

# 沈阳化工大学本科培养方案

## 信息工程学院

专业名称：电气工程及其自动化

专业代码：080601

制 定：蔡庆春

审 核：孔晓光

审 定：于三三

批 准：金志浩

2021年8月

# 电气工程及其自动化专业培养方案

## 一、培养目标

本专业培养具有社会责任感，能够在电气控制、智能电网等领域从事相关的科学研究、工程设计、技术开发和项目管理等工作的高素质应用型工程技术人才，能够适应国家和区域经济发展要求，德智体美劳全面发展的社会主义接班人。

毕业 5 年后：

(1) 具有扎实的理论基础，具备适应装备制造等领域发展的专业能力和专业视野，能够综合运用数学、自然科学、专业知识以及交叉学科知识，对电气工程及相关领域复杂工程问题的解决方案进行分析和设计。

(2) 具有在企业与社会环境下，运用现代工具对装备制造业及相关领域的电气控制系统进行分析、设计、集成和服务的能力。

(3) 具有高度的社会责任感和道德修养、健全的人格、良好的心理素质和人文科学素养、和谐包容的团队精神、有效的沟通与表达能力和工程项目管理能力，在工程实践中能综合考虑法律、环境与可持续性发展等因素，具有坚持公众利益优先的素质。

(4) 具有广阔的国际视野，主动适应不断变化的国内外形势和环境，能够通过多种学习渠道更新知识，形成终生学习的习惯，实现能力和技术水平的提升。

## 二、专业方向

电气控制、智能电网

## 三、毕业要求

本方案根据本科专业类教学质量国家标准、专业认证标准中的要求，基于成果导向教育理念，依据人才培养目标和专业多年形成的人才培养特色，针对电气工程领域及电气工程及其自动化专业的特点，制定本专业毕业能力要求和指标点分解。

毕业能力要求及其指标点分解：

毕业能力要求	指标点
毕业要求 1： 工程知识：掌握数学、自然科学、工程基础和电气专业知识，能够运用其理论和方法解决装备制造业及相关工程领域电气控制系统和智能电网的复杂工程问题。	1-1. 能够将数学、自然科学、工程基础和专业知识运用到复杂工程问题的恰当表述中。
	1-2. 能够将工程基础知识应用于电气控制单元及电力生产过程的设计和分析。
	1-3. 能够将工程基础和专业知识用于装备制造业及相关工程领域电气控制系统和智能电网工程问题的分析和优化。
	1-4. 能够将工程基础和专业知识用于装备制造业及相关工程领域电气控制系统和智能电网的设计和改进。
毕业要求 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、并通过文献研究来分析装备制造业及相	2-1. 能够运用数学、自然科学和工程科学的基本原理，识别装备制造业及相关工程领域电气控制系统、智能电网复杂工程问题中的关键环节和参数。
	2-2. 能够通过系统集成分析、基于设备运行操作指标分析等方法正确表达装备制造业及相关工程领域电气控制系统和智能电网的复杂工程问题。

关工程领域电气控制系统和智能电网的复杂工程问题，以获得有效结论。	2-3. 能够通过文献研究来分析装备制造业及相关工程领域电气控制系统和智能电网的复杂工程问题，以获得有效结论。
毕业要求 3： 设计/开发解决方案：在综合考虑社会、健康、安全、法律、文化以及环境等因素的前提下，能够针对装备制造业及相关工程领域电气控制系统和智能电网的复杂工程问题设计解决方案，设计满足特定需求的系统、单元（部件），并能够在设计环节中体现创新意识。	2-4 能够运用智能电网专业知识分析电力生产过程的影响因素、证实解决方案的合理性。
毕业要求 3： 设计/开发解决方案：在综合考虑社会、健康、安全、法律、文化以及环境等因素的前提下，能够针对装备制造业及相关工程领域电气控制系统和智能电网的复杂工程问题设计解决方案，设计满足特定需求的系统、单元（部件），并能够在设计环节中体现创新意识。	3-1. 能够在综合考虑社会、健康、安全、法律、文化以及环境等现实约束条件下，对装备制造业及相关工程领域电气控制系统的复杂工程问题设计解决方案。
毕业要求 4： 研究：能够基于科学原理并采用科学方法对装备制造业及相关工程领域电气控制系统和智能电网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。	3-2. 能够根据用户的特定需求，设计合理的电气控制系统和智能电网系统。
毕业要求 5： 使用现代工具：掌握文献检索、资料查询以及运用现代信息技术获取相关信息的基本方法，能够针对装备制造业及相关工程领域电气控制系统和智能电网的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。	3-3. 能够通过集成单元过程完成电气控制系统和电力生产的流程设计，并对电气控制和智能电网设计方案进行优化，体现创新意识。
毕业要求 6： 工程与社会：能够基于电气工程相关背景知识进行合理分析，评价电气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。	4-1. 能够基于专业理论，根据对象特性，选择研究路线，设计可行的实验方案。
毕业要求 7： 环境和可持续发展：能够理解和评价针对装备制造业及相关工程领域电气控制系统及智能电网的复杂工程问题的工程实践对环境、社会可持续发展的影响。	4-2. 能够基于科学原理并采用科学方法对电气控制相关的复杂工程问题设计实验方案，开展实验，分析与解释数据。
毕业要求 8： 职业规范：具有人文社会科学素养、社会责任感，能够在装备制造业及相关工程领域电气控制系统的工程实践中理解并遵守工程职业道德和规范，履行责任。	4-3. 能够针对电气控制和智能电网相关的复杂工程问题进行应用研究，并通过信息综合得到合理有效的结论。
毕业要求 5： 使用现代工具：掌握文献检索、资料查询以及运用现代信息技术获取相关信息的基本方法，能够针对装备制造业及相关工程领域电气控制系统和智能电网的复杂工程问题，开发、选择与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复杂工程问题的预测与模拟，并能够理解其局限性。	5-1. 掌握文献检索、资料查询以及运用现代信息技术获取相关信息的基本方法。
毕业要求 6： 工程与社会：能够基于电气工程相关背景知识进行合理分析，评价电气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。	5-2. 能够正确选择与使用仿真工具、人机界面集成工具等技术、资源，对装备制造业及其相关的复杂工程问题进行预测与模拟。
毕业要求 7： 环境和可持续发展：能够理解和评价针对装备制造业及相关工程领域电气控制系统及智能电网的复杂工程问题的工程实践对环境、社会可持续发展的影响。	5-3. 在解决电气控制和智能电网相关的复杂工程问题实践中提高现代工具的应用能力，并能够理解其局限性。
毕业要求 8： 职业规范：具有人文社会科学素养、社会责任感，能够在装备制造业及相关工程领域电气控制系统的工程实践中理解并遵守工程职业道德和规范，履行责任。	6-1. 了解与电气工程背景相关的社会、健康、安全、法律及文化方面的知识。
毕业要求 8： 职业规范：具有人文社会科学素养、社会责任感，能够在装备制造业及相关工程领域电气控制系统的工程实践中理解并遵守工程职业道德和规范，履行责任。	6-2. 掌握社会主义核心价值观的内涵和意义，在正确价值观的指导下，合理分析和评价电气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，理解电气工程师所应承担的社会责任。
	7-1. 能够理解和体验针对电气控制和智能电网相关的复杂工程问题的工程实践对环境、社会可持续发展的影响。
	7-2. 能够运用环境与可持续发展等相关法律法规分析、评价针对电气控制和智能电网相关的复杂工程问题的工程实践对环境、社会可持续发展的影响。
	8-1. 具备科学的世界观、人生观和价值观,理解个人与社会的关系，了解中国国情。
	8-2. 能在工程实践中自觉遵守工程职业道德和规范，诚实公正、诚信守则、爱岗敬业、敬爱生命。
	8-3. 能够在工程实践中自觉履行对公众安全、健康、福祉和环境保护的社会责任。

<p>毕业要求 9:</p> <p>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。</p>	9-1. 理解团队合作的意义,能够在工程项目的研发和实施过程中,与不同学科领域人员进行有效沟通,合作共事。
	9-2. 具有良好大局观念,能够在团队中根据需要独立或合作开展工作。
	9-3. 能够在多学科交叉背景下,组织、协调和带领团队开展工作。
<p>毕业要求 10:</p> <p>沟通:能够就装备制造业及相关工程领域电气控制系统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。</p>	10-1. 能够运用语言工具准确表达自己的观点,能与业界同行和公众进行有效沟通和交流。
	10-2. 了解装备制造业及相关工程专业领域国际发展趋势和热点问题。
	10-3. 理解并尊重文化差异,能够就电气控制和智能电网相关的复杂工程问题,在跨文化背景下进行基本的沟通和交流。
<p>毕业要求 11:</p> <p>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。</p>	11-1. 理解并掌握一定的工程管理原理与经济决策方法。
	11-2. 能够应用工程管理原理与经济决策方法对电气控制和智能电网相关的复杂工程问题进行有效分析和综合评价
<p>毕业要求 12:</p> <p>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。</p>	12-1. 充分认识到装备制造业及相关工程领域电气控制、智能电网系统的快速发展,能在社会发展的大背景下,认识到不断探索和学习的必要性,具有自主学习和终身学习的意识。
	12-2. 具有自主学习能力,包括对问题的理解能力,归纳能力和提出问题能力等;能够通过自主查阅资料,获取解决问题的知识和方法;掌握终身学习的语言工具和计算机工具,具有健康良好的体魄和心理,以适应工作中的各种任务。

专业毕业要求应该能够支撑培养目标的达成。建立本专业毕业要求支撑培养目标实现的关系矩阵。

### 毕业要求支撑培养目标实现的关系矩阵

毕业要求	培养目标			
	培养目标 1	培养目标 2	培养目标 3	培养目标 4
1: 工程知识	√			
2: 问题分析	√			
3: 设计/开发解决方案	√			
4: 研究		√		
5: 使用现代工具		√		
6: 工程与社会		√		
7: 环境和可持续发展			√	√
8: 职业规范			√	
9: 个人和团队			√	
10: 沟通			√	√
11: 项目管理			√	
12: 终身学习				√

#### 四、主干学科

电气工程，控制工程。

#### 五、专业核心课程

电路分析基础、模拟电子技术、数字电子技术、电机学、自动控制原理、电力系统分析基础、电力电子技术、电气控制技术、工厂供电、运动控制系统、智能电网技术、电力系统继电保护。

#### 六、修业年限

本科基本学制 4 年，弹性学习年限 3-6 年，按照学分管理制度管理。

#### 七、授予学位

学生应至少修满 164.0 学分方可毕业。符合《沈阳化工大学本科毕业生学士学位授予工作有关规定(2017 年 3 月修订)》学位授予条件者，可授予工学学士学位。

## 八、学分要求

课程类别	课程模块		课程性质	学分要求	小计	比例(%)
通识教育课	通识教育必修课	思政类	必修	17	41.5	25.30
		外语类		12		
		计算机类		2.5		
		军事安全类		2		
		劳动体育类		5		
		创新创业类		2		
		心理健康类		1		
	通识教育选修课	美育类(400)	选修	2	8	4.88
		中国与世界(500)		2		
		四史(600)		1		
		经济管理类(700)		1		
传统文化(900)		2				
通识教育实践课	军训	实践	2	2	1.22	
学科平台课	学科基础课程	公共基础类	必修		69.0	
		专业基础类		59.5		
	学科实践课程	-	实践	9.5		
专业教育课	专业核心课程	-	必修	10.5	38.5	68.60
	专业 选修课程	-	选修	5		
	专业实践课程	-	实践	23		
能力拓展课	专业特色课程	-	必修(或实践)	5	5	
课外实践环节	课外通识实践	人文社会实践	课外实践	4		
		身心健康实践				
		外语技能实践				
	创新创业实践	创新训练		4		
		创新大赛				
		创客活动				
生涯教育	成长规划类		1			
总学分/比例					164.0	100

# Electrical Engineering and Automation Major 2021 Undergraduate Education Program

## I. Educational Objectives

### 1. Educational Objectives

This major cultivates high-quality applied engineering and technical talents who have a sense of social responsibility, adapt to the requirements of national and regional economic development, develop morally, intellectually, physically, aesthetically and laboriously, and can engage in scientific research, engineering design, technology development and project management related to electrical control and smart grid in the field of equipment manufacturing.

In 5 years after graduation, graduates will be able to:

(1) Have a solid theoretical foundation, professional ability and professional vision to adapt to the development of equipment manufacturing and other fields, and use mathematics, natural science, professional knowledge and interdisciplinary knowledge to analyze and design solutions to complex engineering problems in electrical engineering and related fields;

(2) Have the ability to analyze, design, integrate and serve the electrical control system in equipment manufacturing industry and related fields with modern tools in the enterprise and social environment;

(3) Have a high sense of social responsibility and moral cultivation, sound personality, good psychological quality and humanities literacy, harmonious and inclusive team spirit, effective communication and expression ability and project management ability, and comprehensively consider factors such as law, environment and sustainable development in engineering practice, and have the quality of giving priority to public interests;

Have a broad international perspective, actively adapt to the changing domestic and international situations and environment, can update knowledge through a variety of learning channels, form lifelong learning habits, and improve their capacity and technical level.

## II. Major direction

Electrical control, smart grid

## III. Graduation Requirements

According to the requirements of the national standards of undergraduate professional teaching quality and professional certification standards, based on the concept of achievement oriented education, according to the talent training objectives and professional training characteristics formed over the years, and in view of the characteristics of the field of electrical engineering and electrical engineering and automation specialty, the graduation ability requirements and index points of this specialty are formulated.

Graduates should obtain knowledge and competences as follows:

Graduation Requirements	Indices
<p>Requirement 1: Engineering knowledge: Master mathematics, natural science, basic engineering foundation and professional electrical knowledge, and be able to use their theories and methods to solve complex engineering problems of electrical control system in equipment manufacturing industry and related engineering fields.</p>	1-1. Be able to apply mathematics, natural science, basic and professional engineering knowledge to the proper expression of complex engineering problems.
	1-2. Be able to apply basic engineering knowledge to the design and analysis of electrical control unit and power production process.
	1-3. Be able to apply basic and professional engineering knowledge to analyze and optimize electrical control system and smart grid in equipment manufacturing industry and related engineering fields.
	1-4. Be able to apply basic and professional engineering professional knowledge to designing and improving electrical control system and smart grid in equipment manufacturing industry and related engineering fields.
<p>Requirement 2: Problem analysis: Be able to apply the basic principles of mathematics, natural science and engineering science to identify, express and analyze the complex engineering problems of electrical control system in equipment manufacturing industry and related engineering fields through literature research, so as to obtain effective conclusions.</p>	2-1. Be able to use the basic principles of mathematics, natural science and engineering science to identify the key links and parameters in complex engineering problems of electrical control system in equipment manufacturing industry and related engineering fields.
	2-2. Be able to express the complex engineering problems of electrical control system in equipment manufacturing industry and related engineering fields through system integration analysis and equipment operation index analysis.
	2-3. Through literature research, can analyze the complex engineering problems of electrical control system in equipment manufacturing industry and related engineering through literature research so as to obtain effective conclusions.
	2-4. Be able to use the intelligent power grid expertise to analyze the factors affecting the power production process and confirm the rationality of the solution.
<p>Requirement 3: Design / development solutions: under the premise of comprehensive consideration of social, health, safety, legal, cultural and environmental factors, be able to design solutions for complex engineering problems of electrical control system in equipment manufacturing industry and related engineering fields, design systems, units (components) to meet specific needs, and embody the sense of innovation in the design process.</p>	3-1. Be able to design solutions to complex engineering problems of electrical control system in equipment manufacturing industry and related engineering fields under the realistic constraints of society, health, safety, environment and law.
	3-2. Be able to design reasonable electrical control system and smart grid system according to the specific needs of users.
	3-3. Be able to complete the process design of electrical control system and power production through integrated unit process, optimize the design scheme of electrical control and smart grid, and embody the innovation consciousness.
<p>Requirement 4: Research: Based on scientific principles and by use of scientific methods, be able to study complex engineering problems of electrical control system in equipment manufacturing industry and related engineering fields, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis.</p>	4-1. Be able to select research route and design feasible experimental scheme based on professional theory and object characteristics.
	4-2. Based on scientific principles and scientific methods, be able to design experimental schemes, carry out experiments, analyze and interpret data for complex engineering problems related to electrical control.
	4-3. Be able to conduct researches on control system application for complex engineering problems related to electrical control and smart grid, and get reasonable and effective conclusions through information synthesis.



<p><b>Requirement 5:</b></p> <p>Use of modern tools: Be able to master the basic methods of literature retrieval, data query and using modern information technology to obtain relevant information, and be able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for the complex engineering problems of electrical control system in equipment manufacturing industry and related engineering fields, including the prediction and simulation of complex engineering problems, and to understand their limitations.</p>	<p>5-1. Be able to master the basic methods of literature retrieval, data inquiry and using modern information technology to obtain relevant information.</p>
	<p>5-2. Be able to select and use simulation tools, human-computer interface integration tools and other technologies and resources to predict and simulate the equipment manufacturing industry and its related complex engineering problems.</p>
	<p>5-3. Be able to improve the capacity of modern tools and understand their limitations in solving complex engineering problems related to electrical control and smart grid.</p>
<p><b>Requirement 6:</b></p> <p>Engineering and society: be able to conduct reasonable analysis based on the background knowledge related to electrical control and smart grid, evaluate the impact of professional engineering practice and solutions to complex engineering problems on society, and understand the responsibilities to be undertaken; be able to study complex engineering problems based on scientific principles and scientific methods, including designing experiments, analyzing and interpreting data, and drawing reasonable and effective conclusions through information synthesis.</p>	<p>6-1. Be able to master the relevant knowledge of society, health, safety, law and culture, and be able to make reasonable analysis based on the background knowledge of electrical control system in equipment manufacturing industry and related engineering fields.</p>
	<p>6-2. Be able to grasp the connotation and significance of socialist core values, and under the guidance of correct values, be able to evaluate the impact of engineering practices and engineering schemes on society, health, safety, law and culture, and understand the responsibilities in engineering practice related to electrical control systems and solutions to complex engineering problems in equipment manufacturing industry and related engineering fields.</p>
<p><b>Requirement 7:</b></p> <p>Environment and sustainable development: Be able to understand and evaluate the impact of engineering practice for complex engineering problems of electrical control system in equipment manufacturing industry and related engineering fields on environment and social sustainable development.</p>	<p>7-1. Be able to understand and experience the impact of engineering practice for complex engineering problems related to electrical control and smart grid on environmental and social sustainable development.</p>
	<p>7-2. Be able to relevant laws and regulations to analyze and evaluate the impact of engineering practice for complex engineering problems related to electrical control and smart grid on environmental and social sustainable development.</p>
<p><b>Requirement 8:</b></p> <p>Professional norms: Be able to have a good humanities and social sciences literacy, and a sense of social responsibility, and to understand and abide by the engineering professional ethics and norms in the engineering</p>	<p>8-1. Be able to form a scientific world outlook, outlook on life and values, understand the relationship between individual and society, and understand China's national conditions.</p>
	<p>8-2. Be able to consciously abide by engineering professional ethics and norms in engineering practice, be honest and fair, code of integrity, love their posts and respect their lives.</p>

<p>practice related to electrical control system in equipment manufacturing industry and related engineering fields, and fulfill the responsibilities.</p>	<p>8-3. Be able to consciously fulfill the social responsibility for public safety, health, well-being and environmental protection in engineering practice.</p>
<p>Requirement 9: Individual and team: Be able to take on the roles of an individual, a team member and a leader in a multidisciplinary team.</p>	<p>9-1. Be able to understand the significance of teamwork, and be able to effectively communicate and cooperate with personnel in different disciplines in the R &amp; D and implementation of engineering projects.</p>
	<p>9-2. Have a good overall concept and be able to work independently or cooperatively in the team as required.</p>
	<p>9-3. Be able to organize, coordinate and lead the team to carry out work in the interdisciplinary context.</p>
<p>Requirement 10: Communication: Be able to communicate with industry peers and the public on complex engineering problems of electrical control system in equipment manufacturing and related engineering fields, including writing reports and designing documents, making statements, clearly expressing or responding to instructions, and to have a certain international vision, and to communicate in a cross-cultural background.</p>	<p>10-1. Be able to use language tools to accurately express their views and effectively communicate with peers in the industry and the public.</p>
	<p>10-2. Be able to understand international development trends and hot issues in equipment manufacturing industry and related engineering fields.</p>
	<p>10-3. Be able to understand and respect cultural differences, and be able to conduct basic communication and exchange on complex engineering issues related to electrical control and smart grid in a cross-cultural context.</p>
<p>Requirement 11: Project management: Be able to understand and master engineering management principles and economic decision-making methods, and to apply them in a multidisciplinary environment.</p>	<p>11-1. Be able to understand and master certain engineering management principles and economic decision methods.</p>
	<p>11-2. Be able to effectively analyze and comprehensively evaluate complex engineering problems related to electrical control and smart grid by using engineering management principles and economic decision-making methods.</p>
<p>Requirement 12: Lifelong learning: Be able to have the consciousness of self-learning and lifelong learning, and to have the ability of continuous learning and adapting to development.</p>	<p>12-1. Fully aware of the rapid development of electrical control and smart grid system in equipment manufacturing industry and related engineering fields, can recognize the necessity of continuous exploration and learning under the background of social development, and have the awareness of independent learning and lifelong learning..</p>
	<p>12-2. Have the ability of autonomous learning, including the ability to understand, summarize and ask questions; Be able to obtain knowledge and methods to solve problems through independent access to materials; Master language tools and computer tools for lifelong learning, and have a healthy physique and psychology to adapt to various tasks at work.</p>

## The relationship between graduation requirements and educational objectives

Graduation Requirements	Educational Objectives			
	Educational Objectives 1	Educational Objectives 2	Educational Objectives 3	Educational Objectives 4
1: Engineering Knowledge	√			
2: Problem Analysis	√			
3: Design/Development Solutions	√			
4: Research		√		
5: Use of Modern Tools		√		
6: Engineering and Society		√		
7: Environment and Sustainable Development			√	√
8: Professional Norms			√	
9: Individual and Team			√	
10: Communication			√	√
11: Project Management			√	
12: Lifelong Learning				√

### IV. Major Subject

Electrical engineering, control engineering.

### V. Core Courses

Fundamentals of Circuit Analysis, Analog Electronic Technology, Digital Electronic Technology, Electrical Machinery Theory, Automatic Control Theory, Fundamentals of power system analysis, Power Electronics Technology of Electric Control, Power Supply of Factories, Motion Control System, Smart grid technology, Power system protection

### VI. Educational System

The basic length of undergraduate education is 4 years, and the flexible study period is 3-6 years, which is managed according to the credit system.

### VII. Confer Degrees

Students are required to obtain at least \*164.0 \* credits before graduation. The Bachelor of Engineering degree can be granted to those who meet the requirements of the Relevant Provisions on the Awarding of Bachelor's Degree for Graduates of Shenyang University of Chemical Technology (revised in March 2017).

## VIII. Credit Requirements

Course Type	Course Modules		Course Nature	Credit requirement	Subtotal	Proportion (%)
General Education	General Education (Compulsory)	Ideological and Political Courses	Compulsory	17	41.5	25.30
		Foreign Language Courses		12		
		Computer Courses		2.5		
		Military and Safety Courses		2		
		Labor and Sport Education		5		
		Innovation and Entrepreneurship		2		
		Mental Health		1		
	General Education (Optional)	Aesthetic Education(400)	Optional	2	8	4.88
		China and the World(500)		2		
		Four Histories(600)		1		
		Economic Management(700)		1		
		Traditional Culture(900)		2		
	General Education (Practice)	Military Training	Practice	2	2	1.22
Discipline Education	Basic Courses	Public basic class	Compulsory	59.5	69.0	68.60
		Professional foundation				
	Basic Practice Sessions	-	Practice	9.5		
Specialized Education	Core Courses	-	Compulsory	10.5	38.5	
	Optional Courses	-	Optional	5		
	Specialized Practice Sessions	-	Practice	23		
Competency Development	Individualized Courses	-	Compulsory (or Practice)	5	5	
Extracurricular practice	Extracurricular General Education Practice	Culture and Society Practice	Extracurricular Practice	4		
		Mentally and Physically Practice				
		Foreign Language Proficiency Training Practice				
	Extracurricular Characteristic Practice	Innovative Training		4		
		Innovation Competition				
		Chuangke Activities				
	Career Education	Growth Planning Courses		1		
Total/Proportion					164.0	100

## 九、电气工程及其自动化专业教学进程表

### Table of Teaching Schedule for Electrical Engineering and Automation Major

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学 时数 T. C.H	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes	
							讲课 Lec.	实验 Exp.	上机 Pro.	课外 实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th		
通识教育课 General Education	思政类 Ideological and Political Courses		0710093001	思想道德与法治    Cultivation of Ideological Morality and Basis of Law	3.0	48	32			16		2								
			0710053001	中国近现代史纲要   Outline of Chinese Contemporary and Modern History	3.0	48	32			16	2									
			0710103001	马克思主义基本原理*   Elementary Theory of Marxism*	3.0	48	32			16				2						
			0710133001	毛泽东思想和中国特色社会主义理论体系概论*   Mao Zedong Thought and Theory of Socialism with Chinese Characteristics *	3.0	48	32			16				2						
			0710123001	习近平新时代中国特色社会主义思想概论 Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era	3.0	48	40			8					3					
			0710012301	形势与政策   Current Situation and Policies	2.0	64	64				2	2	2	2	2	2	2	2	2	
	外语类 Foreign Language Courses		0211003101	大学外语I   College English I	3.0	48	48				3									
			0211003201	大学外语II   College English II	3.0	48	48					3								
			0241003301	大学外语III   College English III	3.0	48	48							3						五选 一

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学 时数 T. C.H	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes			
							讲课 Lec.	实验 Exp.	上机 Pro.	课外 实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th				
通识教育课 General Education	必修 Compulsory	外语类 Foreign Language Courses	0241003301	大学外语III（进阶英语）    College English III（Advanced English CET 6-Orientated）	3.0	48	48						3									
				大学外语III（英语口语表达与交流）    College English III（English Oral Expression and Communication）	3.0	48	48								3							
				大学外语III（跨文化交际）    College English III（Intercultural Communication）	3.0	48	48								3							
				大学外语III（英语写作表达与交流）    College English III（English Writing Expression and Communication）	3.0	48	48								3							
			0241003401	大学外语IV*   College English IV*	3.0	48	48									3						
				大学外语IV（进阶英语）    College EnglishIV（Advanced English CET 6-Orientated）	3.0	48	48									3						
				大学外语IV（英语口语表达与交流）    College EnglishIV（English Oral Expression and Communication）	3.0	48	48									3						
				大学外语IV（跨文化交际）    College English IV（Intercultural Communication）	3.0	48	48									3						
				大学外语IV（英语写作表达与交流）    College English IV（English Writing Expression and Communication）	3.0	48	48									3						
				1511372002	C 语言程序设计    C Programming Language	2.5	44	32			12			2								



课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes		
							讲课 Lec.	实验 Exp.	上机 Pro.	课外 实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th			
学科平台课 Discipline Education	必修 Compulsory	数学与自然科学类 Natural Science & Mathematics	0310004101	高等数学 I*   Advanced Mathematics I*	4.5	80	72			8	6										
			0310005201	高等数学 II*   Advanced Mathematics II*	5.5	96	88			8	6										
			0310032001	线性代数    Linear Algebra	2.0	32	32				3										
			0310042001	概率论与数理统计   Probability and Statistics	2.0	32	32							2							
			1510251002	复变函数   Function of Complex Variable	1.5	24	24					2									
			1519501002	面向信息科学的离散数学   Discrete Mathematics in Information Science	1.0	16	16							2							
			0310063101	大学物理 I*   University Physics I*	3.0	48	46	2					3								
			0310063201	大学物理 II*   University Physics II*	3.0	48	46	2						3							
			1511331002	近代物理学    Modern Physics	1.0	16	16							2							
	工程基础类 Foundation Engineering	1510141002	电气工程制图及 CAD    Electrical Engineering Drawing and CAD	1.5	26	20		6				2									
		1510163002	电路分析基础*    Fundamentals of Circuit Analysis*	3.5	56	56						4									
		1510913002	模拟电子技术*    Analogue Electronic Technology*	3.5	60	48	12						3								
		1510923002	数字电子技术*    Digital Electronic Technology*	3.5	60	48	12							3							



课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学 时数 T. C.H	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes			
							讲课 Lec.	实验 Exp.	上机 Pro.	课外 实践 Pra.	一	二	三	四	五	六	七	八				
											1st	2nd	3rd	4th	5th	6th	7th	8th				
学科平台课 Discipline Education	必修 Compulsory	专业基础类 Subject Foundation Requisite	1511364002	自动控制原理*    The Principle of Automatic Control*	4.0	68	56	8	4				4									
			1512532002	电气工程导论    Introduction to Electrical Engineering	1.5	24	18	6			2											
			1512082002	工程电磁场    Engineering Electromagnetic Field	2.0	34	28	6					4									
			1512102002	电力电子技术*    Power Electronics*	2.5	44	32	12							3							
			1512952002	电机学*    Electrical Machinery Theory*	3.0	50	44	6							3							
			1512432002	电机拖动基础    Fundamentals of Electric Machinery and Drive	2.5	42	36	6							3							
			1512711102	电气工程及其自动化专业外语    Specialized English	1.0	16	16								2							
			1512811302	科技论文写作与文献检索    Scientific Thesis Writing and Documentation Retrieval	1.0	16	16										2					
			1512451002	电气安全技术    Electrical Safety Technology	1.0	16	16								2							
			1522401002	电机设计    Design of Electrical Machine	1.0	16	16								2							
			1522383002	开关电源技术    Switching Power Supply Technology	2.0	34	28	6									3					
1522362002	可编程控制器原理与应用    The Principle and Application of Programmable Controller	2.5	44	32	12									4								
小计 Subtotal			59.5	998	882	90	10	16														

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes	
							讲课 Lec.	实验 Exp.	上机 Pro.	课外 实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th		
学科平台课 Discipline Education	实践 Practice		0310081011	大学物理实验    Experiment on Physics	1.0	24		24					√						集中	
			1512722022	工程数学实践    Engineering Mathematics Practice	2.0	48		48						√						分散
			1512202032	生产实习    Production Practice	2.0	48		48										+2		集中
			1510141024	电子技术课程设计    Course Design with Electronic Technique	1	24		24							+1					集中
			1510150012	电路分析基础实验    Circuit Analysis Experiment	0.5	12		12					√							分散
			1512212032	电子工艺实习    Electronic Process Practice	2.0	48		48						+2						集中
			1410071031	金工实习    Metalworking Practice	1.0	24		24					+1							集中
			小计 Subtotal		9.5	228		228												
合计 Total					69.0															
专业教育课 Specialized Education	必修 Compulsory		电气控制方向 Electrical Control	1522732002	电气控制技术    Electrical Control Technology	2.5	42	36	6						3					
				1522392002	工厂供电*    Power Supply of Factories*	2.5	42	36	6					3						
			电气控制方向 Electrical Control	1522372002	运动控制系统*    Motion Control System*	2.5	44	32	12								3			
				1522414002	电力系统分析基础*    Fundamentals of Electric Power System*	3.0	50	44	6						4					
				智能电网方向 Smart Grid	1522142002	电力系统自动化*    Power System Automation*	2.0	32	32								3			

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学 时数 T. C.H	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes	
							讲课 Lec.	实验 Exp.	上机 Pro.	课外 实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th		
专业教育课 Specialized Education	必修 Compulsory		1522562002	智能电网技术    Smart Grid Technology	2.0	32	32									3				
			1522581002	新能源发电技术    New Energy Power Generation Technology	1.5	24	24										2			
			1522322002	电力系统继电保护*    Power System Relay Protection*	2.0	34	28	6									3			
			1522414002	电力系统分析基础*    Fundamentals of Electric Power System*	3.0	50	44	6						4						
			小计 Subtotal			10.5	178	148	30											
							172	160	12											
		选修 Optional		1532121002	高电压工程    High Voltage Engineering	1.0	16	16									2			
			1537042002	计算机网络与通信技术    Computer Network and Communication Technology	2.0	32	32						2							
			1532351002	微网及其控制    Microgrid and its Control	1.0	16	16										2			
			1534962002	C#程序设计    C# Program Design	2.0	36	24		12						2					
			1534302002	信号与系统II    Signals and SystemsII	2.0	34	28	6					2							
			1536252002	VB 程序设计    Visual Basic Program Design	2.0	36	24		12			2								
			1531383002	现代控制理论   Modern Control Theory	3.0	52	40	8	4						3					
			1531392002	数据库基础   Database Basis	2.0	36	24		12					2						

课程类别 Course Type	课程性质 Course Nature	课程号 Course Code	课程名称 Course Name	学分 Cre.	总学时数 T. C.H	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes	
						讲课 Lec.	实验 Exp.	上机 Pro.	课外 实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th		
专业教育课 Specialized Education	选修 Optional	1531992002	仿真技术    Simulation Technology	2.0	36	24		12					2						
		1534992002	微机原理及应用   Principle and Application of Microcomputer	2.5	42	36		6					3						
		1533112002	单片机应用基础   MCU Application Basis	2.0	34	28	6						2						
		1536972002	嵌入式系统原理   Embedded System Principle	2.0	36	24	12							2					
		1534842002	Python 数据分析与应用   Python Data Analysis and Application	2.0	36	24		12					2						
		1533992002	机器人控制   Robot Control	2.0	36	24	12							2					
		1533912002	FPGA 原理及设计   Principle and Design of FPGA	2.0	36	24	12						2						
		1534863002	大数据原理与技术   Principle and Technology of Big Data	3.0	56	32		24						4					
	小计 Subtotal				5.0														
(此处填写修读要求 Fill in the Study Requirements)																			
实践 Practice	电气控制方向 Electrical Control	1512302022	电力电子系统设计   Design of Power Electronic System	2.0	48		48										+2	集中	
		1512252022	供电系统设计   Power Supply System Design	2.0	48		48										2		分散
		1512293022	电气控制技术设计   Design of Electrical Control Technology	3.0	72		72										3		分散

课程类别 Course Type	课程性质 Course Nature		课程号 Course Code	课程名称 Course Name	学分 Cre.	总学 时数 T. C.H	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes	
							讲课 Lec.	实验 Exp.	上机 Pro.	课外 实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th		
专业教育课 Specialized Education	电气控制方向 Electrical Control	1512272022	PLC 系统实训    PLC System Training	2.0	48		48										+2	集中		
		1512222042	毕业设计（论文）    Graduation Design (Thesis)	14	336		336												+14	集中
	实践 Practice	智能电网方向 Smart Grid	1512312022	电力系统继电保护课程设计    Power System Protection Course Design	2.0	48		48										+2	集中	
			1512322022	电力系统自动化课程设计    Fundamentals of Electric Power System Design	2.0	48		48							√					分散
			1512333022	智能微网设计    Intelligent Microgrid Design	3.0	72		72							√					分散
		1512342022	新能源系统设计    Design of New Energy Power System	2.0	48		48									√			分散	
		1512222042	毕业设计（论文）    Graduation Design (Thesis)	14	336		336												+14	集中
		小计 Subtotal		23.0	552		552													
	合计 Total					38.5														
能力拓展课 Competency Development	必修或实践 Compulsory or Practice	1512242022	电机调速系统设计    Design of Motor Speed Control System	2.0	48		48										+2	集中		
		1512282022	电气工程综合实训    Comprehensive Training of Electrical Engineering	3.0	72		72											+3	集中 CDIO 课程	
		小计 Subtotal		5.0	120		120													
		(此处填写修读要求 Fill in the Study Requirements)																		

课程类别 Course Type	课程性质 Course Nature	课程号 Course Code	课程名称 Course Name	学分 Cre.	总学 时数 T. C.H	学时分配 Credit Hour Distribution				各学期周学时分配 Weekly Hours Per Semester								备注 Notes			
						讲课 Lec.	实验 Exp.	上机 Pro.	课外 实践 Pra.	一 1st	二 2nd	三 3rd	四 4th	五 5th	六 6th	七 7th	八 8th				
总计 Sum					164.0	2904	1582	1164	22	136	18.0	28.0	17.5	28.5	18.0	15	10	16+8			
						2898	1594	1146	22	136					13.0	18	12	+5			
课外 环节 Extracurricular practice	课外实践 Extracurricular practice	人文社会实践 Culture and Society Practice	1513401032	社会调查   Social Survey	0.5	12				12								0.5	分散		
		身心健康社会实践 Mentally and Physically Practice	0410050751	课外体育锻炼   Extracurricular Physical Exercise	0.5	12					12								0.5	分散	
			2640030011	劳动教育实践   Labour Education Practice	0.5	12					12	0.5									分散
			0510070311	心理健康辅导   Mental Health Counseling	0.5	12					12								0.5	分散	
		外语技能实践类 Foreign Language Proficiency Training Practice	0210010011	外语技能实践（初级）   Foreign Language Proficiency Training Practice (Elementary)	2.0	48					48				2						分散 二选 一
			0210020011	外语技能实践（高级）   Foreign Language Proficiency Training Practice (Advanced)	2.0	48					48				2						
能力与创新实践 Capability and Innovation Practice	1513414022	大学生素质拓展与创新实践   Quality Development and Innovation Practice	4.0	96					96	1~8 学期依据《沈阳化工大学创新创业实践学分认定办法》由创新创业学院认定								分散			

理论课 1 学分 16 学时，实验课程、上机等 1 学分 24 学时，体育课 1 学分 36 学时，集中实践环节 1 个教学周计 1 学分，学分最小单位为 0.5，课程名称中画\*为考试课。

Note: "Cre. (Credits)", "T.C.H. (Total Credit Hours)", "Lec. (Lecture)", "Exp. (Experiment)", "Pro. (Programming)", "Pra. (Practice)".

## 十、电气工程及其自动化专业学士学位课程一览表

### A list of bachelor's degree programs in Electrical Engineering and Automation

课程类别 Course Type	模块名称 Modules	序号 No.	课程编号 Course Codes	课程名称 Course Name	学分 Credits	开课学期 Semester	
通识教育课 General Education	政治理论 Political Theory	1	0710103001	马克思主义基本原理* Elementary Theory of Marxism*	3	4	
		2	0710133001	毛泽东思想和中国特色社会主义理论体系概论* Mao Zedong Thought and Theory of Socialism with Chinese Characteristics I*	3	4	
学科平台课 Discipline Education	数学 Mathematics	3	0310004101	高等数学I* Advanced Mathematics I*	4.5	1	
	物理 Physics	4	0310063101	大学物理I* University Physics I*	3	2	
	工程基础 Foundations of Engineering	5	1510163002	电路分析基础* Fundamentals of Circuit Analysis*	3.5	2	
		6	1510913002	模拟电子技术* Analogue Electronic Technology*	3.5	3	
		7	1510923002	数字电子技术* Digital Electronic Technology*	3.5	4	
	专业基础 Subject Foundation Requisite	8	1512811102	电气工程及其自动化专业外语 Specialized English	1	5	
		9	1511364002	自动控制原理* The Principle of Automatic Control*	4	4	
		10	1512102002	电力电子技术* Power Electronics*	2.5	5	
		11	1512952002	电机学* Electrical Machinery Theory*	3.0	4	
		12	1512082002	工程电磁场 Engineering Electromagnetic Field	2	3	
	专业教育课 Specialized Education	电气控制 Electrical Control	13	1522732002	电气控制技术 Technology Electrical Control Technology	2.5	5
			14	1522372002	运动控制系统* Motion Control System*	2.5	6
15			1522392002	工厂供电* Power Supply of Factories*	2.5	5	
智能电网 Smart Grid		13	1522322002	电力系统继电保护* Power System Relay Protection*	2.0	6	
		14	1522414002	电力系统分析基础* Fundamentals of Electric Power System*	3.0	5	
		15	1522562002	智能电网技术 Smart Grid Technology	2.0	6	

说明：关于学士学位课的具体要求见《沈阳化工大学关于学士学位课程水平审核制度的若干规定》

### 十一、全学程实践环节周历安排 Weekly Calendar of all Practice Sessions

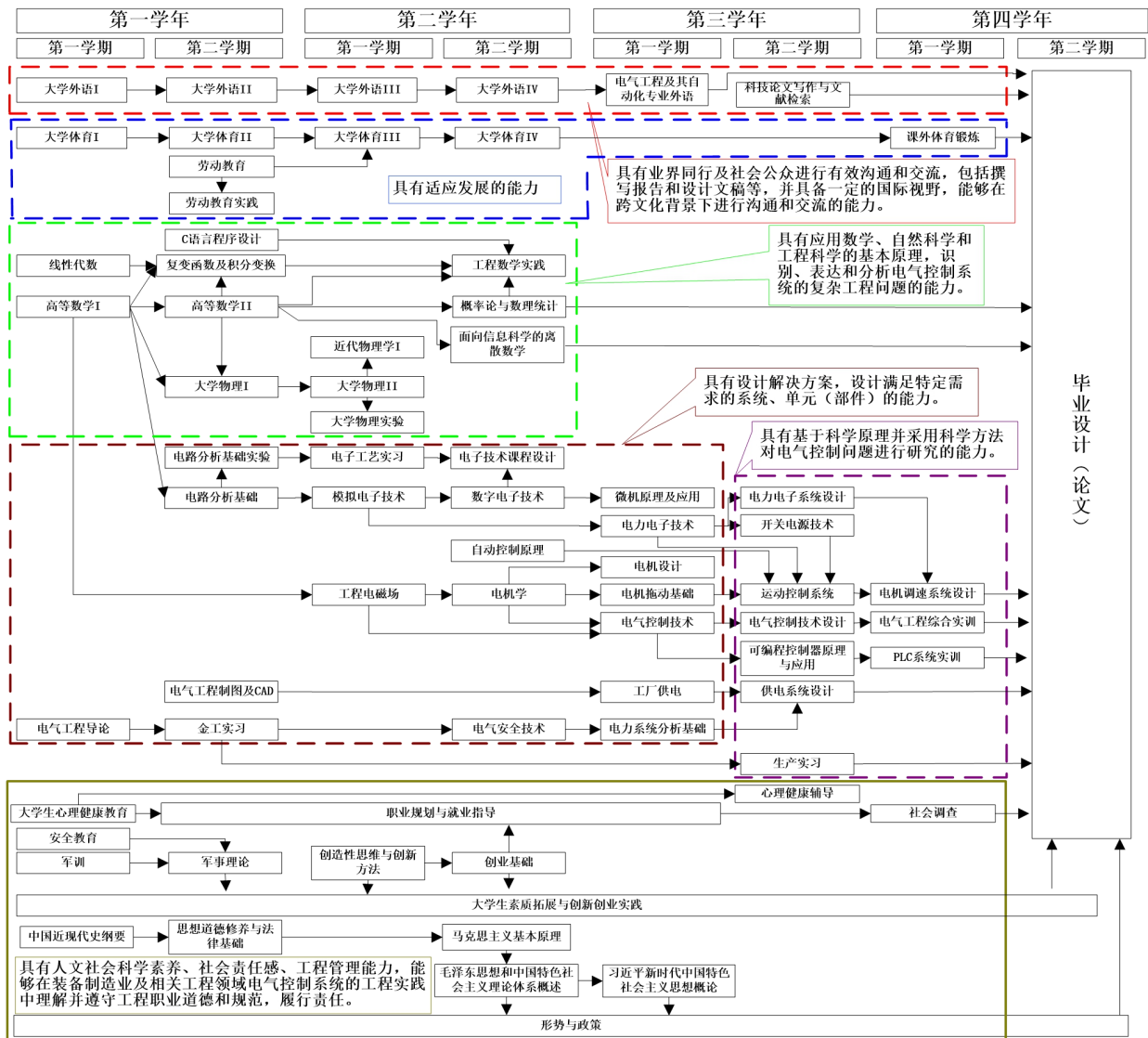
学期	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	备注
一		☆	☆															::	::	•		
二													※					::	::	•		
三																		::	::	•		
四									△									::	::	•		
五									p	p								::	::	•		
六																		::	::	•		
七	△	△	△	△	/	/												::	::	•		
八	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	::	::	•		

符号说明(Symbol Description):

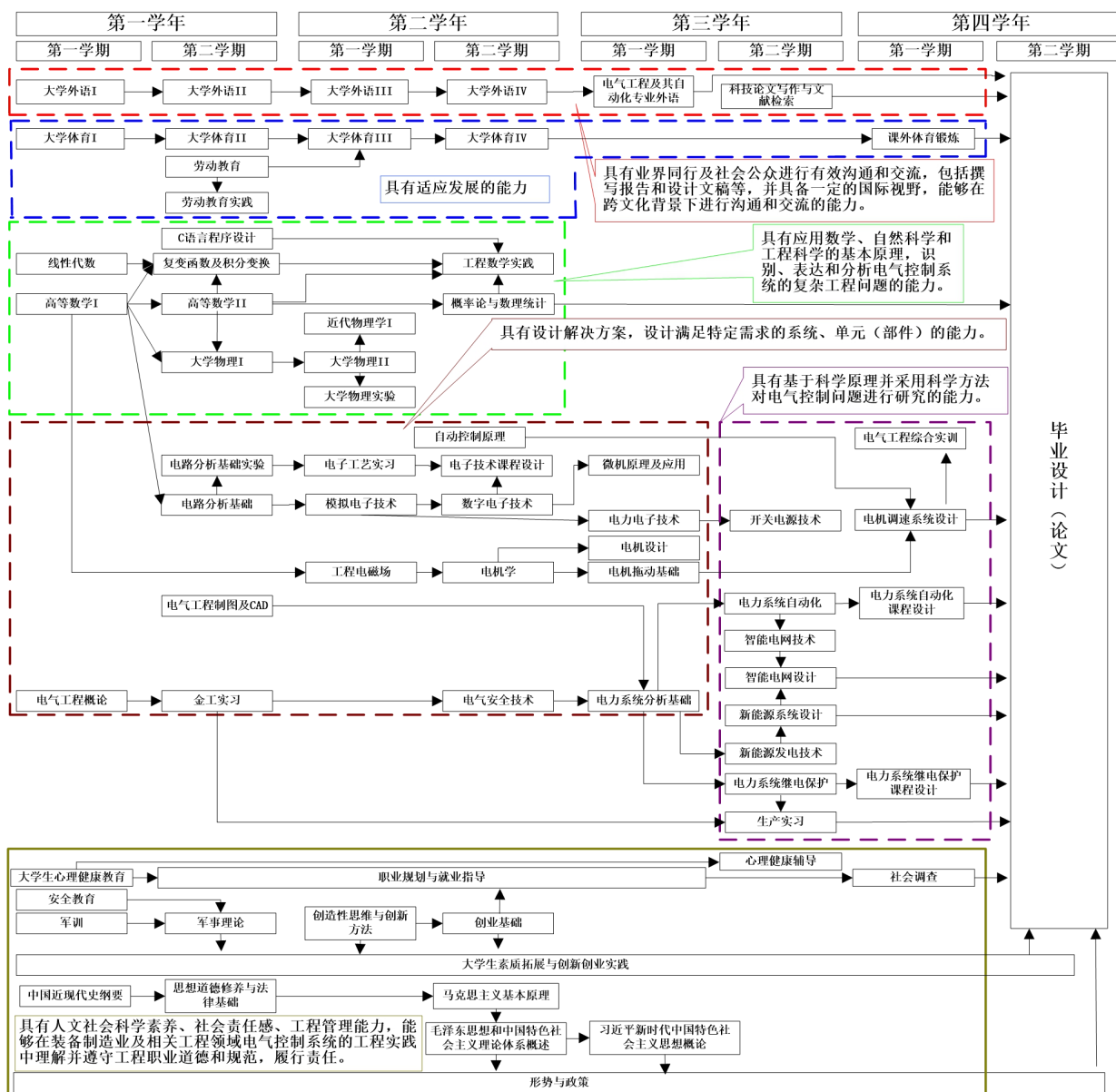
※金工实习||Metalworking Practice    △课程设计||Curriculum Design    /生产实习||Specialized Production Practice    L 专业实验||Specialty Experiment    P 各类实训、学年论文||Practical Training、Term Paper    :: 考试||Examination    ▼ 认识实习||Cognition Practice    ☆军训||Military Training    = 毕业设计(论文)||Graduation Project(Thesis)    ·小学期||Primary Term



## 十二、课程体系配置图 Curriculum System Configuration Diagram



电气控制方向



### 智能电网方向









课程 (Courses)	毕业能力要求 (Graduation Requirements)																																			
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	12.1	12.2		
工程数学实践   Engineering Mathematics Practice					M																					L										
生产实习   Production Practice																	M		M	M					M											
电子技术课程设计   Course Design with Electronic Technique													M				M								L											
电路分析基础实验   Circuit Analysis Experiment		L				L														M				L			M									
电子工艺实习    Electronic Craft Practice											L							L								M		M								
金工实习   Metalworking Practice																			L	M					L	L		M								
电气控制技术   Technology Electrical Control Technology			H	M																																
可编程控制器原理与应用   The Principle and Application of Programmable Controller				M						L																										
运动控制系统*   Motion Control System*			M	H								M		L																						
开关电源技术   Switching Power Supply Technology				L						M																										
工厂供电*										M																								M		







课程 (Courses)	毕业能力要求 (Graduation Requirements)																																			
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	5.3	6.1	6.2	7.1	7.2	8.1	8.2	8.3	9.1	9.2	9.3	10.1	10.2	10.3	11.1	11.2	12.1	12.2		
New Energy Power Generation Technology																																				
社会调查   Social Survey															L										M											
课外体育锻炼   Extracurricular Physical Exercise																					L			L												M
职业规划与就业指导   Career Planning and Employment Guidance																								L	M											