网络空间安全专业人才培养方案

Undergraduate Program for Cybersecurity Major

学科门类: 工学　　　　　　　　　　　国标代码：　　　08

Discipline Type: Engineering　　　　　Code: 08

专业类: 计算机类　　　　　　　　　　国标代码：　　　0809

Type: Computer　　　　　　　　　　Code: 0809

专业名称: 网络空间安全　　　　　　　国 标 代 码 ：　　　校内代码：0907
080911TK

Title of the Major: Cybersecurity　　　Code: 080911TK

一、学制与学位 Length of Schooling and Degree

学制：四年　　　　Duration：Four years

授予学位：工学学士　Degree：Bachelor of Engineering

二、培养目标 Educational Objectives

本专业面向国家网络空间安全战略需求，培养具有强烈的爱国情怀、扎实的专业基础、宽广的国际视野、较强的创新意识和发展潜力的高素质人才。毕业生系统掌握网络空间安全理论基础、网络与系统安全、网络空间内容安全、电力工业控制系统安全等专业知识和相关领域前沿，具有较强的科学研究、工程实践和系统开发能力，能够在国家重要部门、科研院所、能源电力企业等从事网络空间安全尖端技术研发和管理工作。

This major is oriented towards the national strategy for cybersecurity needs, aiming to cultivate high-quality talents with strong patriotism, solid professional foundation, broad international vision, significant innovation awareness, and development potential. Graduates are systematically equipped with theoretical foundations in cybersecurity, expertise in network and system security, network content security, power industry control system security, and other related cutting-edge fields. They possess strong capabilities in scientific research, engineering practice, and system development. They are capable of engaging in cutting-edge technology research and management in cybersecurity in important national departments, research institutes, energy and power enterprises, and other related fields.

学生毕业 5 年左右能够达到的职业和专业成就：

(1)具备较高的人文社会科学素养、社会责任感和工程职业道德，具备较丰富的工程经验，深入了解与网络空间安全领域相关的职业和行业的安全需求，能够提出专业的解决方案；

(2)具有灵活运用数学、自然科学以及经济、管理知识解决网络空间安全领域的复杂工程技术问题的能力，能够成为相关项目的管理和技术核心骨干；

(3)具有较为突出的创新能力，能够深入理解和准确评价复杂工程问题的工程实践对环境、社会可持续发展的影响，能够在综合考虑国家安全、法律以及文化等工程伦理因素下进行网络空间复杂信息系统的安全设计与开发;

(4)能够在跨职能、多学科的工程实践团队中工作和交流，具备管理工作团队及协调项目的活动能力，能够组织制定工作计划并有效实施;

(5)具备终身学习的能力，能够应对科技发展挑战，掌握新兴技术，具备可持续发展理念和国际化视野，能够顺利进行跨文化的交流与合作;

(6)在计算机科学与技术、网络空间安全、能源电力和电子信息等与安全相关专业或交叉学科领域成功就业或进入硕士、博士阶段学习。

Achievements in career and profession that students can reach around 5 years after graduation:

(1)Possessing a high level of humanistic and social science literacy, social responsibility, and professional ethics in engineering, having rich engineering experience, gaining in-depth understanding of the security needs in professions and industries related to cybersecurity, and being able to propose professional solutions;

(2)Having the ability to flexibly apply knowledge of mathematics, natural sciences, as well as economics and management to solve complex engineering and technical problems in the field of cybersecurity, and being able to serve as the management and technical backbone of relevant projects;

(3)Demonstrating outstanding innovation ability, being able to deeply understand and accurately evaluate the impact of engineering practice on the environment and social sustainable development in the face of complex engineering problems, and being able to conduct the security design and development of complex information systems in cyberspace under the comprehensive consideration of national security, legal, and cultural engineering ethics factors;

(4)Being able to work and communicate in cross-functional, multidisciplinary engineering practice teams, possessing the ability to manage work teams and coordinate project activities, being able to organize work plans and effectively implement them;

(5)Having the ability for lifelong learning, being able to cope with challenges in scientific and technological development, mastering emerging technologies, possessing the concept of sustainable development and an international perspective, and being able to smoothly engage in cross-cultural communication and cooperation;

(6)Successfully entering employment in fields related to security such as computer science and technology, cybersecurity, energy and power, and electronic information, or pursuing master's and doctoral studies.

三、专业培养基本要求 Skills Profile

本专业学生主要学习网络空间安全专业知识，接受从事网络空间安全领域的科学研究与应用的基本训练，毕业时应获得以下几方面的知识和能力：

(1) 工程知识：能够将数学、自然科学、工程基础和专业知识用于解决网络空间安全相关领域的复杂工程问题。

(2) 问题分析：能够应用数学、自然科学和工程科学的基本原理，识别、表达、并通过文献研究分析网络系统及能源电力相关领域的复杂工程问题，以获得有效结论。

(3) 设计/开发解决方案：能够设计针对复杂工程问题的解决方案，设计满足特定需求的网络安全系统，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。

(4) 研究：能够基于科学原理并采用科学方法对网络空间安全及能源电力相关领域的复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。

(5) 使用现代工具：能够针对复杂工程问题，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，包括对网络空间安全相关领域的复杂工程问题的预测与模拟，并能够理解其局限性。

(6) 工程与社会：能够基于工程相关背景知识进行合理分析，评价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、团队成员或者负责人的角色。

(10) 沟通：能够就网络空间安全及能源电力相关领域的复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达，具备一定的国际视野，能够在跨文化背 景下进行沟通和交流。

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

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

Students in this major mainly study professional knowledge of cybersecurity and receive basic training in scientific research and applications in the field of cybersecurity. Upon graduation, they should acquire the following knowledge and abilities:

(1) Engineering Knowledge: Being able to apply mathematics, natural sciences, engineering fundamentals, and professional knowledge to solve complex engineering problems in the field of

cybersecurity.

(2) Problem Analysis: Being able to identify, express, and analyze complex engineering problems in network systems and energy-related fields through literature research, using basic principles of mathematics, natural sciences, and engineering sciences to obtain effective conclusions.

(3) Design/Development of Solutions: Being able to design solutions for complex engineering problems, design cybersecurity systems that meet specific requirements, and demonstrate innovation consciousness in the design process, considering factors such as social, health, safety, legal, cultural, and environmental aspects.

(4) Research: Being able to conduct research on complex engineering problems in the fields of cybersecurity and energy by applying scientific principles and using scientific methods, including designing experiments, analyzing and interpreting data, and drawing reasonable and effective conclusions through information synthesis.

(5) Use of Modern Tools: Being able to develop, select, and use appropriate technologies, resources, modern engineering tools, and information technology tools for complex engineering problems, including prediction and simulation of complex engineering problems in the field of cybersecurity, and understanding their limitations.

(6) Engineering and Society: Being able to analyze and evaluate the impact of professional engineering practice and solutions to complex engineering problems on society, health, safety, law, and culture based on engineering-related background knowledge, and understanding the responsibilities to be assumed.

(7) Environment and Sustainable Development: Being able to understand and evaluate the impact of engineering practice on the environment and social sustainable development for complex engineering problems.

(8) Professional Ethics: Having humanistic and social science literacy, social responsibility, being able to understand and abide by engineering professional ethics and norms, and fulfill responsibilities in engineering practice.

(9) Individual and Team: Being able to take on roles as individuals, team members, or leaders in teams with multidisciplinary backgrounds.

(10) Communication: Being able to effectively communicate and interact with industry peers and the public on complex engineering problems in the fields of cybersecurity and energy, including writing reports and designing presentations, making clear statements, having a certain international perspective, and being able to communicate and interact in a cross-cultural context.

(11) Project Management: Understanding and mastering the principles of engineering

management and economic decision-making methods, and being able to apply them in a multidisciplinary environment.

(12) Lifelong Learning: Having awareness of independent learning and lifelong learning, and having the ability to continuously learn and adapt to developments.

四、学时与学分 Hours and Credits

类 别		学 时	学 分	比 例
必修课 Required courses	公共基础 Public infrastructure	644	33	19.08%
	学科门类基础 Basis of discipline	576	36	20.81%
	专业类基础 Basis of major	496	31	17.91%
	专业核心 Required courses of major	240	15	8.67%
	集中实践 Intensive practice	208 学时+21 周 208 class hours + 21 weeks	33	19.08%
必修课小计 Subtotal of Required courses		2164 学时+21 周 2164 class hours + 21 weeks	148	85.55%
选修课 Electives		320	20	11.56%
课外实践学分 Practice credits of extra-curricular		5 周 5 weeks	5	2.89%
总计 Total		2484 学时+26 周 2484class hours + 26 weeks	173	100%

说明：

必修实践环节学分包括：集中实践课程 33 学分，课外实践课程 5 学分，学科门类基础、专业基础课程中的实验课程 4 学分，学科门类基础、专业基础、专业必修课程中的实验、上机学时折算 1 学分，共计 43 学分，占总学分 24.86%。

Note:

Total of 43 credits for required practice training, accounting for 24.86% of the total credits, including: 33 credits for Intensive practice, 5 credits for practice credits of extra-curricular, 4 credits for basis of discipline and basis of major, 1 credit for experiment and computer practice in basis of discipline, basis of major, and required courses of major.

五、专业主干课程 Main Courses

信息安全数学基础、计算机网络、信息论与编码、现代密码学、网络安全、网络空间安全概论、网络攻击与防范、信息安全工程与管理、电力工业控制系统安全、数字内容安全。

Fundamentals of Information Security Mathematics, Computer Networks, Information Theory and Coding, Modern Cryptography, Network Security, Introduction to Cybersecurity, Network Attack and Defense, Information Security Engineering and Management, Power Industridal Control System Security, Digital Content Security,

六、总周数分配 Arrangement of the Total Weeks

总 周 数 分 配

学期 Semester 教学环节 Teaching Program	一	二	三	四	五	六	七	八	合计
理论教学 Theoretic Teaching	17	16	16	17	16	16	17	0	115
复习考试 Review and Exam	2	2	1	1	1	1	3	0	11
集中实践环节 Intensive practice	3	2	3	2	5	3	0	18	36
小计 Subtotal	22	20	20	20	22	20	20	18	162
寒假 Winter Vacation	5		5		5		5		20
暑假 Summer Vacation		6		6		6			18
合计 Total	27	26	25	26	27	26	25	18	200

网络空间安全专业必修课程体系及教学计划

Table of Teaching Schedule for Required Course

类别	课程编号	课程名称	学分	总学时	课内学时	实验学时	课外学时	开课学期
公共基础教育	00700975	中国近现代史纲要 Outline of Modern Chinese History	3	48	32		16	2
	00701353	思想道德修养与法律基础 Ideology and Moral Cultivation and Law Basis	3	48	32		16	1
	00700985	毛泽东思想和中国特色社会主义理论体系概论 Mao Zedong Thought and the Theory of Building Socialism with Chinese characteristic	3	48	32		16	3
	00700971	马克思主义基本原理 Marxism Theory	3	48	32		16	3
	00700989	习近平新时代中国特色社会主义思想概论 Outline of Xi Jinping's New China's Socialist Ideology	3	48	32		16	2
	00701661 -00701668	形势与政策 Current Affair and Policy	2	64	64			1-8
	01390011	军事理论 Military theory	2	36	24		12	1
	J10010	现代电力工程师 Modern Power Engineer	2	32	32			2
	00801410	通用英语 English for General Purpose	4	64	64			1
	00801400	学术英语 English for Academic Purpose	4	64	64			2
	01000011	体育(1) Physical Culture (1)	1	36	30		6	1
	01000021	体育(2) Physical Culture (2)	1	36	30		6	2
	01000031	体育(3) Physical Culture (3)	1	36	30		6	3
	01000041	体育(4) Physical Culture (4)	1	36	30		6	4
	公共基础教育小计 Subtotal of public infrastructure		33	644	528		116	
学科门类基础课	00900130	高等数学(1) Advanced Mathematics (1)	5.5	88	88			1
	00900140	高等数学(2) Advanced Mathematics (2)	6	96	96			2
	00900462	线性代数 Linear Algebra	3	48	48			3
	00900111	概率论与数理统计 Probability and Mathematical Statistics	3.5	56	56			4
	00900053	大学物理(1) College Physics (1)	3.5	56	56			2
	00900064	大学物理(2) College Physics (2)	3	48	48			3
	00900440	物理实验（1） Experiments of Physics（1）	2	32		32		2
	00900450	物理实验（2） Experiments of Physics（2）	2	32		32		3
	04100300	高级语言程序设计 Advanced Language Programming	3.5	56	56			1

类别	课程编号	课程名称	学分	总学时	课内学时	实验学时	课外学时	开课学期
	10410221	面向对象的程序设计 Object-Oriented Programming	3	48	40	8		3
	04101700	计算机导论 Introduction to Computer Science	1	16	16			1
	学科门类基础课小计subtotal of basis of discipline		36	576	504	72		
专业类基础课	00600460	离散数学 Discrete Mathematics	4	64	64			1
	00600600	数据结构 Data Structure and calculation	3.5	56	56			2
	00600651	数字逻辑与数字系统设计 Digital Logic and Digital Design	3	48	48			4
	10410160	计算机网络 Computer Network	3	48	48			3
	00601120	信息安全数学基础 Mathematical Foundation of Information Security	3	48	48			4
	10410560	计算机组成原理 Computer Composition Principle	3.5	56	56			5
	00600100	操作系统 Operating Systems	3.5	56	56			4
	00600621	数据库原理 Principles of Database	2.5	40	40			5
	00600091	编译技术 Compiling Techniques	2.5	40	40			5
	00500641	信息论与编码 Information Theory and Coding	2.5	40	40			5
	专业类基础课小计 subtotal of basis of major		31	496	496			
专业核心课	00400840	网络空间安全概论 Introduction to Cybersecurity	1	16	16			3
	00601141	网络安全 network security	3	48	48			6
	00400880	现代密码学 Modern Cryptography	3	48	48			5
	00400850	网络攻击与防范 Network Attack and Defense	2	32	32			5
	00600900	信息安全工程与管理 Information Security Engineering and Management	2	32	32			7
	00400860	电力工业控制系统安全 Power Industrial Control System Security	2	32	32			6
	00400870	数字内容安全 Digital Content Security	2	32	32			6
	专业核心课程小计Subtotal of Required courses of major		15	240	240			
必修课程学分小计 Subtotal of Required course			115 学分					

网络空间安全专业集中实践环节设置及教学计划

Table of Teaching Schedule for Main Practical Training

类别 Type	课序号 ID	环节名称 Name	学分 Credits	周数 Weeks	学时数 Hours	开课学期 Semester
必修 Required	01390012	军事实践 Military Training	2	2 周		1
	J100060	劳动教育 Labor Education	2	2 周		3
	00690092	程序设计实验 Programming Experiments	1	1 周		1
	00690210	数据结构课程设计 Data Structure Curriculum Design	1	1 周		2
	00690380	数字逻辑与数字系统设计综合实验 Experiment of Digital Logic and Digital System Design	1	1 周		4
	10410569	计算机组成原理综合实验 Experiment of Computer Composition Principle	1	1 周		5
	00690290	计算机网络综合实验 Experiment of Computer Network	1	1 周		3
	00690900	现代密码学综合实验 Experiment of Modern Cryptography	2	2 周		5
	00601149	网络安全综合实验 Experiment of Network Security	1	1 周		6
	00690061	操作系统综合实验 Experiment of Operating System	1	1 周		4
	00690280	信息安全综合实验 Experiment of Information Security	2	2 周		6
	00690190	数据库原理课程设计 Database Principles Curriculum Design	1	1 周		5
	00690040	编译技术课程设计 Compiling Technology Curriculum Design	1	1 周		5
	00690021	毕业设计 Graduation Project	13		208	7-8
	00690130	认识实习 Acquaintanceship Practice	1	1 周		2
	00690031	毕业实习 Major Practice	2	2 周		8
	00690010	毕业教育 Graduation Education	0	1 周		8
集中实践小计 Subtotal of Major Practical Training			33	21 周	208	

网络空间安全专业选修课教学进程

Table of Teaching Schedule for Electives

  选修课程分为专业领域课程、其它专业课程、通识教育课程 3 个部分，总学分不低于 20 学分。其中，专业领域课程和其它专业课程学分不低于 10 学分。学生可根据自身情况、兴趣爱好等进行选课。

  Elective courses are divided into 3 parts: major courses, general education courses, other major courses. The total elective credits are not less than 20 credits total credits, and the total courses including major courses and other major courses are not less than 12 credits total credits. Students can choose courses according to their own situation and interests.

1．专业领域课程 Major field courses

  专业领域课程旨在培养学生在该专业某领域内具备综合分析、处理（研究、设计）问题的技能及专业前沿知识。本专业领域的选修课程如下表所示。

  Major field courses aim to develop students' skills and advanced knowledge of comprehensive analysis, processing (research, design) problems in a certain field of the major. Elective courses in this field are shown in the following table.

2．其他专业课程 Other major courses

  为了培养复合型人才，鼓励学生跨专业选修课程。学生可以选修我校开设的任何专业的课程。

  In order to cultivate compound talents, students should be encouraged to cross major elective courses. Students can take any courses offered by our university.

3．通识教育课程 General education curriculum

  通识教育课程包括人文社科、语言交流、文化艺术、科学技术、经济管理、创新创业等模块，学生从学校给定的通识教育课程中选择。

  General education curriculum includes humanities and social sciences, language communication, culture and art, science and technology, economic management, innovation and entrepreneurship modules. Students choose from general education courses offered by the university. The courses "Introduction to environmental protection and sustainable society" and "Engineering Project Management" are suggested to be selected.

网络空间安全专业选修课程体系及教学计划

Table of Teaching Schedule for Elective Course and Teaching Plan

组别 Group	课程编号 Course ID	课程名称 Course name	学分 Credits	总学时 Hours	课内学时 In class hours	实验学时 Lab hours	课外学时 Off class hours	开课学期 Semester	模块 module
1	00601160	电力信息安全 Electric Power Security	2	32	32			6	
	00400890	无线网络与移动通信 Wireless Networks and Mobile Communications	2	32	32			6	
	00600521	人工智能及应用 Artificial Intelligence and Application	2	32	32			4	
	00600920	专业英语阅读(信息安全) Information Security Specialty English	2	32	32			7	
	10411011	人工智能安全 Artificial Intelligence Security	2	32	32			6	
	00400900	量子密码学导论 Introduction to Quantum Cryptography	2	32	32			6	
	00601740	Web 智能编程与应用 Web intelligent programming and application	2	32	32			5	
		跨专业选修其他专业的专业课程 Interdisciplinary Electives						2-8	其他专业模块
2		通识教育选修课程 General Education Electives	公共艺术类课程至少选修 2 学分；其它可用组别 1 中课程学分替代						
选修课小计 Subtotal of Elective Courses			20	320	320				
选修课总学分不低于 20 学分。其中，组别 1 中的专业领域课程和其它专业课程学分不低于 12 学分。 The total credits of elective courses should not be less than 20 credits. Among them, the course credits in Group 1 shall not be less than 12 credits.									

选修课选课建议：Recommendations for electives

1. 第二、第三学期：建议每学期选修通识教育选修课程模块中的课程 1-2 门。

2. 第四、五、六、七、八学期：建议每学期从专业选修课各模块中选修 1-3 门课程；也可根据个人兴趣，跨专业选修其他专业的专业课程。

1. Second and third semesters: It is recommended to select 1-2 courses in General Education Electives every semester.

2. Fourth, fifth, sixth, seventh, and eighth semesters: It is recommended to choose 1-3 courses from each part of electives each semester; you can also select Interdisciplinary Electives based on personal interests.

辅修网络空间安全专业人才培养方案

Undergraduate Program for the Cybersecurity Major

组别 Group	课程编号 Course ID	课程名称 Course name	学分 Credits	总学时 Hours	课内学时 In class hours	实验学时 Lab hours	开课学期 Semester	备注 Comment
A	00600460	离散数学 Discrete Mathematics	4	64	64		1	
	00600600	数据结构 Data Structure	3.5	56	56		2	
	10410160	计算机网络 Computer Networks	3	48	48		3	
	10410560	计算机组成原理 Principles of Computer Composition	3.5	56	56		5	
	00601120	信息安全数学基础 Fundamentals of Information Security Mathematics	3	48	48		4	
	00601140	网络安全 Network Security	3	48	48		6	
	00600321	现代密码学 Modern Cryptography	3	48	48		5	
	00500641	信息论与编码 Information Theory and Coding	2.5	40	40		5	
	00600101	操作系统 Operating System	3.5	56	56		4	
B	00690031	毕业设计 Graduation Project	13				7-8	
学分合计 Subtotal of courses			42	464	464			

说明：1．辅修专业需修读 A 组课程，计 29 学分；

2．辅修专业学士学位需修读 A、B 两组课程，计 42 学分。