8					4						
	20604200	计量误差理论 Computation Error Theory	2.5	40	32	8					2.5						
	20703100	电子测量 Electronic Measurement	3	48	44	4					3						
	20711002	数字信号处理 B Digital Signal Processing B	3	48	40	8					3						
	20718601	传感器及检测技术 A Sensor and detection technology A	4	64	52	12					4						
	20722200	微机原理与接口技术 Principle and Interface of Computer	3.5	56	40	16					3.5						
	20600600	测控软件设计基础 Introduction to Measuring and Controlling Software Design	3.5	56	40	16					3.5						
	20603200	电子电路仿真与电磁兼容 Electronic Circuit Simulation and EMC	2	32	16	16					2						
	20605700	物理探测理论与检测技术 Physics Detection Theory and Technology	2.5	40	30	10						2.5					
	20606200	智能仪器仪表设计基础 The Basis of Intelligent Instrument Design	2.5	40	30	10						2.5					
	20711600	现代可编程逻辑器件 Modern Programming Logic Device	2.5	40	20	20						2.5					
		小计 Sum		33	528	400	128					25.5	7.5				

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 Crs	学时 Hrs	学时分类 Class Hours		学期学分分配 Semester Credits											
					讲课 Lec.	实验 Lab.	一	二	三	四	五	六	七	八				
							1st	2nd	3rd	4th	5th	6th	7th	8th				
Specialty Elective Courses 专业选修课		具体见专业选修课列表	17	272														
	合计 Sub-total		153.5	2456	1714	254	19.5	30	24.5	17.5	25.5	7.5						
Practical Work 实践环节	40000100	劳动教育 Labor Education	1	1周			1											
	44300200	军事训练 Military Training	2	2周			2											
	40707404	金工实习 D Metalworking Practice D	1.5	1周			1.5											
	41904300	计算机高级语言课程设计(C) Course Design for High-level Computer Language (C)	2	1.5周				2										
	40703600	电子技术课程设计 Electronic Technology Practice	3	2周					3									
	40703000	电路综合实习 Electronic Circuit Training	4.5	3周						4.5								
	40604400	检测技术教学实习 Detection Technology Training	6	4周									6					
	42300200	生产实习 Production Practice	4.5	3周											4.5			
	42300100	毕业实习与毕业设计 Practice for Graduation and Design for Graduation	24	16周														24
		小计 Sum		48.5	33.5周			4.5	2	3	4.5		6	4.5	24			
Autonomous Learning 自主学习	ZZ35S	社会调查 Social Investigation	2															
	ZZ09Y	大学英语(自主学习) College English (Autonomous Learning)	3															
		其他(学科竞赛、发明创造、科研报告) Others (Contest, Invention, Innovation and Research Presentation)	3															
		小计 sum		8														
总计 Total			210	2456+ 33.5周	1714	254	24	32	27.5	22	25.5	13.5	4.5	24				

课程类别 Classification	课程编号 Code	课程名称 Course Name	学分 CrS	学时 Hrs	学时分类 Class Hours		学期学分分配 Semester Credits								
					讲课 Lec.	实验 Lab.	一	二	三	四	五	六	七	八	
							1st	2nd	3rd	4th	5th	6th	7th	8th	
专业选修课列表 Specialty d Elective Courses	20722300	测控系统设计与应用 Measurement and Control System Design & Application	2.5	40	34	6							2.5		
	20606000	虚拟仪器 Virtual Instrument	2.5	40	20	20							2.5		
	20718502	电力电子技术 B Power Electronic Technology B	2.5	40	36	4							2.5		
	20605500	微弱信号检测基础 Introduction to Weak Signal Detection	2	32									2		
	20722400	嵌入式系统 Embedded Systems	2.5	40	24	16							2.5		
	20601900	地球物理仪器 Geo-physics Instrument	3.5	56	44	12								3.5	
	20722500	无线传感网络(物联网)技术 Wireless Sensor Network Technology(Networking)	2.5	40	32	8								2.5	
	20716102	DSP 技术及应用 B DSP Technologies and Application B	2.5	40	20	20								2.5	
	20704802	光电检测技术 B Photoelectron Detecting Technology B	2.5	40	32	8								2.5	

注：通识教育选修课学分和自主学习学分未列入具体学期。

测控技术与仪器专业课程分类统计

	通识教育课程 Liberal Education Courses		学科基础课 Disciplinary Fundamental Courses	专业主干课 Main Specialty Courses	专业选修课 Specialty Elective Courses	实践环节 Practical Work	自主学习 Autonomous Learning	学时总计 Total Hours	学分总计 Total Credits
	必修	选修							
学时/学分	592/37	192/12	872/54.5	528/33	272/17	33.5 周 /48.5	8	2456+ 33.5 周	210
学分所占比例	23.3%		26.0%	15.7%	8.1%	23.1%	3.8%		100%