电气卓越计划实验班本科培养计划

Undergraduate Experimental Program in Electrical Engineering and Automation for Exemplary Engineer Education

一、培养目标

Ⅰ. Program Objective

面向电力系统、电气装备制造、电气科学研究等领域，具备扎实的数理和专业基础、自主学习能力和国际视野，针对复杂工程问题能开展系统分析并给出合理解决方案，创新意识突出；在工程实践中体现较强的人际沟通、团队协作、组织管理能力；具有正确的人生观、高度的社会责任感与良好的人文素养。

Facing the areas of power system, electrical equipment manufacture and electrical scientific research, with solid background of mathematics and physics as well as specialized area in electrical engineering, with self-dependent study capability and international vision, can do systematical analysis for complex engineering problems and provide reasonable solutions, with excellent sense of innovation; reflecting strong capabilities of communication, team-work and leadership in engineering practice; with right view of life, strong social responsibility and excellent humanistic quality.

二、基本规格要求

Ⅱ. Learning Outcomes

通过本专业的学习，毕业生应获得以下几个方面的知识和能力：

Through the study in this program, graduates should be with the following knowledge and capability:

毕业要求 1：具备数学、自然科学、电气工程基础和专业知识，用于发现、描述和分析电力系统、电气装备制造及电气科学研究等相关复杂问题。

Graduation requirement 1: With the fundamental and special knowledge of mathematics, natural science and electrical engineering, which can be utilized in discovering, expressing and analyzing the related complex problems in power system, electrical equipment manufacture and electrical scientific research.

毕业要求 2：具有对电气工程及相关复杂工程问题进行建模、设计、实验和研究等工程综合实践能力，具有创新意识。

Graduation requirement 2: With the capability of comprehensive engineering practice including modeling, designing, doing experiment and research on the complex engineering problems related to electrical engineering, with innovative sense.

毕业要求 3：熟练掌握信息技术工具，具有信息收集、检索、阅读分析能力；熟练掌握现代工程工具，能对电气工程领域的相关复杂工程问题进行模拟，对解决方案及结果评估优化，体现创新能力。

Graduation requirement 3: With proficient mastery of information technical tools, with the capability of collecting, searching, reading and analyzing information; with proficient mastery of modern engineering tools, can simulate the complex engineering problems related to electrical engineering, with the capability of evaluating and optimizing the solutions and results and showing the innovative capability.

毕业要求 4：能了解学科前沿发展趋势，关注本专业与其他学科衍生交叉的新理论、新方法

和新技术，具有国际视野和全球意识。

Graduation requirement 4: With the capability of understanding the tendency of the discipline front, paying attention to the new theory, new methods and new technologies in the cross-areas with other disciplines, with international vision and global sense.

毕业要求 5：了解国家宏观发展相关产业政策与法律法规，正确认识和评价工程实践对环境、社会、健康、安全以及文化的影响，保持与社会、环境的和谐可持续发展。

Graduation requirement 5: Understanding the policy and law of the national long-term development in the related industry, with right cognition and evaluation of the influence of engineering practice on environment, society, health, security and culture, keeping sustainable and harmonious development with society and environment.

毕业要求 6：具有良好的人文素养和高度的社会责任感、理解并遵守职业伦理。

Graduation requirement 6: With good humanistic quality and social responsibility, understanding and following the professional ethics.

毕业要求 7：具有开放包容的心态，积极沟通与分享，具有团队协作能力和组织管理能力；熟练运用一门以上的外语，具有较强的书面和语言表达能力。

Graduation requirement 7: With open and comprehensive attitude, can communicate and share actively, with team-work capability and leadership, with at least one fluent foreign language, with strong writing and oral expression capability.

毕业要求 8：保持好奇心，不断进取，具有自主学习和持续更新核心知识的能力，能在不同和多元环境下有效工作，适应专业或职业发展趋势。

Graduation requirement 8: Keeping curious and ambitious for advancement, with capability of self-dependent study and continuous updating core knowledge, can work effectively in different and multi-disciplinary environment, adaptive to disciplinary and professional development tendency.

三、培养特色

Ⅲ. Program Highlights

通过拓展与创新学科研究方向，将传统电气工程学科方向拓展到超导电力、等离子体、加速器、强磁场、脉冲功率等强电磁工程领域，并将新的学科研究方向成果融入到人才培养中，建设了具有国际学科发展特色的电气工程创新人才培养体系。

Traditional scope is extended to cover superconducting power, plasma power, particle accelerator, high-intensity magnetic field, and pulsed power etc., latest research outcome is integrated into education.

四、主干学科

Ⅳ. Main Disciplines

电气工程 Electrical Engineering,

相关学科：控制科学与工程 Control Science and Engineering,计算机科学与技术 Computer Science and Technology，电子科学与技术 Electronic Science and Technology

五、学制与学位

Ⅴ. Program Length and Degree

修业年限：四年

Duration: 4 years

授予学位：工学学士

Degrees Conferred: Bachelor of Engineering

六、学时与学分

Ⅵ. Credits Hours and Units

完成学业最低课内学分（含课程体系与集中性实践教学环节）要求：165 学分。其中，专业基础课程、专业核心课程不允许用其他课程学分冲抵和替代；通识教育基础课程中的选修课程，要求学生从管理、经济两类中至少各选一门 2 学分以上的课程；艺术类中至少选一门 2 学分的课程；专业核心选修课程 A 组和 B 组任选一组；专业方向课程中的任意选修类 6 个学分，要求至少要选修 1.5 个学分的工具类课程。

Minimum Credits of Curricular (comprising course system and intensified internship practical training): 162 credits。Major-related basic courses and core courses cannot be covered using credits from other courses in the program. Selected course in fundamental general education requires student to choose at least one course in both economy and management, with minimum credit of two for each; Art courses 2 credits; Selected course in core disciplinary course requires student to select Group A or Group B; Disciplinary selective course requires student to choose 6 credits, with at least 1.5 credits from the course of tools.

完成学业最低课外学分要求： 5 学分。其中：要求每名学生至少必须参加一次各类竞赛或大创项目或专业教师的科研课题。

Minimum Extracurricular Credits: 5 credits. With the five credits, every student should attend at least one contest or university start-up program or real research topic with faculty members.

1. 课程体系学时与学分

Course Credits Hours and Units

课程类别		课程性质	学时/学分	占课程体系学分比例（%）
素质教育通识课程		必修	608/34	22.9
		选修	160/10	6.73
学科基础课程	学科大类基础课程	必修	1160/66	44.44
	学科专业基础课程	必修	248/15.5	10.44
专业课程	专业核心课程	选修	240/15	10.1
	专业方向课程	选修	128/8	5.39
合计			2511/148.5	100

Course type		Required/elective	Hrs/Crs	Percentage (%)
Essential-qualities-oriented Education General Courses		Required	608/34	22.9
		Elective	160/10	6.73
Discipline-related Courses	Discipline-related General Courses	Required	1160/66	44.44
	Basic Sub-disciplinary Courses	Required	248/15.5	10.44
Major-specific courses	Major-specific Core Courses	Elective	240/15	10.1
	Major-specific Electives	Elective	128/8	5.39
Total			2511/148.5	100

2. 集中性实践教学环节周数与学分

Practicum Credits

实践教学环节名称	课程性质	周数/学分	占实践教学环节学分比例（%）
军事训练	必修	2/1	6.06
公益劳动	必修	1/0.5	3.03
电工实习	必修	2/1	6.06
金工实习	必修	1/0.5	3.03

续表

实践教学环节名称	课程性质	周数/学分	占实践教学环节学分比例（%）
认知实习	必修	1/0.5	3.03
生产实习（社会实践）	必修	2/1	6.06
综合训练	必修	4/2.0	12.12
课程设计	必修	4/2	12.12
毕业设计（论文）	必修	16/8	48.49
合计		33/16.5	100

Course Credits	Required/elective	Weeks/Credits	Percentage (%)
Military Training	Required	2/1	6.06
On-campus Voluntary Work	Required	1/0.5	3.03
Electrical Engineering Training	Required	2/1	6.06
Industrial Practice	Required	1/0.5	3.03
Professional Cognitive Practice	Required	1/0.5	3.03
Engineering Internship (Social Practice)	Required	2/1	6.06
Comprehensive Training	Required	4/2.0	12.12
Course Project	Required	4/2	12.12
Undergraduate Thesis	Required	16/8	48.49
Total		33/16.5	100

3. 课外学分

Extracurricular Credits

序号	活动名称	课外活动和社会实践的要求		课外学分
1	社会实践活动	提交社会调查报告，通过答辩者		2
		个人被校团委或团省委评为社会实践活动积极分子者，集体被校团委或团省委评为优秀社会实践队者		2
2	英语及计算机考试	全国大学英语六级考试	获六级证书者	2
		全国计算机等级考试	获二级以上证书者	2
		全国计算机软件资格、水平考试	获程序员证书者	2
			获高级程序员证书者	3
			获系统分析员证书者	4
3	竞赛	校级	获一等奖者	3
			获二等奖者	2
			获三等奖者	1
		省级	获一等奖者	4
			获二等奖者	3
			获三等奖者	2
		全国	获一等奖者	6
			获二等奖者	4
			获三等奖者	3
4	论文	在全国性刊物发表论文	每篇论文	2~3
5	科研	视参与科研项目时间与科研能力	每项	1~3
6	实验	视创新情况	每项	1~3
7	讲座	电气精英讲座	必须参加 4 次以上	2
8	讲座	综合素质培养系列讲座	必须参加 4 次以上	2

No.	Activities	Requirements		Extracurricular Credits
1	Community Engagement	Submiting a report and passing the oral defense		2
		Individuals awarded “Active Particiant”/Teams awarded “Excellent Performance” by HUST or HUBEI YOUTH League committee		2
2	Qualifications	CET-6	Certificate	2
		National Computer Rank Examination	Certificate(Grade 1/2)	2
		Qualifications for computer and software Technology proficiency	programmer	2
			Senior Programmer	3
			System Analyst	4
3	Competitions	University Level	first prize	3
			second prize	2
			third prize	1
		Provincial Level	first prize	4
			second prize	3
			third prize	2
		National Level	first prize	6
			second prize	4
			third prize	3
4	Academic papers	Published in national-level journals	Each paper	2~3
5	Research Programs	Contribution and research capability	Each program	1~3
6	Experiments	Innovative capacity	Each experiment	1~3
7	Lecture	Lecture series given by elities in electrical engeering	A minimum of 4 times	2
8	Lecture	Discussion series on whole person education	A minimum of 4 times	2

七、主要课程

Ⅶ. Main Courses

电路理论 Circuit Theory、电磁场与波 Electromagnetic Fields & Waves、电子技术 Electronics、单片机原理及应用 Principles and Applications of Microcomputer、信号与系统 Signals and Systems、自动控制理论 Automatic Control Theory、电机学 Electrical Machinery Theory、电力电子学 Power Electronics

专业核心模块课程 1 Core Courses I in Specialty：电气工程基础（一）Fundamental of Electrical Engineering I、高电压与绝缘技术（一）High Voltage and Insulation Technology I、电力拖动与控制系统 Electric Drive and Control Systems、电磁装置设计原理 Principles of Electromagnetic Device Design、电力电子装置与系统 Power Electronic Devices and Systems

专业核心模块课程 2 Core Courses II in Specialty：电气工程基础（二）Fundamental of Electrical Engineering II、高电压与绝缘技术（二）High Voltage and Insulation Technology II、电力系统分析 Power System Analysis、电力系统继电保护 Protective Relaying in Power Systems、电力系统自动化 Automation of Power System

八、主要实践教学环节（含专业实验）

Ⅷ. Practicum Module（Experiments Included）

电路测试技术基础 Fundamental of Circuit Measurement Technology、电子测试与实验 Electronic Testing and Experiments 计算机原理与应用实验 Experiments on Computer Principles and Applications，信号与控制综合实验 Comprehensive Exp. on Signals and Control,电工实习 Electrical Engineering Practice，认知实习 Professional Cognitive Practice,生产实习（社会实践）Engineering Internship (Social Practice)

九、教学进程计划表

Ⅸ. Course Schedule

院（系）：电气与电子工程学院　　专业：电气工程及其自动化

School (Department): School of Electrical and Electronic Engineering　　Specialty: Electrical Engineering and Automation

课程类别 course type	课程性质 required/ elective	课程代码 course code	课程名称 course name	学时 hrs	学分 crs	其中 Including		设置学期 semester
						实验 exp.	上机 operation	
素质教育通识课程 Essential-qualities-oriented Education General Courses	必修 required	0301901	思想道德修养与法律基础 Morals & Ethics & Fundamentals of Law	48	3			1
	必修 required	0100721	中国近现代史纲要 Survey of Modern Chinese History	32	2			2
	必修 required	0100732	马克思主义基本原理 Basic Theory of Marxism	48	3			3
	必修 required	0100321	毛泽东思想和中国特色社会主义理论体系概论 General Introduction to Mao Zedong Thought and Socialist Theory with Chinese Characteristics	64	4			4
	必修 required	0100741	形势与政策 Situation and Policy	32	2			5-7
	必修 required	0510071	中国语文 Chinese	32	2			1
	必修 required	0508453	综合英语（一） Comprehensive of English （Ⅰ）	56	3.5			1
	必修 required	0508463	综合英语（二） Comprehensive of English （Ⅱ）	56	3.5			2
	必修 required	1100011	军事理论 Military Theory	16	1			2
	必修 required	0400111	大学体育（一） Physical Education(Ⅰ)	32	1			1
	必修 required	0400121	大学体育（二） Physical Education(Ⅱ)	32	1			2
	必修 required	0400131	大学体育（三） Physical Education(Ⅲ)	32	1			3
	必修 required	0400141	大学体育（四） Physical Education(Ⅳ)	32	1			4
	必修 required	0827781	计算机及程序设计基础(C++) Fundamental of computer programming(C++)	48	3		8	2
	必修 required	0833031	工程导论 Introduction of Engineering	16	1			2
	必修 Required 二选一 (one out of two	0802891	计算机网络与通讯 Computer Network and Communication	32	2		8	5
		0833174	数据库技术及应用 Database technology and its application	32	2		8	1
			人文社科类选修课程 Electives in Humanities and Social Science	160	10			
	必修 required	0801665	工程制图（一） Engineering Graphics（Ⅰ）	40	2.5			1

续表

课程类别 course type	课程性质 required/ elective	课程代码 course code	课程名称 course name	学时 hrs	学分 crs	其中 Including		设置学期 semester
						实验 exp.	上机 operation	
学科基础课程·学科大类基础 Discipline-related General Courses	必修 required	0700011	微积分（一）（上） Calculus (Ⅰ)	88	5.5			1
	必修 required	0700012	微积分（一）（下） Calculus (Ⅱ)	88	5.5			2
	必修 required	0700048	大学物理（一） Physics (Ⅰ)	64	4			2
	必修 required	0700049	大学物理（二） Physics (Ⅱ)	64	4			3
	必修 required	0706891	物理实验（一） Physical Experiments (Ⅰ)	32	1			2
	必修 required	0706901	物理实验（二） Physical Experiments (Ⅱ)	24	0.8			3
	必修 required	0706441	大学化学 University Chemistry	32	2			1
	必修 required	0700051	线性代数（一） Linear Algebra (Ⅰ)	40	2.5			2
	必修 required	0700071	复变函数与积分变换 Complex Function and Integral Transform	40	2.5			3
	必修 required	0700063	概率论与数理统计（三） Probability and Mathematics Statistics (Ⅲ)	40	2.5			3
	必修 required	0700081	数理方程与特殊函数（一） Mathematics Physics Equation and Special Function (Ⅰ)	40	2.5			4
	必修 required	0833333	工程力学（三） Engineering Mechanics (III)	40	2.5			5
	必修 required	0800118	电路理论（上） Circuit Theory	40	2.5			2
	必修 required	0800115	电路理论（下） Circuit Theory	64	4			3
	必修 required	0806992	电路测试技术基础 Circuit Measurement Technology	32	1	32		3
	必修 required	0800124	模拟电子技术（二） Analogue Electronics (Ⅱ)	56	3.5			3
	必修 required	0800133	数字电子技术 Digital Electronics	40	2.5			4
	必修 required	0802404	电子测试与实验（二） Electronic Testing and Experiments (Ⅱ)	40	1.3	40		4
	必修 required	0808463	单片机原理及应用 Principles and Applications of Microcomputer	40	2.5			5
	必修 required	0819042	计算机原理及应用实验 Experiments on Computer Principles and Applications	24	0.8	24		5

续表

课程类别 course type	课程性质 required/ elective	课程代码 course code	课程名称 course name	学时 hrs	学分 crs	其中 Including		设置学期 semester
						实验 exp.	上机 operation	
学科基础课程·学科大类基础 Discipline-related General Courses	必修 required	0800452	信号与系统 Signals and Systems	40	2.5			4
	必修 required	0800319	自动控制理论 Automatic Control Theory	56	3.5			5
	必修 required	0802911	检测技术 Detection and Measurement Technology	32	2			6
	必修 required	0815882	信号与控制综合实验（一） Comprehensive Exp. on Signals and Control Ⅰ	24	0.8	24		5
	必修 required	0815912	信号与控制综合实验(二) Comprehensive Exp. on Signals and Control Ⅱ	40	1.3	40		6
	必修 required	0802422	电力电子学 Power Electronics	48	3			6
	必修 required	0841801	电气工程学科导论（一） Introduction to Electrical Engineering Ⅰ	24	1.5			2
	必修 required	0804084	电磁场与波 Electromagnetic Field and Wave	64	4	4		4
	必修 required	0833361	电机学（上） Electrical Machinery Theory Ⅰ	56	3.5	6		4
	必修 required	0833371	电机学（下） Electrical Machinery Theory Ⅱ	56	3.5	8		5
专业课程·专业核心 Major-specific Core Courses			专业核心选修课程 Common Core Electives in Specialty	240	15			
			课程组 A Group A	240	15			
	选修 Elective	0833401	电气工程基础（一） Fundamentals of Electrical Engineering Ⅰ	56	3.5			5
	选修 Elective	0833411	高电压与绝缘技术（一） High Voltage and Insulation Technology I	56	3.5			6
	选修 Elective	0802431	电力拖动与控制系统 Electric Drive and Control Systems	48	3	8		6
	选修 Elective	0802502	电磁装置设计原理 Principles of Electromagnetic Device Design	40	2.5			6
	选修 Elective	0807773	电力电子装置与系统 Power Electronic Devices and Systems	40	2.5			6
			课程组 B Group B					
	选修 Elective	0833421	电气工程基础（二） Fundamentals of Electrical Engineering（I）	24	1.5			5
	选修 Elective	0815921	电力系统分析（一） Power System Analysis（I）	40	2.5			5
	选修 Elective	0818982	电力系统分析（二） Power System Analysis（II）	32	2			6

续表

课程类别 course type	课程性质 required/ elective	课程代码 course code	课程名称 course name	学时 hrs	学分 crs	其中 Including		设置学期 semester
						实验 exp.	上机 operation	
	选修 Elective	0833412	高电压与绝缘技术（二） High Voltage and Insulation Technology II	48	3			6
	选修 Elective	0818991	电力系统继电保护 Protective Relaying in Power Systems	48	3	6		6
	选修 Elective	0807661	电力系统自动化 Automation of Power System	48	3	4		6
专业课程·专业方向 Major-specific Electives			限定选修类（≥2 学分）	32	2			
	选修 Elective	0800461	核能与核电原理 Principles of nuclear energy and nuclear power	32	2			7
	选修 Elective	0833431	超导电力技术 Superconducting Power Technology	32	2			7
	选修 Elective	0833441	工业等离子体应用 Industrial plasma applications	32	2			7
	选修 Elective	0807852	脉冲功率技术 Pulse Power Technology	32	2			7
	选修 Elective	0833451	加速器原理及应用 Principle and Application Accelerator	32	2			7
	选修 Elective	0836021	磁场技术与应用 Magnetic Field technology and its application	32	2			7
			任意选修类：≧6 学分	96	6			
			工具类（≥1.5 学分）	24	1.5			
	选修 Elective	0802651	Matlab 语言与控制系统仿真 Matlab Language and Simulation of Control Systems	32	2		16	7
	选修 Elective	0802641	DSP 原理及应用 Principles and Applications of DSP	24	1.5			7
	选修 Elective	0818951	计算机控制原理 Principals of Computer Control System	24	1.5			7
			其他类					
	选修 Elective	0810531	直流输电 DC Power Transmission	24	1.5			7
	选修 Elective	0833461	电工材料 Electric Materials	24	1.5			7
	选修 Elective	0802573	电磁兼容原理及应用 Principles and Applications on Electromagnetic Compatibility	24	1.5			7
	选修 Elective	0833471	新型电机及应用 And application of new motor	24	1.5			7
	选修 Elective	0827434	高电压综合实验 Comprehensive Exp. on High Voltage	24	0.8	24		7

续表

课程类别 course type	课程性质 required/ elective	课程代码 course code	课程名称 course name	学时 hrs	学分 crs	其中 Including		设置学期 semester
						实验 exp.	上机 operation	
	选修 Elective	0802472	电力系统综合实验 Comprehensive Experiment on Power Systems	24	0.8	24		7
	选修 Elective	0802741	电力系统规划 Power System Planning	16	1			7
	选修 Elective	0818961	光纤传感技术 Optical Fiber Sensor Technique	24	1.5			7
	选修 Elective	0802712	建筑电子工程 Building Electronic Engineering	24	1.5			7
	选修 Elective	0841802	电气工程学科导论 （二） Introduction to Electrical Engineering II	16	1			7
实践环节 practical training items	必修 required	1100011	军事训练 Military Training	2w	1			1
	必修 required	1300024	公益劳动 Laboring for Public Benefit	1w	0.5			8
	必修 required	1300079	金工实习 Industrial Engineering Practice	1w	0.5			2
	必修 required	1304411	电工实习 Electrical Engineering Practice	2w	1			3
	必修 required	130010a	专业认知实习 Cognitive Practice	1w	0.5			4
	必修 required	1304601	工程综合训练一 Engineering comprehensive training I	2w	1			5
	二选一（one put of two）	1304611	工程综合训练二（A 组） Engineering comprehensive training II（Group A）	2w	1			6
		1304621	工程综合训练二（B 组） Engineering comprehensive training II（Group B）	2w	1			6
	必修 required	1302341	生产实习 Engineering Internship	2w	1			6
	必修 required	1300974	综合训练 Comprehensive Training	4W	2			4-7
	必修 required	130004a	毕业设计 Undergraduate Thesis	16w	8			8

备注：工程综合训练一：整合平台大类课程内容形成的针对工程实践的综合训练。

工程综合训练二：整合 A、B 两组课程内容形成的针对工程实践的综合训练，必须与模块课选择保持一致。

Engineering training program 1: synthesis training program aiming at engineering practice which is through integration of the content of platform courses

Engineering training program 2: synthesis training program aiming at engineering practice which is through integration of the content of A and B courses, it should be in correspondence with the selection of modular courses