

# 电气工程及其自动化专业 2017 版本本科培养方案

## Undergraduate Education Plan for Specialty in Electrical Engineering and Automation (2017)

专业名称	电气工程及其自动化	主干学科	电气工程、控制科学与工程、计算机科学与技术
Major	Electrical Engineering and Automation	Major Disciplines	Electrical Engineering, Control Science and Engineering, Computer Science and Technology
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	68	\	28	\	170
选修课 Elective Courses	9	20	6	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

武汉理工大学电气工程及其自动化专业面向电气工程领域科学研究、技术开发、工程设计和技术服务等任务，培养基础扎实、适应能力强、具有创新能力和国际化视野的高素质专业技术人才与管理人才。

- (1) 能设计电气系统解决方案，并能设计基于电路原理的实际应用系统；
- (2) 在团队中作为技术骨干或领导有效发挥作用；
- (3) 具有良好的修养和道德品质，有意愿并有能力服务社会；
- (4) 能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提升。

#### Educational Objectives

The Electrical Engineering and its Automation major in Wuhan University of Technology is oriented to face the mission of scientific research, technology development, engineering design and technology service, etc in the field of electrical engineering. It is expected to train high-quality professional and technical personnel and management personnel with a solid professional foundation, strong adaptability, innovation capability as well as global perspective view.

1. Capable of design electrical system solutions, as well as design the practical application system based on circuit principle.
2. Work effectively as a technical backbone or leader in the team.
3. Have good self-cultivation and ethical standards, have willingness and ability to serve the society.
4. The ability and the skills level can be improved and the knowledge can be updated by continuing education or other learning channels.

## (二) 毕业要求

- (1) 工程知识：能够将数学、自然科学、工程基础和专业知用于解决电气工程及其自动化专业领域的复杂工程问题。
- (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及其自动化专业领域的复杂工程问题，以获得有效结论。
- (3) 设计/开发解决方案：能够设计针对电气工程及其自动化专业领域的复杂工程问题的解决方案，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。
- (4) 研究：能够基于科学原理并采用科学方法对电气工程及其自动化专业领域的复杂工程问题进行研究，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。
- (5) 使用现代工具：能够针对电气工程及其自动化专业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，包括对电气工程及其自动化专业领域的复杂工程问题的预测与模拟，并能够发现其局限性。
- (6) 工程与社会：能够利用工程相关背景知识进行合理分析，评价电气工程及其自动化专业领域的工程实践和复杂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。
- (7) 环境和可持续发展：能够理解和评价针对电气工程及其自动化专业领域的复杂工程问题的具体工程实践对环境、社会可持续发展的影响。
- (8) 职业规范：具有人文社会科学素养、社会责任感，能够在电气工程及其自动化工程领域的实践中理解并遵守工程职业道德和规范，履行责任。
- (9) 个人和团队：能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。
- (10) 沟通：能够就电气工程及其自动化专业领域的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。
- (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。
- (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。

### **Educational Requirement**

1. Engineering knowledge: have the ability to solve complex engineering problems in the field of electrical engineering using mathematics, natural science, engineering foundation and professional knowledge.
2. Problem solving: have the ability to identify, express, and analyze through the literature research the complex engineering problems in the field of electrical engineering using fundamental principles in mathematics, natural science and engineering to get valid conclusions.
3. Design/develop solution: have the ability to design solutions for the complex engineering problems in the field of electrical engineering. In the mean time be able to reflect innovation consciousness in the design process, as well as considering the factors in society, health, safety, law, culture and environment.
4. Research: be able to research the complex engineering problems in the field of electrical engineering based on science principles and science methods, including developing experiment, analyze and explain data, and drawing reasonable and effective conclusions through integrative information.
5. Using modern tools: be able to develop, choose and use appropriate technology, resources, modern engineering tools and information technical tools to predict and simulate the complex engineering problems in the field of electrical engineering and be capable of finding the limitations in it.
6. Engineering and society: be able to use relevant background and knowledge in engineering to analyze and evaluate the influence of society, health, safety, law, culture and environment to the complex engineering problems in the field of electrical engineering and understand the responsibilities.

7. Environment and sustainable development: be able to understand and evaluate the influence of engineering practice on the complex engineering problems in the field of electrical engineering to environment and sustainable development.
8. Professional norm: Have humanistic quality and social responsibility. Be able to understand and comply with the engineering ethics and norms in the field of electrical engineering practice and carry out the responsibilities.
9. Individual and team: be able to carry out the role of individual, team member as well as team leader in a multidisciplinary team.
10. Communication: be able to communicate effectively with industry peers and public citizens in the complex engineering problems in the field of electrical engineering. This includes writing reports and design documents, making statement, expressing ideas or respond instructions clearly. Having a sense of international perspective. Being capable of communication in multi-culture background.
11. Project management: be able to comprehend and master the project management principals and economic decision method. And be capable of apply it in multidisciplinary environment.
12. Lifelong learning: Consciousness of independent learning and lifelong learning. Have the ability of constant learning and adoption to development.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 1	√			
毕业要求 2	√			
毕业要求 3	√			
毕业要求 4	√			
毕业要求 5	√			
毕业要求 6				√
毕业要求 7				√
毕业要求 8			√	√
毕业要求 9		√	√	√
毕业要求 10		√	√	√
毕业要求 11		√		√
毕业要求 12				√

## 二、专业核心课程与专业特色课程

### II Core Courses and Characteristic Courses

#### (一) 专业核心课程

电路原理, 模拟电子技术基础, 数字电子技术基础, 微机原理及接口技术, 电机学, 自动控制原理, 电力电子技术, 电气工程基础, 电磁场与电磁波。

Core Courses: Circuit Theory, Analog Electronic Technology, Digital Electronic Technology, Microcomputer Principles and Interfacing Technique, Electric Machinery, Automatic Control Principle, Power Electronics, Basic Principle of Power System Engineering, Electromagnetic Field and Electromagnetic Wave.

#### (二) 专业特色课程

电力系统分析, 电力系统继电保护, 高电压技术, 电力电子装置及控制, 电力拖动与控制系统, 可再生能源发电技术, 电力市场与电力经济, 智能电网新技术, 电力系统自动化

Characteristic Courses: Power System Analysis, Protective Relaying in Power Systems, , High-voltage Technology, Power Electronic System and Control, Electric Drive and Control System, Renewable Energy Technologies, Power Market and Power Economy, Smart Grid Novel Technology, Power System Automation.

附：毕业要求实现矩阵：

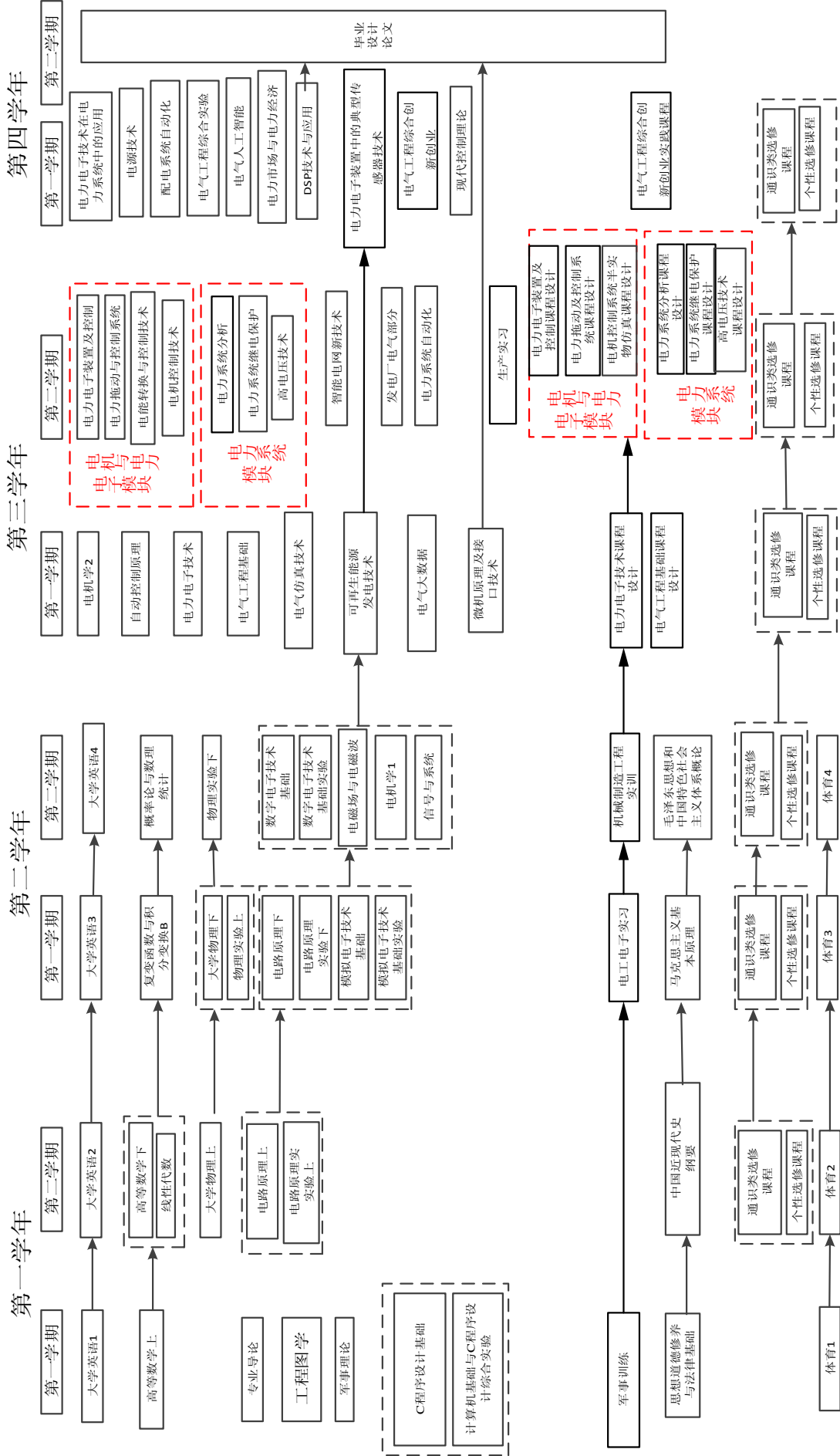
专业核 心课程	专业特 色课程	课程名称	电气工程及其自动化专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		思想道德修养与法律基础			√			√	√	√				
		中国近现代史纲要						√	√	√				
		毛泽东思想和中国特色社会 主义理论体系概论						√	√	√	√	√		
		马克思主义基本原理						√	√	√	√	√		
		军事理论								√	√	√	√	
		体育								√	√	√		
		大学英语										√		√
		C 程序设计基础	√	√		√								
		计算机基础与 C 程序设计综 合实验	√	√		√								
		专业导论	√	√	√	√		√	√	√		√	√	√
		工程图学	√	√		√								
		高等数学上	√	√										
		高等数学下	√	√										
		概率论与数理统计	√	√										
		线性代数	√	√										
		复变函数与积分变换	√	√										
		大学物理上	√	√										
		大学物理下	√	√										
		物理实验上	√	√										
		物理实验下	√	√										
√		电路原理上	√	√										
√		电路原理下	√	√										
		电路原理实验上	√	√										
		电路原理实验下	√	√										
√		模拟电子技术基础	√	√										

专业核 心课程	专业特 色课程	课程名称	电气工程及其自动化专业毕业要求														
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)			
		模拟电子技术基础实验	√	√													
√		数字电子技术基础	√	√													
		数字电子技术基础实验	√	√													
√		微机原理及接口技术	√	√													
√		电机学 1	√	√													
√		电机学 2	√	√													
√		自动控制原理	√	√													
√		电力电子技术	√	√													
√		电气工程基础	√	√													
	√	电力系统分析	√	√	√	√											
	√	电力电子装置及控制	√	√	√	√											
	√	电力系统继电保护	√	√		√											
	√	电力拖动与控制系统	√	√	√												
		计算机技术基础	√	√		√											
		电气 CAD	√	√		√											
√		电磁场与电磁波	√	√													
		数据库技术	√	√		√											
	√	高电压技术	√	√													
		电机控制技术	√	√													
	√	电力系统自动化	√	√													
	√	可再生能源发电技术	√	√				√	√								
		电气工程综合实验	√	√	√												
	√	电力市场与电力经济	√	√			√	√								√	
		现代控制理论	√	√													
		信号与系统	√	√													
		电气仿真技术	√	√			√										
		电能转换与控制技术		√	√												
		电力电子技术在电力系统中的应用	√	√				√	√								
	√	智能电网新技术	√	√				√	√								

专业核 心课程	专业特 色课程	课程名称	电气工程及其自动化专业毕业要求													
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		
		电力电子装置中的典型传感器技术	√	√			√									
		电源技术	√	√												
		电气大数据	√	√	√	√										
		电气人工智能	√	√	√	√										
		计算机控制技术	√	√			√									
		配电系统及其自动化	√	√												
		DSP 技术与应用	√	√	√	√	√									
		控制系统仿真技术	√	√			√									
		电力系统分析课程设计	√	√	√	√	√									
		电力拖动与控制系统课程设计	√	√	√	√	√									
		电力系统继电保护课程设计	√	√	√	√	√									
		高电压技术课程设计	√	√	√	√	√									
		电气工程基础课程设计	√	√	√	√	√									
		电力电子技术课程设计	√	√	√	√	√									
		军事训练								√	√	√				
		电工电子实习	√	√							√	√				
		机械制造工程实训	√	√							√	√				
		电工电子基础强化训练	√	√							√	√				
		生产实习	√	√							√	√				
		毕业设计	√	√	√	√	√	√	√			√	√	√		
		电气工程综合创新创业			√			√	√	√			√	√		
		电气工程综合创新创业实践			√			√	√	√	√		√	√		

### 三、课程教学进程图

#### III Teaching Process Map



#### 四、 理论教学建议进程表

#### IV Theory Course Schedule

课程编号 Course Number	课 程 名 称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
4220003110	毛泽东思想和中国特色社会主义理论体 系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		3	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		4	
1060003130	军事理论 Military Theory	1	32			16		2	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Fundamentals of Computer Program Design(C)	2	32					2	
4120336170	计算机基础与 C 程序设计综合实验 Computer Foundation and C Programming Comprehensive Experiment	1	32	32				2	
小 计 Subtotal		29	640	32	0	64	48		



课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses	人文社科类 Arts and Social Science Courses	经济管理类 Economy and Management Courses	科学技术类 Science and Technology Courses	艺术体育类 Art and Physical Education Courses	要求至少取得 9 个学分, 且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分, 在创新创业类课程中至少选修一门课程, 在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must contain art courses of 2 credits from the category of Art and Physical Education Courses, at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.				
(三) 专业教育必修课程 Basic Disciplinary Required Courses									
4100211170	电气专业导论 Introduction to Electrical Engineering and Automation	1	16					1	
4080373170	工程图学 B Engineering Graphics	3.5	72				16	1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	高等数学上
4050229110	线性代数 Linear Algebra	2.5	40					2	
4050021110	大学物理 A 上 Physics A I	3.5	56					2	
4050022110	大学物理 A 下 Physics II	3.5	56					3	大学物理上
4050466130	物理实验 A 上 Physics Lab. I	1	32	32				3	
4050467130	物理实验 A 下 Physics Lab. II	1	32	32				4	物理实验上
4100030110	电路原理 A 上 Circuit Theory I	3	48					2	
4100032110	电路原理 A 实验上 Circuit Theory Exp I	0.5	16	16				2	
4100031110	电路原理 A 下 Circuit Theory II	3	48					3	电路原理上
4100033110	电路原理 A 实验下 Circuit Theory Exp II	0.5	16	16				3	电路原理实验上

课程编号 Course Number	课程名称 Course Title	学分 CrS	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050052110	复变函数与积分变换 B Complex Function and Integral Transform	3	48					3	
4110049110	模拟电子技术基础 B Analog Electronic Technology	3.5	56					3	
4110051110	模拟电子技术基础实验 Analog Electronic Exp	0.5	16	16				3	
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					4	
4110067110	数字电子技术基础 B Digital Electronic Technology	3.5	56					4	
4110068110	数字电子技术基础实验 Digital Electronic Experiment	0.5	16	16				4	
4100241170	电磁场与电磁波 D Electromagnetic Field and Electromagnetic Wave	1.5	24					4	
4100242170	电机学 A1 Electric Machinery I	3	48	8				4	
4100243170	电机学 A2 Electric Machinery II	3	48	8				5	电机学 1
4100244170	自动控制原理 A Automatic Control Principle	3	48	8				5	
4100245170	微机原理及接口技术 C Microcomputer Principles and Interfacing Technique	3	48	8				5	
4100246170	电力电子技术 D Power Electronics	3.5	56	12				5	
4100247170	电气工程基础 B Basic Principle of Power System Engineering	3	48	8				5	
4100248170	电气工程综合创新创业 Innovation and Entrepreneurship Course on Electrical Engineering	1	16					7	
小 计 Subtotal		68	1168	180	0	0	16		
(四) 专业教育选修课程 Specialized Elective Courses									
电机与电力电子模块 Power Electronic System and Control									
4100141130	电力电子装置及控制 C Power Electronic System and Control	2.5	40	8				6	
4100023110	电力拖动与控制系统 A Electric Drive and Control System	3.5	56	8				6	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4100013110	电机控制技术 Motor Control Technique	2	32					6	
4100249170	电能转换与控制技术 A Power Conversion and Control Technique	2.5	40					6	
电力系统模块 Electric Power System									
4100250170	高电压技术 A High-voltage Technology	3	48					6	
4100025110	电力系统分析 B Power System Analysis	4.5	72	12				6	
4100026110	电力系统继电保护 B Protective Relaying in Power Systems	3	48	8				6	
公共选修部分									
4110094110	信号与系统 B Signal and System	3	48	8				4	
4100266170	电气大数据 Electrical Big Data	1	16					5	
4100027110	电力系统自动化 A Automatic Techniques in Power System	3.5	56	8				6	
4100131130	发电厂电气部分 Electrical Systems of Power Plants	2	32					6	
4100251170	电力电子装置中的典型传感器技术 Typical sensor technology applied in power	2.5	40					7	
4100252170	电力电子在电力系统中的应用 Power Electronics in Power Systems	2.5	40					7	
4100253170	电源技术 A Power Supply Technologies	3	48					7	
4100037110	电气工程综合实验 Automation Experiment	1	32	32				7	
4100022110	电力市场与电力经济 Power Market and Power Economy	2	32					7	
4100267170	电气人工智能 Electrical Artificial Intelligence	1	16					7	
4100051110	配电系统及其自动化 Distribution Systems and Automation	2	32					7	
小 计 Subtotal		44.5	728	84	0	0	0		

课程编号 Course Number	课程名称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
修读说明：专业选修课程要求至少选修 20 学分，电机与电力电子模块和电力系统模块并行上课，学生必须选择其一进行选修。学分不满 20 的通过其余选修课补齐总学分，选修另一模块课程等同选修课学分。 NOTE: Minimum subtotal credits: 17. The students are required to take at least 20 credits from Specialized Elective Courses, the modules of Power Electronic System and the modules Control and Electric Power System are taught in parallel. Students must choose one of them for elective courses. The students whose credits are less than 20 will be filled by the remaining elective courses, and the other modules will be equivalent to elective credits.									
(五) 个性课程 Personalized Elective Courses									
4100183160	电气仿真技术 Electrical Simulation	2	32		16			5	
4100048110	可再生能源发电技术 A Renewable Energy Technologies	2.5	40	8				5	
4100158160	智能电网新技术 Smart Grid Novel Technology	2	32					6	
4100001110	DSP 技术与应用 DSP Technology & Application	2	32	4				7	
4100058110	现代控制理论 Modern Control Theory	2	32	6				7	
小 计 Subtotal		10.5	168	18	16	0	0		
修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。 NOTE: Students can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.									

## 五、集中性实践教学环节

### V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crts	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4100068110	电工电子实习 A Practice of Electrical Engineering & Electronics	2	2	3
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering	2	2	4
4100127120	电工电子基础强化训练 Foundation Strengthening Training on Electronic & Electrics	1	1	4(暑期)
4100254170	电力电子技术课程设计 Course Design of Power Electronic Technology	1.5	1.5	5
4100255170	电气工程基础课程设计 Course Design of Electrical Engineering Basic	1.5	1.5	5

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
4100081110	生产实习 Practice of Manufacture	3	3	6(暑期)
4100256170	电气工程创新创业实践 Innovation and Entrepreneurship Practice	1	1	7
4100257170	毕业论文 Graduation Thesis	10	17	8
电机与电力电子模块 Power Electronic System and Control				
4100072110	电力电子装置及控制课程设计 Course Design on Power Electronic System and Control A	1.5	1.5	6
4100258170	电机控制系统半实物仿真课程设计 Course Design on Motor control system semi-material	1.5	1.5	6
4100073110	电力拖动与控制系统课程设计 Course Design on Electric Drive and Control System	1.5	1.5	6
电力系统模块 Electric Power System				
4100259170	高电压技术课程设计 Course Design on High Voltage Technology	1.5	1.5	6
4100260170	电力系统分析课程设计 Course Design on Power System Analysis	1.5	1.5	6
4100075110	电力系统继电保护课程设计 Course Design on Protective Relaying in Power Systems	1.5	1.5	6
小 计 Subtotal		28	41	

## 六、其它要求

### VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
- 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。

1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.

2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人：周新民

专业培养方案责任人：夏泽中，侯慧，朱国荣

# 自动化专业 2017 版本本科培养方案

## Undergraduate Education Plan for Specialty in Automation(2017)

专业名称	自动化	主干学科	控制科学与工程、电气工程、计算机科学与技术
Major	Automation	Major Disciplines	Control Science and Engineering, Electrical Engineering, Computer Science and Technology
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	68.5	\	26.5	\	170
选修课 Elective Courses	9	21	6	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

武汉理工大学自动化专业面向自动化领域的科学研究、技术开发、工程设计和技术服务需求，培养赋有健全人格、人文社会科学素养、自然科学基础和专业知识扎实、具有快速适应能力、创新创业意识、实干精神和国际化视野的高素质专业技术人才和管理人才。

毕业 5 年内预期达到的目标如下：

- (1) 能根据具体问题设计自动化系统解决方案，并能有效地运用专业知识来保障其实施和达成；
- (2) 能在团队中开展有效的工作和交流，并成为技术骨干或部门负责人，且有效发挥作用；
- (3) 具有良好的修养和职业道德；
- (4) 在与自动化及相关专业领域成功就业/创业并具有竞争优势，或有能力完成研究生学业；
- (5) 有意愿并有能力为本地、本国乃至全球的公众服务。

#### I educational objectives

The automation major in Wuhan University of Technology is oriented to the requirements of scientific research, technology development, engineering design and technology service, etc. in the field of automation. It is expected to cultivate the high-qualified professionals and management talents with a health personality, humanities and social science literacy, solid professional foundation and skill, strong adaptability, a sense of innovation and entrepreneurship, a spirit of work hard as well as a global perspective view.

1. Capable of designing automation system solutions for specific task, as well as guarantee the implementation and achievement by means of professional knowledge.

2. Worked effectively and efficiently via cooperation and communication as a key technician or department head.
3. Have good self-cultivation and ethical standards.
4. Succeed in being employed in the field of automation or related/ having own business, and show a competitive advantage. Graduates have outstanding ability in engineering practice.
5. Committed and able to provide public services in local, national and global society.

## (二) 毕业要求

- (1) **工程知识**: 能够将数学、自然科学、工程基础和专业知用于解决自动化专业领域的复杂工程问题。
- (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自动化专业领域的复杂工程问题, 以获得有效结论。
- (3) **设计/开发解决方案**: 能够设计针对自动化专业领域的复杂工程问题的解决方案, 设计/开发满足特定需求的控制算法、控制策略、自动化装置、自动化系统和信息处理方案或技术, 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。
- (4) **研究**: 能够基于科学原理并采用科学方法对自动化专业领域的复杂工程问题进行研究, 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。
- (5) **使用现代工具**: 能够针对自动化专业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, 包括对自动化专业领域的复杂工程问题的预测与模拟, 并能够理解其局限性。
- (6) **工程与社会**: 能够基于工程相关背景知识进行合理分析, 评价自动化专业工程实践和复杂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。掌握工业控制系统的设计方法、技术及相关开发平台, 能理解工业控制系统的设计方法和步骤。并能在工程设计中能综合考虑经济、环境、法律、安全和伦理等制约因素。
- (7) **环境和可持续发展**: 能够理解和评价针对自动化专业领域的复杂工程问题的具体工程实践对环境、社会可持续发展的影响。
- (8) **职业规范**: 具有人文社会科学素养、社会责任感, 能够在自动化工程实践中理解并遵守工程职业道德和规范, 履行责任。
- (9) **个人和团队**: 能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。
- (10) **沟通**: 能够就自动化专业领域的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。
- (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。
- (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。

## II Graduation Requirements:

1. **Engineering knowledge**: with the ability to solve complex engineering problems in the field of automation by applying mathematics, natural science, engineering foundation and professional knowledge.
2. **Problem solving**: with the ability to identify, express, and analyze the complex engineering problems in the field of automation through the literature review methods by applying fundamental principles in

- mathematics, natural science and engineering to get valid conclusions.
3. **Design/develop solution:** with the ability to design solutions for the complex engineering problems in the field of automation. The ability to design /develop control algorithm/strategy, automation equipment, solution and related technology of automation system and information system to meet the specific requirements. Meanwhile, graduates are supposed to design with innovative inspiration, as well as considering the relationship with society, health, safety, law, culture and environment.
  4. **Research:** with the ability to research the complex engineering problems in the field of automation based on science principles and science methods, including developing experiment, analyzing and explaining data, and drawing reasonable and effective conclusions through integrative information.
  5. **Using modern tools:** with the ability to develop, choose and use appropriate technology, resources, modern engineering tools and information technical tools to predict and simulate the complex engineering problems in the field of automation and be capable of finding the associative limitations.
  6. **Engineering and society:** with the ability to analyze and evaluate the influence on society, health, safety, law, culture and environment from the complex engineering practice/solution in the field of automation by applying the project background and relevant knowledge. Also, responsibility should be understood.
  7. **Environment and sustainable development:** with the ability to understand and evaluate the influence on environment and sustainable development, which is caused by engineering practice of the complex engineering projects in the field of automation.
  8. **Professional norm:** be with humanistic quality and social responsibility. With the ability to understand and comply with the engineering ethics and norms in the field of automatic engineering practice and take the responsibilities.
  9. **Individual and team:** with the ability to competently play the role of individual, team member as well as team leader in a multidisciplinary team.
  10. **Communication:** with the ability to communicate effectively with industry peers and public citizens about the complex engineering problems in the field of automation. It includes writing reports and designing documents, making statement, expressing ideas or respond instructions clearly. Graduates are supposed to be with international perspective and be capable of communicating in a multi-culture background.
  11. **Project management:** with the ability to comprehend and master the project management principals and economic decision method, which can be applied in a multidisciplinary environment.
  12. **Lifelong learning:** be aware of independent learning and lifelong learning. With the ability to keep learning and adapt to the development.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4	培养目标 5
毕业要求 1	√				
毕业要求 2	√				
毕业要求 3	√			√	√
毕业要求 4	√			√	
毕业要求 5	√				
毕业要求 6			√	√	√
毕业要求 7			√		√
毕业要求 8			√		√
毕业要求 9		√			



	培养目标 1	培养目标 2	培养目标 3	培养目标 4	培养目标 5
毕业要求 10		√		√	√
毕业要求 11		√			
毕业要求 12				√	√

## 二、专业核心课程与专业特色课程

### II Core Courses and Characteristic Courses

#### (一) 培养特色:

采用宽口径、厚基础、重实践、聚前沿的人才培养模式，突出“嵌入式计算、自动化执行、智能化决策”的专业核心，与计算机、信息技术深度融合的特色。凝练“信息与物联网”和“工控与智能机器人”两个子方向、强调综合知识运用。

In the program, college students are supposed to with broad extension and solid foundation of professional knowledge, endowed with high practical ability, acquaint themselves with the knowledge on the cutting edge. It highlights the professional core as “embedded computing, automated execution, intelligent decision making”. The specialty is deeply integrated with computer science and information technology. The plan focus on two sub-direction “information and Internet of Thing”, “industrial control and intelligent robot”, emphasizing the application of comprehensive knowledge.

#### (二) 专业核心课程:

电路原理，电子技术，自动控制原理，微处理器与微控制器，电力电子技术与运动控制系统，计算机过程控制系统，智能机器人、数据通讯与计算机网络、传感与检测技术、程序设计方法、电机与拖动基础、电器控制与可编程序控制器、物联网技术与工程。

Core Courses: Circuit Theory, Electronics, Automatic Control Principle, Micro-computer processor and Microcomputer controller, Power Electronics & Motion Control System, Computer Process Control System, Introduction to intelligent robotics, Data communication and computer network, Sensor and Detecting Technique, Introduction to programming design, Basic of Electric Machines and Electric, control apparatus and PLC, Technology and engineering of internet of Things.

#### (三) 专业特色课程:

控制工程实践与系统仿真、图像处理与机器视觉、工业机器人编程与实践、嵌入式系统与应用 (I)、射频识别 (RFID) 原理与应用、自动化综合实验

Characteristic Courses: Control Engineering Practice and System Simulation, Image Processing and Machine Vision, Programming and Practice of Industrial robot, embedded system and application (I), Principle and Application of RFID, , Automation Experiment

附：毕业要求实现矩阵:

专业核心课程	专业特色课程	课程名称	自动化专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		思想道德修养与法律基础	√						√					
		中国近现代史纲要	√											
		毛泽东思想和中国特色社会主义理论体系概论	√						√					

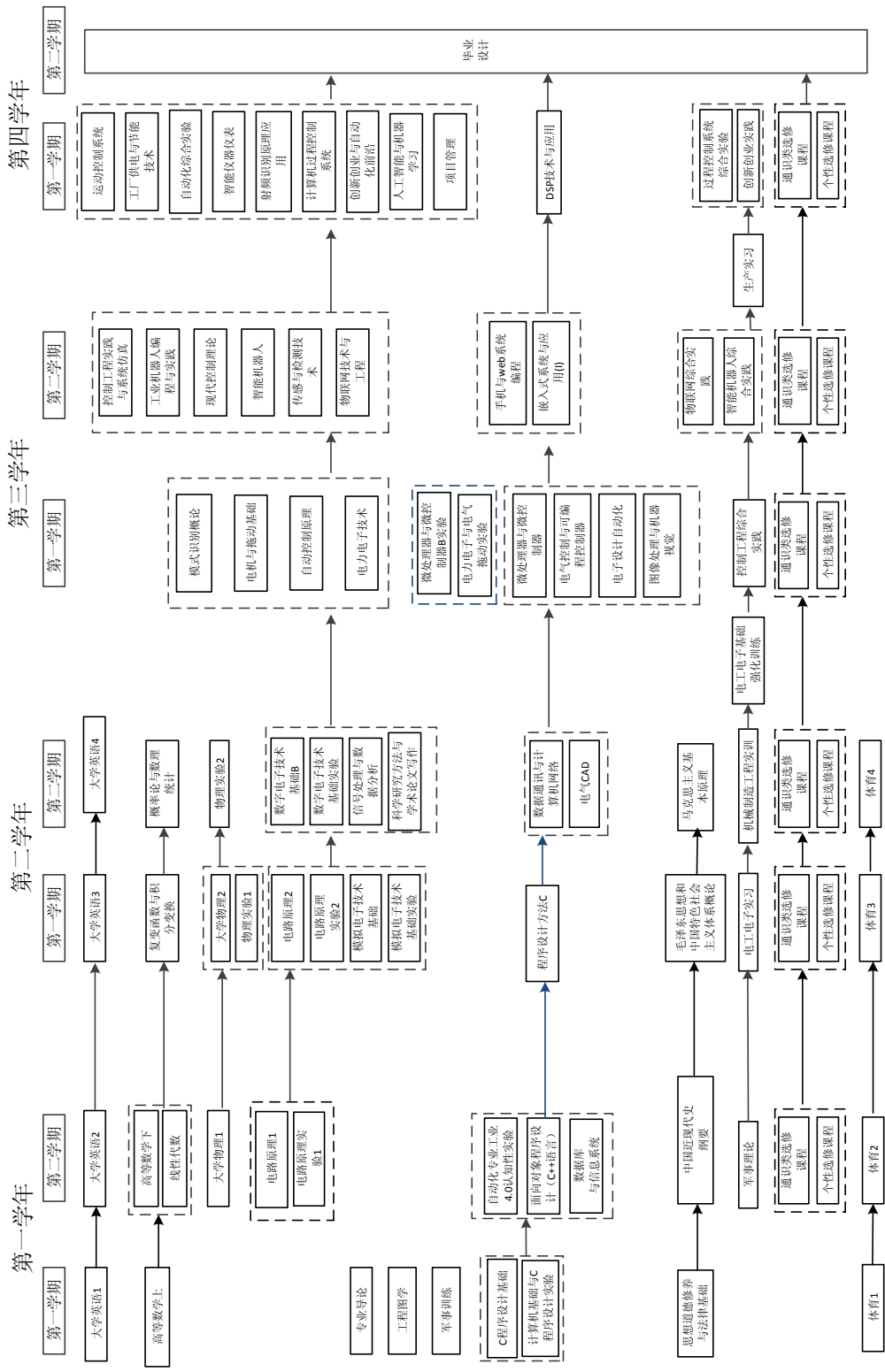
专业 核心 课程	专业 特色 课程	课程名称	自动化专业毕业要求													
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		
		马克思主义基本原理	√							√						
		军事理论	√													
		体育 1	√													
		体育 2	√													
		体育 3	√													
		体育 4	√													
		大学英语 1										√		√		
		大学英语 2										√		√		
		大学英语 3										√		√		
		大学英语 4										√		√		
		C 程序设计基础		√	√	√										
		计算机基础与 C 程序设计综合实验		√	√	√	√									
		专业导论	√		√	√										√
		工程图学			√	√										
		高等数学上		√												
		高等数学下		√												
		概率论与数理统计		√												
		线性代数		√												
		复变函数与积分变换		√												
		大学物理上		√												
		大学物理下		√												
		物理实验上			√		√									
		物理实验下			√		√									
√		电路原理上			√	√		√	√							
√		电路原理下			√	√		√	√							
		电路原理实验上			√		√						√			
		电路原理实验下			√		√						√			
√		模拟电子技术基础		√	√	√		√								
		模拟电子技术基础实验			√		√									

专业 核心 课程	专业 特色 课程	课程名称	自动化专业毕业要求												
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
√		数字电子技术基础		√	√	√		√							
		数字电子技术基础实验			√		√								
		面向对象程序设计 (C++)			√		√					√		√	
		电气 CAD					√	√				√			
		信号处理与数据分析	√	√	√	√						√		√	
		数据库与信息系统	√	√	√	√	√					√		√	
√		程序设计方法	√		√		√								√
√		数据通讯与计算机网络	√	√	√	√	√					√		√	
√		电力电子技术			√	√	√	√	√	√					
√		微处理器与微控制器	√	√	√		√								√
√		电机与拖动基础			√	√	√	√							
√		传感与检测技术	√	√	√	√	√					√		√	
√		智能机器人	√	√	√		√								√
√		计算机过程控制系统		√	√		√	√				√		√	
√		运动控制系统		√	√	√	√	√				√		√	
√		电力电子与电气拖动实验	√	√	√		√				√				
√		微处理器与微控制器实验	√			√	√					√		√	
		自动化专业工业 4.0 认知实验	√		√						√	√		√	
		现代控制理论	√	√		√	√					√		√	
√		控制工程实践与系统仿真	√	√	√	√	√					√		√	
√		图像处理与机器视觉	√	√	√	√	√					√		√	
		电子设计自动化	√		√	√	√	√				√			
√		嵌入式系统与应用	√	√	√	√	√					√		√	
		DSP 技术与应用	√		√	√	√					√		√	
		人工智能与机器学习	√	√	√	√									√
		项目管理		√	√				√					√	
		模式识别概论			√							√			
		电器控制与可编程序控制器	√	√			√					√		√	
		工厂供电与节能技术	√			√			√			√		√	

专业 核心 课程	专业 特色 课程	课程名称	自动化专业毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	√	工业机器人编程与实践	√	√	√	√	√					√		√
	√	自动化综合实验			√						√	√		√
	√	物联网技术与工程	√						√					√
		智能仪器仪表	√	√			√							√
	√	射频识别（RFID）原理与应用	√	√		√	√					√		√
		军事训练	√											
		电工电子实习	√		√	√	√				√	√		
		机械制造工程实训			√									
		电工电子基础强化训练	√		√	√	√	√	√					
		控制工程综合实践												
		物联网综合实践												
		智能机器人综合实践												
		生产实习						√	√	√		√		
		毕业设计	√	√	√	√	√		√			√	√	
√		自动控制原理	√	√	√	√	√					√		√
		手机与 web 系统编程			√	√	√						√	√
		科学研究方法与学术论文写作	√	√	√	√								
		创新创业实践												
		创新创业与自动化前沿		√	√		√	√				√		√

### 三、课程教学进程图

#### III Teaching Process Map



#### 四、 理论教学建议进程表

#### IV Theory Course Schedule

课程编号 Course Number	课 程 名 称 Course Title	学分 Crts	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
4220003110	毛泽东思想和中国特色社会主义理论体 系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		3	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		4	
1060003130	军事理论 Military Theory	1	32				16	2	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Fundamentals of Computer Program Design(C)	2	32					2	
4120336170	计算机基础与 C 程序设计综合实验 Computer foundation and C Programming Comprehensive Experiment	1	32	32				2	
小 计 Subtotal		29	640	32	0	48	64		

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses	要求至少取得 9 个学分,且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分,在创新创业类课程中至少选修一门课程,在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must contain art courses of 2 credits from the category of Art and Physical Education Courses, at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.								
人文社科类 Arts and Social Science Courses									
经济管理类 Economy and Management Courses									
科学技术类 Science and Technology Courses									
艺术体育类 Art and Physical Education Courses									
(三) 专业教育必修课程 Basic Disciplinary Required Courses									
4100212170	自动化专业导论 Introduction to Materials Physics	1	16				1		
4080373170	工程图学 B Engineering Graphics	3.5	72			16	1		
4050063110	高等数学 A 上 Advanced Mathematics I	5	80				1		
4050064110	高等数学 A 下 Advanced Mathematics II	5	80				2	高等数学上	
4050229110	线性代数 Linear Algebra	2.5	40				2		
4050021110	大学物理 A 上 Physics I	3.5	56				2	大学物理上	
4050022110	大学物理 A 下 Physics II	3.5	56				3		
4050466130	物理实验 A 上 Physics Lab. I	1	32	32			3	物理实验上	
4050467130	物理实验 A 下 Physics Lab. II	1	32	32			4		
4100030110	电路原理 A 上 Circuit Theory I	3	48				2		
4100031110	电路原理 A 下 Circuit Theory II	3	48				3	电路原理上	
4100032110	电路原理 A 实验上 Circuit Theory Exp	0.5	16	16			2		
4100033110	电路原理 A 实验下 Circuit Theory Exp	0.5	16	16			3	电路原理实验上	

课程编号 Course Number	课 程 名 称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4050052110	复变函数与积分变换 B Complex Function and Integral Transform	3	48					3	
4110049110	模拟电子技术基础 B Analog Electronic Technology	3.5	56					3	
4110051110	模拟电子技术基础实验 Analog Electronic Exp	0.5	16	16				3	
4110067110	数字电子技术基础 B Digital Electronic Technology	3.5	56					4	
4110068110	数字电子技术基础实验 Digital Electronic Exp.	0.5	16	16				4	
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					4	
4100172160	电力电子技术 F Power Electronic	2	32					5	
4100169160	电机与拖动基础 B Basic of ElectricMachineds and Electric Drive	2.5	40					5	
4100218170	电力电子与电气拖动实验 Experiment of Power Eectronics and Motor Drive	0.5	16	16				5	
4100166160	微处理器与微控制器 B Micro Process and Micro Controller	3.5	56					5	
4100167160	微处理器与微控制器实验 Micro Process and Micro Controller Exp.	0.5	16	16				5	
4100064110	自动控制原理 H Automatical Control principle	4.5	72	8				5	
4100219170	计算机过程控制系统 D Instrument and Process Control System	3.5	56	8				7	
4100176160	运动控制系统 C Motion Control System	3.5	56	8				7	
4100220170	创新创业与自动化前沿 Innovation/Entrepreneurship and automation frontier	1	16					7	
小 计 Subtotal		68.5	1192	184	0	0	16		
(四) 专业教育选修课程 Specialized Elective Courses									
信息与物联网方向 Information and Internet of Things									
4100208160	数据通讯与计算机网络 A Data Dommuncation and Dcomputer Network	3	48	8				4	



课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4100221170	传感与检测技术 E Photoelectron Materials and its Applications	2.5	40	8				6	数字/模拟电子技术基础
4100222170	物联网技术与工程 Introduction to Internet of Things	2.5	40	8				6	
工控与智能机器人方向 Industrial control and Intelligent robot									
4100223170	程序设计方法 C Programming Method	2.5	40	8				3	
4100192160	图像处理与机器视觉 A Photoelectron Materials and its Applications	2.5	40	8				5	
4100178160	智能机器人 Introduction to Intelligent Robotics	3	48	8				6	
选修模块 1									
4100179160	自动化专业与工业 4.0 认知实验 Congnition Experiment of Automation and Industry 4.0	0.5	16	16				2	
4100189160	信号处理与数据分析 Signal Processing and Data Analysisi	2	32					4	
4100058110	现代控制理论 Modern Control Theory	2	32	6				6	
4100224170	控制工程实践与系统仿真 Control Engineering Practice and System Simulation	3	48	16				6	
选修模块 2									
4100182160	数据库与信息系统 Database and Infomation System	2	32		12			2	
4100186150	面向对象程序设计 (C++) Object-oriented Programming (c++)	2	32		12			2	
4100050110	模式识别概论 Introduction to Pattern Recognition	2	32					5	
4100225170	手机与 web 系统编程 Programming for Smart Phone and Web System	3	48	16				6	
选修模块 3									
4100034110	电气 CAD(A) Electrical CAD	3	48		20			4	
4100226170	电子设计自动化 C Eelectronic Design Automation	2.5	40	12				5	

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4100227170	嵌入式系统与应用 Embedded System and Application	2.5	40	8				6	
选修模块 4									
4100228170	电器控制与可编程序控制器 Introduction to Pattern Recognition	3.5	56	16				5	
4100195160	工业机器人编程与实践 Programming and Practice of Industrial Robot	2	32	16				6	
4100043110	工厂供电与节能技术 Plant Power Supply & Sower Saving Technology	3	48	6				7	
4100229170	自动化综合实验 C Integrated Exp of Automatic	1.5	48	48				7	
小 计 Subtotal		50.5	840	208	44	0	0		
<p>修读说明：专业选修课程要求至少选修 21 学分，信息与物联网方向和工控与智能机器人方向并行上课，学生必须选择其一选修全部课程。学分不满 21 的通过其余选修课补齐总学分，选修另一方向课程等同选修其它模块学分。若选择信息与物联网方向，则组合（工控与智能机器人方向和选修模块 1~4）中每个模块内的课程至少选一门。若选择工控与智能机器人方向，则组合（信息与物联网方向和选修模块 1~4）中每个模块内的课程至少选一门。</p> <p>NOTE: Minimum subtotal credits: 21. The students are required to take at least 21 credits from Specialized Elective Courses , the modules A and the modules B are taught in in parallel. Students must choose one of them for elective courses. The students whose credits less than 21 will be filled by the remaining optional courses, and the other modules will be equivalent to elective credits. At least one in each module within the group (module B and module 1~4 ) should be chosen if module A is chosen. At least one in each module within the group (module A and module 1~4 ) should be chosen if module B is chosen.</p>									
(五) 个性课程 Personalized Electice Courses									
4100230170	科学研究方法与学术论文写作 Scientific Research Methods and Academic Paper Writing	2	32					4	
4100103110	智能仪器仪表 Intelligent Instrument	2	32					7	
4100210160	射频识别（RFID）原理与应用 Pricipale and Application of RFID	2	32					7	
4100203160	人工智能与机器学习 Artificial Intelligence and Machine Learning	2.5	40	8				7	
4100001110	DSP 技术与应用 DSP Technology & Application	2	32	4				7	
4170149110	项目管理 A Project Management	2	32					7	
小 计 Subtotal		12.5	200	12	0	0	0		
<p>修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。</p> <p>NOTE: Sudent can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.</p>									

## 五、集中性实践教学环节

### V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crts	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4100068110	电工电子实习 A Practice of Electrical Engineering & Electronics	2	2	3
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering	2	2	4
4100127120	电工电子基础强化训练 Foundation Strengthening Training on Electronic & Electrics	1	1	4 (暑假)
4100231170	控制工程综合实践 Comprehensive Practice of Automatic Control principle	1.5	1.5	5
4100082110	生产实习 Practice of Manufacture	3	3	6 (暑期)
4100232170	过程控制系统综合实践 Integrated Practice of Process Control System	1.5	1.5	7
4100233170	自动化专业创新创业实践 Training Programs for Innovation and Entrepreneurship	1	1	7
4100234170	毕业设计 Graduation Thesis	10	17	8
信息与物联网方向				
4100235170	物联网综合实践 Training on Mechanical Manufacturing Engineering	3	3	6
工控与智能机器人方向				
4100236170	智能机器人综合实践 Comprehensive Practice of Programming Design	3	3	6
小 计 Subtotal		26.5	35	

## 六、其它要求

### VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
- 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。

1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.

2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人：周新民  
专业培养方案责任人：李志俊  
执笔人：傅 剑

# 电气工程及其自动化专业(卓越工程师班)2017 版本本科培养方案

## Undergraduate Education Plan for Specialty in Electrical Engineering and Automation (Excellent Engineer Class)(2017)

专业名称	电气工程及其自动化	主干学科	电气工程、控制科学与工程、计算机科学与技术
Major	Electrical Engineering and Automation	Major Disciplines	Electrical Engineering, Control Science and Engineering, Computer Science and Technology
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	61.5	\	32.5	\	170
选修课 Elective Courses	9	22	6	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

武汉理工大学电气工程及其自动化卓越工程师班面向电气工程领域科学研究、技术开发、工程设计和技术服务等任务，培养高素质、应用型、具有较强实践经验、适应能力、创新能力及国际化视野的“专业理论+工程实践+创新能力”的电力应用技术人才与管理人才。

- (1) 能设计电气系统解决方案，能设计基于电路原理的实际应用系统，并具有实际电气系统运行和维护能力；
- (2) 在团队中作为技术骨干或领导有效发挥作用；
- (3) 具有良好的修养和道德品质，有意愿并有能力服务社会；
- (4) 能够通过继续教育或其它学习渠道更新知识，实现能力和技术水平的提升。

#### Educational Objectives

The electrical engineering and its automation major (Excellent Engineer Class) in Wuhan University of Technology is oriented to face the mission of scientific research, technology development, engineering design and technology service, etc in the field of electrical engineering. It is expected to train high-quality “professional theory + engineering practice + innovation ability” technical personnel and management personnel with application-oriented, strong practical ability, strong adaptability, innovation capability as well as global perspective.

1. Capable of design electrical system solutions, as well as design practical application system based on circuit principle. Also have the ability to operate and maintain practical electrical system.

2. Work effectively as a technical backbone or leader in the team.
3. Have good self-cultivation and ethical standards, have the willingness and the ability to serve the society.
4. The ability and the skills level can be improved and the knowledge can be updated by continuing education or other learning channels.

## (二) 毕业要求

- (1) 工程知识：能够将数学、自然科学、工程基础和专业知识用于解决电气工程及其自动化专业领域的复杂工程问题。
- (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及其自动化专业领域的复杂工程问题，以获得有效结论。
- (3) 分析/设计解决方案及工程运行维护能力：具有分析、提出方案并解决电气工程及其自动化领域工程实际问题的能力，能够参与电气工程及其自动化领域生产及运作系统的设计，并具有运行和维护能力；具有较强的创新意识和进行产品开发和设计、技术改造与创新的初步能力，并能够考虑社会、健康、安全、法律、文化以及环境等因素。
- (4) 研究：能够基于科学原理并采用科学方法对电气工程及其自动化专业领域的复杂工程问题进行研究，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。
- (5) 使用现代工具：能够针对电气工程及其自动化专业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，包括对电气工程及其自动化专业领域的复杂工程问题的预测与模拟，并能够发现其局限性。
- (6) 工程与社会：能够利用工程相关背景知识进行合理分析，评价电气工程及其自动化专业领域的工程实践和复杂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。
- (7) 环境和可持续发展：能够理解和评价针对电气工程及其自动化专业领域的复杂工程问题的具体工程实践对环境、社会可持续发展的影响。
- (8) 职业规范：具有人文社会科学素养、社会责任感，能够在电气工程及其自动化工程领域的实践中理解并遵守工程职业道德和规范，履行责任。
- (9) 个人和团队：能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。
- (10) 沟通：能够就电气工程及其自动化专业领域的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 design 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。
- (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。
- (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。

## **Educational Requirement**

1. Engineering knowledge: have the ability to solve complex engineering problems in the field of electrical engineering using mathematics, natural science, engineering foundation and professional knowledge.
2. Problem solving: have the ability to identify, express, and analyze through the literature research the complex engineering problems in the field of electrical engineering using fundamental principles in mathematics, natural science and engineering to get valid conclusions.
3. Design/develop solution and engineering operation and maintenance ability: have the ability to design and propose solutions for the complex engineering problems in the field of electrical engineering. Be able to participate in the practical operation and maintenance of electrical engineering system. In the mean time be able to reflect innovation consciousness in the design, development or technology upgrading process, as well as considering the factors in society, health, safety, law, culture and environment.
4. Research: be able to research the complex engineering problems in the field of electrical engineering based on science principles and science methods, including developing experiment, analyze and explain

- data, and drawing reasonable and effective conclusions through integrative information.
5. Using modern tools: be able to develop, choose and use appropriate technology, resources, modern engineering tools and information technical tools to predict and simulate the complex engineering problems in the field of electrical engineering and be capable of finding the limitations in it.
  6. Engineering and society: be able to use relevant background and knowledge in engineering to analyze and evaluate the influence of society, health, safety, law, culture and environment to the complex engineering problems in the field of electrical engineering. And understand the responsibilities.
  7. Environment and sustainable development: be able to understand and evaluate the influence of engineering practice on the complex engineering problems in the field of electrical engineering to environment and sustainable development.
  8. Professional norm: Have humanistic quality and social responsibility. Be able to understand and comply with the engineering ethics and norms in the field of electrical engineering practice and carry out the responsibilities.
  9. Individual and team: be able to carry out the role of individual, team member as well as team leader in a multidisciplinary team.
  10. Communication: be able to communicate effectively with industry peers and public citizens in the complex engineering problems in the field of electrical engineering. This includes writing reports and design documents, making statement, expressing ideas or respond instructions clearly. Having a sense of international perspective. Being capable of communication in multi-culture background.
  11. Project management: be able to comprehend and master the project management principals and economic decision method. And be capable of apply it in multidisciplinary environment.
  12. Lifelong learning: Consciousness of independent learning and lifelong learning. Have the ability of constant learning and adoption to development.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4
毕业要求 1	√			
毕业要求 2	√			
毕业要求 3	√			
毕业要求 4	√			
毕业要求 5	√			
毕业要求 6				√
毕业要求 7				√
毕业要求 8			√	√
毕业要求 9		√	√	√
毕业要求 10		√	√	√
毕业要求 11		√		√
毕业要求 12				√

## 二、专业核心课程与专业特色课程

### II Core Courses and Characteristic Courses

#### (一) 专业核心课程：

电路原理，模拟电子技术基础，数字电子技术基础，微机原理及接口技术，电机学，自动控制原理，电力电子技术，电气工程基础。

Core Courses: Circuit Theory, Analog Electronic Technology, Digital Electronic Technology, Microcomputer Principles & Interfacing Technique, Electric Machinery, Automatic Control Principles, Power Electronics, Basic Principle of Power Engineering

(二) 专业特色课程:

电力系统分析, 电力系统继电保护, 高电压技术, 电力系统自动化, 电力电子装置及控制, 电力拖动与控制系统, 发电厂电气部分, 电磁场与电磁波, 智能电网新技术, 专业实践, 岗位实习。

Characteristic Courses: Power System Analysis, Protective Relaying in Power Systems, , High-voltage Technology, Power System Automation, Power Electronic System and Control, Electric Drive and Control System, Electric Elements of Power Plants, Electromagnetic Field and Electromagnetic Wave, Smart Grid Novel Technology, Professional Practice, Post Practice.

附: 毕业要求实现矩阵:

专业核 心课程	专业特色 课程	课程名称	电气工程及其自动化专业(卓越工程师班)毕业要求												
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
		思想道德修养与法律基础			√			√	√	√					
		中国近现代史纲要						√	√	√					
		毛泽东思想和中国特色社 会主义理论体系概论						√	√	√	√	√			
		马克思主义基本原理						√	√	√	√	√			
		军事理论								√	√	√	√		
		体育								√	√	√	√		
		大学英语										√		√	
		C 程序设计基础	√	√			√								
		计算机基础与 C 程序设计 综合实验	√	√			√								
		专业导论	√	√	√	√		√	√	√		√	√	√	
		工程图学	√	√		√									
		高等数学上	√	√											
		高等数学下	√	√											
		概率论与数理统计	√	√											
		线性代数	√	√											
		复变函数与积分变换	√	√											
		大学物理上	√	√											
		大学物理下	√	√											
		物理实验上	√	√											
		物理实验下	√	√											

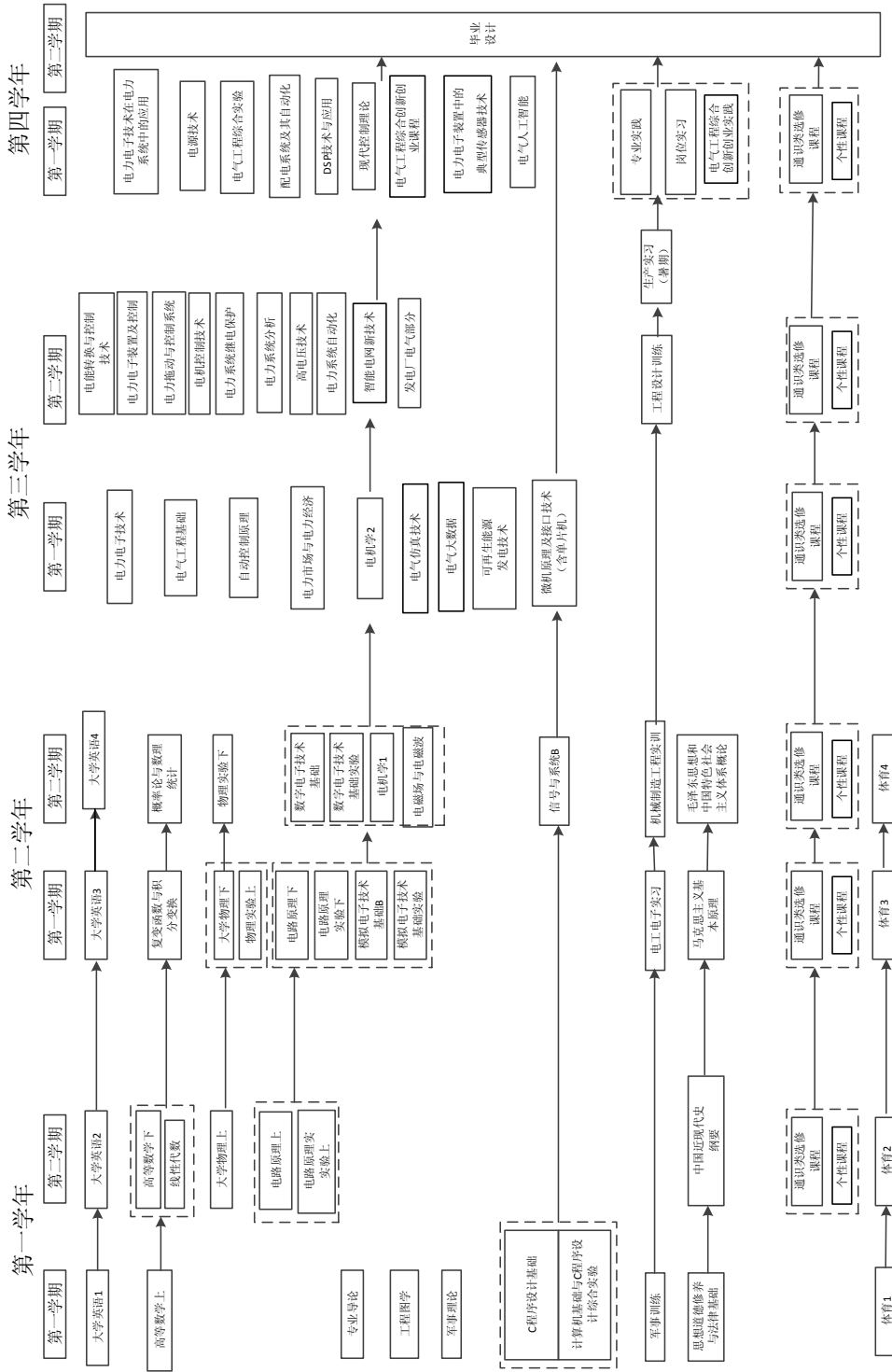
专业核 心课程	专业特色 课程	课程名称	电气工程及其自动化专业（卓越工程师班）毕业要求													
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		
√		电路原理上	√	√												
√		电路原理下	√	√												
		电路原理实验上	√	√												
		电路原理实验下	√	√												
√		模拟电子技术基础	√	√												
		模拟电子技术基础实验	√	√												
√		数字电子技术基础	√	√												
		数字电子技术基础实验	√	√												
√		微机原理及接口技术	√	√												
√		电机学 1	√	√												
√		电机学 2	√	√												
√		自动控制原理	√	√												
√		电力电子技术	√	√												
√		电气工程基础	√	√												
	√	电力系统分析	√	√	√	√										
	√	电力电子装置及控制	√	√	√	√										
	√	电力系统继电保护	√	√		√										
	√	电力拖动与控制系统	√	√	√											
		电气 CAD	√	√		√										
	√	电磁场与电磁波	√	√												
		数据库技术	√	√		√										
	√	高电压技术	√	√												
		电机控制技术	√	√												
		电力系统自动化	√	√												
		可再生能源发电技术	√	√					√	√						
		传感与检测技术	√	√												
		电气工程综合实验	√	√	√											
		电力市场与电力经济	√	√				√	√						√	
	√	发电厂电气部分	√	√												
		电力电子技术在电力系统中的应用	√	√					√	√						



专业核 心课程	专业特色 课程	课程名称	电气工程及其自动化专业（卓越工程师班）毕业要求												
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
		电能转换与控制技术		√	√										
		配电系统及其自动化	√	√											
	√	智能电网新技术	√	√				√	√						
		电力电子装置中的典型传感器技术	√	√			√								
		电气大数据	√	√	√	√									
		电气人工智能	√	√	√	√									
		电气仿真技术	√	√			√								
		军事训练								√	√	√			
		电工电子实习	√	√							√	√			
		机械制造工程实训	√	√							√	√			
		电工电子基础强化训练	√	√							√	√			
		工程设计训练(电气工程)	√	√							√	√			
		生产实习	√	√							√	√			
	√	专业实践	√	√		√	√			√	√	√	√	√	√
	√	岗位实习	√	√		√	√			√	√	√	√	√	√
		毕业设计	√	√	√	√	√	√	√			√	√	√	√
		电气工程综合创新创业课程			√			√	√	√			√	√	√
		电气工程综合创新创业实践课程			√			√	√	√	√		√	√	√

### 三、课程教学进程图

#### III Teaching Process Map



#### 四、理论教学建议进程表

#### IV Theory Course Schedule

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识教育必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		3	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		4	
1060003130	军事理论 Military Theory	1	32			16		1	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Fundamentals of Computer Program Design(C)	2	32					2	
4120336170	计算机基础与 C 程序设计综合实验 Computer Foundation and C Programming Comprehensive Experiment	1	32	32				2	
小 计 Subtotal		29	640	32	0	64	48		

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识教育选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses	人文社科类 Arts and Social Science Courses 经济管理类 Economy and Management Courses 科学技术类 Science and Technology Courses 艺术体育类 Art and Physical Education Courses	要求至少取得 9 个学分,且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分,在创新创业类课程中至少选修一门课程,在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must contain art courses of 2 credits from the category of Art and Physical Education Courses, at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.							
人文社科类 Arts and Social Science Courses									
经济管理类 Economy and Management Courses									
科学技术类 Science and Technology Courses									
艺术体育类 Art and Physical Education Courses									
(三) 专业教育必修课程 Basic Disciplinary Required Courses									
4100211170	电气专业导论 Introduction to Materials Physics	1	16				1		
4080373170	工程图学 B Engineering Graphics	3.5	72			16	1		
4050063110	高等数学 A 上 Advanced Mathematics I	5	80				1		
4050064110	高等数学 A 下 Advanced Mathematics II	5	80				2	高等数学上	
4050229110	线性代数 Linear Algebra	2.5	40				2		
4050021110	大学物理 A 上 Physics I	3.5	56				2		
4050022110	大学物理 A 下 Physics II	3.5	56				3	大学物理上	
4050466130	物理实验 A 上 Physics Lab. I	1	32	32			3		
4050467130	物理实验 A 下 Physics Lab. II	1	32	32			4	物理实验上	
4100030110	电路原理 A 上 Circuit Theory I	3	48				2		
4100032110	电路原理 A 实验上 Circuit Theory Exp I	0.5	16	16			2		
4100031110	电路原理 A 下 Circuit Theory II	3	48				3	电路原理上	
4100033110	电路原理 A 实验下 Circuit Theory Exp II	0.5	16	16			3	电路原理实验上	

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4110049110	模拟电子技术基础 B Analog Electronic Technology	3.5	56					3	
4110051110	模拟电子技术基础实验 Analog Electronic Exp	0.5	16	16				3	
4050052110	复变函数与积分变换 B Complex Function and Integral Transform	3	48					3	
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					4	
4110067110	数字电子技术基础 B Digital Electronic Technology	3.5	56					4	
4110068110	数字电子技术基础实验 Digital Electronic Experiment	0.5	16	16				4	
4100241170	电磁场与电磁波 D Electromagnetic Field and Electromagnetic Wave	1.5	24					4	
4100242170	电机学 A1 Electric Machinery I	3	48	8				4	
4100243170	电机学 A2 Electric Machinery II	3	48	8				5	电机学 1
4100244170	自动控制原理 A Automatic Control Principle	3	48	8				5	
4100245170	微机原理及接口技术 C Microcomputer Principles and Interfacing Technique	3	48	8				5	
4100248170	电气工程综合创新创业 Innovation and Entrepreneurship Course	1	16					7	
小 计 Subtotal		61.5	1064	160	0	0	16		
(四) 专业教育选修课程 Specialized Elective Courses									
4110094110	信号与系统 B Signal and System	3	48	8				4	
4100246170	电力电子技术 D Power Electronics	3.5	56	12				5	
4100141130	电力电子装置及控制 C Power Electronic System and Control	2.5	40	8				6	
4100023110	电力拖动与控制系统 A Electric Drive and Control System	3.5	56	8				6	
4100013110	电机控制技术 Motor Control Technique	2	32					6	
4100249170	电能转换与控制技术 A Power Conversion and Control Technique	2.5	40					6	

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4100250170	高电压技术 A High-voltage Technology	3	48					6	
4100025110	电力系统分析 B Power System Analysis	4.5	72	12				6	
4100247170	电气工程基础 B Basic Principle of Power System	3	48	8				5	
4100266170	电气大数据 Electrical Big Data	1	16					5	
4100026110	电力系统继电保护 B Protective Relaying in Power Systems	3	48	8				6	
4100251170	电力电子装置中的典型传感器技术 Typical sensor technology applied in power	2.5	40					7	
4100027110	电力系统自动化 A Automatic Techniques in Power System	3.5	56	8				6	
4100131130	发电厂电气部分 Electrical Systems of Power Plants	2	32					6	
4100020110	电力电子技术在电力系统中的应用 Power Electronics in Power Systems	2.5	40					7	
4100253170	电源技术 A Power Supply Technologies	3	48					7	
4100037110	电气工程综合实验 Automation Experiment	1	32	32				7	
4100267170	电气人工智能 Electrical artificial intelligence	1	16					7	
4100022110	电力市场与电力经济 Power Market and Power Economy	2	32					7	
4100051110	配电系统及其自动化 Distribution Systems and Automation	2	32					7	
小 计 Subtotal		51	816	104	0	0	0		
修读说明：专业选修课程要求至少选修 22 学分。 NOTE: Minimum subtotal credits: 22.									
(五) 个性课程 Personalized Elective Courses									
4100183160	电气仿真技术 Electrical Simulation	2	32		16			5	
4100048110	可再生能源发电技术 A Renewable Energy Technologies	2.5	40	8				5	
4100158160	智能电网新技术 Smart Grid Novel Technology	2	32					6	

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4100001110	DSP 技术与应用 DSP Technology & Application	2	32	4				7	
4100058110	现代控制理论 Modern Control Theory	2	32	6				7	
小 计 Subtotal		10.5	168	18	16	0	0		

修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。

NOTE: Students can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.

## 五、集中性实践教学环节

### V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1
4100068110	电工电子实习 A Practice of Electrical Engineering & Electronics	2	2	3
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering	2	2	4
4100261170	工程设计训练(电气工程) Engineering design Training	2	2	6(企业)
4100081110	生产实习 Practice of Manufacture	3	3	6(暑期)
4100109110	专业实践 Professional Practice	3	3	7(企业)
4100110110	岗位实习 Job Practice	8	8	7(企业)
4100256170	电气工程创新创业实践 Innovation and Entrepreneurship Practice	1	1	7
4100257170	毕业论文 Graduation Thesis	10	17	8
小 计 Subtotal		32.5	41	

## 六、其它要求

### VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
- 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。

1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.

2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

学院教学责任人：周新民

专业培养方案责任人：夏泽中，侯慧，朱国荣



# 自动化专业（卓越工程师班）2017 版本本科培养方案

## Undergraduate Education Plan for Specialty in Automation (Excellent Engineer Class) (2017)

专业名称	自动化	主干学科	控制科学与工程、电气工程、计算机科学与技术
Major	Automation	Major Disciplines	Control Science and Engineering, Electrical Engineering, Computer Science and Technology
计划学制	四年	授予学位	工学学士
Duration	4 Years	Degree Granted	Bachelor of Engineering

### 最低毕业学分规定

#### Graduation Credit Criteria

课程类别 Course Classification 课程性质 Course Nature	通识教育课程 Public Basic Courses	专业教育课程 Specialized Courses	个性课程 Personalized Course	集中性实践 Practice Courses	课外学分 Study Credit after Class	总学分 Total Credits
必修课 Required Courses	29	63.5	\	32.5	\	170
选修课 Elective Courses	9	20	6	\	10	

### 一、培养目标与毕业要求

#### I Educational Objectives & Requirement

##### (一) 培养目标

武汉理工大学自动化专业面向自动化领域科学研究、技术开发、工程设计和技术服务需求，培养赋有健全人格、人文社会科学素养、自然科学基础和专业知识扎实、工程实践能力强、具有快速适应能力、创新创业意识、实干精神和国际化视野的高素质专业技术人才和管理人才。

- (1) 能针对具体问题设计自动化系统解决方案，并能有效地运用专业知识来保障实施和达成；
- (2) 在团队中进行工作和交流，并成为技术骨干或部门负责人，且有效发挥作用；
- (3) 具有良好的修养和职业道德；
- (4) 在与自动化及相关专业领域成功/创业就业并体现出竞争优势，工程实践能力突出；
- (5) 意愿并有能力为本地、本国乃至全球的公众服务。

#### I. Ieducational objectives

The automation major in Wuhan University of Technology is oriented to the requirements of scientific research, technology development, engineering design and technology service, etc. in the field of automation. It is expected to cultivate the high-qualified professionals and management talents with a health personality, humanities and social science literacy, solid professional foundation and skill, strong practical ability in Engineering, strong adaptability, a sense of innovation and entrepreneurship, a spirit of work hard as well as a global perspective view.

1. Capable of designing automation system solutions for specific task, as well as guarantee the implementation and achievement by means of professional knowledge.
2. Worked effectively and efficiently via cooperation and communication as a key technician or leader.
3. Have good self-cultivation and ethical standards.
4. Succeed in being employed in the field of automation or related, and show a competitive advantage. Or, graduates have already completed postgraduate studies.
5. Committed and able to provide public services in local, national and global society.

## (二) 毕业要求

- (1) **工程知识**: 能够将数学、自然科学、工程基础和专业知识用于解决自动化专业领域的复杂工程问题;
- (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自动化专业领域的复杂工程问题, 以获得有效结论;
- (3) **设计/开发解决方案**: 能够设计针对自动化专业领域的复杂工程问题的解决方案, 设计/开发满足特定需求的控制算法、控制策略、自动化装置、自动化系统和信息处理方案或技术, 具有较强产品开发和设计、技术改造等工程项目实践的初步能力, 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;
- (4) **研究**: 能够基于科学原理并采用科学方法对自动化专业领域的复杂工程问题进行研究, 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;
- (5) **使用现代工具**: 能够针对自动化专业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, 包括对自动化专业领域的复杂工程问题的预测与模拟, 并能够理解其局限性;
- (6) **工程与社会**: 能够基于工程相关背景知识进行合理分析, 评价自动化专业工程实践和复杂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。掌握工业控制系统的设计方法、技术及相关开发平台, 能理解工业控制系统的设计方法和步骤。并能在工程设计中能综合考虑经济、环境、法律、安全和伦理等制约因素;
- (7) **环境和可持续发展**: 能够理解和评价针对自动化专业领域的复杂工程问题的具体工程实践对环境、社会可持续发展的影响;
- (8) **职业规范**: 具有人文社会科学素养、社会责任感, 能够在自动化工程实践中理解并遵守工程职业道德和规范, 履行责任;
- (9) **个人和团队**: 能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色;
- (10) **沟通**: 能够就自动化专业领域的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;
- (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;
- (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。

## II Graduation Requirements:

1. **Engineering knowledge**: with the ability to solve complex engineering problems in the field of automation by applying mathematics, natural science, engineering foundation and professional knowledge;
2. **Problem solving**: with the ability to identify, express, and analyze the complex engineering

- problems in the field of automation through the literature review methods by applying fundamental principles in mathematics, natural science and engineering to get valid conclusions;
3. **Design/develop solution:** with the ability to design solutions for the complex engineering problems in the field of automation. Graduates have the ability to design /develop control algorithm/strategy, automation equipment, solution and related technology of automation system and information system to meet the specific requirements, especially with rather strong capacity of practice for product development and design, technical reformation and so on. Meanwhile, graduates are supposed to design with innovative inspiration, as well as considering the relationship with society, health, safety, law, culture and environment;
  4. **Research:** with the ability to research the complex engineering problems in the field of automation based on science principles and science methods, including developing experiment, analyzing and explaining data, and drawing reasonable and effective conclusions through integrative information;
  5. **Using modern tools:** with the ability to develop, choose and use appropriate technology, resources, modern engineering tools and information technical tools to predict and simulate the complex engineering problems in the field of automation and be capable of finding the associative limitations;
  6. **Engineering and society:** with the ability to analyze and evaluate the influence on society, health, safety, law, culture and environment from the complex engineering practice/solution in the field of automation by applying the project background and relevant knowledge. Also, responsibility should be understood;
  7. **Environment and sustainable development:** with the ability to understand and evaluate the influence on environment and sustainable development, which is caused by engineering practice of the complex engineering projects in the field of automation;
  8. **Professional norm:** be with humanistic quality and social responsibility. With the ability to understand and comply with the engineering ethics and norms in the field of automatic engineering practice and take the responsibilities;
  9. **Individual and team:** with the ability to competently play the role of individual, team member as well as team leader in a multidisciplinary team;
  10. **Communication:** with the ability to communicate effectively with industry peers and public citizens about the complex engineering problems in the field of automation. It includes writing reports and designing documents, making statement, expressing ideas or respond instructions clearly. Graduates are supposed to be with international perspective and be capable of communicating in a multi-culture background;
  11. **Project management:** with the ability to comprehend and master the project management principals and economic decision method, which can be applied in a multidisciplinary environment;
  12. **Lifelong learning:** be aware of independent learning and lifelong learning. With the ability to keep learning and be adapt to the development.

附：培养目标实现矩阵

	培养目标 1	培养目标 2	培养目标 3	培养目标 4	培养目标 5
毕业要求 1	√				
毕业要求 2	√				
毕业要求 3	√			√	√
毕业要求 4	√				
毕业要求 5	√			√	
毕业要求 6				√	√
毕业要求 7			√		√
毕业要求 8			√		√
毕业要求 9		√	√		
毕业要求 10		√		√	√
毕业要求 11		√			
毕业要求 12				√	√

## 二、专业核心课程与专业特色课程

### II Core Courses and Characteristic Courses

#### (一) 培养特色：

采用宽口径、厚基础、重实践、聚前沿的人才培养模式，突出“嵌入式计算、自动化执行、智能化决策”的专业核心，与计算机、信息技术深度融合的特色。凝练“信息与物联网”和“工控与智能机器人”两个子方向、强调综合知识运用和工程项目实践。

In the program, college students are supposed to with broad extension and solid foundation of professional knowledge, endowed with high practical ability, acquaint themselves with the knowledge on the cutting edge. It highlights the professional core as “embedded computing, automated execution, intelligent decision making”. The specialty is deeply integrated with computer science and information technology. The plan focus on two sub-direction“information and Internet of Thing”,“industrial controland intelligent robot”, emphasizing the application and practice of comprehensive knowledge in engineering.

#### (二) 专业核心课程：

电路原理，电子技术，自动控制原理，微处理器与微控制器，电力电子技术与运动控制系统，计算机过程控制系统，智能机器人、数据通讯与计算机网络、传感与检测技术、程序设计方法导论、电机与拖动基础。

Core Courses: Circuit Theory, Electronics, Automatic Control Principle, Microcomputer processor and Microcomputer controller, Power Electronics & Motion Control System, Computer Process Control System, Introduction to intelligent robotics, Data communication and computer network, Sensor and Detecting Technique, Introduction to programming design, Basic of Electric Machines and Electric

#### (三) 专业特色课程：

图像处理与机器视觉、智能机器人、工业机器人编程与实践、嵌入式系统与应用 I、射频识别（RFID）原理与应用、物联网技术与工程、电子设计自动化、自动化综合实验

Characteristic Courses: Image Processing and Machine Vision, Introduction to Intelligent Robot, Programming and Practice of Industrial robot, embedded system and application I, Principle and Application of RFID, Internet of things technology and engineering., Electronic Design Automation, Automation Experiment

附：毕业要求实现矩阵：

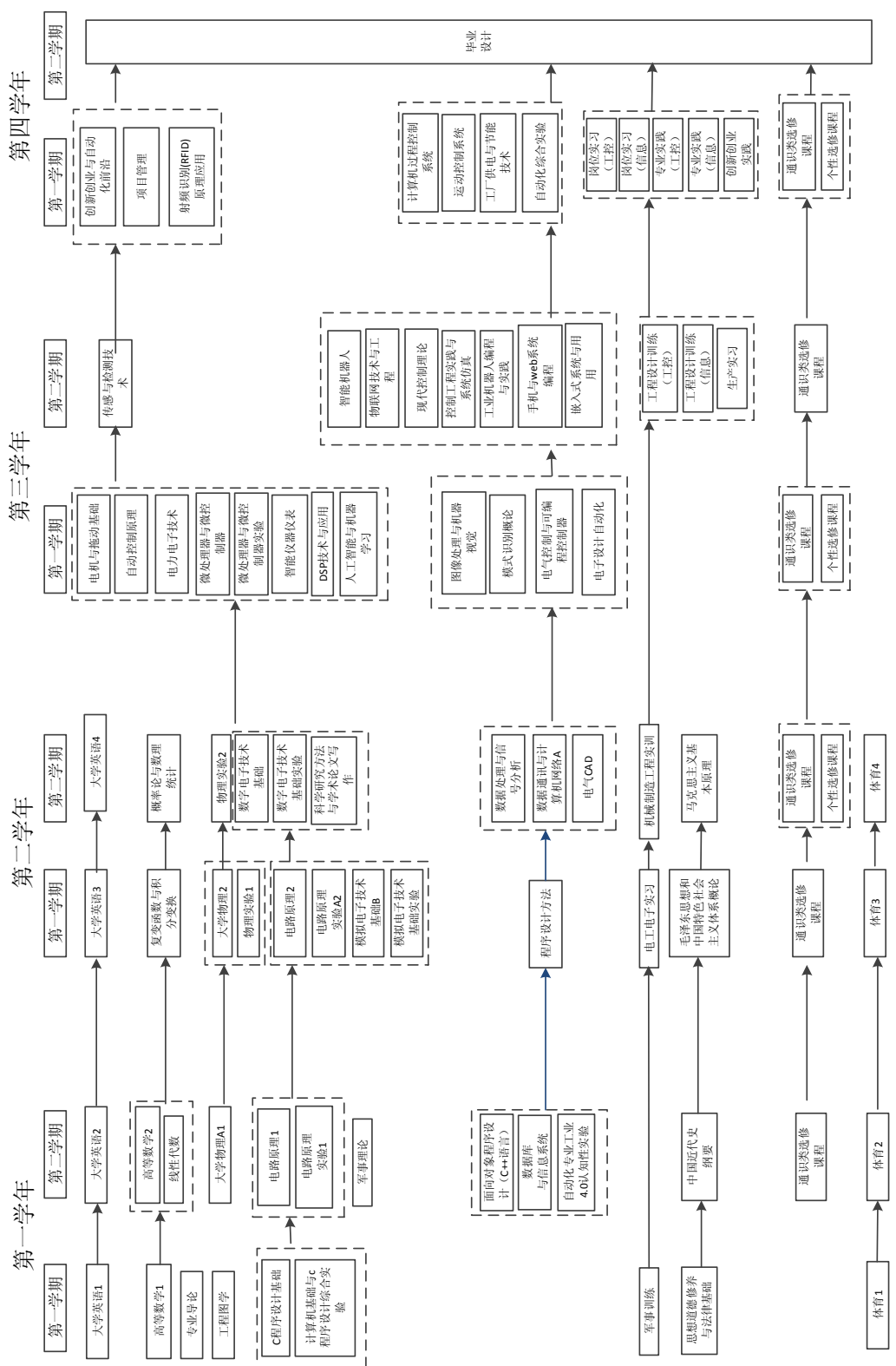
专业 核心 课程	专业 特色 课程	课程名称	自动化专业（卓越工程师班）毕业要求													
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		
		思想道德修养与法律基础	√							√						
		中国近现代史纲要	√													
		毛泽东思想和中国特色社会主义理论体系概论	√							√						
		马克思主义基本原理	√							√						
		军事理论	√													
		体育 1	√													
		体育 2	√													
		体育 3	√													
		体育 4	√													
		心理健康教育	√													
		大学英语 1									√		√			
		大学英语 2									√		√			
		大学英语 3									√		√			
		大学英语 4									√		√			
		C 程序设计基础		√	√	√										
		计算机基础与 C 程序设计综合实验		√	√	√	√									
		专业导论	√		√	√										√
		工程图学			√	√										
		高等数学上		√												
		高等数学下		√												
		概率论与数理统计		√												
		线性代数		√												
		复变函数与积分变换		√												
		大学物理上		√												
		大学物理下		√												

专业 核心 课程	专业 特色 课程	课程名称	自动化专业（卓越工程师班）毕业要求												
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
		物理实验上			√		√								
		物理实验下			√		√								
√		电路原理上			√	√		√	√						
√		电路原理下			√	√		√	√						
		电路原理实验上			√		√						√		
		电路原理实验下			√		√						√		
√		模拟电子技术基础		√	√	√		√							
		模拟电子技术基础实验			√		√								
√		数字电子技术基础		√	√	√		√							
		数字电子技术基础实验			√		√								
		面向对象程序设计（c++）			√		√						√		√
		电气 CAD					√	√					√		
		信号处理与数据分析	√	√	√	√							√		√
		控制工程实践与系统仿真	√	√		√	√						√		√
		数据库与信息系统	√	√	√	√	√						√		√
		自动化专业工业 4.0 认知性实验	√		√							√	√		√
		数据通讯与计算机网络	√	√	√		√						√		√
√		电力电子技术													
√		微处理器与微控制器	√	√	√		√								√
		电机与拖动基础													
√		运动控制系统													
		图像处理与机器视觉	√	√	√	√	√						√		√
		电子设计自动化	√		√	√	√	√					√		
		射频识别（RFID）原理与应用	√	√		√	√						√		√
		嵌入式系统与应用	√	√	√	√	√						√		√
		电器控制与可编程序控制器		√			√						√		√
		智能机器人	√	√	√		√							√	
		现代控制理论	√	√		√	√						√		√
		工厂供电与节能技术	√			√			√				√		√
		工业机器人编程与实践	√	√	√	√	√						√		√

专业 核心 课程	专业 特色 课程	课程名称	自动化专业（卓越工程师班）毕业要求											
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		物联网技术与工程	√						√					√
		DSP 技术与应用	√		√	√	√						√	√
		模式识别概论			√								√	
		智能仪器仪表	√	√			√							√
		军事训练	√											
		电工电子实习	√		√	√	√				√	√		
		机械制造工程实训			√									
		工程设计训练					√	√	√	√				
		生产实习						√	√	√		√		
		专业实践	√			√	√	√	√		√	√	√	√
		岗位实习						√	√	√	√	√	√	
		毕业设计	√	√	√	√	√		√			√	√	
		传感与检测技术	√	√	√	√	√					√		√
		微处理器与微控制器实验	√			√	√					√		√
		自动控制原理	√	√	√		√							√
		自动化综合实验												
		计算机过程控制系统		√	√		√	√				√		√
		程序设计方法	√		√		√							√
		手机与 web 系统编程		√	√		√						√	
		科学研究方法与学术论文写作	√	√		√	√					√		
		创新创业与自动化前沿												
		人工智能与机器学习	√	√	√	√	√							√
		项目管理		√	√				√				√	

### 三、课程教学进程图

#### III Teaching Process Map





#### 四、 理论教学建议进程表

#### IV Theory Course Schedule

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(一) 通识必修课程 General Education Required Courses									
4220001110	思想道德修养与法律基础 Morals, Ethics and Fundamentals of Law	3	48			8		1	
4220002110	中国近现代史纲要 Outline of Contemporary and Modern Chinese History	2	32					1	
4220003110	毛泽东思想和中国特色社会主义理论体系概论 Introduction to Mao Zedong Thought and Socialism with Chinese Characteristics	4	96			32		3	
4220005110	马克思主义基本原理 Marxism Philosophy	3	48			8		4	
1060003130	军事理论 Military Theory	1	32				16	2	
4210001170	体育 1 Physical Education I	1	26					1	
4210002170	体育 2 Physical Education II	1	34					2	
4210003170	体育 3 Physical Education III	1	34					3	
4210004170	体育 4 Physical Education IV	1	34					4	
4030002180	大学英语 1 College English I	3	60				12	1	
4030003180	大学英语 2 College English II	2	44				12	2	大学英语 1
4030004180	大学英语 3 College English III	2	44				12	3	大学英语 2
4030004180	大学英语 4 College English IV	2	44				12	4	大学英语 3
4120335170	C 程序设计基础 Fundamentals of Computer Program Design(C)	2	32					1	
4120336170	计算机基础与 C 程序设计综合实验 Comprehensive Experiments of Foundation of Computer and C Language Programming	1	32	32				1	
小 计 Subtotal		29	640	32	0	48	64		

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
(二) 通识选修课程 General Education Elective Courses									
创新创业类 Innovation and Entrepreneurship Courses	要求至少取得 9 个学分,且必须选修艺术体育类课程中的艺术类相关课程并取得至少 2 个学分,在创新创业类课程中至少选修一门课程,在人文社科类或经济管理类课程中至少选修一门。 Students are required to obtain at least 9 credits, which must contain art courses of 2 credits from the category of Art and Physical Education Courses, at least one course from the category of Innovation and Entrepreneurship Courses, and at least one course from the category of Arts and Social Science Courses or the category of Economy and Management Courses.								
人文社科类 Arts and Social Science Courses									
经济管理类 Economy and Management Courses									
科学技术类 Science and Technology Courses									
艺术体育类 Art and Physical Education Courses									
(三) 专业教育必修课程 Basic Disciplinary Required Courses									
4100212170	专业导论 Introduction to Materials Physics	1	16					1	
4080373170	工程图学 C Engineering Graphics	3.5	72				16	1	
4050063110	高等数学 A 上 Advanced Mathematics I	5	80					1	
4050064110	高等数学 A 下 Advanced Mathematics II	5	80					2	高等数学上
4050229110	线性代数 Linear Algebra	2.5	40					2	
4050021110	大学物理 A 上 Physics A I	3.5	56					2	大学物理上
4050022110	大学物理 A 下 Physics II	3.5	56					3	
4050466130	物理实验 A 上 Physics Lab. I	1	32	32				3	物理实验上
4050467130	物理实验 A 下 Physics Lab. II	1	32	32				4	
4100030110	电路原理 A 上 Circuit Theory A I	3	48					2	
4100032110	电路原理 A 实验上 Circuit Theory Exp	0.5	16	16				2	
4100031110	电路原理 A 下 Circuit Theory II	3	48					3	电路原理上
4100033110	电路原理 A 实验下 Circuit Theory Exp	0.5	16	16				3	电路原理实验上
4050052110	复变函数与积分变换 B Complex Function and Integral Transform	3	48					3	

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4110049110	模拟电子技术基础 B Analog Electronic Technology	3.5	56					3	
4110051110	模拟电子技术基础实验 Analog Electronic Exp	0.5	16	16				3	
4110067110	数字电子技术基础 B Digital Electronic Technology	3.5	56					4	
4110068110	数字电子技术基础实验 Digital Electronic Exp	0.5	16	16				4	
4050058110	概率论与数理统计 B Probability and Mathematical Statistics	3	48					4	
4100172160	电力电子技术 F power electronic	2	32					5	
4100169160	电机与拖动基础 B Basic of ElectricMachineds and Electric Drive	2.5	40					5	
4100166160	微处理器与微控制器 B micro. process and micro.controller	3.5	56					5	数字 / 模拟 电子技基础
4100167160	微处理器与微控制器实验 Experiment of micro. process and micro.controlle	0.5	16	16				5	
4100064110	自动控制原理 H Automatical Control principle	4.5	72	8				5	信号处理与 数据分析
4100221170	传感与检测技术 E Sensor and Detecting Technology	2.5	40	8				6	数字 / 模拟 电子技基础
4100220170	创新创业与自动化前沿 Innovation/Entrepreneurship and automation frontier	1	16					7	
小 计 Subtotal		63.5	1104	160	0	0	16		
(四) 专业教育选修课程 Specialized Elective Courses									
信息与物联网方向 Information and Internet of things.									
4100208160	数据通讯与计算机网络 A Data Dommuncation and Dcomputer network	3	48	8				4	
4100222170	物联网技术与工程 Introduction to Internet of Things	2.5	40	8				6	
4100219170	计算机过程控制系统 C Instrument and Process Control System	3.5	56	8				7	
工控与智能机器人方向 Industrial control and intelligent robot									

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议 修读 学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4100223170	程序设计方法 C Introduction to Programming Design	2.5	40	8				3	
4100178160	智能机器人 Introduction to Intelligent Robotics	3	48	8				6	
4100176160	运动控制系统 D Motion Control System	3.5	56	8				7	
选修模块 1									
4100179160	自动化专业与工业 4.0 认知实验 Congnition Experiment of Automation and Industry 4.0	0.5	16	16				2	
4070021110	信号处理与数据分析 Signal processing and data analysis	2	32					4	
4100058110	现代控制理论 Modern Control Theory	2	32	6				6	
4100224170	控制工程实践与系统仿真 control engineering practice and system simulation	3	48	16				6	
选修模块 2									
4100182160	数据库与信息系统 database and infromation system	2	32		12			2	
4100186150	面向对象程序设计 (C++) object-oriented programming (c++)	2	32		12			2	
4100192160	图像处理与机器视觉 A Photoelectron Materials and its Applications	2.5	40	8				5	
4100050110	模式识别概论 Introduction to Pattern Recognition	2	32					5	
4100225170	手机与 web 系统编程 programming for smart Phone and Web System	3	48	16				6	
选修模块 3									
4100034110	电气 CAD electrical CAD	3	48		20			4	
4100226170	电子设计自动化 C Eelectronic Design Automation	2.5	40	12				5	
4100227170	嵌入式系统与应用 Embeded System and Application	2.5	40	8				6	
选修模块 4									
4100228170	电器控制与可编程序控制器 Introduction to Pattern Recognition	3.5	56	16				5	
4100195160	工业机器人编程与实践 Programming and Practice of Industrial Robot	2	32	16				6	

课程编号 Course Number	课程名称 Course Title	学分 Crs	学时分配 Including					建议修读学期 Suggested Term	先修课程 Prerequisite Course
			总学时 Tot hrs.	实验 Exp.	上机 Ope- ration	实践 Prac- tice	课外 Extra- cur		
4100043110	工厂供电与节能技术 Plant Power Supply & Sower Saving Technology	3	48	6				7	
4100229170	自动化综合实验 C Automatic synthesis experiment	1.5	48	48				7	
小 计 Subtotal		46	768	192	44	0	0		
<p>修读说明：专业选修课程要求至少选修 20 学分，信息与物联网方向和工控与智能机器人方向并行上课，学生必须选择其一进行选修。学分不满 20 的通过其余选修课补齐总学分，选修另一模块课程等同选修课学分。若选择信息与物联网方向，则组合（工控与智能机器人方向和模块 1~4）中每个模块内的课程至少选一门。若选择工控与智能机器人方向，则组合（信息与物联网方向和模块 1~4）中每个模块内的课程至少选一门。</p> <p>NOTE: Minimum subtotal credits: 20. The students are required to take at least 20 credits from Specialized Elective Courses, Information and Internet of things direction and industrial control and intelligent robot direction are taught in in parallel. Students must choose one of them for elective courses. The students whose credits less than 20 will be filled by the remaining optional courses, and the other modules will be equivalent to elective credits. At least one in each module within the group (industrial control and intelligent robot direction and module 1~4) should be chosen if Information and Internet of things direction.is chosen. At least one in each module within the group (Information and Internet of things direction and module 1~4) should be chosen if industrial control and intelligent robot direction is chosen.</p>									
(五) 个性课程 Personalized Electice Courses									
4100230170	科学研究方法与学术论文写作 Scientific research methods and academic paper writing	2	32					4	
4100103110	智能仪器仪表 intelligent instrument	2	32					5	
4100203160	人工智能与机器学习 Artificial Intelligence and Machine Learning	2.5	40	8				5	
4100001110	DSP 技术与应用 DSP Technology & Application	2	32	4				5	
4100210160	射频识别 (RFID) 原理与应用 pricipale and application of RFID	2	32					7	
4170149110	项目管理 A project management	2	32					7	
小 计 Subtotal		12.5	200	12	0	0	0		
<p>修读说明：学生从以上个性课程和学校发布的其它个性课程目录中选课，要求至少选修 6 学分。</p> <p>NOTE: Sudents can select courses from above and the other personalized courses in catalog, and are required to obtain at least 6 credits.</p>									

## 五、集中性实践教学环节

### V Practice Schedule

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
1060002110	军事训练 Military Training	1.5	3	1

课程编号 Course Number	实践环节名称 Practice Courses Name	学分 Crs	周数 Weeks	建议修读学期 Suggested Term
4100068110	电工电子实习 A Practice of Electrical Engineering & Electronics	2	2	3
4080151110	机械制造工程实训 C Training on Mechanical Manufacturing Engineering	2	2	4
4100082110	生产实习 Practice of manufacture	3	3	6 (暑期)
4100233170	自动化专业创新创业实践 Training Programs for Innovation and Entrepreneurship	1	1	7
4100234170	毕业设计 Graduation Thesis	10	17	8
信息与物联网工程方向				
4100235170	工程设计训练 (信息) engineering design training	2	2	6 (企业)
4100263170	专业实践 (信息) profressinal practice	3	3	7 (企业)
4100264170	岗位实习 (信息) job practice	8	8	7 (企业)
工控与智能机器人方向				
4100238170	工程设计训练(工控) engineering design training	2	2	6 (企业)
4100239170	专业实践 (工控) profressinal practice	3	3	7 (企业)
4100240170	岗位实习 (工控) job practice	8	8	7 (企业)
小 计 Subtotal		32.5	41	

## 六、其它要求

### VI Recommendations on Course Studies

- 1、《形势与政策》和《心理健康教育》课程为课外必修课程，分别计 2 个和 1 个课外学分。
  - 2、学生选修的通识选修课程和从学校发布的个性课程目录中选修的个性课程，要求与本专业培养方案内设置的课程内容不重复。
- 1.Situation & Policy (2 credits) and Mental Health Education (1 credit) are the required extracurricular courses.
  - 2.The selected General Education Elective Courses and Personalized Elective Courses from the courses program by university must be different from the major undergraduate education plan in content.

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