

廣東工業大學

Guangdong University of Technology



自动化学院

电气工程及其自动化专业人才培养方案
自 2022 级开始执行

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自动化学院

电气工程及其自动化本科专业人才培养方案

Undergraduates cultivation scheme

前言（修订说明）

电气工程及其自动化专业是强电（电为能量载体）与弱电（电为信息载体）相结合的专业，要求掌握电机学、电力电子技术、电力系统基础、高电压技术、供配电与用电技术等知识领域的核心内容，培养具有工程技术基础知识和相应的电气工程专业知识，具有解决电气工程技术分析与控制问题基本能力的高级工程技术人才。

本专业培养具有工科基础理论知识和以电能生产、传输与利用为核心的相关专业知识，能够利用所学知识解决工程问题和构建工程系统，具有良好的社会道德和职业道德以及适应社会发展的综合素养，可以从事与电气工程有关的规划设计、电气设备制造、发电厂和电网建设、系统调试与运行、信息处理、保护与系统控制、状态监测、维护检修、环境保护、经济管理、质量保障、市场交易等领域工作，具有科学研究、技术开发与组织管理能力的高素质专门人才。

我校电气工程及其自动化专业前身是 1958 年原广东工学院电工系创办的发电厂电力网及电力系统专业，同年面向全国招生。该专业是全国最早创办电气工程专业的院校之一，也是广东省内最早开办的电气工程专业的院校。广东工业大学电气工程及其自动化专业 50 多年来累计为社会培养 5000 多位合格的专业技术人才，广泛分布于广东省各重点行业。

本专业的课程体系设计，遵循以下基本原则：

- ① 紧密跟踪社会经济与电气领域技术发展新趋势；
- ② 以能力培养为导向，明确专业能力主线，实现能力渐进培养；
- ③ 强调综合与实践，整合课程内容，建设专业能力课程群；
- ④ 以毕业要求为抓手，及时评估，持续改进课程教学。

根据上述基本原则，本专业构建“三大基础、一个领域”课程体系，包括人文社科基础、自然科学基础、电气专业基础、电气专业领域四大类。其中，人文社科基础培养学生生活广度，自然科学基础培养学生学术深度，专业基础涵盖本专业的基础知识并完成运用知识能力的基础训练，专业领域重点培养学生综合运用知识能力，适当体现专业特色。课程体系呈金字塔结构，如图 1 所示。

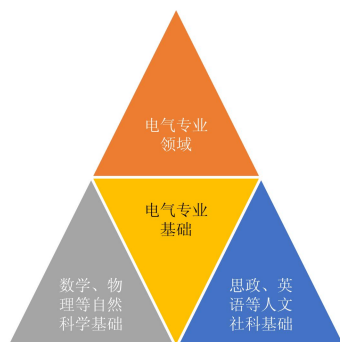


图 1 电气工程及其自动化专业课程体系结构

本次培养方案的修订主要目的是进一步梳理电气工程及其自动化专业核心课程的安排及课程思政内容的建设等。

Introduction

Electrical Engineering and Automation is a major that combines strong electricity (electricity as an energy carrier) and weak electricity (electricity as an information carrier). The core content of electrical technology and other knowledge fields is to cultivate senior engineering and technical personnel with basic knowledge of engineering technology and corresponding electrical engineering expertise, and the basic ability to solve electrical engineering technology analysis and control problems.

This major cultivates high-quality professionals with basic theoretical knowledge of engineering and related professional knowledge centered on electric energy production, transmission and utilization, use of knowledge learned to solve engineering problems and build engineering systems and good social and professional ethics, suitable for social development literacy, engaged in planning and design related to electrical engineering, electrical equipment manufacturing, power plant and power grid construction, system commissioning and operation, information processing, protection and system control, condition monitoring, maintenance and repair, environmental protection, economic management, quality assurance, scientific research, technology development and organizational management capabilities working in fields of market transactions and other fields.

The predecessor of Electrical Engineering and Automation major of our university is the power plant power network and power system major established by the former Department of Electrical Engineering, Guangdong Institute of Technology in 1958. In the same year, it recruited students nationwide. This major is one of the earliest colleges in the country to establish electrical engineering majors, and it is also the earliest established electrical engineering colleges in Guangdong Province. The electrical engineering and automation major in Guangdong University of Technology had cultivated more than 5,000 qualified professional and technical workers for the society for more than 50 years, and they are widely distributed in various key industries in Guangdong province.

The curriculum system design of this major follows the following basic principles:

1. Closely track the new trends of technological development in the social economy and electrical fields;
2. Guided by ability training, clarify the main line of professional ability, and realize gradual ability training;
3. Emphasize synthesis and practice, integrate course content, and build professional ability course groups;
4. Taking the graduation requirements as the starting point, timely evaluation and continuous improvement of course teaching.

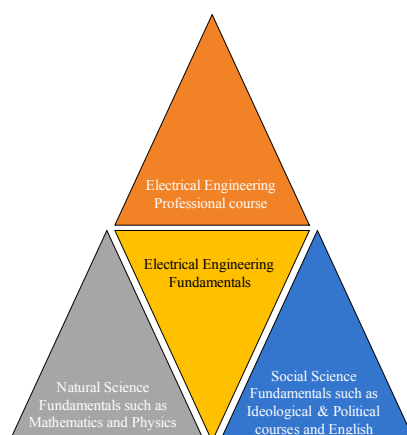


Fig. 1. The professional curriculum architecture of Electrical Engineering and Automation
The main purpose of the revision of this training plan is to further sort out the arrangement of the core

courses of electrical engineering and automation and the construction of the ideological and political contents of the courses.

专业名称：电气工程及其自动化

Major: Electrical Engineering and Automation

专业代码：080601

Code: 080601

学制：4 年

Length of schooling: 4years

授予学位：工学学士

Degree: Bachelor of Engineering

制定（修订）时间：2022 年 1 月 10 日

Time of revision: 2022/01/10

一、培养目标

I. Educational objectives

培养学生成为德才兼备，具有家国情怀、创新精神与协同意识，适应社会、技术与经济发展的电气工程相关领域的技术和管理人才。

To educate students to become technical and managerial talents in electrical engineering related fields with both moral integrity and ability, national feelings, innovation spirit and collaborative consciousness, and adapt to the development of society, technology and economy.

学生毕业 5 年后预期达到以下具体目标：

Five years after graduation, students are expected to achieve the following specific objectives.

目标 1：具有家国情怀，知晓电气行业技术标准和政策法规，坚守职业道德与专业操守。

Objective 1: Have a national feeling, awareness of technical standards and policies and regulations in the relevant areas of electrical engineering, and have the ability to demonstrate ethical and moral responsibility in engineering.

目标 1 的二级指标包括：

- 1.1 具有家国情怀，在工程实践中能够坚持公众利益优先与可持续性发展原则。
- 1.2 熟悉并遵守相关的法律、法规、标准与规范，尊重不同文化下的社会价值。
- 1.3 具有积极主动的工作态度，在本职业务中能够坚守客观、公正、诚信的原则。
- 1.4 尊重他人，具有良好的合作态度与协作精神。

The secondary objectives for objective 1 include:

- 1.1 Have a national feeling, and adhere to the principles of public interest first and sustainable development in engineering practice.
- 1.2 Be familiar with and comply with relevant laws, regulations, standards and norms, and respect social values in different cultures.
- 1.3 Have a proactive working attitude and adhere to the principles of objectivity, impartiality and integrity in their own business.
- 1.4 Respect others and have a good cooperative attitude.

目标 2：具有系统思维与专业素养，具备解决不确定环境下电气领域复杂工程问题能力。

Objective 2: Have systematic thinking and professional quality and the ability to solve complex engineering problems in the field of electrical engineering in an uncertain environment.

目标 2 的二级指标包括：

- 2.1 具有系统思维，多学科知识交叉融合与应用的能力。
- 2.2 掌握电气领域的专业知识与工程技能，熟悉电气相关技术领域，能够对多种资源综合利用。
- 2.3 能够跟踪相关领域前沿技术，具有对电气领域复杂工程问题进行理解、分析、综合、比较、概括、抽象、推理、论证和判断的能力。
- 2.4 不确定环境下，能充分考虑社会、经济、安全、伦理等方面的相关因素，通过分析、研究、实验与论证，提供创新性的解决方案。

The secondary objectives for objective 2 include:

2.1 Have the ability of systematic thinking, interdisciplinary knowledge integration and application.
2.2 Master professional knowledge and engineering skills in the electrical field, be familiar with electrical related technology, and be able to make comprehensive utilization of multiple resources.

2.3 Be able to track cutting-edge technologies in related fields and have the ability to understand, analyse, synthesise, compare, generalise, abstract, reason, argue and judge complex engineering problems in the field of electrical engineering.

2.4 Can fully consider the relevant factors of society, economy, security, ethics under uncertain environment to provide innovative solutions through analysis, research, experiment and demonstration.

目标 3：具备良好的沟通与协调能力，具备组织与实施电气领域工程项目的团队合作或领导能力。

Objective 3: Have good communication and coordination skills and be capable in skills of teamwork or leadership on organizing and implementing engineering projects in electrical engineering and other relevant fields.

目标 3 的二级指标包括：

3.1 具有与同事、客户和公众有效沟通的能力。

3.2 能寻找合作伙伴、专业组织，获取社会各种资源与协助。

3.3 具有融入、领导及带动团队发展的团队合作精神或领导能力。

3.4 熟悉工程经济和管理方面的知识 with 技能，具有组织、协调项目实施的能力。

The secondary objectives for objective 3 include:

3.1 Have the ability to communicate effectively with colleagues, customers and the public.

3.2 The ability to find partners, professional organizations and access various resources in the community.

3.3 Have the team work spirit or leadership ability to integrate, lead and drive team.

3.4 Be familiar with knowledge and skills in engineering economy and management, and have the ability to organize and coordinate project implementation.

目标 4：致力于终身学习与职业发展，能够适应技术、经济与社会的持续发展。

Objective 4: Committed to lifelong learning and career development, can adapt to the sustainable development of technology, economy and society.

目标 4 的二级指标包括：

4.1 具备自我更新及终身学习的意识。

4.2 积极参与岗位进修，推进职业发展。

4.3 能够根据社会与经济发展趋势制定个人发展规划，寻找学习资源，提高个人素养。

4.4 具有一定的全球化意识和国际视野，能够积极主动适应不断变化的国内外形势和环境。

The secondary objectives for objective 4 include:

4.1 Have the awareness of self-renewal and lifelong learning.

4.2 Could actively participate in post training and promote career development.

4.3 Be able to formulate personal development plans according to social and economic development trends, find learning resources and improve personal literacy.

4.4 Have globalization and international vision, and be able to actively adapt to the changing domestic and international situation and environment.

二、毕业要求

II. Graduation requirements

经过四年的系统学习，本专业学生在毕业时可达成以下毕业要求。

After four years of comprehensive learning, the students should reach the following graduation requirements when they graduate.

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领域复杂工程问题。

1. Engineering knowledge: Be able to apply mathematics, natural sciences, engineering fundamentals and professional knowledge to solve complex engineering problems in the electrical field.

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领域复杂工程问题，以获得有效结论。

2. Analysis of issues: Be able to apply the fundamental principles of mathematics, natural and engineering sciences to identify, describe, and analyse complex engineering problems in the electrical field through literature research in order to reach valid conclusions.

3.设计/开发解决方案：能够设计针对电气领域复杂工程问题的解决方案，设计满足特定需求的系统、单元（部件）、工艺流程或方案，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。

3. Design/development solutions: Be able to design solutions to complex engineering problems in the electrical field, designing systems, units (components), processes or scheme to meet specific needs, and be able to demonstrate a sense of innovation in the design process, taking into account social, health, safety, legal, cultural and environmental factors.

4.研究：能够基于科学原理并采用科学方法对电气领域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。

4. Research: Be able to research complex engineering problems in the electrical field based on scientific principles and using the scientific method, including designing experiments, analyzing and interpreting data, and synthesizing information to reach reasonable and valid conclusions.

5.使用现代工具：能够针对电气领域复杂工程问题，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，包括对电气领域复杂工程问题的预测与模拟，并能够理解其局限性。

5. Using modern tools: Be able to develop, select and use appropriate techniques, resources, modern engineering tools and IT tools for complex engineering problems in the electrical field, including prediction and simulation of complex engineering problems in the electrical field, and be able to understand their limitations.

6.工程与社会：能够基于工程相关背景知识进行合理分析，评价工程实践和电气领域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。

6. Engineering and society: Be able to carry out reasonable analysis based on engineering-related background knowledge, and evaluate the social, health, safety, legal and cultural implications of engineering practices and solutions to complex engineering problems in the electrical field, and understand the responsibilities involved.

7.环境和可持续发展：能够理解和评价针对电气领域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. Environment and sustainable development: Be able to understand and evaluate the impact of engineering practice on environmental, socially sustainable development in response to complex engineering problems in the electrical field.

8.职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。

8. Professional Code: Possess humanities and social science literacy, social responsibility, and the ability to understand and comply with engineering professional ethics and codes of conduct and fulfil responsibilities in engineering practice.

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。

9. Individuals and teams: Be able to undertake the role of individual, team members and the person in charge in the team with multi-subject background.

10.沟通：能够就电气领域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。

10. Communication: be able to communicate and interact effectively with industry colleagues and the public on complex engineering issues in the electrical field, including writing reports and design submissions, presenting statements, articulating or responding to instructions, and have an international perspective and be able to communicate and interact in a cross-cultural context.

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。

11. Project management: Understand and master the principles of engineering management and economic decision-making methods and be able to apply them in a multidisciplinary environment.

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。

12. Lifelong learning: A sense of self-directed and lifelong learning, with the ability to learn continuously and adapt to development.

三、专业培养特色

III. Characteristics of professional training

在新工科导向下，秉承以学生为中心、成果导向教育（OBE）和持续质量改进的教育理念，以

智能电网与先进信息技术融合为发展方向，以培养电气工程领域高素质创新性应用型人才为目标，紧扣国家级一流本科专业建设任务和工程教育专业认证持续改进要求，坚持内涵式发展。基于 OBE 反向教学设计理念，明确专业课程对毕业要求的支撑，精细化课程考核，提高课程教学质量，加强教学全过程的信息收集与即时反馈，夯实教学质量改进循环机制。

Directed by the new discipline of engineering, we adhere to the educational philosophy of student-centered principle, Outcome Oriented Education (OBE), and continuous quality improvement. We take the development of smart grids and advanced information technology as the trend of improvement, aim at cultivating high-quality innovations and innovative applied talents in the field of power system, closely follow the requirements for the national first-class construction principle of undergraduate courses and the continuous improvement of the certification for the engineering discipline education, and adhere to the connotative development. Based on the OBE concept of reverse teaching design, we clarify the support of courses for graduation requirements, refine assessments for course studies, improve the teaching quality, strengthen the instant feedback and information collection throughout the teaching process, and consolidate the circulation mechanism of teaching quality improvement.

四. 专业主干学科

IV. Key discipline for the specialty

电气工程、控制科学与工程、计算机科学与技术

Electrical Engineering, Control Science and Engineering, Computer Science and Technology

五. 专业核心课程

V. Core courses

电路、模拟电子技术、数字电子技术、工程电磁场、电机学、**电力电子技术**、自动控制原理、**电力系统分析(1)(2)**、**电力系统继电保护**、**高电压技术**、**电力市场**。

Circuitry, Analog Electronic Technology, Digital Electronic Technology, Engineering Electromagnetic Field, Electric Machinery, **Power Electronics**, Principle of Automatic Control, **Power System Analysis (I, II)**, **Power System Relaying**, **High Voltage Technology**, **Power Markets**.

六. 特色课程（全英课程、双语课程及其他特色教学改革课程）

VI. Featured courses (English courses, bilingual courses and other featured reforming courses)

电力市场、电机学、电力电子技术、自动控制原理、电力系统分析(1)(2)

Power Markets, Electric Machinery, Power Electronics, Principle of Automatic Control, Power System Analysis (I, II)

七. 毕业学分要求

VII. Credits required for graduation

课内总学分不低于 **162.5** 学分，**实践教学环节**（含课内实验）学分不少于 40 学分。

The total credits in class are not less than **162.5** credits, **in which the practicing credits (including experiments in class) are not less than 40.**

八. 主要实践教学环节

VIII. Main components of practical teaching

电机学实验、电力电子技术实验与实训、电力系统分析课程设计、电力系统继电保护课程设计、发电厂电气部分课程设计、电力系统自动化综合实训、高级语言应用实践、Matlab 与电气工程仿真实训、生产实习、毕业设计（论文）等。

Electric Machinery Experiments, Power Electronics Experiments and Training, Project of Power System Analysis, Project of Power System Relaying, Project of Electric Parts of Power Plants, Power System Automation Comprehensive Training, High-level language programming and its practical application, Matlab and Electrical Engineering Simulation Practice, Professional Internship, Final Year Project.

九. 课程体系的构成及课程学分分配比例

IX. Course system structure and course credit proportion

1、课内部分 Intra-curricular sector

课程类别 Course category		内容说明 Description	总学分 Total credits	总学时 Total Teaching Hours	占总学分比例 Percentage	小计 Subtotal
必修 Compulsory courses	公共基础课 Basic Public Courses	含“思想政治理论课”、体育、大学英语、高等数学、大学物理、计算机文化基础等。 Courses such as Ideological & Political Theories, University Physical Education, College English, Advanced Mathematics, Basic Computer Literacy.	57.0	1028	35.1%	58.8%
	专业基础课 Basic Specialty Courses	构筑专业基础平台的基本概念、理论和基础知识的课程。 Courses for constructing the basic concepts, theories and knowledge underlying the specialty.	25.5	408	15.7%	
	专业课 Specialty Courses	构筑专业方向的概念、理论和知识的课程。 Courses for constructing concepts, theories and knowledge of the specialty emphasis.	13.0	208	8.0%	
	实验实习实训 Experimental and practical courses		15.5	240	9.5%	18.7%
	设计（论文） Graduation Design (thesis)		15	240	9.2%	

课程类别 Course category		内容说明 Description	总学分 Total credits	总学时 Total Teaching Hours	占总学分比例 Percentage	小计 Subtotal
选修 Elective courses	全校性公共课（至少选12.0学分） University Wide Public Courses (A minimum of 12.0 credits required)	指人文社科类、自然科学与工程技术类全校性公选课。 University wide public elective courses in humanities and social sciences, natural sciences, and engineering.	12.0	192	7.3%	19.9%
	专业基础课（至少选8.0学分） Basic Specialty Courses (A minimum of 8.0 credits required)	指相关学科和跨学科的基础理论和知识的课程。 Courses for basic theories and knowledge in the main discipline and related disciplines. Courses that are related disciplines and interdisciplinary basic theory and knowledge	8.0	128	4.9%	
	专业课（至少选12.5学分） Specialty Courses (A minimum of 12.5 credits required)	指学科方向和跨学科方向的基础理论和知识的课程。 Courses for basic theories and knowledge in the disciplinary emphasis and interdisciplinary emphasis.	12.5	200	7.7%	
	实验实习实训（至少选2.0学分） Experimental and Practical Courses (A minimum of 2.0 credits required)		2.0	32	1.2%	2.4%
	设计（论文）（至少选2.0学分） Design (thesis)		2.0	32	1.2%	

	(A minimum of 2.0 credits required)					
合计 Total			162.5	2708		100%

2、课外部分 Extra-curricular sector

课程类别 Category		课程名称 Course name	学分 Credits	学时 Hours	实验学时 Experiments hours	实习实训 学时 Practice hours	上机学时 Computer hours
必修 Compulsory part	公共教育类 Public education	入学教育 Entrance education	0.5	0.5 周 0.5 week			
		公益活动 Social work	1.0	16			
		社会实践 Social practice	2.0	32			
		“毛泽东思想和中国特色社会主义理论体系概论”课外导读 Extra-curricular guided reading of Introduction to MAO Zedong Thought and the theoretical system of Socialism with Chinese Characteristics	1.0	16			
		毕业教育 Graduation education	0.5	0.5 周 0.5 week			
	小计 Subtotal		5.0				
选修 Elective part	课外活动名称 Extra-curricular activities	课外活动和社会实践的要求 Requirements for extra-curricular activity and social practice					课外学分 Extra-curricular credits
	英语及计算机考试 English and computer tests	全国大学英语六级考试 National College English Test (CET) 6			考试成绩达到学校要求者 Meeting the required score of the university.		2
		全国计算机等级考试 National Computer Rank Examination (NCRE)			获二级以上证书者 Granted certificate of or above Level 2		2
		全国计算机软件资格、水平考试 National computer software qualification and proficiency tests			获程序员证书者 Granted programmer's certificate		2
					获高级程序员证书者 Granted advanced programmer's certificate		3
					获系统分析员证书者 Granted system analyst's certificate		4
	行业资格考试 Professional qualification tests	参加全国行业资格统考 Nationwide uniform professional qualification tests			获行业资格证书者 Granted professional qualification certificate		1
	竞赛 Contests	校级 University level			获一等奖者 Awarded first prize		2
					获二等奖者 Awarded second prize		1
					获三等奖者 Awarded third prize		0.5
		省级 Provincial level			获一等奖者 Awarded first prize		3

			获二等奖者 Awarded second prize	2
			获三等奖者 Awarded third prize	1
		全国 National level	获一等奖者 Awarded first prize	5
			获二等奖者 Awarded second prize	4
			获三等奖者 Awarded third prize	3
	系列讲座 Serial lectures	参加学校组织的系列讲座 Attending serial lectures held on the campus	参加累计 4 场次以上 Attending a minimum of 4 lectures	1
	论文 Academic papers	在全国性一般刊物发表论文 Having papers published in nationwide average journals	每篇论文 Per paper	1
		核心刊物发表论文 Having papers published in nationwide key journals	每篇论文 Per paper	2
	课外科技创新活 动 Extra-curricular scientific and technological innovation activities	参与课外科技创新活动 Participating extra-curricular scientific and technological innovation activities	每项 Per event	1

十. 课程设置及学时（学分）分配（下表格式供参考）

X. Program requirements and credit (teaching hours) distribution

1、课内部分 Intra-curricular sector

课程类别 Category	课程名称 Course Name	学分 Credits	总学时 Total Teaching Hours	实验学时 Teaching Hours for Experiments	实习实训学时 Teaching Hours for Practice	上机学时 Teaching Hours with Computers
必修课 Compulsory Courses	中国近现代史纲要 Outline of Modern Chinese History	3.0	48		12	
	思想道德与法治 Ideological Morality and Rule of Law	3.0	48		12	
	马克思主义基本原理 Basic Principles of Marxism	3.0	48		12	
	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 Theoretical System of Socialism with Chinese Characteristics	3.0	48		12	
	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			
	形势与政策 Situation and Policy	2.0	64		32	
	体育(1) Physical Education (1)	1.0	36		20	
	体育(2) Physical Education (2)	1.0	36		20	
	体育(3) Physical Education (3)	1.0	36		20	
	体育(4) Physical Education (4)	1.0	36		20	
	大学英语(1) College English (1)	4.0	64	16		
	大学英语(2) College English (2)	4.0	64	16		
	大学物理 A University Physics (A)	8.0	128			
	高等数学 A Advanced Mathematics A	10.5	168			
	军事理论 Military Theory	2.0	36			
	国家安全教育 National Security Education	1.0	16			
	大学生职业规划与创业教育 College Students' Career Planning and Entrepreneurship	1.0	16		8	
	大学生就业创业指导 Guidance of College Students' Employment and Entrepreneurship	1.5	24			

		大学生心理健康教育 College Students' Psychological Health Education	2.0	32		8	
		人工智能基础：科学与工程 Fundamentals of Artificial Intelligence: Science and Engineering	2	32			
		小计 Subtotal	57	1028	32	176	
	专业基础课 Basic Specialty Courses	专业导论 Introduction to Electrical Engineering	1.0	16			
		线性代数 Linear Algebra	2.5	40			
		复变函数与积分变换 Functions of Complex Variables and Integral Transform	2.0	32			
		概率论与数理统计 C Probability & Statistics C	2.5	40			
		离散数学 Discrete Mathematics	2.0	32			
		电路 Circuitry	5.0	80			
		工程电磁场 Engineering Electromagnetic	2.0	32			
		模拟电子技术 Analog Electronic Technology	3.0	48			
		自动控制原理 Principle of Automatic Control	3.5	56	8		
		数字电子技术 Digital Electronic Technology	2.0	32			
		小计 Subtotal	25.5	408	8		
	专业课 Specialty Courses	电机学 Electric Machinery	4.5	72			
		电力电子技术 Power Electronics	2.5	40			
		电力系统分析（1） Power System Analysis (I)	3.0	48	2		
		电力系统分析（2） Power System Analysis (II)	3.0	48	6		
		小计 Subtotal	13.0	208	8		
	实验实习 实训 Experimental and Practical Courses	军训 Military Training	2.0	2 周		32	
		高级语言应用实践 High-level language programming and its practical application	2.0	32			32
		电路实验 Circuitry Experiment	1.0	16	16		
		模拟电子技术实验 Analog Electronic Technology Experiment	1.0	16	16		
		数字电子技术实验 Digital Electronic Technology Experiment	1.0	16	16		

		大学物理实验 A (1) University Physics Experiment (A)(I)	1.5	24	24		
		电机学实验 Electric Machinery Experiment	1.0	16	16		
		电力电子技术实验与实训 Power Electronics Experiments and Training	1.0	16	6	10	
		大学物理实验(2) University Physics Experiment (A)(II)	1.5	24	24		
		生产实习 Professional Internship	2.0	2 周		32	
		工程训练 C Engineering Training C	1.5	1.5 周		24	
		小计 Subtotal	15.5	248	118	98	32
	设计（论文） Graduation Design (Thesis)	毕业设计（论文） Final Year Project	15.0	15 周			
		小计 Subtotal	15.0	240			

课程类别 Category		课程名称 Course Name	学分 Credits	总学时 Total Teaching Hours	实验学时 Teaching Hours for Experiments	实习实训学时 Teaching Hours for Practice	上机学时 Teaching Hours with Computers
选修课 Elective Courses	人文社科公选课 Humanities and Social Sciences	工程伦理 Engineering Ethics	1.5	24			
		劳动教育 Labor Education	1.5	32		28	
		“四史”大视野 The Grand Vision of “Four Histories”	1.0	16		8	
		美育类限选课程 Limited Courses for aesthetic education	2.0	32			
		马克思主义中国化进程与青年学生使命担当 The Sinicization of Marxism and the mission of young students	1.5	24		8	
		其他 Others	1.5	24			
	自然科学公选课 Natural Sciences and Engineering Technology	工程管理 Engineering Management	1.5	24			
		其他 Others	1.5	24			
		小计（至少选 12.0 学分） Subtotal (at least 12.0 credits)	12.0	192		44	
	专业基础课 Basic Specialty Courses	工程制图 Engineering Drawing	2.0	32			
		计算方法 Method of Calculation	2.0	32			
		电气测试技术 Electrical testing technology	2.0	32	6		
		微机原理与单片机技术 The Principle of Microcomputer	2.5	40	8		

		and Microcontroller					
		信号分析与处理 Signal Analysis and Processing	2.0	32			
		可编程控制器原理及应用 Principle and application of programmable logic controller	2.0	32	6		
		小计（至少选 8.0 学分，至多选 12.5 学分） Subtotal (at least 8.0 credits, at most 12.5 credits)	12.5	200	20		
	专业课 Specialty Courses	电力系统继电保护 Power System Relaying	3.5	56	6		
		发电厂电气部分 Electrical Parts of Power Plants	3.0	48	4		
		电力系统自动化 Power System Automation	2.5	40			
		高电压技术 High Voltage Technology	2.0	32	4		
		电力市场 Power Markets	2.0	32			
		智能电网技术 Technologies for Smart Grid	1.5	24			
		专业英语 Professional English	1.0	16			
		楼宇智能化技术 Intelligent Building Technology	2.0	32	6		
		电力拖动与运动控制 Electric Drives and Motion Control	3.0	48	8		
		中低压开关盘原理与运行 Principle and operation of low and medium voltage switchboard	1.0	16			
		电气逻辑图与接线图 Electrical logic diagram and wiring diagram	1.0	16			
		小计（至少选 12.5 学分，至多选 17.0 学分） Subtotal (at least 12.5 credits, at most 17.0 credits)	23	368	28		
	实验实习实训 Experimental and Practical Courses	电机修理实训 Practice of Electric Machinery Repair	1.0	1 周		16	
		电力系统自动化综合实训 Comprehensive Training of Power System Automation	1.0	16	8	8	
		Matlab 与电气工程仿真 Matlab and Electrical Engineering Simulation	1.0	16			16
		科技创新活动 Science and Technology Innovation Activities	1.0	1 周		16	
		小计（至少选 2.0 学分） Subtotal (at least 2.0 credits)	4.0	64	8	40	16
	设计（论文） Graduation Design (Thesis)	电力系统分析课程设计 Project of Power System Analysis	1.0	1 周			16
		电力系统继电保护课程设计 Project of Power System Relaying	1.0	1 周			16
		发电厂电气部分课程设计 Project of Electric Parts of Power Plants	1.0	1 周			4

		楼宇智能化技术课程设计 Project of Building Intelligent Technology	1.0	1 周		16	
		电气测试技术课程设计 Project of Electrical Testing Technology	1.0	1 周			6
		小计（至少选 2.0 学分） Subtotal (at least 2.0 credits)	5.0	80	0	16	42

附录

1、课程体系对毕业要求的支撑关系

The supporting relationship between course system and its graduation requirements

毕业要求	指标点分解	课程名称
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领域复杂工程问题。 1. Engineering knowledge: Be able to apply mathematics, natural sciences, engineering fundamentals and professional knowledge to solve complex engineering problems in the electrical field.	1.1 能够运用数学、自然科学、工程基础和专业知识解释电气专业的复杂工程问题，建立正确的数学、物理模型； 1.1 Be able to use mathematics, natural science, engineering foundation and professional knowledge to explain complex engineering problems in electrical majors, and establish correct mathematical and physical models;	高等数学 A 线性代数 离散数学 大学物理 A(+实验) 概率论与数理统计 C 电路 (+实验) Advanced Mathematics A Linear Algebra Discrete Mathematics University Physics A (+ Experiments) Probability & Statistics C Circuitry (+Experiments)
	1.2 理解并掌握电气工程的基础知识，能够将其用于推演、分析工程问题中的电磁场、电网络等相关问题； 1.2 Understand and master the basic knowledge of electrical engineering, and be able to use it to deduce and analyze related issues such as electromagnetic fields and electrical networks in engineering problems;	电路 (+实验) 工程电磁场 模拟电子技术 (+实验) 数字电子技术 (+实验) Circuitry (+Experiments) Engineering Electromagnetic Field Analog Electronic Technology (+ Experiments) Digital Electronics Technology (+ Experiments)
	1.3 能够运用数学、电气工程专业知识抽象、归纳电气工程问题的本质，并对解决方案进行比较与综合； 1.3 Be able to use mathematics and electrical engineering expertise to abstract and summarize the essence of electrical engineering problems, and compare and synthesize solutions;	复变函数与积分变换 离散数学 工程电磁场 电机学 (+实验) 自动控制原理 (含实验) Functions of Complex Variables and Integral Transform Discrete Mathematics Engineering Electromagnetic Fields Electrical Machinery (+ Experiment) Automatic control principle (including experiment)
	1.4 能够选择恰当的数学模型，用于描述电气领域复杂工程问题，并进行分析和求解。 1.4 Be able to select an appropriate mathematical model to describe, analyze and solve complex engineering problems in the electrical field.	概率论与数理统计 C 电力系统分析(1)(2) (含实验) 发电厂电气部分 (含实验) 电力系统继电保护 (含实验) Probability & Statistics C Power System Analysis (1) (2) (including experiments) Electrical part of power plant (including experiments) Power System Relaying (including experiments)
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领域复杂工程问题，以获得有效结论。 2. Problem Analysis: Be able to apply the fundamental principles of mathematics, natural and engineering sciences to identify, describe, and analyse complex engineering problems in the electrical field through	2.1 能够应用数学、自然科学和工程科学的基本原理对电气领域复杂工程问题的关键环节进行识别和判断； 2.1 Be able to apply the basic principles of mathematics, natural science and engineering science to identify and judge the key links of complex engineering problems in the electrical field;	线性代数 概率论与数理统计 C 电机学 (+实验) 电力系统自动化 高电压技术 (含实验) Linear Algebra Probability & Statistics C Electric Machinery (+ Experiment) Automation of Electric Power Systems High voltage technology (including experiments)
	2.2 能够运用数学模型、图纸、图表和文字等工程语言对电气专业的复杂工程问题进行表述和解析； 2.2 Be able to use engineering languages such as mathematical models, drawings, diagrams and texts to express and analyze complex engineering problems in the electrical major;	线性代数 电力系统继电保护 (含实验) 发电厂电气部分 (含实验) 科技创新活动 Linear Algebra Power System Relaying (including

literature research in order to reach valid conclusions.		experiments) Electrical part of power plant (including experiment) Science and Technology Innovation Activities
	2.3 能认识到解决问题有多种可选择方案，会通过文献研究寻求可替代的解决方案，能通过建模与仿真分析比较各解决方案； 2.3 Be able to recognize that there are many alternatives to solve problems, seek alternative solutions through literature research, and compare solutions through modeling and simulation analysis;	计算方法 电力电子技术 自动控制原理（含实验） Matlab 与电气工程仿真实训 专业英语 Method of Calculation Power Electronics Principle of Automatic Control (including experiment) Matlab and Electrical Engineering Simulation Practice Professional English
	2.4 能够运用电气工程基本原理，结合文献研究，分析电气领域复杂工程问题的影响因素，论证解决方案的合理性。 2.4 Be able to use basic principles of electrical engineering, combined with literature research, to analyze the influencing factors of complex engineering problems in the electrical field and to demonstrate the rationality of solutions.	电力系统分析课程设计 发电厂电气部分课程设计 毕业设计（论文） Project of Power System Analysis Project of Electric Parts of Power Plants Final Year Project
3.设计/开发解决方案： 能够设计针对电气领域复杂工程问题的解决方案，设计满足特定需求的系统、单元（部件）或工艺流程，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。 3.Design/development solutions: Be able to design solutions to complex engineering problems in the electrical field, designing systems, units (components) or processes to meet specific needs, and be able to demonstrate a sense of innovation in design process, considering social, health, safety, legal, cultural and environmental factors.	3.1 掌握电气工程设计和产品开发全周期、全流程的基本设计/开发方法和技术，了解影响设计目标和技术方案的各种因素； 3.1 Master the basic design/development methods and technologies in the entire cycle and process of electrical engineering design and product development, and understand various factors that affect design goals and technical solutions;	电气测试技术 电力系统分析课程设计 发电厂电气部分课程设计 电力系统继电保护课程设计 Electrical testing technology Project of Power System Analysis Project of Electric Parts of Power Plants Project of Power System Relaying
	3.2 能够针对特定需求，完成单元（部件）的设计，能够进行电气领域的系统或工艺流程设计，在设计中体现创新意识； 3.2 Be able to complete the design of units (components) according to specific needs, be able to carry out system or process design in the electrical field, and reflect the sense of innovation in the design;	人工智能基础：科学与工程 电力系统分析课程设计 电力系统继电保护课程设计 电力系统自动化综合实训 科技创新活动 Fundamentals of Artificial Intelligence: Science and Engineering Project of Power System Analysis Project of Power System Relaying Power System Automation Comprehensive Training Science and Technology Innovation Activities
	3.3 在设计中能够考虑安全、健康、法律、文化及环境等制约因素。 3.3 Considering the safety, health, legal, cultural and environmental constraints can be in design.	电力系统分析课程设计 发电厂电气部分课程设计 工程伦理 毕业设计（论文） Project of Power System Analysis Project of Electric Parts of Power Plants Engineering Ethics Final Year Project
4.研究： 能够基于科学原理并采用科学方法对电气领域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。 4. Research: Be able to research complex engineering problems in the electrical field based on scientific principles and using the scientific method,	4.1 能够基于电气工程基本原理，通过文献研究或相关方法，调研和分析电气领域复杂工程问题的解决方案； 4.1 Be able to investigate and analyze solutions to complex engineering problems in the electrical field through literature research or related methods based on the basic principles of electrical engineering;	电力系统分析(1)(2)（含实验） 电力电子技术 电力系统自动化 Power System Analysis (1) (2) (including experiments) Power Electronics Power System Automation
	4.2 能够针对电气领域复杂工程问题，选择研究路线，设计实验方案并构建实验系统，安全开展实验，正确采集实验数据； 4.2 Be able to select research routes, design experimental schemes and build experimental systems for complex engineering problems in the	电机修理实训 电力电子技术实验与实训 电力系统自动化综合实训 Practice of Electric Machinery Repair Power Electronics Experiments and Training Power System Automation

including designing experiments, analyzing and interpreting data, and synthesis information to reach reasonable and valid conclusions.	electrical field, conduct experiments safely, and collect experimental data correctly;	Comprehensive Training
	4.3 能对实验结果进行分析和解释, 并通过信息综合得到合理有效的结论。 4.3 Be able to analyze and interpret experimental results, and obtain reasonable and effective conclusions through information synthesis.	概率论与数理统计 C 计算方法 信号分析与处理 Probability & Statistics C Method of Calculation Digital Signal Processing
5.使用现代工具: 能够针对电气领域复杂工程问题, 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, 包括对电气领域复杂工程问题的预测与模拟, 并能够理解其局限性。 5. Using modern tools: Be able to develop, select and use appropriate techniques, resources, modern engineering tools and IT tools for complex engineering problems in the electrical field, including prediction and simulation of complex engineering problems in the electrical field, and be able to understand their limitations.	5.1 了解电气专业常用的现代仪器、信息技术工具、工程工具和模拟软件的使用原理和方法, 并理解其局限性; 5.1 Understand the principles and methods of using modern instruments, information technology tools, engineering tools and simulation software commonly used in electrical professions, and understand their limitations;	高级语言应用实践 微机原理与单片机技术 电气测试技术 Matlab 与电气工程仿真实训 High-level language programming and its practical application The Principle of Microcomputer and Microcontroller Electrical testing technology Matlab and Electrical Engineering Simulation Practice
	5.2 能够选择与使用恰当的仪器、信息资源、工程工具和专业模拟软件, 对电气领域复杂工程问题进行分析、计算与设计; 5.2 Be able to select and use appropriate instruments, information resources, engineering tools and professional simulation software to analyze, calculate and design complex engineering problems in the electrical field;	人工智能基础: 科学与工程 高级语言应用实践 微机原理与单片机技术实践 电力系统继电保护课程设计 Fundamentals of Artificial Intelligence: Science and Engineering High-level language programming and its practical application Microcomputer and Microcontroller Training Project of Power System Relaying
	5.3 能够针对电气领域复杂工程问题, 开发或选用满足特定需求的现代工具, 模拟和预测专业问题, 并能够分析其局限性。 5.3 Be able to develop or select modern tools that meet specific needs for complex engineering problems in the electrical field, simulate and predict professional problems, and be able to analyze their limitations.	信号分析与处理 Matlab 与电气工程仿真实训 毕业设计 (论文) Digital Signal Processing Matlab and Electrical Engineering Simulation Practice Final Year Project
6.工程与社会: 能够基于工程相关背景知识进行合理分析, 评价工程实践和电气领域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。 6.Engineering and society: Be able to carry out reasonable analysis based on engineering-related background knowledge, and evaluate the social, health, safety, legal and cultural implications of engineering practices and solutions to complex engineering problems in the electrical field, and understand the responsibilities involved.	6.1 了解社会文化、风俗伦理以及电气相关领域的技术标准体系、知识产权、产业政策和法律法规, 能够分析和评价电气领域复杂工程问题的解决方案,理解不同社会文化对工程活动的影响; 6.1 Understand social culture, customs and ethics, and technical standard system, intellectual property rights, industrial policies, laws and regulations in electrical-related fields, be able to analyze and evaluate solutions to complex engineering problems in the electrical field, and understand the impact of different social cultures on engineering activities;	习近平新时代中国特色社会主义思想概论 思想道德与法治 中国近现代史纲要 “四史”大视野 工程伦理 Ideological Morality and Rule of Law Outline of Modern and Contemporary Chinese History The Grand Vision of “Four Histories” Engineering Ethics Introduction to Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era
	6.2 能分析和评价电气专业工程实践对社会、健康、安全、法律、文化的影响, 以及这些制约因素对项目实施的影响, 并理解应承担的责任。 6.2 Be able to analyze and evaluate the impact of electrical engineering practice on society, health, safety, law, and culture, as well as the impact of these constraints on project implementation, and understand the responsibilities that should be undertaken.	毛泽东思想和中国特色社会主义理论体系概论 生产实习 毕业设计 (论文) Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics Professional Internship Final Year Project
7.环境和可持续发展: 能够理解和评价针对电气领域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. Environment and	7.1 知晓和理解环境保护和可持续发展的理念和内涵; 7.1 Know and understand the concept and connotation of environmental protection and sustainable development;	思想道德与法治 形势与政策 生产实习 工程伦理 Ideological Morality and Rule of Law Situation and Policy

<p>sustainable development: Be able to understand and evaluate the impact of engineering practice on environmental, socially sustainable development in response to complex engineering problems in the electrical field.</p>	<p>7.2 能够站在环境保护和可持续发展的角度思考电气专业工程实践的可持续性, 评价产品周期中可能对人类和环境造成的损害和隐患。 7.2 Be able to think about the sustainability of electrical engineering practice from the perspective of environmental protection and sustainable development, and evaluate the possible damage and hidden dangers to humans and the environment during the product cycle.</p>	<p>Professional Internship Professional Internship Engineering Ethics 智能电网技术 高电压技术 (含实验) 生产实习 Technologies for Smart Grid High Voltage Technology Professional Internship</p>
<p>8.职业规范: 具有人文社会科学素养、社会责任感, 能够在工程实践中理解并遵守工程职业道德和规范, 履行责任。 8. Professional Code: Possess humanities and social science literacy, social responsibility, and the ability to understand and comply with engineering professional ethics and codes of conduct and fulfil responsibilities in engineering practice.</p>	<p>8.1 树立正确的人生观和价值观, 具有人文社会科学素养和社会责任感, 了解中国国情; 8.1 Establish a correct outlook on life and values, have humanities and social science literacy and a sense of social responsibility, and understand China's national conditions;</p>	<p>马克思主义基本原理 毛泽东思想和中国特色社会主义理论体系概论 形势与政策 国家安全教育 军事理论 Fundamental Principles of Marxism Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics Situation and Policy National Security Education Military Theory</p>
	<p>8.2 理解诚实公正、诚信守则的工程职业道德和规范, 并能在工程实践中自觉遵守; 8.2 Understand the engineering professional ethics and norms of honesty, fairness and integrity, and consciously abide by it in engineering practice;</p>	<p>思想道德与法治 毛泽东思想和中国特色社会主义理论体系概论 国家安全教育 工程伦理 Ideological Morality and Rule of Law Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics National Security Education Engineering Ethics</p>
	<p>8.3 理解电气工程师对公众的安全、健康、福祉和环境保护的社会责任, 能够在工程实践中自觉履行责任。 8.3 Understand the social responsibilities of electrical engineers to the safety, health, well-being and environmental protection of the public, and be able to consciously perform their responsibilities in engineering practice.</p>	<p>工程伦理 生产实习 Engineering Ethics Professional Internship</p>
<p>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。 9. Individuals and teams: Be able to undertake the role of individual, team members and the person in charge in the team with multi-subject background.</p>	<p>9.1 能与其他学科的成员有效沟通, 合作共事; 9.1 Able to communicate effectively and work cooperatively with members of other disciplines;</p>	<p>电力市场 工程管理 Power Markets Engineering Management</p>
	<p>9.2 能够在团队中独立或合作开展工作, 并组织、协调和指挥团队开展工作。 9.2 Be able to work independently or cooperatively in a team and organize, coordinate and direct the work of a team.</p>	<p>电机修理实训 电力电子技术实验与实训 科技创新活动 Practice of Electric Machinery Repair Power Electronics Experiments and Training Science and Technology Innovation Activities</p>
<p>10.沟通: 能够就电气领域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>	<p>10.1 能够就电气领域复杂工程问题, 以口头、文稿、图表等方式, 准确表达自己的观点, 回应质疑, 理解与业界同行和社会公众交流的差异性; 10.1 Be able to accurately express one's own views on complex engineering issues in the electrical field by means of oral, manuscript, diagrams, etc., respond to doubts, and understand the differences in communication with peers in the industry and the public;</p>	<p>专业英语 生产实习 劳动教育 Professional English Professional Internship Labor Education</p>

<p>10. Communication: be able to communicate and interact effectively with industry colleagues and the public on complex engineering issues in the electrical field, including writing reports and design submissions, presenting statements, articulating or responding to instructions, and have an international perspective and be able to communicate and interact in a cross-cultural context.</p>	<p>10.2 了解专业领域的国际发展趋势、研究热点，理解和尊重世界不同文化的差异性和多样性，具备跨文化交流的语言和书面表达能力，能就专业问题，在跨文化背景下进行基本沟通和交流。 10.2 Understand the international development trends and research hotspots in the professional field, understand and respect the differences and diversity of different cultures in the world, have language and written expression skills for cross-cultural communication, and be able to conduct basic communication and communication on professional issues in a cross-cultural context. communicate with.</p>	<p>大学英语(1)(2) 专业英语 智能电网技术 College English I, II Professional English Technologies for Smart Grid</p>
<p>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。 11. Project management: Understand and master the principles of engineering management and economic decision-making methods and be able to apply them in a multidisciplinary environment.</p>	<p>11.1 掌握工程项目中涉及的管理与经济决策方法，了解工程及产品全周期、全流程的成本构成，理解其中涉及的工程管理与经济决策问题； 11.1 Master the management and economic decision-making methods involved in engineering projects, understand the cost structure of the whole cycle and the whole process of engineering and products, and understand the engineering management and economic decision-making issues involved; 11.2 能在多学科环境下(包括模拟环境)，在设计开发解决方案的过程中，运用工程管理与经济决策方法。 11.2 Be able to apply engineering management and economic decision-making methods in the design and development of solutions in a multidisciplinary environment (including simulation environments).</p>	<p>马克思主义基本原理 工程管理 电力市场 Fundamental Principles of Marxism Engineering Management Power Markets</p>
<p>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。 12. Lifelong learning: A sense of self-directed and lifelong learning, with the ability to learn continuously and adapt to development.</p>	<p>12.1 能在社会发展的大背景下，认识到自主和终身学习的必要性； 12.1 Able to recognize the necessity of autonomous and lifelong learning in the context of social development; 12.2 具有自主学习的能力，包括对技术问题的理解能力，归纳总结的能力等。 12.2 Have the ability to learn independently, including the ability to understand technical issues and the ability to summarize.</p>	<p>专业导论 “四史”大视野 马克思主义中国化进程与青年学生使命担当 Introduction to Electrical Engineering The Grand Vision of “Four Histories” The Sinicization of Marxism and the mission of young students 毛泽东思想和中国特色社会主义理论体系概论 电力系统自动化综合实训 毕业设计（论文） Introduction to Mao Zedong Thought and Theoretical System of Socialism with Chinese Characteristics Power System Automation Comprehensive Training Final Year Project</p>

2、毕业要求对培养目标的支撑关系

The supporting relationship between graduation requirements and its objectives

毕业要求 \ 培养目标		目标 1: 具有家国情怀, 知晓电气行业技术标准和政策法规, 坚守职业道德与专业操守;				目标 2: 具有系统思维与专业素养, 具备解决不确定环境下电气领域复杂工程问题能力;				目标 3: 具备良好的沟通与协调能力, 具备组织与实施电气领域工程项目的团队合作和领导能力;				目标 4: 致力于终身学习与职业发展, 能够适应技术、经济与社会的持续发展。			
		1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4
毕业要求 1 (工程知识)	指标点 1.1					○		○									
	指标点 1.2							○									
	指标点 1.3						○	○									
	指标点 1.4							○									
毕业要求 2 (问题分析)	指标点 2.1						○										
	指标点 2.2						○	○									
	指标点 2.3							○									
	指标点 2.4							○									
毕业要求 3 (设计/开发解决方案)	指标点 3.1								○								
	指标点 3.2								○								
	指标点 3.3								○								
毕业要求 4 (研究)	指标点 4.1							○									
	指标点 4.2							○	○								
	指标点 4.3							○	○								

毕业要求 5 (使用现代工具)	指标点 5.1						Ö										
	指标点 5.2						Ö										
	指标点 5.3					Ö											
毕业要求 6 (工程与社会)	指标点 6.1		Ö														
	指标点 6.2		Ö														
毕业要求 7 (环境和可持续发展)	指标点 7.1	Ö															
	指标点 7.2	Ö															
毕业要求 8 (职业规范)	指标点 8.1			Ö													
	指标点 8.2			Ö													
	指标点 8.3				Ö												
毕业要求 9 (个人和团队)	指标点 9.1									Ö	Ö						
	指标点 9.2									Ö	Ö						
毕业要求 10 (沟通)	指标点 10.1									Ö							
	指标点 10.2									Ö							
毕业要求 11 (项目管理)	指标点 11.1											Ö					
	指标点 11.2											Ö					
毕业要求 12 (终身学习)	指标点 12.1												Ö		Ö		
	指标点 12.2													Ö		Ö	

Graduation requirements		Educational objectives				Objective 1: Have a national feeling, awareness of technical standards and policies and regulations in the relevant areas of electrical engineering, and have the ability to demonstrate ethical and moral responsibility in engineering.				Objective 2: Have systematic thinking and professional quality and the ability to solve complex engineering problems in the field of electrical engineering in an uncertain environment.				Objective 3: Have good communication and coordination skills and be capable in skills of teamwork or leadership on organizing and implementing engineering projects in electrical engineering and other relevant fields.				Objective 4: Committed to lifelong learning and career development, can adapt to the sustainable development of technology, economy and society.			
		1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4	4.1	4.2	4.3	4.4				
Graduation requirement 1 Engineering knowledge	1.1					Ö		Ö													
	1.2							Ö													
	1.3						Ö	Ö													
	1.4							Ö													
Graduation requirement 2 Analysis of issues	2.1						Ö														
	2.2						Ö	Ö													
	2.3							Ö													
	2.4							Ö													
Graduation requirement 3 Design/development solutions	3.1								Ö												
	3.2								Ö												
	3.3								Ö												
Graduation requirement 4 Research	4.1							Ö													
	4.2							Ö	Ö												
	4.3							Ö	Ö												
Graduation	5.1						Ö														

requirement 5 Using modern tools	5.2						Ö										
	5.3					Ö											
Graduation requirement 6 Engineering and society	6.1		Ö														
	6.2		Ö														
Graduation requirement 7 Environment and sustainable development	7.1	Ö															
	7.2	Ö															
Graduation requirement 8 Professional Code	8.1			Ö													
	8.2			Ö													
	8.3				Ö												
Graduation requirement 9 Individuals and teams	9.1									Ö	Ö						
	9.2									Ö	Ö						
Graduation requirement 10 Communication	10.1								Ö								
	10.2								Ö								
Graduation requirement 11 Project management	11.1											Ö					
	11.2											Ö					
Graduation requirement 12 Lifelong learning	12.1												Ö		Ö		
	12.2													Ö		Ö	

3、毕业要求达成度评价机制

Graduation requirements evaluation mechanism

本专业根据课程体系对毕业要求的支撑关系，综合考虑各门课程的具体教学环节和内容对各项毕业要求及其指标点达成的关联程度、课程类别（理论课程、实验实习实训、毕业设计）对各项毕业要求及其指标点达成程度的差异、课程性质（专业核心课程、非专业核心课程）对各项毕业要求及其指标点达成程度的差异，同时将每项毕业要求指标点归一化，忽略与毕业要求达成关联程度过少的课程，制定以下权重系数设定规则：

According to the supporting relationship between the curriculum system and graduation requirements of this major. Considering the specific teaching steps and contents of each course of the graduation requirements and indicators point to achieve the degree of correlations, course category (theory courses, experiment practice, graduation design) for the graduation requirements and indicators point to reach a degree of difference, the type of the course (professional core courses, unprofessional core courses) points to the graduation requirements and its indexes reached a degree of difference. At the same time, the index points of each graduation requirement are normalized, and the courses with too little correlation with graduation requirements are ignored. The following rules for setting weight coefficients are formulated.

1. 关联程度的权重 (K_1)
 - 1) 高关联程度 (H) 的权重系数: $K_1=1.5$;
 - 2) 中等关联程度 (M) 的权重系数: $K_1=0.5$ 。
2. 课程类别的权重 (K_2)
 - 1) 理论课程的权重系数: $K_2=1.0$;
 - 2) 实验课、课程设计以及实习实训课程的权重系数: $K_2=1.5$;
 - 3) 毕业设计的权重系数: $K_2=2.0$ 。
3. 课程性质的权重 (K_3)
 - 1) 专业核心课程的权重系数: $K_3=1.5$;
 - 2) 非专业核心课程的权重系数: $K_3=1.0$ 。

1. Weight of association degree (K_1)
 - 1) Weight coefficient of high correlation degree (H): $K_1=1.5$;
 - 2) Weight coefficient of moderate correlation degree (M): $K_1=0.5$ 。
2. Weight of course category (K_2)
 - 1) Weight coefficient of theoretical courses: $K_2=1.0$;
 - 2) Weight coefficient of experimental courses, curriculum design and practical training courses: $K_2=1.5$;
 - 3) Weight coefficient of graduation design: $K_2=2.0$ 。
3. Weight of course type (K_3)
 - 1) Weight coefficient of professional core courses: $K_3=1.5$;
 - 2) Weight coefficient of professional core courses: $K_3=1.0$ 。

毕业要求	指标点分解	课程名称	学分	课程权重
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领域复杂工程问题	1.1 能够运用数学、自然科学、工程基础和专业知识解释电气专业的复杂工程问题，建立正确的数学、物理模型；	高等数学 A Advanced Mathematics A	10.5	0.25
		线性代数 Linear Algebra	2.0	0.10
		离散数学 Discrete Mathematics	2.0	0.10

毕业要求	指标点分解	课程名称	学分	课程权重
<p>题。</p> <p>1. Engineering knowledge: Be able to apply mathematics, natural sciences, engineering fundamentals and professional knowledge to solve complex engineering problems in the electrical field.</p>	1.1 Be able to use mathematics, natural science, engineering foundation and professional knowledge to explain complex engineering problems in electrical majors, and establish correct mathematical and physical models;	大学物理 A(+实验) University Physics A (+ Experiments)	11	0.25
		概率论与数理统计 C Probability & Statistics C	2.5	0.10
		电路 (+实验) Circuitry (+Experiments)	6.5	0.20
	1.2 理解并掌握电气工程的基础知识, 能够将其用于推演、分析工程问题中的电磁场、电网络等相关问题; 1.2 Understand and master the basic knowledge of electrical engineering, and be able to use it to deduce and analyze related issues such as electromagnetic fields and electrical networks in engineering problems;	电路 (+实验) Circuitry (+Experiments)	6.5	0.30
		工程电磁场 Engineering Electromagnetic Field	2.0	0.20
		模拟电子技术 (+实验) Analog Electronic Technology (+ Experiments)	4.0	0.25
		数字电子技术 (+实验) Digital Electronics Technology (+ Experiments)	4.0	0.25
	1.3 能够运用数学、电气工程专业知识抽象、归纳电气工程问题的本质, 并对解决方案进行比较与综合; 1.3 Be able to use mathematics and electrical engineering expertise to abstract and summarize the essence of electrical engineering problems, and compare and synthesize solutions;	复变函数与积分变换 Functions of Complex Variables and Integral Transform	2.0	0.15
		离散数学 Discrete Mathematics	2.0	0.15
		工程电磁场 Engineering Electromagnetic Fields	2.0	0.15
		电机学 (+实验) Electrical Machinery (+ Experiment)	6.0	0.30
		自动控制原理 (含实验) Automatic control principle (including experiment)	3.5	0.25
	1.4 能够选择恰当的数学模型, 用于描述电气领域复杂工程问题, 并进行分析和求解。 1.4 Be able to select an appropriate mathematical model to describe, analyze and solve complex engineering problems in the electrical field.	概率论与数理统计 C Probability & Statistics C	2.5	0.10
		电力系统分析(1)(2) (含实验) Power System Analysis (1) (2) (including experiments)	6.0	0.35
		发电厂电气部分 (含实验) Electrical part of power plant (including experiments)	3.0	0.25
		电力系统继电保护 (含实验) Power System Relaying (including experiments)	3.5	0.30
<p>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领域复杂工程问题, 以获得有效结论。</p> <p>2. Problem Analysis: Be able to apply the fundamental principles</p>	2.1 能够应用数学、自然科学和工程科学的基本原理对电气领域复杂工程问题的关键环节进行识别和判断; 2.1 Be able to apply the basic principles of mathematics, natural science and engineering science to identify and judge the key links of complex engineering problems in the electrical field;	线性代数 Linear Algebra	2.0	0.10
		概率论与数理统计 C Probability & Statistics C	2.5	0.10
		电机学 (+实验) Electrical Machinery (+ Experiment)	6.0	0.35
		电力系统自动化 Automation of Electric Power Systems	2.5	0.25
		高电压技术 (含实验) High voltage technology (including experiments)	2.0	0.20
	2.2 能够运用数学模型、图纸、图表和文字等工程语言对电气专业	线性代数 Linear Algebra	2.0	0.20
		电力系统继电保护 (含实验) Power System Relaying (including	3.5	0.35

毕业要求	指标点分解	课程名称	学分	课程权重
of mathematics, natural and engineering sciences to identify, describe, and analyse complex engineering problems in the electrical field through literature research in order to reach valid conclusions.	的复杂工程问题进行表述和分析; 2.2 Be able to use engineering languages such as mathematical models, drawings, diagrams and texts to express and analyze complex engineering problems in the electrical major;	experiments)		
		发电厂电气部分 (含实验) Electrical part of power plant (including experiment)	3.0	0.35
		科技创新活动 Science and Technology Innovation Activities	1.0	0.10
	2.3 能认识到解决问题有多种可选择方案, 会通过文献研究寻求可替代的解决方案, 能通过建模与仿真分析比较各解决方案; 2.3 Be able to recognize that there are many alternatives to solve problems, seek alternative solutions through literature research, and compare solutions through modeling and simulation analysis;	计算方法 Method of Calculation	2.0	0.20
		电力电子技术 Power Electronics	2.5	0.25
		自动控制原理 (含实验) Principle of Automatic Control (including experiment)	3.5	0.30
		Matlab 与电气工程仿真实训 Matlab and Electrical Engineering Simulation Practice	1.0	0.15
		专业英语 Professional English	1.0	0.10
	2.4 能够运用电气工程基本原理, 结合文献研究, 分析电气领域复杂工程问题的影响因素, 论证解决方案的合理性。 2.4 Be able to use basic principles of electrical engineering, combined with literature research, to analyze the influencing factors of complex engineering problems in the electrical field and to demonstrate the rationality of solutions.	电力系统分析课程设计 Project of Power System Analysis	2.0	0.30
		发电厂电气部分课程设计 Project of Electric Parts of Power Plants	1.0	0.30
		毕业设计 (论文) Final Year Project	15	0.40
3. 设计/开发解决方案: 能够设计针对电气领域复杂工程问题的解决方案, 设计满足特定需求的系统、单元 (部件) 或工艺流程, 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。 3.Design/development solutions: Be able to design solutions to complex engineering problems in the electrical field, designing systems, units (components) or processes to meet specific needs, and be able to demonstrate a sense of innovation in design process, considering social, health, safety, legal, cultural and environmental factors.	3.1 掌握电气工程设计 and 产品开发全周期、全流程的基本设计/开发方法和技术, 了解影响设计目标和技术方案的各种因素; 3.1 Master the basic design/development methods and technologies in the entire cycle and process of electrical engineering design and product development, and understand various factors that affect design goals and technical solutions;	电气测试技术 Electrical testing technology	2.0	0.30
		电力系统分析课程设计 Project of Power System Analysis	2.0	0.30
		发电厂电气部分课程设计 Project of Electric Parts of Power Plants	1.0	0.20
		电力系统继电保护课程设计 Project of Power System Relaying	1.0	0.20
	3.2 能够针对特定需求, 完成单元 (部件) 的设计, 能够进行电气领域的系统或工艺流程设计, 在设计中体现创新意识; 3.2 Be able to complete the design of units (components) according to specific needs, be able to carry out system or process design in the electrical field, and reflect the sense of innovation in the design;	人工智能基础: 科学与工程 Fundamentals of Artificial Intelligence: Science & Engineering	2.0	0.25
		电力系统分析课程设计 Project of Power System Analysis	2.0	0.20
		电力系统继电保护课程设计 Project of Power System Relaying	1.0	0.20
		电力系统自动化综合实训 Power System Automation Comprehensive Training	1.0	0.20
		科技创新活动 Science and Technology Innovation Activities	1.0	0.15
	3.3 在设计中能够考虑安全、健康、法律、文化及环境等制约因素。 3.3 Considering the safety, health,	电力系统分析课程设计 Project of Power System Analysis	2.0	0.20
		发电厂电气部分课程设计 Project of Electric Parts of Power Plants	1.0	0.15
		工程伦理 Engineering Ethics	1.5	0.25

毕业要求	指标点分解	课程名称	学分	课程权重
	legal, cultural and environmental constraints can be in design.	毕业设计（论文） Final Year Project	15	0.40
<p>4. 研究：能够基于科学原理并采用科学方法对电气领域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。</p> <p>4. Research: Be able to research complex engineering problems in the electrical field based on scientific principles and using the scientific method, including designing experiments, analyzing and interpreting data, and synthesis information to reach reasonable and valid conclusions.</p>	4.1 能够基于电气工程基本原理，通过文献研究或相关方法，调研和分析电气领域复杂工程问题的解决方案； 4.1 Be able to investigate and analyze solutions to complex engineering problems in the electrical field through literature research or related methods based on the basic principles of electrical engineering;	电力系统分析(1)(2)（含实验） Power System Analysis (1) (2) (including experiments)	6.0	0.40
		电力电子技术 Power Electronics	2.5	0.30
		电力系统自动化 Power System Automation	2.5	0.30
	4.2 能够针对电气领域复杂工程问题，选择研究路线，设计实验方案并构建实验系统，安全开展实验，正确采集实验数据； 4.2 Be able to select research routes, design experimental schemes and build experimental systems for complex engineering problems in the electrical field, conduct experiments safely, and collect experimental data correctly;	电机修理实训 Practice of Electric Machinery Repair	1.0	0.30
		电力电子技术实验与实训 Power Electronics Experiments and Training	1.0	0.40
		电力系统自动化综合实训 Power System Automation Comprehensive Training	1.0	0.30
	4.3 能对实验结果进行分析和解释，并通过信息综合得到合理有效的结论。 4.3 Be able to analyze and interpret experimental results, and obtain reasonable and effective conclusions through information synthesis.	概率论与数理统计 C Probability & Statistics C	2.5	0.20
		计算方法 Method of Calculation	2.0	0.40
		信号分析与处理 Digital Signal Processing	2.0	0.40
<p>5. 使用现代工具：能够针对电气领域复杂工程问题，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，包括对电气领域复杂工程问题的预测与模拟，并能够理解其局限性。</p> <p>5. Using modern tools: Be able to develop, select and use appropriate techniques, resources, modern engineering tools and IT tools for complex engineering problems in the electrical field, including prediction and simulation of complex engineering problems in the electrical field, and be able to understand their limitations.</p>	5.1 了解电气专业常用的现代仪器、信息技术工具、工程工具和模拟软件的使用原理和方法，并理解其局限性； 5.1 Understand the principles and methods of using modern instruments, information technology tools, engineering tools and simulation software commonly used in electrical professions, and understand their limitations;	高级语言应用实践 High-level language programming and its practical application	2.0	0.25
		微机原理与单片机技术 The Principle of Microcomputer and Microcontroller	2.5	0.35
		电气测试技术 Electrical testing technology	2.0	0.25
		Matlab 与电气工程仿真实训 Matlab and Electrical Engineering Simulation Practice	1.0	0.15
	5.2 能够选择与使用恰当的仪器、信息资源、工程工具和专业模拟软件，对电气领域复杂工程问题进行分析、计算与设计； 5.2 Be able to select and use appropriate instruments, information resources, engineering tools and professional simulation software to analyze, calculate and design complex engineering problems in the electrical field;	人工智能基础：科学与工程 Fundamentals of Artificial Intelligence: Science and Engineering	2.0	0.20
		高级语言应用实践 High-level language programming and its practical application	2.0	0.30
		微机原理与单片机技术实践 Microcomputer and Microcontroller Training	2.5	0.40
		电力系统继电保护课程设计 Project of Power System Relaying	1.0	0.10
	5.3 能够针对电气领域复杂工程问题，开发或选用满足特定需求	信号分析与处理 Digital Signal Processing	2.0	0.35

毕业要求	指标点分解	课程名称	学分	课程权重
	的现代工具，模拟和预测专业问题，并能够分析其局限性。 5.3 Be able to develop or select modern tools that meet specific needs for complex engineering problems in the electrical field, simulate and predict professional problems, and be able to analyze their limitations.	Matlab 与电气工程仿真实训 Matlab and Electrical Engineering Simulation Practice	1.0	0.25
		毕业设计（论文） Final Year Project	15	0.40
6. 工程与社会：能够基于工程相关背景知识进行合理分析，评价工程实践和电气领域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。 6.Engineering and society: Be able to carry out reasonable analysis based on engineering-related background knowledge, and evaluate the social, health, safety, legal and cultural implications of engineering practices and solutions to complex engineering problems in the electrical field, and understand the responsibilities involved.	6.1 了解社会文化、风俗伦理以及电气相关领域的技术标准体系、知识产权、产业政策和法律法规，能够分析和评价电气领域复杂工程问题的解决方案，理解不同社会文化对工程活动的影响； 6.1 Understand social culture, customs and ethics, and technical standard system, intellectual property rights, industrial policies, laws and regulations in electrical-related fields, be able to analyze and evaluate solutions to complex engineering problems in the electrical field, and understand the impact of different social cultures on engineering activities;	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	0.20
		思想道德与法治 Ideological Morality and Rule of Law	3.0	0.20
		中国近现代史纲要 Outline of Modern and Contemporary Chinese History	3.0	0.20
		“四史”大视野 The Grand Vision of “Four Histories”	1.0	0.20
		工程伦理 Engineering Ethics	1.5	0.20
		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 Theoretical System of Socialism with Chinese Characteristics	3.0	0.40
	6.2 能分析和评价电气专业工程实践对社会、健康、安全、法律、文化的影响，以及这些制约因素对项目的影响，并理解应承担的责任。 6.2 Be able to analyze and evaluate the impact of electrical engineering practice on society, health, safety, law, and culture, as well as the impact of these constraints on project implementation, and understand the responsibilities that should be undertaken.	生产实习 Professional Internship	2.0	0.40
		毕业设计（论文） Final Year Project	15	0.20
7. 环境和可持续发展：能够理解和评价针对电气领域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. Environment and	7.1 知晓和理解环境保护和可持续发展的理念和内涵； 7.1 Know and understand the concept and connotation of environmental protection and sustainable development;	思想道德与法治	3.0	0.35
		形势与政策	2.0	0.25
		生产实习	2.0	0.20
		工程伦理	1.5	0.20
	7.2 能够站在环境保护和可持续发展的角度思考电气专业工程实践的可持续性，评价产品周期中	智能电网技术 Technologies for Smart Grid	1.5	0.40

毕业要求	指标点分解	课程名称	学分	课程权重
sustainable development: Be able to understand and evaluate the impact of engineering practice on environmental, socially sustainable development in response to complex engineering problems in the electrical field.	可能对人类和环境造成的损害和隐患。 7.2 Be able to think about the sustainability of electrical engineering practice from the perspective of environmental protection and sustainable development, and evaluate the possible damage and hidden dangers to humans and the environment during the product cycle.	高电压技术（含实验） High Voltage Technology	2.0	0.40
		生产实习 Professional Internship	2.0	0.20
8. 职业规范：具有人文社会科学素养、社会责任感，能够在工程实践中理解并遵守工程职业道德和规范，履行责任。 8. Professional Code: Possess humanities and social science literacy, social responsibility, and the ability to understand and comply with engineering professional ethics and codes of conduct and fulfil responsibilities in engineering practice.	8.1 树立正确的人生观和价值观，具有人文社会科学素养和社会责任感，了解中国国情； 8.1 Establish a correct outlook on life and values, have humanities and social science literacy and a sense of social responsibility, and understand China's national conditions;	马克思主义基本原理 Fundamental Principles of Marxism	3.0	0.25
		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 Theoretical System of Socialism with Chinese Characteristics	5.0	0.35
		形势与政策 Situation and Policy	2.0	0.15
		国家安全教育 National Security Education	1.0	0.10
		军事理论 Military Theory	2.0	0.15
		思想道德与法治 Ideological Morality and Rule of Law	3.0	0.35
	8.2 理解诚实公正、诚信守则的工程职业道德和规范，并能在工程实践中自觉遵守； 8.2 Understand the engineering professional ethics and norms of honesty, fairness and integrity, and consciously abide by it in engineering practice;	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 Theoretical System of Socialism with Chinese Characteristics	5.0	0.45
		国家安全教育 National Security Education	1.0	0.10
		工程伦理 Engineering Ethics	1.5	0.10
		工程伦理 Engineering Ethics	1.5	0.50
	8.3 理解电气工程师对公众的安全、健康、福祉和环境保护的社会责任，能够在工程实践中自觉履行责任。 8.3 Understand the social responsibilities of electrical engineers to the safety, health, well-being and environmental protection of the public, and be able to consciously perform their responsibilities in engineering practice.	生产实习 Professional Internship	2.0	0.50
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。 9. Individuals and teams: Be able to	9.1 能与其他学科的成员有效沟通，合作共事； 9.1 Able to communicate effectively and work cooperatively with members of other disciplines;	电力市场 Power Markets	2.0	0.60
		工程管理 Engineering Management	1.5	0.40
	9.2 能够在团队中独立或合作开展工作，并组织、协调和指挥团队开展工作。	电机修理实训 Practice of Electric Machinery Repair	1.0	0.30

毕业要求	指标点分解	课程名称	学分	课程权重
undertake the role of individual, team members and the person in charge in the team with multi-subject background.	9.2 Be able to work independently or cooperatively in a team and organize, coordinate and direct the work of a team.	电力电子技术实验与实训 Power Electronics Experiments and Training	1.0	0.30
		科技创新活动 Science and Technology Innovation Activities	1.0	0.40
10. 沟通：能够就电气领域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。 10. Communication: be able to communicate and interact effectively with industry colleagues and the public on complex engineering issues in the electrical field, including writing reports and design submissions, presenting statements, articulating or responding to instructions, and have an international perspective and be able to communicate and interact in a cross-cultural context.	10.1 能够就电气领域复杂工程问题，以口头、文稿、图表等方式，准确表达自己的观点，回应质疑，理解与业界同行和社会公众交流的差异性； 10.1 Be able to accurately express one's own views on complex engineering issues in the electrical field by means of oral, manuscript, diagrams, etc., respond to doubts, and understand the differences in communication with peers in the industry and the public;	专业英语 Professional English	1.0	0.30
		生产实习 Professional Internship	2.0	0.30
		劳动教育 Labor Education	1.5	0.40
	10.2 了解专业领域的国际发展趋势、研究热点，理解和尊重世界不同文化的差异性和多样性，具备跨文化交流的语言和书面表达能力，能就专业问题，在跨文化背景下进行基本沟通和交流。 10.2 Understand the international development trends and research hotspots in the professional field, understand and respect the differences and diversity of different cultures in the world, have language and written expression skills for cross-cultural communication, and be able to conduct basic communication and communication on professional issues in a cross-cultural context. communicate with.	大学英语(1)(2) College English I, II	8.0	0.50
		专业英语 Professional English	1.0	0.20
		智能电网技术 Technologies for Smart Grid	1.5	0.30
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。 11. Project management: Understand and master the principles of engineering management and economic decision-making	11.1 掌握工程项目中涉及的管理与经济决策方法，了解工程及产品全周期、全流程的成本构成，理解其中涉及的工程管理与经济决策问题； 11.1 Master the management and economic decision-making methods involved in engineering projects, understand the cost structure of the whole cycle and the whole process of engineering and products, and understand the engineering management and economic decision-making issues involved;	马克思主义基本原理 Fundamental Principles of Marxism	3.0	0.40
		工程管理 Engineering Management	1.5	0.30
		电力市场 Power Markets	2.0	0.30

毕业要求	指标点分解	课程名称	学分	课程权重
methods and be able to apply them in a multidisciplinary environment.	11.2 能在多学科环境下(包括模拟环境), 在设计开发解决方案的过程中, 运用工程管理与经济决策方法。 11.2 Be able to apply engineering management and economic decision-making methods in the design and development of solutions in a multidisciplinary environment (including simulation environments).	工程管理 Engineering Management	1.5	0.30
		电力市场 Power Markets	2.0	0.30
		毕业设计(论文) Final Year Project	15	0.40
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。 12. Lifelong learning: A sense of self-directed and lifelong learning, with the ability to learn continuously and adapt to development.	12.1 能在社会发展的大背景下, 认识到自主和终身学习的必要性; 12.1 Able to recognize the necessity of autonomous and lifelong learning in the context of social development;	专业导论 Introduction to Electrical Engineering	1.0	0.40
		“四史”大视野 The Grand Vision of “Four Histories”	1.0	0.20
		马克思主义中国化进程与青年学生使命担当 The Sinicization of Marxism and the mission of young students	1.5	0.40
	12.2 具有自主学习的能力, 包括对技术问题的理解能力, 归纳总结的能力等。 12.2 Have the ability to learn independently, including the ability to understand technical issues and the ability to summarize.	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 Theoretical System of Socialism with Chinese Characteristics	5.0	0.30
		电力系统自动化综合实训 Power System Automation Comprehensive Training	1.0	0.30
		毕业设计(论文) Final Year Project	15	0.40