

自动化学院

南京理工大学自动化学院的前身是哈尔滨军事工程学院炮兵工程系指挥仪器专业和解放军炮兵工程学院火炮动力传动”专业。经过专业的不断改造,院系调整,学校迁移等变化于1984年正式成立了华东工学院自动控制系,1996年改名为南京理工大学自动化系,2005年更名为南京理工大学自动化学院。

自动化学院现有自动控制系、电气工程系、信息工程系和交通工程系四个专业系,设有C3I系统、过程控制等八个研究所。全院现有教职工120余人,包括中组部“千人计划”2人、教育部“长江学者”特聘教授2人,“长江学者”讲座教授2人,国家外专局高端外国专家2人,国家杰出青年基金获得者1人,博士生导师13人,正高级职称19人,副高级职称53人。

自动化学院拥有“控制科学与工程”一级学科博士学位授予权(内含“控制理论与控制工程”、“系统工程”、“导航、制导与控制”、“检测技术与自动化装置”等五个二级学科博士点)和一级学科博士后流动站以及相应的硕士学位授予权,电气工程和交通运输工程2个一级学科硕士点,控制工程和电气工程2个专业具有工程硕士学位研究生培养资格。其中控制科学与工程是江苏省一级学科重点学科和国家一级重点学科培育点,系统工程为国防科工委重点学科。

学院设有自动化、电气工程及其自动化、智能电网信息工程和轨道交通信号与控制四个本科专业。其中自动化专业为国家级特色专业建设点、江苏省品牌专业,电气工程及其自动化专业为江苏省特色专业。拥有江苏省自动化实验示范中心和工信部电气工程实验示范中心各一个,学院现有在校本科生1500余人,硕士研究生(含工程硕士)1500余人,博士研究生100余人。

学院科研实力雄厚,在复杂系统建模与控制、火力与指挥控制、网络控制系统、网络信息安全以及多传感器信息融合等领域具有特色和很强的科研能力。近年来学院承担了国家项目和各类横向科技项目300余项,取得了丰硕成果。拥有三个江苏省工程技术研究中心。获国家级、省部级以上各类科技和教学奖项60余项;发表高质量学术论文1500余篇,有近600篇论文被SCI、EI、ISTP收录。

自动化学院有着优越的实验和科研条件,现有办公室和实验室面积近22000平方米,实验和专用设备5000余台套,为学生的成才创造了极为有利的条件。

自动化学院学术氛围浓厚、教风严谨、学风踏实,在各项教学环节中以培养高素质创新型人才为目标。大学生科技活动成果丰硕,近四年获国际国家级奖励30余项,省部级奖励60余项。学生就业形势好,考取研究生比例高。

自动化学院与美国、英国、德国、法国、日本、加拿大、新加坡等国家保持着良好的学术交流和科研合作关系,并聘请了包括中科院院士、IEEE Fellow等在内的近二十名国内外知名学者任我学院的兼职教授和客座教授,极大地提高了我院的学术水平和国内外的知名度。

目前,自动化学院师生正以崭新的面貌迎接新世纪的挑战,与时俱进,开拓创新,为再创辉煌而努力奋斗。



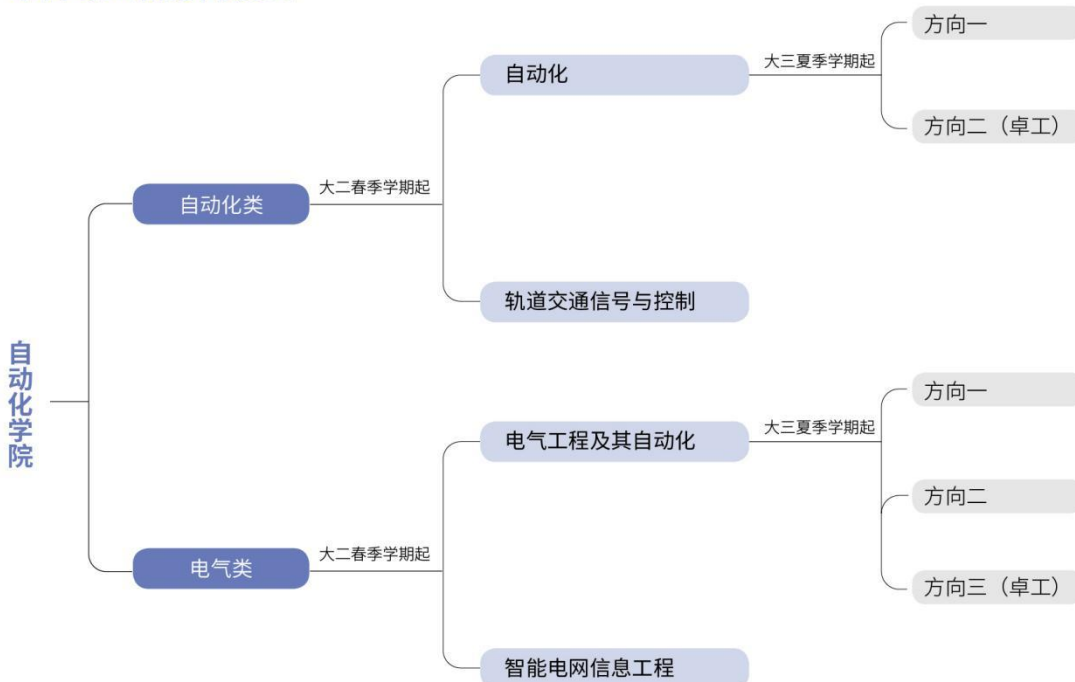
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本科专业和方向设置



School of Automation

The Automation School of Nanjing University of Science and Technology (NUST) dates back to Command Instrument specialty in the Artillery Engineering Department of Harbin Institute of Military Engineering and Dynamic Transmission specialty of Artillery Engineering Institute of People's Liberation Army. After constant professional development and department adjustment, Automatic Control Department of East China Institute of Technology was established in 1984. In 1996, it changed its name to Automation Department of NUST. In 2005, it was renamed to Automation School of NUST.

Currently, there are 4 departments (Automatic Control, Electrical Engineering, Information Engineering and Traffic Engineering) and 8 research labs (C3I, process control, etc.) in the School. The School has more than 120 faculty and staff, including 2 scholars of Recruitment program of global experts, 2 Cheung Kong Scholar professors, 2 Cheung Kong Scholar chair professors, 2 National Bureau of Foreign Experts of high-end, 1 winner of a National Outstanding Youth Fund, 13 doctoral advisors, 19 professors and 53 associate professors.

The School has a post-doctoral station in the discipline of Control Science and Engineering, and it has 1 primary discipline doctoral program of Control Science and Engineering, including 5 secondary discipline doctoral programs, specifically, Control Theory and Control Engineering, Systems Engineering, Navigation, Guidance and Control, Detection Technology and Automation Devices, and Intelligent Grid & Control, and the corresponding master programs. There are 2 primary discipline master programs of Electrical Engineering and Transport Engineering, and 2 professional master programs of Control Engineering and Electrical Engineering. In addition, Control Science and Engineering is a primary key discipline of Jiangsu province and national preliminary key discipline, and Systems Engineering is a key discipline of Commission on Science, Technology and Industry for National Defense.

The school has 4 majors: Automation, Electrical Engineering and Automation, Electronic and Information Engineering, and Rail

Traffic Signal & Control. Automation is the Featured Specialty under construction at national level and also the provincial key major; Electrical Engineering and Automation is the provincial key major. The school has a provincial experimental demonstration center for Automation and an experimental demonstration center for Electrical Engineering of MIIT (Ministry of industry and information technology).

The school has an excellent cooperative tradition in academic research. It has established prominent reputation in the special fields of modeling and control of complex systems, firepower and command control, network control systems, network and information security, and multi-sensor information fusion, etc. The faculty members have achieved a considerable number of research accomplishments, such as National Outstanding Youth Funds, and nearly 300 research projects supported by related companies and institutes. The school has 3 provincial engineering technological research centers. The faculty members have gained more than 60 national and provincial awards and have published over 1500 high-level academic articles, of which 600 papers have been cited by SCI, EI, and ISTP systems.

The school has superior experiments and research facilities, nearly 22,000 square meters of office and laboratory area, and 5000 sets of equipment, which provides favorable conditions for students.

The faculty is notable for their devotion and for their pedagogical skills. Students have won over 30 items in national competitions and 60 items in provincial contests.

The school takes an active part in setting up international cooperative programs in teaching and researching with foreign countries, such as the U.S.A., the U.K., Germany, France, Japan, Canada, Singapore, etc. It invites plenty of famous scholars, including Chinese Academy of Sciences Fellow, IEEE Fellow as chair professors and part-time professors. It also encourages professors to develop overseas communications and researches.

自动化

一、专业介绍

自动化技术在工业、农业、航空航天、国防、交通运输、商业、经济、管理、医疗、服务等领域应用极其广泛。本专业历史悠久、师资力量雄厚、教学条件优越，是江苏省品牌专业、国家级特色专业建设点。本专业拥有国家级优秀教学团队和国家级教学名师。

在“以人为本，以学生为中心”的理念指导下，依托一级学科优势，构建了一套培育系统设计师的实践教学体系。在机器人控制、运动控制、过程控制、网络控制以及嵌入式控制系统等方面，特色鲜明。建设有多门国家级和省级精品课程、国家级优秀双语教学课程、省级自动化实践教学示范中心、大学生创新实践活动基地，极大地促进了学生科研素养的提升和创新能力的培养，为学生培养和进一步深造提供了良好的条件。

近年来，本专业在校生在“挑战杯”课外学术科技作品竞赛、工业自动化挑战赛、智能汽车竞赛、中国机器人大赛、电子设计竞赛等多项全国性大学生科技竞赛中屡创佳绩，共获得特等、一等和二等奖五十余项，并连年获得省级优秀毕业设计团队奖。本专业毕业生广泛从事自动化领域的系统设计、新产品研制、软硬件开发，主要就业于电子、通信、电力等相关研究机构与国内外知名企业。毕业生动手能力强、适应面宽，综合素质高，得到用人单位广泛赞誉。近3年毕业生约60%继续在国内外深造，就业率达99%。

二、培养目标

本专业面向国家经济和社会建设、国防现代化和“军民融合”发展需求，培养能在经济、社会和国防建设诸多行业的自动化领域，从事自动测试、嵌入式计算机、信息处理、运动/过程控制、机器人控制、导航制导等自动化相关系统和设备的分析与设计、集成与优化、研究与开发、运行与维护及工程管理等工作的宽口径高级工程技术人才。

毕业五年左右的毕业生应具有以下能力：

(1) 能够应用基础理论、专业知识和交叉学科知识，综合考虑社会、环境和可持续性等因素，有效评估和合理选择方案，解决自动化相关领域的复杂工程问题；

(2) 能够胜任自动化相关技术或产品的研究、设计、开发、生产和运营等工作，在工程实践中体现创新性，成为单位的工程技术和业务骨干；

(3) 能够在跨学科团队和跨文化环境下有效地沟通和表达，拥有健康的身心和良好的团队合作精神，具有一定的工程项目管理能力；

(4) 能够在工作中遵守各项法律、法规，具有良好的工程职业道德和社会责任感；

(5) 能够跟踪国际自动化技术前沿和发展趋势，获取新知识，迎接新挑战，不断提升自身素质和综合能力，具有较强的职场竞争力。

三、毕业生能力和学分要求

1.毕业生能力要求

为使本专业学生达到培养目标，要求毕业生应具备以下 12 项能力：

(1)工程知识：能够将数学、自然科学、工程基础和专业知用于解决自动化领域复杂工程问题。

(2)问题分析：能够应用数学、自然科学基本原理，并通过文献研究，识别、表达、分析自动化领域复杂工程问题，以获得有效结论。

(3)设计/开发解决方案：能够设计针对自动化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，考虑法律、健康、安全、文化、社会以及环境等因素。

(4)研究：能够基于科学原理并采用科学方法对自动化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。

(5)使用现代工具：能够针对自动化领域复杂工程问题，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，包括对自动化领域复杂工程问题的预测与模拟，并能够理解其局限性。

(6)工程与社会：能够基于自动化工程相关背景知识进行合理分析，评价自动化专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

(7)环境和可持续发展：能够理解和评价针对自动化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。

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

(9)个人和团队：能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。

(10)沟通：能够就自动化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。

(11)项目管理：理解并掌握自动化工程管理原理与经济决策方法，并能在多学科环境中应用。

(12)终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

2.毕业学分要求

课程模块	课程性质	修读学分	备注
通识教育课	必修	38	
学科教育课	必修	38.5	
专业基础课	必修	54.5	
专业方向课（方向一）	必修	15	
专业方向课 （方向二，卓工）	必修	17.5	
专业选修课	选修	12	从本专业开出的 19 门课程（35.5 学分）中选修 12 学分，其中《学科前沿系列讲座 I、II》2 门选修课中必须选修 1 门。
通识教育选修课	选修	8	从学校开出的课程中选修 8 学分；其中， 人文与艺术类 ≥ 2 门、 经济与社会类 ≥ 1 门、 创新与创业类 ≥ 1 门。

毕业总学分	方向一	166	另需取得 4 个素质发展学分，方可毕业
	方向二，卓工	168.5	另需取得 4 个素质发展学分，方可毕业

四、学制与学位

标准学制：四年

修业年限：三到六年

授予学位：工学学士

五、主干学科与交叉学科

主干学科：控制科学与工程

交叉学科：电气工程、计算机科学与技术

六、专业核心课程

控制工程基础、现代控制理论基础、运动控制系统、过程控制系统、嵌入式控制系统及应用、微机原理与接口技术、传感器与检测技术、机器人控制技术等。

七、主要集中实践环节

金属工艺实习、电子工艺实习、电路综合实验、电子线路综合实验、EDA 综合实验、控制系统综合课程设计、毕业实习、毕业设计等。

Automation

I. Introduction

Automation technology is widely applied in industry, agriculture, aerospace, national defense, etc. Selected as one of the “Brand programs of Jiangsu Province” and “National Featured Specialties”, the program of Automation has rich educational resources and outstanding teaching staff and faculty, some of whom have won the honor of “National Teaching Team” and “National Distinguished Teachers”.

Guided by the concept of “people-oriented and student-centered”, and based on the advantage of First-level discipline, the practice teaching system is constructed targeted at cultivating system designers specialized in robotics, motion control, process control, network control systems, and embedded control systems, etc. There’re national and provincial top-quality courses, national excellent bilingual demonstration courses, a provincial experimental teaching demonstration center for automation, an innovation and practice activity base for undergraduates, which significantly help promote students’ research ability and scientific literacy, and thus provide a good foundation for student cultivation.

In recent years, the students have achieved over fifty awards in various national undergraduate competitions, including the "Challenge Cup" National College Student Curricular Academic Science and Technology Works Competition, the Industrial Automation Challenge, the Smart Car Contest, the China Robot Competition and the National Undergraduate Electronic Design Contest. The graduates are contributing in the system design, new product R&D, and software/hardware development in research institutes and companies. In the last three years, 60% of the graduates continue their studies at domestic and abroad universities.

II. Objectives

The program trains students to be research and application-oriented professionals to meet the needs of social and economic development and modernization of national defense, with solid scientific knowledge and basic theoretical knowledge in automation field, high sense of social responsibility and professional ethics, good humanistic quality, team spirit and physical and mental health, also with global vision, innovative awareness, and the ability to analyze and solve complex engineering problems in automation field.

The educational objectives of the program are the following career and professional accomplishments that the program is preparing graduates to achieve within about 5 years after graduation:

- a) Demonstrate technical competence in system analysis and design, integration and optimization, development and research, operation and maintenance, and technical management.
- b) Be successful in automatic testing, embedded computer, electronic technology, information technology, motion control, process control, robot control, navigation guidance and other automation related fields.
- c) Show an ability to be competent and become the backbones of employers

III. Graduates' Ability and Credit Requirements

1. Requirements for graduates' abilities

In order to achieve the training objectives, graduates are expected to possess the following abilities:

(1) Engineering knowledge: Have the ability to apply knowledge of mathematics, natural sciences, engineering foundations and expertise to solve complex engineering problems in the field of automation.

(2) Problem analysis: Have the ability to identify, express and analyze complex engineering problems in automation field, by means of applying basic principles of mathematics and natural science, and literature review, so as to obtain effective conclusions

(3) Design/Development: Have the ability to design solutions to complex engineering problems in automation field, design systems, components or process flow to meet specific needs, and embody innovative consciousness in the design process, taking into account such factors as law, health, safety, culture, society and environment.

(4) Research: Have the ability to study complex engineering problems in automation field by means of applying scientific approaches, including designing experiments, analyzing and interpreting data, and obtaining reasonable and effective conclusions through information synthesis.

(5) Using modern tools: Have the ability to develop, select and adopt appropriate technologies, resources, modern engineering tools and information technology tools for complex engineering problems in the automation field, including prediction and simulation of complex engineering problems in the automation field, and understanding its limitation.

(6) Engineering and Society: Have the ability to conduct a reasonable analysis based on the background knowledge of automation engineering, evaluate the impact of automation professional engineering practice and complex engineering problem solutions on social, health, safety, law and culture, and understand the responsibilities.

(7) Environment and sustainable development: Have the ability to understand and evaluate the impact of engineering practices on complex engineering issues in the automation field on environmental and social sustainability.

(8) Professional norms: Have humanities and social scientific ethics, social responsibility; Have the ability to understand and comply with engineering ethics and practices and fulfill responsibilities in automation engineering practice.

(9) Individuals and teams: Have the ability to play the roles of individuals, team members, and responsible individuals in a multidisciplinary team.

(10) Communication: Have the ability to effectively communicate with the industry peers and the public in the field of complex engineering, including writing reports and design manuscripts, presenting statements, clearly expressing or responding to instructions in a

cross-cultural background.

(11) Project Management: Have the ability to manage the engineering projects in the field of automation and to make economic decisions in a multidisciplinary environment.

(12) Lifelong learning: Have the awareness of independent learning and lifelong learning, and the ability to continuously learn and adapt to development.

2.Requirements for graduation credits

Course Modules	Course Nature	Credits
Course of General Education	Compulsory Course	38
Course of Discipline Education	Compulsory Course	38.5
Fundamental Specialized Course	Compulsory Course	54.5
Course of Specialized Direction (I)	Compulsory Course	15
Course of Specialized Direction (II)	Compulsory Course	17.5
Optional Specialized Course	Optional Course	12 (One of the 'Lectures on Control System Frontiers' should be taken at least)
Optional Course of General Education	Optional Course	8
Total	Direction I	166
	Direction II	168.5

Another 4 quality development credits are required for graduation.

IV. Length of program and degree

Standard Academic Year: 4 years;

Length of Schooling: 3 to 6 years;

Degree: Bachelor of Engineering.

V. Leading discipline and inter-discipline

Main disciplines: Control Science and Engineering

Interdisciplinary: Electrical Engineering, Computer Science and Technology

VI. Core courses

Control Engineering Fundamentals, Modern Control Theory, Motion Control Systems, Process Control Systems, Embedded Control Systems & Applications, Microcomputer Principle and Interface Technology, Sensors and Measurement Technology, Robot Control Technology.

VII. Collective practical teaching session

Metal Technics Practice, Practice on Electronic Technology, Comprehensive Experiments on Circuits, Comprehensive Experiments on Electronic Circuits, EDA Synthetic Experiments,

Comprehensive Course Design of Control Systems, Graduation Practice, Graduation Project.

八、教学计划进程表

自动化专业教学计划进程表

Table of Teaching Plan for Automation Program

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位	
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0
必修课程●通识教育课（38 学分） Compulsory Course●Course of General Education																		
21020303	军事训练 Military Training	2	80				80	2										245
06000201	计算思维 Computational Thinking	2	32	24		8			2									106
14120601	通用英语（I） English for General Purpose（I）	2	32	32					2									114
15045602	思想道德修养与法律基础 Moral Cultivation and Law Basics	3	48	42			6		3									123
20000102	大学生职业生涯规划 Career Planning for College Students	0.5	8	8					0.5									245
21120101	体育（I） P.E(I)	1	32	32					1									122
07057201	创业教育 Entrepreneurship Education	1	16	16						1								107
14220601	通用英语（II） English for General Purpose（II）	2	32	32						2								114
15042402	中国近现代史纲要 Outline of Modern Chinese History	3	48	42			6			3								123
21220101	体育（II） P.E(II)	1	32	32						1								122
21020503	军事理论 Military Theory	2	32	16			16				2							372

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1
14120701	进阶英语 (I) English for Specific Purpose (I)	2	32	32							2								114
15045203	马克思主义基本原理概论 Fundamental Principles of Marxism	3	48	42			6				3								123
21320101	体育 (III) P.E(III)	1	32	32							1								122
14220701	进阶英语 (II) English for Specific Purpose (II)	2	32	32							2								114
21420101	体育 (IV) P.E(IV)	1	32	32							1								122
15045304	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 The Theoretical System of Socialism With Chinese Characteristics	5	80	67			13							5					123
20000301	就业指导 Vocational Guidance	0.5	8	8										0.5					245
88000001	科研训练 Scientific Research Training	2	80				80									2			242
	形势与政策 (I) - (VIII) Situation and Policy (I) - (VIII)	2	64	64				I-1、I-2、II-1、II-2、III-1、III-2、IV-1、IV-2 每学期安排 8 个讲课学时，共计 2 学分。									123		
必修课程●学科教育课 (38.5 学分) Compulsory Course●Course of Discipline Education																			
05021705	工程制图 Engineering Drawing	2	32	26		6				2									101
06000704	C 语言程序设计 C Language Programming	4	64	48		16				4									110
11123302	高等数学 (I) Calculus (I)	4.5	80	64			16			4.5									113
11031201	线性代数 Linear Algebra	2.5	40	40							2.5								113

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1	IV-2
11120804	大学物理 (I) College Physics (I)	3.5	56	56							3.5									113
11120904	大学物理实验 (I) Experiments on College Physics (I)	1.5	24		24						1.5									113
11223302	高等数学 (II) Calculus (II)	5.5	96	80			16				5.5									113
07022604	管理学原理 Principles of Management	2	32	32								2								107
11024002	工程数学 Engineering Mathematics	3	48	48								3								113
11220804	大学物理 (II) College Physics (II)	3.5	56	56								3.5								113
11220904	大学物理实验 (II) Experiments on College Physics (II)	1.5	24		24							1.5								113
23020104	金属工艺实习 Metal Technics Practice	2	80				80					2								369
11022601	概率与统计 Probability and Statistics	3	48	48									3							113
必修课程●专业基础课 (54.5 学分) Compulsory Course●Fundamental Specialized Course																				
06025003	软件技术基础 Software Fundamentals	2	32	32							2									110
04061501	电路 Circuits	3.5	56	56								3.5								104
04061601	电路综合实验 Comprehensive Experiments on Circuits	1	40		40							1								104
10054401	控制电机 Control Electric Machinery	2.5	40	32	8								2.5							110
04026304	数字逻辑电路 Digital Logic Circuits	3.5	56	56									3.5							104

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1	IV-2
04026804	模拟电子线路 Analog Circuits	3.5	56	56																104
04033902	电子工艺实习 Practice on Electronic Technology	2	80				80													369
04061701	电子线路综合实验 Comprehensive Experiments on Electronic Circuits	1.5	60		60															104
10031702	数据通信与网络 Data Communications and Networks	2	32	24	8															110
10020802	传感器与检测技术 Sensors and Measurement Technology	2	32	26	6									2						110
10032001	嵌入式控制系统及应用 Embedded Control Systems & Applications	3	48	32	16									3						110
04061101	模拟电子线路 EDA Analog Circuits EDA	1	40				40							1						104
10021704	电力电子技术 Power Electronics Technology	2	32	32										2						110
10025406	控制工程基础 ▼ Control Engineering Fundamentals	3.5	56	48	8									3.5						110
10027005	微机原理与接口技术 Microcomputer Principles and Interface Technology	3.5	56	48			8							3.5						110
10027703	数字信号处理 Digital Signal Processing	2	32	32										2						110
10023602	过程控制系统 Process Control Systems	2.5	40	28	12													2.5		110
10029601	运动控制系统 Motion Control Systems	3	48	40	8													3		110
10054301	机器人控制技术 Robot Control Technology	2.5	40	24	16													2.5		110

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1	IV-2
10027103	现代控制理论基础 ▼ Modern Control Theory	3	48	40	8											3				110
10028902	控制系统综合课程设计 Comprehensive Course Design of Control Systems	2	80				80											2		110
10051802	机器人控制技术创新创业实践 Innovation and Entrepreneurship Practice on Robot Control Technology	2	32	24			8											2		110
10030304	EDA 综合实验 EDA Synthesis Experiments	1	40				40											1		110
必修课程●专业方向课【任选一个方向修读】 Compulsory Course●Course of Specialized Direction																				
方向一（15 学分） Course of Specialized Direction（I）																				
10020406	毕业实习 Graduation Practice	3	120				120										3			110
10044201	优化理论及应用 ▼ Introduction to Optimal Control	2	32	32														2		110
10020302	毕业设计 Graduation Project	10	560				560												10	110
方向二（卓工）（17.5 学分） Course of Specialized Direction（II）																				
23020503	电子信息工程综合实习 Comprehensive Practice on Electronic Information Engineering	2	80				80									2				369
10020496	毕业实习 Graduation Practice	3	120				120										3			110
10054501	高频电路 CAD 技术 High Frequency Circuit CAD	1	40				40											1		110
10020392	毕业设计 Graduation Project	10	560				560												10	110

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1
10051901	智能制造综合实践 Comprehensive Practice on Intelligent Manufacturing	1.5	60				60											1.5	110
选修课程●专业选修课（35.5 学分）【选修 12 学分】 Optional Course●Optional Specialized Course																			
10128602	学科前沿系列讲座（I） Lectures on Control System Frontiers（I）	1	16	16								1							110
10022402	电气制图及 CAD Electrical Drawing and CAD	1.5	24	8		16							1.5						110
10026202	数据库原理及应用 Principles and Applications of Database	2	32	24		8								2					110
10031201	导航技术基础 Introduction to Navigation	2	32	24	8									2					110
10025501	控制系统计算机辅助设计 Computer Aided Design for Control Systems	2	32	8		24									2				110
10032202	微控制器应用及系统设计 Application and Design of MCU System	2	32	24	8										2				110
10037101	航天控制概论 Introduction to Astronautics Control	2	32	32											2				110
10044001	无人机控制技术 Unmanned Aerial Vehicles Control Techniques	2	32	16	16										2				110
10045301	人工智能技术 Artificial Intelligence Technology	2	32	32											2				110
10052001	面向网络应用的高级语言程序设计 Programming for Web-based Applications Using Advanced Languages	2	32	24		8									2				110
10055201	可编程逻辑控制器综合实验 Comprehensive Practices on Programmable Logic Controller	2	32	16	16										2				110

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester											开课 单位	
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1		IV-2
10026602	数字图像处理 Digital Image Processing	2	32	32														2		110
10027803	虚拟仪器技术与设计 Virtual Instrumentation Technology and Design	2	32	4	14	14												2		110
10031801	建模与辨识基础 Introduction to Modeling and Identification	2	32	24		8												2		110
10032101	模糊控制及应用 Fuzzy Control and Applications	2	32	24	8													2		110
10032301	火力控制技术基础 Introduction to Fire Control	2	32	32														2		110
10050001	控制系统案例分析 Case Study on Control Systems	2	32	32														2		110
10228602	学科前沿系列讲座(II) Lectures on Control System Frontiers (II)	1	16	16														1		110
10052101	物联网技术 Internet Technology of Intelligences	2	32	24			8												2	110
方向一 (I)	必修课程汇总 Compulsory Courses Total	146	3268	1745	238	30	1255	2	19	22	4	20.5	21	0	17	16.5	3	9	10	
方向二 (II)	必修课程汇总 Compulsory Courses Total	148.5	3416	1713	238	30	1435	2	19	22	4	20.5	21	0	17	18.5	3	8	11.5	
	选修课程汇总 Optional Specialized Courses Total	35.5	568	412	70	70	16	0	0	0	0	0	1	1.5	4	14	0	13	2	
								说明：“形势与政策”课程学分未计入学期学分。												

注：1.课程名称标有“▼”的为全英文授课课程，其余均为中文授课课程；

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester												开课 单位
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1	IV-2	

2.学期为“0”的表示夏季学期，“1”秋季学期，“2”春季学期。

Notes: 1. Courses with ‘▼’ are taught in English ,the others are taught in Chinese;

2.semester ‘0’ stands for Summer semester, ‘1’ and ‘2’ stands for Autumn semester and Spring semester.

轨道交通信号与控制

一、专业介绍

轨道交通信号与控制专业是自动化大类的特设专业。本专业围绕国家经济社会发展的重大需求，依托交通运输工程学科、江苏省一级学科重点学科控制科学与工程和江苏省品牌专业自动化专业的雄厚积淀而建立的。在“全员育人”的理念指导下，依托江苏省实验教学示范中心-自动化实验教学中心，构建了多层次的实践教学体系。创建了“智慧交通工作室”、“大学生课外科技创新中心”等高校创客空间，极大地促进了学生科研素养的提升和创新能力的培养，为学生培养和进一步深造提供了良好的条件。本专业在校生在“挑战杯”课外学术科技作品竞赛、全国大学生交通科技大赛、智慧城市技术大赛、中国“互联网+”大学生创新创业大赛等多项全国性大学生科技竞赛中屡获佳绩。

本专业与城市轨道交通公司、轨道交通信号控制系统与道路交通信号控制系统研发单位建立了良好的合作关系，并与上海铁路局南京电务段、南京市地铁集团有限公司、国瑞集团恩瑞特实业有限公司、卡斯柯信号有限公司、自仪泰雷兹交通自动化系统有限公司等签订了联合办学或实习实践协议，建立了校外一批人才培养基地。学生可就业的领域包括铁路部门、城市轨道交通部门，以及轨道交通和道路交通信号控制系统研发单位，也可以在“交通运输工程”和“控制科学与工程”等相关学科考研深造。

二、培养目标

本专业培养具有坚实的自然科学基础知识，掌握自动化专业大类的宽厚的基础理论和轨道交通信号与控制的基本理论，富有创新精神、工程素质、工程实践能力和工作责任心，能够在自动化、轨道交通信号与控制、道路交通信号控制领域从事设计、开发、生产、管理、维护和技术支持等工作的应用型工程技术和科研人才。毕业五年后能成为工作领域内的团队核心或中坚力量。

三、毕业生能力和学分要求

1. 毕业生能力要求

毕业生主要从事轨道交通信号与控制系统和道路交通控制系统的分析规划、设计、开发、生产、管理、维护和技术支持等方面工作，毕业生应获得以下知识与能力：

要求 1：具有从事交通信号与控制专业工作所需的相关数学、自然科学以及经济和管理知识，并将其用于解决轨道交通信号与控制等系统中的工程问题。

要求 2：能够应用数学、自然科学和工程科学的基本原理，通过文献研究获取分析轨道交通信号与控制等系统中的工程问题，得出恰当结果或结论。

要求 3：能够综合运用所学理论和技术手段进行轨道交通信号与控制系统的的设计、开发和分析，设计过程中能够综合考虑经济、环境、法律、安全、健康、伦理等制约因素。

要求 4：能够基于科学原理并采用科学方法对轨道交通信号与控制系统中的工程问题进

行实验研究，并通过对实验数据的分析得到合理有效的结论。

要求 5: 能够使用轨道交通信号与控制中的常用仪器、仿真软件及相关信息资源，从事轨道交通信号与控制系统研究、开发和维护工作。

要求 6: 能够基于轨道交通信号与控制工程相关背景知识进行合理分析，评价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。

要求 7: 能够理解和评价针对轨道交通信号与控制系统对环境、社会可持续发展的影响。

要求 8: 具有人文社会科学素养、社会责任感、自信心和工程职业道德。

要求 9: 具有一定的组织管理能力、表达能力和人际交往能力以及团队合作能力。

要求 10: 能够就轨道交通信号与控制工程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。并具有国际视野和国际交流能力，能进行有效的工程技术沟通、合作与竞争。

要求 11: 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。

要求 12: 树立终身学习的意识，在学习方法和基础知识方面具备终身学习的能力；具有不断探索、与时俱进、适应当前社会发展的能力。

2. 毕业学分要求

课程模块	课程性质	修读学分	备注
通识教育课	必修	38	
学科教育课	必修	38.5	
专业基础课	必修	69.5	
专业选修课	选修	12	从本专业开出的 27 门课程（54 学分）中选修 12 学分
通识教育选修课	选修	8	从学校开出的课程中选修 8 学分；其中， 人文与艺术类≥2 门 经济与社会类≥1 门 创新与创业类≥1 门

毕业总学分	166	另需取得 4 个素质发展学分，方可毕业
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四、学制与学位

标准学制：四年

修业年限：三至六年

授予学位：工学学士

五、主干学科与交叉学科

主干学科：控制科学与工程、交通运输工程

交叉学科：电子科学与技术、信息工程

六、专业核心课程

电路、模拟电子线路、数字逻辑电路、微机原理及接口技术、控制工程基础、现代控制理论基础、系统可靠性与安全性、传感器与检测技术、车站信号自动控制、行车调度指挥自动化、列车运行控制技术、轨道交通网络与通信技术等。

七、集中实践教学环节

大学物理实验、电子工艺实习、EDA 综合实验、电路综合实验、电子线路综合实验、轨道交通信号控制综合实验、轨道交通信号控制课程设计、毕业实习、毕业设计（论文）等。

Rail Transit Signal and Control

I. Introductions

Rail Transit Signal and Control, an ad hoc major in Automation, is built upon traffic engineering, control engineering and automation to meet the developmental demand of the domestic economy and society. Under the guidance of “comprehensive education”, a multi-level practice and education system is constructed with the support of the Jiangsu practice and education demonstration center. “Intelligent transportation studio”, “Extracurricular science and technology innovation center for undergraduates” are established to promote the students’ innovation ability and to provide a good condition for students’ further education. Students have obtained a lot of awards in various competitions, such as the “Challenge Cup” extracurricular academic and research competition, the national traffic science competition for the undergraduates, the smart city competition, China’s “Internet +” Innovation entrepreneurship competition.

The Department of Transportation has built a good cooperative relationship with companies, and research institutes of rail transit, rail transit signal control, and road traffic signal control. To provide a good practice condition for students, joint protocols have been signed with several companies, such as Shanghai Railway Bureau (Branch in Nanjing), Nanjing Metro Company, Guorui Group Enruiter Industrial Co., Ltd., Casco Signal Co., Ltd., Thales SEC Transport Co., Ltd.. Graduates are able to find jobs or to further studies in the fields of rail transit systems, metro systems, rail transit signal control systems, road traffic control systems, traffic engineering and control science and engineering, and other related areas.

II. Objectives

The major aims at cultivating engineering technicians and scientific talents with innovative spirit, practical ability, solid basic knowledge and theory in automation, rail transit signal and control. Graduates should be competent in system analysis, engineering construction, system design, system management, system operation, device development, etc., in the areas of automation, rail transit signal and control and road traffic signal control.

III. Requirements for the graduates

1. Requirements about ability

Graduates should be able to engage in the analysis, planning, design, developing, production, management, maintenance, and technical support of the rail transit signal and control systems and the traffic control systems. More specifically, graduates should obtain knowledge and ability of the following aspects:

(1) Acquire knowledge of rail transit signal and control, mathematics, natural science and certain knowledge of economics and management; and be able to apply this knowledge to solve the practical problems in the rail transit signal and control system.

(2) Use the basic theory of mathematics, natural science and engineering, and apply the literature review to analysis the engineering problems in rail transit signal and control system, and make a solid conclusion.

(3) Design, develop and analyze the rail transit signal and control system with the learned theory and technology, considering the economic, environmental, legal, safety, health, ethics and other constraints.

(4) Conduct the experiments of the rail transit signal and control system using the scientific principles and methods, and make the reasonable and effective conclusions using the testing data.

(5) Use the instruments, simulation tools and other related information sources in the rail transit signal and control system, to assist the research, development and maintenance.

(6) Analyze and evaluate the impact of rail transit signal and control engineering on the society, health, security, legal and culture by using the learned knowledge, and have awareness of the responsibility.

(7) Understand and evaluate the impact of rail transit signal and control system on the environment and sustainable development.

(8) Have awareness of humanities, social responsibility, self-confidence, and engineering professional ethics.

(9) Maintain capabilities of organization and management, people skill, and team working.

(10) Communicate effectively and exchange ideas with the peers and the public on the rail transit signal and control engineering issues, including writing reports and designing papers, making speeches, and expressing or responding to directives. Besides, have an international perspective and the ability to communicate with foreigners, and thus effectively communicate, cooperate and compete on engineering techniques.

(11) Understand and master the principles of project management and economic decision-making, and use them in a multi-major environment.

(12) Establish the awareness of lifelong learning and have the ability of lifelong learning in terms of learning methods and knowledge. Have the ability to continuously explore, keep pace with the times and adapt to the current social development.

2. Requirements about credit

Course Modules	Course Nature	Credits
Course of General Education	Compulsory Course	38
Course of Discipline Education	Compulsory Course	38.5
Fundamental Specialized Course	Compulsory Course	69.5
Optional Specialized Course	Optional Course	12
Optional Course of General Education	Optional Course	8
Total		166

Another 4 quality development credits are required for graduation.

IV. Length of Program and Degree

Standard schooling: four years

Length of program: three to six years

Degree awarding: bachelor of engineering

V. Leading discipline and interdisciplinary subjects

Leading discipline subjects: control science and engineering, transportation engineering

Interdisciplinary subjects: electronic science and technology, information engineering

VI. Core courses

Circuits, analog electronic circuit, Digital logic circuit, Microcomputer principle and interface technology, Control engineering foundation, Modern control theory, System reliability and safety, Sensor and detection technology, Station signal automatic control, Traffic dispatch and command automation, Train operation control technology, Rail transit network and communication technology, etc.

VII Collective practical teaching session

Metalworking Practice, Electronic Technology Practice, EDA Design, Comprehensive experiments of rail transit signal control, Course Design of rail transit signal control, comprehensive experiments of road traffic control, Graduation Practice, Graduation Project, etc.

八、教学计划进程表

轨道交通信号与控制专业教学计划进程表

Table of Teaching Plan for Major of Rail Transit Signal and Control

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester												开课 单位
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1	IV-2	
必修课程●通识教育课（38 学分） Compulsory Course●Course of General Education																				
21020303	军事训练 Military Training	2	80				80	2											245	
06000201	计算思维 Computational Thinking	2	32	24		8			2										106	
14120601	通用英语（I） English for General Purpose（I）	2	32	32					2										114	
15045602	思想道德修养与法律基础 Moral Cultivation and Law Basics	3	48	42			6		3										123	
20000102	大学生职业生涯规划 Career Planning for College Students	0.5	8	8					0.5										245	
21120101	体育（I） P.E(I)	1	32	32					1										122	
07057201	创业教育 Entrepreneurship Education	1	16	16						1									107	
14220601	通用英语（II） English for General Purpose（II）	2	32	32						2									114	
15042402	中国近现代史纲要 Outline of Modern Chinese History	3	48	42			6			3									123	
21220101	体育（II） P.E(II)	1	32	32						1									122	
21020503	军事理论 Military Theory	2	32	16			16					2							372	
14120701	进阶英语（I） English for Specific Purpose（I）	2	32	32									2						114	

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1	IV-2
15045203	马克思主义基本原理概论 Fundamental Principles of Marxism	3	48	42			6						3							123
21320101	体育 (III) P.E(III)	1	32	32									1							122
14220701	进阶英语 (II) English for Specific Purpose (II)	2	32	32									2							114
21420101	体育 (IV) P.E(IV)	1	32	32									1							122
15045304	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 The Theoretical System of Socialism With Chinese Characteristics	5	80	67			13									5				123
20000301	就业指导 Vocational Guidance	0.5	8	8												0.5				245
88000001	科研训练 Scientific Research Training	2	80				80											2		242
	形势与政策 (I) - (VIII) Situation and Policy (I) - (VIII)	2	64	64				I-1、I-2、II-1、II-2、III-1、III-2、IV-1、IV-2 每学期安排 8 个讲课学时, 共计 2 学分。									123			
必修课程●学科教育课 (38.5 学分) Compulsory Course●Course of Discipline Education																				
05021705	工程制图 Engineering Drawing	2	32	26		6										2				101
06000704	C 语言程序设计 C Language Programming	4	64	48		16										4				110
11123302	高等数学 (I) Calculus (I)	4.5	80	64			16									4.5				113
11031201	线性代数 Linear Algebra	2.5	40	40												2.5				113

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester											开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1		IV-2		
11120804	大学物理 (I) College Physics (I)	3.5	56	56							3.5											113
11120904	大学物理实验 (I) Experiments on College Physics (I)	1.5	24		24						1.5											113
11223302	高等数学 (II) Calculus (II)	5.5	96	80			16				5.5											113
07022604	管理学原理 Principles of Management	2	32	32						2												107
11024002	工程数学 Engineering Mathematics	3	48	48						3												113
11220804	大学物理 (II) College Physics (II)	3.5	56	56						3.5												113
11220904	大学物理实验 (II) Experiments on College Physics (II)	1.5	24		24					1.5												113
23020104	金属工艺实习 Metal Technics Practice	2	80				80			2												369
11022601	概率与统计 Probability and Statistics	3	48	48						3												113
必修课程●专业基础课 (69.5 学分) Compulsory Course●Fundamental Specialized Course																						
06025003	软件技术基础 Fundamentals of Software Technology	2	32	32							2											110
04061501	电路 Circuits	3.5	56	56						3.5												104
04061601	电路综合实验 Comprehensive Experiments on Circuits	1	40		40					1												104
10037202	轨道交通概论 Introduction to Rail Transit	1.5	24	24							1.5											110
10060102	轨道交通信号设备 Signal Equipments of Rail Transit	1.5	24	20			4				1.5											110

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I -0	I -1	I -2	II -0	II -1	II -2	III-0	III-1	III-2		IV-0	IV-1
04026304	数字逻辑电路 Digital Logic Circuits	3.5	56	56							3.5								104
04026804	模拟电子线路 Analog Circuits	3.5	56	56							3.5								104
04030804	信号与系统 Signal and System	2	32	32							2								104
04033902	电子工艺实习 Practice on Electronic Technology	2	80				80				2								369
04061701	电子线路综合实验 Comprehensive Experiments on Electronic Circuits	1.5	60		60						1.5								104
10043102	道路交通控制 Road Traffic Control	2.5	40	34			6						2.5						110
10052201	专业导论 Introduction to the Specialty	0.5	20	4			16						0.5						110
10021704	电力电子技术 Power Electronics Technology	2	32	32									2						110
10025406	控制工程基础 ▼ Fundamentals of Control Engineering	3.5	56	48	8								3.5						110
10027005	微机原理与接口技术 Microcomputer Principles and Interface Technology	3.5	56	48			8						3.5						110
10032001	嵌入式控制系统及应用 Embedded Control System & Its Application	3	48	32	16								3						110
10043001	系统可靠性与安全性 System Reliability and Safety	2	32	32									2						110
10037501	轨道交通运行控制技术 Operation Control Technology of Rail Transit	2	32	26	6									2					110

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1
10037601	轨道交通网络与通信技术 Network and Communication Technology of Rail Transit	2	32	28	4										2				110
10052301	车站信号自动控制 Automatic Control of Station Signals	2.5	40	32			8								2.5				110
10020802	传感器与检测技术 Sensors and Testing Technology	2	32	26	6										2				110
10027105	现代控制理论基础▼ Fundamentals of Modern Control Theory	3	48	48											3				110
10037701	轨道交通控制综合实验 Comprehensive Experiments on Rail Transit Control	1	40				40									1			110
10037801	轨道交通信号课程设计 Course Design of Rail Transit Signals	1	40				40									1			110
10030304	EDA 综合实验 Comprehensive Experiments of EDA	1	40				40									1			110
10052401	行车调度指挥自动化 Automation of Traffic Dispatching	1	16	16													1		110
10052501	交通科技创新创业实践 Innovation and Entrepreneurship Practice on Traffic Technology	2	32	16			16										2		110
10020304	毕业设计 Graduation Project	10	560				560											10	110
10020405	毕业实习 Graduation Practice	3	120				120											3	110
选修课程●专业选修课（64 学分）【选修 12 学分】 Optional Course●Optional Specialized Course																			
10026602	数字图像处理 Digital Image Processing	2	32	32										2					110

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I -0	I -1	I -2	II -0	II -1	II -2	III-0	III-1	III-2		IV-0	IV-1	IV-2
04027703	数字信号处理 Digital Signal Processing	2	32	32										2						104
10026202	数据库原理及应用 Principles and Applications of Database	2	32	24		8								2						110
10028003	自动控制元件 Automatic Control Components	2.5	40	32	8									2.5						110
10043301	轨道交通车辆 Rail Transit Vehicles	2	32	32										2						110
10052801	交通模拟仿真技术与应用 Traffic Simulation Technology and Applications	2	32	26			6							2						110
10054701	智能交通与安全 ▼ Intelligent Transportation Systems and Safety	2	32	32										2						110
10023901	机器人控制导论 Introduction to Robot Control	2	32	24	8										2					110
10024601	过程计算机控制系统 Process Computer Control System	3	48	32	16										3					110
10025502	控制系统计算机仿真及辅助设计 Computer Aided Design and Simulation in Control System	1.5	24	8		16									1.5					110
10029601	运动控制系统 Motion Control System	3	48	40	8										3					110
10044001	无人机控制技术 Unmanned Aerial Vehicle Control Technology	2	32	16	16										2					110
10045301	人工智能技术 Artificial Intelligence Technology	2	32	32											2					110
10052601	城市轨道交通综合监控技术 Monitoring Technology of Urban Rail Traffic	2	32	32											2					110

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1	IV-2
10052901	DSP/FPGA 嵌入式实时处理技术及应用 DSP/FPGA Real Time Processing Technology and Applications	2	32	32												2				110
10043201	道路交通控制综合实验 Comprehensive Experiments on Road Traffic Control	1	40				40										1			110
01032901	城市客运交通 Urban Passenger Transportation	2	32	32														2		110
10027803	虚拟仪器技术与设计 Virtual Instrument Technology and Design	2	32	4	14	14												2		110
10028605	学科前沿系列讲座 Lectures on Frontier Discipline	1	16	16														1		110
10031801	建模与辨识基础 Fundamentals of Modeling and Identification	2	32	24		8												2		110
10032101	模糊控制及应用 Fuzzy Control and Its Application	2	32	24	8													2		110
10038301	轨道交通信号抗干扰技术 Anti-Interference Technology of Rail Transit Signals	2	32	32														2		110
10038401	轨道交通信息技术 Information Technology of Rail Transit	2	32	32														2		110
10038601	道路交通现代控制技术 Modern Control Technology of Road Traffic	2	32	32														2		110
10052701	城市轨道交通运营安全管理 Operation Safety Management of Urban Rail Transit	2	32	32														2		110
10054601	城市轨道交通电力牵引与控制 Electric Power Traction and	2	32	32														2		110

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1
	Control of Urban Rail Transit																		
10052101	智联网技术 Technology for Internet of Intelligences	2	32	24			8											2	110
	必修课程汇总 Compulsory Courses Total	146	3256	1781	188	30	1257	2	19	22	4	20.5	21.5	0	17	17	3	5	13
	选修课程汇总 Optional Specialized Courses Total	54	888	710	78	46	54	0	0	0	0	0	2	0	12.5	17.5	1	19	2
								说明：“形势与政策”课程学分未计入学期学分。											

注：1.课程名称标有“▼”的为全英文授课课程，其余均为中文授课课程；

2.学期为“0”的表示夏季学期，“1”秋季学期，“2”春季学期。

Notes: 1. Courses with ‘▼’ are taught in English ,the others are taught in Chinese;

2.semester ‘0’ stands for Summer semester, ‘1’ and ‘2’ stands for Autumn semester and Spring semester.

电气工程及其自动化

一、专业介绍

电气工程及其自动化专业源于 1993 年和 1994 年创办的“电气技术”和“电力系统及其自动化”专业，1999 年合并成立电气工程及其自动化专业。电气工程是现代科技领域中的核心专业之一，从一定程度上代表着社会的科技水平，是当今高新技术领域中不可或缺的关键专业。本专业师资力量雄厚、教学条件优越，为江苏省重点专业、教育部卓越工程师教育培养计划专业。

本专业学生主要学习电工技术、电子技术、电气工程、信息控制、计算机技术等方面课程，掌握较宽广的工程技术基础和专业基础知识，涵盖电机与电器、电力系统、电力电子及电力传动等领域。本专业主要特点是强弱电结合、电工技术与电子技术相结合、软件与硬件相结合、元件与系统结合、理论知识学习与应用能力培养相结合，学生受到电工电子、信息控制及计算机技术方面的基础训练，具有分析解决电气工程与控制技术问题的一般能力。

本专业毕业生广泛从事电气工程相关系统、设备的设计、运行控制、信息处理、研究开发，主要就业于电力、电气、电子等相关研究机构与国内外知名企业。毕业生动手能力强、适应面宽，综合素质高，得到用人单位广泛赞誉。

二、培养目标

本专业培养适应社会主义现代化建设、德智体全面发展、拥有扎实的数学与自然科学和工程技术基础、掌握电气工程专业基本理论与技术知识、具有分析和解决电气工程领域复杂工程问题的能力、具备良好的外语和计算机应用能力，具有创新意识和团队协作精神的电气工程领域的高级工程技术人才。本专业学生毕业 5 年左右可在科研机构、高等院校和企事业单位等部门，成为电气工程及其自动化领域从事电气工程相关部件及系统的研究、设计、开发和系统维护、技术管理等工作的骨干人才。

三、毕业生能力和学分要求

1. 毕业生能力要求

为使本专业学生达到培养目标，要求毕业生应具备以下 12 项能力：

(1) 工程知识：能够将数学、自然科学、工程基础和专业基础知识用于解决电气工程及其自动化领域复杂工程问题。

(2) 问题分析：能够应用数学、自然科学基本原理，并通过文献研究，识别、表达、分析电气工程及其自动化领域复杂工程问题，以获得有效结论。

(3) 设计/开发解决方案：能够设计针对电气工程及其自动化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，考虑法律、健康、安全、文化、社会以及环境等因素。

(4) 研究：能够基于科学原理并采用科学方法对电气工程及其自动化领域复杂工程问题

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。

(5) 使用现代工具：能够针对电气工程及其自动化领域复杂工程问题，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，包括对电气工程及其自动化领域复杂工程问题的预测与模拟，并能够理解其局限性。

(6) 工程与社会：能够基于电气工程相关背景知识进行合理分析，评价电气工程及其自动化专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。

(7) 环境和可持续发展：能够理解和评价针对电气工程及其自动化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。

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

(9) 个人和团队：能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。

(10) 沟通：能够就电气工程及其自动化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。

(11) 项目管理：理解并掌握电气工程管理原理与经济决策方法，并能在多学科环境中应用。

(12) 终身学习：具有自主学习和终身学习的意识，有不断学习和适应发展的能力。

2. 毕业学分要求

课程模块	课程性质	修读学分	备注
通识教育课	必修	38	
学科教育课	必修	32.5	
专业基础课	必修	50	
专业方向课（方向一）	必修	25.5	
专业方向课（方向二）	必修	25.5	
专业方向课 （方向三，卓工）	必修	27	
专业选修课	选修	12	从本专业开出的 22 门课程（43 学分）中选修 12 学分

通识教育选修课	选修	8	从学校开出的课程中选修 8 学分；其中， 人文与艺术类 ≥ 2 门、 经济与社会类 ≥ 1 门、 创新与创业类 ≥ 1 门。
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毕业总学分	方向一	166	另需取得 4 个素质发展学分，方可毕业
	方向二	166	另需取得 4 个素质发展学分，方可毕业
	方向三，卓工	167.5	另需取得 4 个素质发展学分，方可毕业

四、学制与学位

标准学制：四年

修业年限：三至六年

授予学位：工学学士

五、主干学科与交叉学科

主干学科：电气工程

交叉学科：控制科学与工程、计算机科学与技术

六、专业核心课程

电路、模拟电子线路、数字逻辑电路、工程电磁场、电机学、电力电子技术、检测技术、控制工程基础、电力系统分析、微机原理及接口技术等。

七、主要集中实践环节

电路与电子技术实验、电子工艺实习、计算机软件实践及硬件实践、电气工程认知实习、电路综合实验、电子线路综合实验、电气工程课程设计、毕业实习、毕业设计（论文）等。

Electrical Engineering and Automation

I. Introduction

Electrical Engineering and Automation, originating in the major of Electrical Technology and Power System, was established in 1999. It is a provincial key major and provides Excellent Engineers Program.

The major has clear objectives, good atmosphere of teaching and researching. The major focuses on fundamentals of strong electricity and weak electricity, software and hardware, and systems and components. The major specializes in four areas, namely power system, motor and electrical appliances, electrical power and electronics, and electrical measurement. Graduates are expected to engage in electrical system designing, product manufacturing, and software/hardware development in the fields of power system and electrical system. Graduates will be well prepared to do scientific research, technological development, product design, or relevant technical management in institutes, universities, and relevant hi-tech enterprises.

II. Objectives

The major aims at cultivating students with scientific knowledge of humanities quality, social responsibility and professional ethics; innovative mind and engineering practice ability. Graduates are expected to acquire global vision, frontiers and trends of power system and electrical system, teamwork spirit and management. Graduates are required to obtain fundamentals of power system and electrical system, and to undertake design and development of power system and electrical equipment.

The major is designed to cultivate advanced technical engineers and researchers who can adjust to the demand of modern scientific technology and economic development with systematic professional knowledge of electrical engineering and industrial automation. Graduates should possess abilities to analyze and solve complex problems in electrical engineering. After graduation they can engage in researching, designing, developing, system maintaining and technological managing in the areas of electrical engineering and automation. In addition, graduates can take on education and management work in colleges, universities, public institutions, enterprises and research institutes.

III. Requirements of Abilities and Credits

1. Abilities

Graduates should obtain knowledge and ability of the following aspects:

(1) Engineering knowledge: Acquire knowledge of electrical engineering and automation, mathematics, natural science and certain knowledge of economics and management;

(2) Problem analysis: Have the ability to apply basic principles of applied mathematics and natural sciences and to perform literature review in analyzing and solving engineering problems arising in the field of electrical engineering and automation;

(3) Design/Development: Apply instruments skillfully; have abilities of experiment design,

implementation and analysis, electrical engineering and automation system research, development and maintenance;

(4) Research: Have the ability to perform basic scientific research, including designing experiments, data analysis and explanation, and evaluation.

(5) Use of modern scientific tools: Master techniques and skills in electrical engineering and automation, signal processing, automatic measurement, computer application, and networking; understand state-of-art and development trend of the discipline;

(6) Engineering and society: Have the awareness of humanities, social responsibility, self-confidence, and engineering professional ethics;

(7) Environment and sustainable development: the ability to understand and evaluate the impact of engineering practice on the environmental and social sustainable development of complex engineering problems in the field of electrical engineering and automation.

(8) Professional norms: Humanities, social sciences and social responsibility. Graduates can understand and abide by professional ethics and norms in the practice of electrical engineering, and fulfill responsibilities.

(9) Individuals and teams: the ability to assume the roles of individuals, team members, and leaders in a multidisciplinary team.

(10) Communication: able to effectively communicate and communicate with the industry peers and the public in the field of complex engineering, including writing reports and design manuscripts, presenting statements, clearly expressing or responding to instructions. Graduates have a certain international perspective and can communicate and communicate in the cross-cultural background.

(11) Project management: understand and master the electrical engineering management principles and economic decision-making methods, and can be applied in a multidisciplinary environment.

(12) Lifelong learning: the consciousness of autonomous learning and lifelong learning, and the ability to continue to learn and adapt to development.

2. Credits

Course Modules	Course Nature	Credits
Course of General Education	Compulsory Course	38
Course of Discipline Education	Compulsory Course	32.5
Fundamental Specialized Course	Compulsory Course	50
Course of Specialized Direction (I)	Compulsory Course	25.5
Course of Specialized Direction (II)	Compulsory Course	25.5

Course of Specialized Direction (III)	Compulsory Course	27	
Optional Specialized Course	Optional Course	12	
Optional Course of General Education	Optional Course	8	
Total		Direction I	166
		Direction II	166
		Direction III	167.5

Another 4 quality development credits are required for graduation.

IV. Length of program and degree

Standard Academic Year: 4 years;

Length of Schooling: 3 to 6 years;

Degree: Bachelor of Engineering

V. The leading discipline and interdisciplinary subjects

Leading Discipline: Electrical Engineering

Interdisciplinary Subjects: Control Science and Engineering, Computer Science and Technology

VI. Core courses

Electric Circuits, Analogic Electronic Circuits, Digital Logic Circuits, Engineering Electromagnetic Field, Electric Machinery, Power Electronics, Measurement Technology, Control Engineering Fundamentals, Power System Analysis, Microcomputer Principle and Interface Technology, etc.

VII. Collective practical teaching session

Circuits Comprehensive Experiment, Metalworking Practice, Electronic Technology Practice, Electronic Circuits Comprehensive Experiment, Comprehensive Experiment of Electrical Instrumentation and Measurement, Analog Electronic Circuit EDA, Electrical Engineering Cognition Practice, Comprehensive Experiment of Power Electronics Design, Course Design of Electrical Engineering, Graduation Practice, Graduation Project, etc.

八、教学计划进程表

电气工程及其自动化专业教学计划进程表

Table of Teaching Plan for Major of Electrical Engineering and Automation

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester												开课 单位
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1	IV-2	
必修课程●通识教育课（38 学分） Compulsory Course●Course of General Education																				
21020303	军事训练 Military Training	2	80				80	2											245	
06000201	计算思维 Computational Thinking	2	32	24		8			2										106	
14120601	通用英语（I） English for General Purpose（I）	2	32	32					2										114	
15045602	思想道德修养与法律基础 Moral Cultivation and Law Basics	3	48	42			6		3										123	
20000102	大学生职业生涯规划 Career Planning for College Students	0.5	8	8					0.5										245	
21120101	体育（I） P.E(I)	1	32	32					1										122	
07057201	创业教育 Entrepreneurship Education	1	16	16						1									107	
14220601	通用英语（II） English for General Purpose（II）	2	32	32						2									114	
15042402	中国近现代史纲要 Outline of Modern Chinese History	3	48	42			6			3									123	
21220101	体育（II） P.E(II)	1	32	32						1									122	
21020503	军事理论 Military Theory	2	32	16			16					2							372	

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester												开课 单位
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1	IV-2	
14120701	进阶英语（I） English for Specific Purpose（I）	2	32	32																114
15045203	马克思主义基本原理概论 Fundamental Principles of Marxism	3	48	42			6													123
21320101	体育（III） P.E(III)	1	32	32																122
14220701	进阶英语（II） English for Specific Purpose（II）	2	32	32																114
21420101	体育（IV） P.E(IV)	1	32	32																122
15045304	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 The Theoretical System of Socialism With Chinese Characteristics	5	80	67			13											5		123
20000301	就业指导 Vocational Guidance	0.5	8	8														0.5		245
88000001	科研训练 Scientific Research Training	2	80				80												2	242
	形势与政策（I）-（VIII） Situation and Policy（I）-（VIII）	2	64	64				I-1、I-2、II-1、II-2、III-1、III-2、IV-1、IV-2 每学期安排8个讲课学时，共计2学分。												123
必修课程●学科教育课（32.5 学分） Compulsory Course●Course of Discipline Education																				
05021705	工程制图 Engineering Drawing	2	32	26		6													2	101
06000704	C 语言程序设计 C Language Programming	4	64	48		16													4	110
11123302	高等数学（I） Calculus（I）	4.5	80	64			16												4.5	113

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester												开课 单位				
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1	IV-2					
11031201	线性代数 Linear Algebra	2.5	40	40								2.5												113
11120804	大学物理 (I) College Physics (I)	3.5	56	56								3.5												113
11120904	大学物理实验 (I) Experiments on College Physics (I)	1.5	24		24							1.5												113
11223302	高等数学 (II) Calculus (II)	5.5	96	80			16					5.5												113
07022604	管理学原理 Principles of Management	2	32	32									2											107
11220804	大学物理 (II) College Physics (II)	3.5	56	56									3.5											113
11220904	大学物理实验 (II) Experiments on College Physics (II)	1.5	24		24								1.5											113
23020104	金属工艺实习 Metal Technics Practice	2	80				80						2											369
必修课程●专业基础课 (50 学分) Compulsory Course●Fundamental Specialized Course																								
04061501	电路 Circuits	3.5	56	56										3.5										104
04061601	电路综合实验 Comprehensive Experiments on Circuits	1	40		40									1										104
11024001	工程数学 Engineering Mathematics	4	64	64										4										113
04026304	数字逻辑电路 Digital Logic Circuits	3.5	56	56											3.5									104
04026804	模拟电子线路 Analog Circuits	3.5	56	56											3.5									104
04033902	电子工艺实习 Practice on Electronic Techology	2	80				80								2									369

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1	IV-2
04061701	电子线路综合实验 Comprehensive Experiments on Electronic Circuits	1.5	60		60															104
10041301	工程电磁场 Engineering Electromagnetic Fields	3	48	45	3															110
10130603	电机学（I） Electrical Machinery(I)	2.5	40	32	8															110
11022601	概率与统计 Probability and Statistics	3	48	48																113
10028801	电工仪表与测量综合实验 Comprehensive Experiments on Electrical Instruments and Measurement	1	40		30	10														104
10050401	电气工程认知实习 Cognition Practice on Electric Engineering	1	40				40							1						110
04061101	模拟电子线路 EDA Analog Circuits EDA	1	40				40								1					104
100217E1	电力电子技术【英】▼ Power Electronics Technology[E]	3	48	40			8								3					110
10022205	检测技术 Detection Technology	2.5	40	34	6										2.5					110
10025403	控制工程基础▼ Fundamentals of Control Engineering	3	48	48											3					110
10027005	微机原理与接口技术 Microcomputer Principles and Interface Technology	3.5	56	48			8								3.5					110
10230603	电机学（II） Electrical Machinery(II)	2.5	40	32	8										2.5					110
10030303	电力电子设计综合实验 Comprehensive Experiments on Power	1	40				40										1			110

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1
	Electronics Design																		
10029002	电气工程课程设计 Course Design of Electric Engineering	2	80				80										2		110
10053001	电气领域创新创业与实践 Practices, Innovation and Entrepreneurship on Electrical Engineering	2	32				32											2	110
必修课程●专业方向课【任选一个方向修读】 Compulsory Course●Course of Specialized Direction																			
方向一（25.5 学分） Course of Specialized Direction（I）																			
10054801	电气工程基础 Fundamentals of Electrical Engineering	3.5	56	52	4										3.5				110
10041503	交直流调速系统 AC and DC Motor Speed Control System	2.5	40	36	4											2.5			110
10041602	开关电源设计与应用 Design and Applications of Switching Power Supply	2.5	40	36	4											2.5			110
10043502	电机设计技术 Electrical Machine Design	2	32	32												2			110
10033104	电气测控系统原理 Theory of Electrical Testing and Control System	2	32	26	6												2		110
10020307	毕业设计 Graduation Project	10	560				560											10	110
10020401	毕业实习 Graduation Practice	3	120				120											3	110
方向二（25.5 学分） Course of Specialized Direction（II）																			

课程编码 Course No	课程名称 Course Name	学分	总学时	讲课	实验	上机	实践	学年-学期 Academic Year-Semester												开课单位				
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1	IV-2					
10054901	电力系统分析 Power System Analysis	3.5	56	52	4												3.5						110	
08024002	高电压技术 High Voltage Technology	2	32	28	4													2						110
10055001	电力系统继电保护 Power System Protective Relaying	2.5	40	36	4													2.5						110
10055101	发电厂电气工程 Electrical Engineering for Power Plants	2.5	40	36	4													2.5						110
10033101	电气设备在线检测 On-Line Monitoring and Diagnosis for Electrical Equipments	2	32	32																	2			110
10020307	毕业设计 Graduation Project	10	560					560															10	110
10020401	毕业实习 Graduation Practice	3	120					120															3	110
方向三（卓工）（27 学分） Course of Specialized Direction（III）																								
10054901	电力系统分析 Power System Analysis	3.5	56	52	4													3.5						110
08024002	高电压技术 High Voltage Technology	2	32	28	4														2					110
10041503	交直流调速系统 AC and DC Motor Speed Control System	2.5	40	36	4														2.5					110
10041602	开关电源设计与应用 Design and Applications of Switching Power Supply	2.5	40	36	4														2.5					110
10055001	电力系统继电保护 Power System Protective Relaying	2.5	40	36	4														2.5					110

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1	IV-2
10051503	电气设备制造工艺 Manufacturing Technics of Electrical Equipments	1	16	12	4													1		110
10020491	毕业实习 Graduation Practice	3	120				120												3	110
10020397	毕业设计 Graduation Project	10	560				560												10	110
选修课程●专业选修课（43 学分）【选修 12 学分】 Optional Course●Optional Specialized Course																				
06025003	软件技术基础 Fundamentals of Software Technology	2	32	32								2								110
08034904	电力系统自动化 Automation of Power System	2	32	32												2				110
10021101	单片机应用技术 Applications of Single-chip Microcomputer	3	48	36	12											3				110
10027703	数字信号处理 Digital Signal Processing	2	32	32												2				110
10028206	现代控制理论基础 Fundamentals of Modern Control Theory	2	32	32												2				110
10030201	学科前沿系列讲座 Lectures on Frontier Discipline	1	16	16												1				110
10030602	建筑电气技术 Architecture Electric Technology	2	32	28	4											2				110
10030801	供配电技术 Power Supply and Distribution Technology	2	32	32												2				110
10033502	电能质量分析与控制 Analysis and Control of Power Quality	2	32	32												2				110
10040902	新能源发电技术 ▼ New Energy Generation Technology	2	32	32												2				110

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester												开课 单位
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1	IV-2	
10050501	新型电机及应用 New Motor and Its Application	2	32	32												2				110
10050701	电力电子系统建模与控制 Modeling and Control of Power Electronics System	2	32	32												2				110
10050801	电器逻辑控制技术 Programmable Logic Control Technology of Electric Appliances	2	32	24	8											2				110
10053101	电池管理技术 Battery Management Technology	2	32	32												2				110
08032501	电力系统远程监控原理 Introduction to Remote Monitoring and Control of Power System	2	32	30	2													2		110
08035001	电力系统计算机辅助分析 Computer Aided Analysis of Power System	2	32	22	10													2		110
10031103	灵活交流输电技术 Flexible Alternating Current Transmission Technology	2	32	32														2		110
10033701	虚拟仪器与自动测试技术 Virtual Instrument and Automatic Testing Technology	2	32	24	8													2		110
10034101	无线传感器网络技术基础 Fundamentals of Wireless Sensor Network Technology	2	32	24	8													2		110
10041701	电力系统电磁兼容 EMC of Power System	2	32	26	6													2		110
10043702	智能电网概论 Introduction to Smart Grid	1	16	16														1		110

课程编码 Course No	课程名称 Course Name	学分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester												开课 单位
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	IV-0	IV-1	IV-2	
10050601	电力电子器件 Power Electronics Devices	2	32	32														2		110
方向一 (I)	必修课程汇总 Compulsory Courses Total	146	3316	1728	221	40	1327	2	19	20	4	21.5	23	1	19	12.5	3	4	15	
方向二 (II)	必修课程汇总 Compulsory Courses Total	146	3316	1730	219	40	1327	2	19	20	4	21.5	23	1	19	12.5	3	4	15	
方向三 (III)	必修课程汇总 Compulsory Courses Total	147.5	3340	1746	227	40	1327	2	19	20	4	21.5	23	1	19	15	3	3	15	
	选修课程汇总 Optional Specialized Courses Total	43	688	630	58	0	0	0	0	0	0	2	0	0	0	26	0	15	0	
								说明：“形势与政策”课程学分未计入学期学分。												

注：1.课程名称标有“▼”的为全英文授课课程，其余均为中文授课课程；

2.学期为“0”的表示夏季学期，“1”秋季学期，“2”春季学期。

Notes: 1. Courses with ‘▼’ are taught in English ,the others are taught in Chinese;

2.semester ‘0’ stands for Summer semester, ‘1’ and ‘2’ stands for Autumn semester and Spring semester.

智能电网信息工程

一、专业介绍

智能电网信息工程源于 1995 年创办的信息工程专业（后于 1998 改成电子信息工程专业），2012 年为响应国家面向新能源、高新技术发展的需要而设立。该专业现属省级重点建设品牌专业，也是我校“智能电网与控制”二级博士点学科指导下的一个本科专业。智能电网信息工程专业以电力系统自动化、信息工程、控制工程等为基础，依托优良的教学团队、实验环境、实习基地等优质教学资源，培养具有扎实专业理论和技能，具备较强的电气工程和信息工程综合素质和创新精神，掌握电力系统通信技术、信息采集和处理的基本理论与技术，熟悉智能电网的发展动态、电力系统生产和运行规律与特点，受到智能电网领域的软、硬件良好训练，在新能源发电与智能接入技术、电网智能调度与控制技术、电能计量与监测、计算机与网络通信技术等方面学有所长，可以在网络化、信息化、智能化电气系统等领域从事生产制造、工程设计、系统运行、系统分析、技术开发、教育科研等方面工作的特色鲜明的复合型高级工程技术人才。毕业生可从事国家有关部门、科研院所、高等院校、企业、高新技术公司从事智能电网系统及其设备的研究、设计与制造工作。

二、培养目标

本专业紧密结合国家智能电网建设之需，旨在培养具有扎实的专业理论和专业技能，具备较强的综合素质和创新能力，能综合应用智能电网相关理论及通信、控制、传感与检测、计算机应用等相关信息技术，从事“智能电网信息工程”专业相关的智能用电、智能电网调度与控制、智能化变电站、分布式发电、微网等系统及其装备的研究、设计、开发和应用集成，适应新兴国家战略产业发展需要的复合型高级工程技术人才和工程管理人才。

三、毕业生能力和学分要求

1. 毕业生能力要求

本专业学生主要学习电工技术、电子线路/电子技术基础、控制理论与控制工程、电力系统分析、信息处理、自动检测、计算机技术与应用和通信网络技术等方面的基本理论和专业知识，受到良好的工程实践和创新训练，具有智能电网相关系统分析、设计、开发与研究的基本能力。毕业生应获得以下几方面的知识和能力：

- （1）掌握从事智能电网信息工程等相关工作所需的相关数学、自然科学、技术科学、工程科学、管理和经济方面的知识。
- （2）具备利用应用数学、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智能电网复杂工程问题并获得有效结论的能力。
- （3）具备根据智能电网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）或工艺流程的能力；并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

(4) 具备基于科学原理并采用科学方法对智能电网复杂工程问题进行研究的能力, 包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

(5) 针对智能电网复杂工程问题, 具备开发、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的能力, 以实现对复杂工程问题的预测与模拟等, 并能够理解工具的局限性。

(6) 具备基于工程相关背景知识进行智能电网专业工程实践和复杂工程问题解决方案的合理性分析的能力, 以评价其对社会、健康、安全、法律以及文化的影响, 并理解应承担的责任。

(7) 具备理解和评价针对智能电网复杂工程问题的专业工程实践对环境、社会可持续发展的影响的能力。

(8) 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。

(9) 具有一定的组织管理能力、表达能力和人际交往能力以及团队合作能力; 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; 能够在多学科背景下的团队中承担个体、团队成员以及负责人的角色。

(10) 具备就智能电网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; 具备一定的国际视野, 能够在跨文化背景下进行沟通和交流。

(11) 具备一定的项目管理能力, 理解并掌握智能电网工程管理原理与经济决策方法, 并能在多学科环境中应用。

(12) 具备终身学习的意识, 在学习方法和基础知识方面, 具有具备终身学习、不断探索、与时俱进、适应当前社会发展的能力。

2. 毕业学分要求

课程模块	课程性质	修读学分	备注
通识教育课	必修	38	
学科教育课	必修	32.5	
专业基础课	必修	75.5	
专业选修课	选修	12	从本专业开出的 17 门课程 (34 学分) 中选修 12 学分
通识教育选修课	选修	8	从学校开出的课程中选修 8 学分; 其中, 人文与艺术类 ≥ 2 门 经济与社会类 ≥ 1 门

			创新与创业类 \geq 1 门
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毕业总学分	166	另需取得 4 个素质发展学分，方可毕业	
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四、学制与学位

标准学制：四年

修业年限：三至六年

授予学位：工学学士

五、主干学科与交叉学科

主干学科：电气工程、控制科学与工程。

交叉学科：计算机科学与技术，电子科学与技术。

六、专业核心课程

电路、模拟电子线路、数字逻辑电路、电机学、电力系统分析、电力电子技术、软件技术基础、控制工程基础、智能电网信息技术、智能变电站技术、嵌入式系统设计与应用基础等。

七、主要集中实践环节

金属工艺实习，EDA 设计，电路综合实验，电子线路综合实验，电工仪表与测量综合实验、智能电网课程设计、毕业实习和毕业设计等。

Information Engineering for Smart Grid

I. Introduction

Information Engineering for Smart Grid, provincial key major in Jiangsu, was established in 2012. It offers bachelor, master and doctoral degrees. Information Engineering for Smart Grid combines power electronics technology, automatic control on electrical power system and information engineering. With an excellent faculty team, the major attempts to cultivate students in the field of electrical engineering and information engineering with high quality and innovation spirit. Students are required to be familiar with the developments of Smart Grid and the rules of power system. Students are trained to be equipped with new energy power generation and intelligent access technology, grid intelligent scheduling and control technology, energy measurement and monitoring, computer and network communication technology, etc. Graduates are expected to engage in manufacturing, engineering design, system operation, system analysis, technology development, education and scientific research in the field of networking, information technology, and intelligent electrical system.

II. Objectives

The major aims at cultivating engineering technicians and scientific talents with innovative spirit, practical ability, solid basic knowledge and theory in electrical engineering and information engineering for smart grid to be competent for the jobs of research, design, development or integrated application on smart electricity, smart schedule and control, intelligent substation, distributed power generation, micro-grid, etc.

III. Requirements of Abilities and Credits

1. Abilities

Students are required to master knowledge in electrical technology, fundamentals of circuits / electronic technology, control technology, power system, new energy technology, information processing, automatic inspection, computer application and communication networking technology. Based on sound training and practicing in engineering and innovating, they should be capable of analyzing, designing, developing and researching of the smart grid systems.

Graduates should obtain knowledge and ability of the following aspects:

(1) Engineering knowledge

Have the ability to apply mathematics, natural science, engineering fundamentals and expertise to solve complex engineering problems.

(2) Problem analysis

Have the ability to apply basic principles of mathematics, natural science and engineering science to identify, present and analyze complex engineering problems through literature review in order to produce effective conclusion.

(3) Solution Design

Have the ability to design solutions to complex engineering problems, fit-for-purpose systems, units (components) and technological processes with the integration / fusion of innovative consciousness and elements like society, health, security, law, culture and environment, etc.

(4) Research

Have the ability to apply scientific principles and approaches to complex engineering research, including experiment design, data analysis and interpretation, and produce rational and effective conclusion through information integration.

(5) Modern tool application

Have the ability to develop, select and employ proper technology, resources, modern engineering tool and information technology to deal with complex engineering problems involving prediction and simulation, and understand the limitations.

(6) Engineering and society

Have the ability to reasonably analyze and assess the influences of professional engineering practice and solutions to complex engineering problems upon society, health, law and culture, and understand the responsibilities.

(7) Environment and sustainable development

Have the ability to comprehend and assess the influences of engineering practice of complex engineering problems upon environment and sustainable development.

(8) Professional norms

Have the ability to understand and abide by professional ethics and norms and fulfill responsibilities in engineering practice with scientific literacy of social science and sense of social responsibilities.

(9) Individuals and teams

Have the ability to take on the responsibility as an individual, a team member and a leader in multidisciplinary teams.

(10) Communication

Have the ability to communicate and exchange ideas effectively with the peers and the public on complex project issues, including reports writing, manuscripts designing, speeches delivering, clarifying and responding to directions; and the ability to communicate and exchange ideas with international outlook in cross-cultural contexts.

(11) Project management

Have the ability to understand and master engineering management principles and economic decision-making methods, and to apply them in a multidisciplinary environment.

(12) Lifelong learning

Have the awareness of independent and lifelong learning, and the ability to learn continuously to accommodate the development.

2.Credits

Course Modules	Course Nature	Credits
Course of General Education	Compulsory Course	38
Course of Discipline Education	Compulsory Course	32.5
Fundamental Specialized Course	Compulsory Course	75.5
Optional Specialized Course	Optional Course	12
Optional Course of General Education	Optional Course	8
Total		166

Another 4 quality development credits are required for graduation.

IV. Length of schooling and degree to be awarded

Standard Academic Year: 4 years;

Length of Schooling: 3 to 6 years;

Degree: Bachelor of Engineering

V. The leading discipline and interdisciplinary subjects

Leading Discipline: Electrical Engineering, Control Science and Engineering

Interdisciplinary Subjects: Computer Science and Technology, Information Engineering

VI. Core courses

Circuits, Analog Circuits, Digital Logic Circuits, Electrical Machinery, Power System Analysis, Power Electronics Technology, Software Technology, Control Engineering Fundamentals, Information Technology of Smart Grid, Intelligent Substation Technology, Design and Application of Embedded System, etc.

VII. Collective practical teaching session

Metalworking Training, Electronic Design Automation, Circuits Comprehensive Experiment, Electronic Circuits Comprehensive Experiment, Comprehensive Experiment of Electrical Instrumentation and Measurement, Course Design of Smart Grid, Graduation Practice, Graduation Project, etc.

八、教学计划进程表

智能电网信息工程专业教学计划进程表

Table of Teaching Plan for Major of Information Engineering for Smart Grid

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2	
必修课程●通识教育课（38 学分） Compulsory Course●Course of General Education																	
21020303	军事训练 Military Training	2	80				80	2									245
06000201	计算思维 Computational Thinking	2	32	24		8			2								106
14120601	通用英语（I） English for General Purpose（I）	2	32	32					2								114
15045602	思想道德修养与法律基础 Moral Cultivation and Law Basics	3	48	42			6		3								123
20000102	大学生职业生涯规划 Career Planning for College Students	0.5	8	8					0.5								245
21120101	体育（I） P.E(I)	1	32	32					1								122
07057201	创业教育 Entrepreneurship Education	1	16	16						1							107
14220601	通用英语（II） English for General Purpose（II）	2	32	32						2							114
15042402	中国近现代史纲要 Outline of Modern Chinese History	3	48	42			6			3							123
21220101	体育（II） P.E(II)	1	32	32						1							122
21020503	军事理论 Military Theory	2	32	16			16				2						372

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1
14120701	进阶英语（I） English for Specific Purpose（I）	2	32	32							2								114
15045203	马克思主义基本原理概论 Fundamental Principles of Marxism	3	48	42			6				3								123
21320101	体育（III） P.E(III)	1	32	32						1									122
14220701	进阶英语（II） English for Specific Purpose（II）	2	32	32							2								114
21420101	体育（IV） P.E(IV)	1	32	32							1								122
15045304	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 The Theoretical System of Socialism With Chinese Characteristics	5	80	67			13								5				123
20000301	就业指导 Vocational Guidance	0.5	8	8											0.5				245
88000001	科研训练 Scientific Research Training	2	80				80										2		242
	形势与政策（I）-（VIII） Situation and Policy（I）-（VIII）	2	64	64				I-1、I-2、II-1、II-2、III-1、III-2、IV-1、IV-2 每学期安排8个讲课学时，共计2学分。									123		
必修课程●学科教育课（32.5 学分） Compulsory Course●Course of Discipline Education																			
05021705	工程制图 Engineering Drawing	2	32	26		6				2									101
06000704	C 语言程序设计 C Language Programming	4	64	48		16				4									110
11123302	高等数学（I） Calculus（I）	4.5	80	64			16			4.5									113

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1	IV-2
11031201	线性代数 Linear Algebra	2.5	40	40							2.5									113
11120804	大学物理 (I) College Physics (I)	3.5	56	56							3.5									113
11120904	大学物理实验 (I) Experiments on College Physics (I)	1.5	24		24						1.5									113
11223302	高等数学 (II) Calculus (II)	5.5	96	80			16				5.5									113
07022604	管理学原理 Principles of Management	2	32	32						2										107
11220804	大学物理 (II) College Physics (II)	3.5	56	56						3.5										113
11220904	大学物理实验 (II) Experiments on College Physics (II)	1.5	24		24					1.5										113
23020104	金属工艺实习 Metal Technics Practice	2	80				80			2										369
必修课程●专业基础课 (75.5 学分) Compulsory Course●Fundamental Specialized Course																				
04061501	电路 Circuits	3.5	56	56						3.5										104
04061601	电路综合实验 Comprehensive Experiments on Circuits	1	40		40					1										104
11024001	工程数学 Engineering Mathematics	4	64	64						4										113
10028801	电工仪表与测量综合实验 Comprehensive Experiments on Electrical Instruments and Measurement	1	40		30	10					1									104
04026304	数字逻辑电路 Digital Logic Circuits	3.5	56	56						3.5										104

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1
04026804	模拟电子线路 Analog Circuits	3.5	56	56							3.5								104
04033902	电子工艺实习 Practice on Electronic Technology	2	80				80				2								369
04061701	电子线路综合实验 Comprehensive Experiments on Electronic Circuits	1.5	60		60						1.5								104
06025003	软件技术基础 Fundamentals of Software Technology	2	32	32							2								110
11022601	概率与统计 Probability and Statistics	3	48	48							3								113
10042001	智能变电站技术 Intelligent Substation Technology	2	32	28	4									2					110
10045002	智能电网导论▼ Introduction to Smart Grid	1.5	24	24										1.5					110
10045201	智能电网信息技术 Information Technology of Smart Grid	3	48	48										3					110
04040001	EDA 设计 Electronic Design Automation	1	40				40							1					104
10021701	电力电子技术▼ Power Electronics Technology	3	48	40	8									3					110
10025402	控制工程基础[英]▼ Fundamentals of Control Engineering[E]	3	48	48										3					110
10027005	微机原理与接口技术 Microcomputer Principles and Interface Technology	3.5	56	48			8							3.5					110
10030603	电机学 Electrical Machinery	3	48	38	10									3					110

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1
08022404	电力系统继电保护 Power System Protective Relaying	3	48	48												3			110
08040502	嵌入式系统设计与应用 Design and Application of Embedded System	3	48	40	8											3			110
10040902	新能源发电技术 New Energy Generation Technology	2	32	32												2			110
10054902	电力系统分析 Power System Analysis	4.5	72	56	16											4.5			110
10045101	智能电网课程设计 Course Design of Smart Grid	2	80				80										2		110
10030303	电力电子设计综合实验 Comprehensive Experiments on Power Electronics Design	1	40				40											1	110
10020308	毕业设计 Graduation Project	10	560				560											10	110
10020403	毕业实习 Graduation Practice	3	120				120											3	110
10053201	微网集成与控制创新创业 Innovation and Entrepreneurship Practices on Microgrid Integration & Control	2	32				32											2	110
选修课程●专业选修课（34 学分）【选修 12 学分】 Optional Course●Optional Specialized Course																			
10020102	PLC 原理及应用 PLC: Principles And Applications	2	32	24	8											2			110
10034601	学科前沿系列讲座 Lectures on Frontier Discipline	1	16	14	2											1			110
10042501	智能电量计量 Intelligent Electricity Metering	2	32	24	8											2			110

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位			
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1	IV-2
10051101	图像处理技术 Image Processing Technique	2	32	32												2				110
10053601	微网分布式电源运行与控制 Operation & Control of Distributed Generation in Microgrid	2	32	24			8									2				110
10053701	主动配电网技术 Active Distribution Technology	2	32	32												2				110
10054201	面向对象程序设计综合实践 Comprehensive Practice of Object-oriented Programming	2	32	8			24									2				110
10022701	多媒体技术基础 Fundamentals of Multimedia Technology	2	32	26		6												2		110
10045301	人工智能技术 Artificial Intelligence Technology	2	32	32														2		110
10045901	先进传感技术 Advanced Sensing Technology	3	48	48														3		110
10053301	电力系统实时仿真技术 Real-time Simulation Technology of Power System	2	32	22			10											2		110
10053401	电力市场原理与优化运营 Principles and Optimized Operation of Electricity Market	2	32	32														2		110
10053501	大电网运行与调度技术 Operation and Dispatch Technology of Bulk Power System	2	32	32														2		110
10053801	智能电网交互式仿真技术 Interactive Simulation Technology for Smartgrid	2	32	24			8											2		110

课程编码 Course No	课程名称 Course Name	学 分	总学 时	讲 课	实 验	上 机	实 践	学年-学期 Academic Year-Semester									开课 单位		
								I-0	I-1	I-2	II-0	II-1	II-2	III-0	III-1	III-2		IV-0	IV-1
10053901	智能电网信息安全基础 Fundamentals of Smartgrid Information Security	2	32	32													2		110
10054001	机器学习技术及其在智能电网中的应用 Machine Learning and Its Applications in Smartgrid	2	32	24			8										2		110
10054101	智能电网应急管理技术 Emergency Management Technology of Smartgrid	2	32	32													2		110
	必修课程汇总 Compulsory Courses Total	146	3292	1749	224	40	1279	2	19	20	4	21.5	19.5	0	20	18	2	3	15
	选修课程汇总 Optional Specialized Courses Total	34	544	462	18	6	58	0	0	0	0	0	0	0	13	0	21	0	
								说明：“形势与政策”课程学分未计入学期学分。											

注：1.课程名称标有“▼”的为全英文授课课程，其余均为中文授课课程；

2.学期为“0”的表示夏季学期，“1”秋季学期，“2”春季学期。

Notes: 1. Courses with ‘▼’ are taught in English ,the others are taught in Chinese;

2.semester ‘0’ stands for Summer semester, ‘1’ and ‘2’ stands for Autumn semester and Spring semester.

