（085400）电子信息学科 2020 级非全日制工程博士培养方案（网络空间安全学院）

2020 Part-time PhD Program for Electronic Information

一、基本信息 Basic Information

院系名称 School	(036)电子信息与电气工程学院(网络空间安全学院) School of Electronic Information & Electrical Engineering			**适用年级** Grade	2020 级 Class
适用专业 Major	电子信息 Electronic Information			**标准学制** Duration	4 年 Years
学习形式 Study Mode	非全日制 Part time				
项目类型 Program Type	专业型 Professional				
培养层次 Program Level	普博生 Regular Doctoral Students				
最低学分 Min Credit	16	**最低 GPA 学分** Min GPA Credit	14	**最低 GPA** Min GPA	2.8

二、学科简介 Introduction

上海交通大学网络空间安全学院（其前身是信息安全工程学院）创建于 2000 年 10 月，是由国家教育部、科技部、上海市政府共同建设的国内首家学院建制的信息安全高层次人才培养基地，拥有网络空间安全一级学科，培养包括博士生、硕士生、本科生等不同学历层次的信息安全专业人才。

学院在学术研究和技术创新领域具有雄厚基础和实力，网络空间安全一级学科拥有中国工程院院士、长江学者、国家百千万人才、国际知名学者等骨干教授 10 余人，拥有信息内容分析技术国家工程实验室、可扩展计算与系统国家重点实验室培育基地、国家商用密码检测（上海）中心（筹）、教育部工程中心、上海市重点实验室等科研基地。对接国际学术前沿和国家发展战略，学院规划的重点研究领域包括：1）

密码理论与算法、2）量子计算与后量子密码、3）软件与系统安全、4）硬件与嵌入式系统安全、5）安全体系结构、6）信息内容安全、7）人工智能安全、8）云安全与大数据隐私保护、9）工业互联网、无线网与物联网安全、10）区块链与金融安全。近年来，学院承担了国家自然科学基金重点项目、国家 973 计划、国家重大专项、国家重点研发计划等一批重要科研任务，与 Intel、Microsoft、阿里、百度、腾讯等国内外著名企业开展科研交流与合作，先后获得国家科技进步奖、上海市科技进步奖、国防科学技术奖、密码科技进步奖、国家网络安全人才奖和教师奖、中国密码学会密码创新奖等国家和省部级科研及人才奖励 20 余项。

学院的本科生和研究生主要来自全国百强重点中学和 985/双一流高校，学科声誉、专业热门度和社会关注度都名列前茅。在校学生获得各类国际国内信息安全大赛奖数十项，在 CRYPTO、EUROCRYPT、ASIACRYPT、ACM CCS、NDSS、USENIX Security、ACM Computing Surveys、IEEE TIFS、IEEE TDSC、IEEE TIT、IEEE TCAD、IEEE JSAC 等高水平学术会议和期刊上发表了大量研究论文。90%以上的毕业生分布在世界一流大学或研究机构攻读更高学位或任教、全国一流大学担任重要教职、或全球 500 强企业和国家重要职能部门担任核心骨干。

The School of Cyber Science and Engineering (CSE, formerly known as the School of Information Security Engineering) of Shanghai Jiao Tong University was founded in October 2000. It was the first school-level training base for high-level information security professionals in China. It was jointly established by the Ministry of Education of China, the Ministry of Science and Technology of China, and the Shanghai Municipal People' s Government. The school has a first-level discipline in cyberspace security and aims to cultivate information security professionals at different levels including bachelors, masters, and doctoral students.

The school has substantial accumulation and potent in both academic research and technological innovation on cyberspace security. The school has more than ten world-renowned professors including members of the Chinese Academy of Engineering, national "1000 Talents Program" experts, "Chang Jiang Scholars" distinguished professors, national "Millions of Talent Project". The school also has various national and provincial scientific research platforms such as the National Engineering Laboratory for Information Content Analysis Technology, State Key Laboratory Breeding Base for Scalable Computing and Systems. National Commercial Crypto Testing Center in Shanghai (in preparation), Engineering Center of the Ministry of Education of China, Shanghai Key Laboratory, etc. Docking international academic frontiers and national development strategies, the key research areas of school' s planning include: 1) Theory of Cryptography and Algorithms, 2) Quantum Computing and Post-quantum Cryptography, 3) Software and System Security, 4) Hardware and Embedded System Security, 5) Security Architecture, 6) Information Content Security, 7) Artificial Intelligence Security, 8) Cloud Security and Big Data Privacy Protection, 9) Industrial Internet, Wireless Network and Internet of Things Security, 10) Blockchain and Financial Security.

In recent years, the school has undertaken several important research projects including the key projects of the National Natural Science Foundation, the National 973 Plan, the Major National Projects, and the National Key R&D Programs. The school has subscribed exchanges and firm collaborations with famous Chinese and foreign companies such as Intel, Microsoft, Ali, Baidu, Tencent, etc. Professors of the school have won more than twenty national, provincial and ministerial level scientific research and talent awards including National Science and Technology Progress Award, Shanghai Science and Technology Progress Award, National Defense Science and Technology Award, Crypto Science and Technology Progress Award, National Cyber Security Talents Award and Teacher Award, China Association of Cryptography Innovation Award, etc.

The majority of the students of the school comes from the top 100 key high schools and 985/"Double-First" universities in China. The academic reputation, professional popularity, and social attention of the school have always been among the best across the nation. Postgraduate and undergraduate students of the school have won dozens of prizes in international and domestic information security competitions. A large number of research papers have been published in top academic conferences and journals such as CRYPTO、EUROCRYPT、ASIACRYPT、ACM CCS、NDSS、USENIX Security、ACM Computing Surveys、IEEE TIFS、IEEE TDSC、IEEE TIT、IEEE TCAD、IEEE JSAC, etc. More than ninety percent of the graduates have pursued higher degrees, taken faculty positions in highly ranked international and domestic universities and research institutions, or served as backbone staff in the global top 500 enterprises or important functional departments in the Chinese government.

三、培养目标 Program Objective

对接国家重大技术需求，培养适应国家建设和社会发展所需要的，具有网络空间安全技术创新能力、管理能力、国际化视野的高水平领军人才。

- ✓ 热爱祖国，遵纪守法，具有良好的职业道德，具有高度的事业心和追求真理、献身科学的敬业精神，具有高尚的科学道德和创新精神，具有良好的体魄与素养，能积极为社会主义建设服务;
- ✓ 具有系统、深入的网络空间安全专业知识以及坚实、宽广的相关领域理论基础;
- ✓ 具有解决复杂工程技术问题、进行工程技术创新以及规划和组织实施工程技术研究开发工作的能力;
- ✓ 能够在推动网络空间安全产业发展和工程技术进步方面取得创造性成果;

✓ 能够承担企事业单位的重大项目，具有网络空间安全领域技术创新能力以及相关项目的工程管理、组织和领导能力。

To dock the crucial technical needs of the country and the requirement of the society, the objective of the program for a professional Ph.D. in cyberspace security is to cultivate spearheading professionals in information security with the ability to innovate and manage and a global vision. Precisely speaking:

A). Be patriotic, law-abiding, and preserve a decent professional ethic. Be industrious and devoted to science with academic ethic and pioneering spirit. Be physically robust and serve actively for the development of socialism in China.

B). Have a systematic and profound understanding of cyberspace security and solid, broad theoretical foundations on related fields.

C). Be able to solve complex engineering problems, conduct technical innovation, design, and organize the development of engineering technologies.

D). Be able to achieve groundbreaking results that boost the development of cyberspace security industry and engineering technologies.

E). Be able to undertake major projects of government-affiliated institutions and to manage, organize, and lead groups or projects that explore novel aspects of cyberspace security.

四、培养方式及学习年限 Training Mode and Study Duration

网络空间安全学科非全日制工程博士采用非全日制学习、校内导师与行业导师联合培养的导师制培养模式。本项目标准学制 4 年，未能按时完成学业者，最长可延长 2 学年。

The cultivation of a professional Ph.D. in cyberspace security is part-time and jointly advised by tutors from the school and the industry. The normal duration of this program is four years, one who fails to meet the criteria of timely graduation can apply for an extension of at most two years.

五、课程学习要求 Course Requirement

须修读完成不少于 16 学分，其中 GPA 学分不少于 14（数学类课程至少 4 学分），GPA 不低于 2.8。各类课程具体要求如下:

To pursue the degree of this program, one has to earn credits of no less than eighteen, with no less than fourteen credits from GPA courses (at least four credits have to come from mathematics). The GPA has to be no less than 2.8, the detailed requirement of courses are listed as follows:

课程类别 **Course Type**	学分要求 **Min Credits**	门数要求 **Min Courses**	GPA 学分要求 **Min GPA Credit**	备注 **Note**
公共基础课 General Courses	6	4	/	MARX7001 中国马克思主义与当代(2 学分)，GE6001 学术写作、规范与伦理(1 学分)，MATH6002 工程数学(2 学分)，GE9002 工程科技前沿专题(1 学分)这 4 门课为必修。 MARX7001 Development History of Marxist Ideological (2 credits), GE6001 Academic writing, norms and ethics (1 credit), MATH6002 Engineering Mathematics (2 credits) and GE9002 frontier engineering science and technology (1 credit) are compulsory.
专业基础课 Program Core Courses	/	/	/	数学类课程≥4 学分 No less than four credits have to come from maths courses.
专业前沿课 Program Frontier Courses	2	1	/	GE9001 创新工程实践 (2 学分) GE9001 Innovative Engineering Practices (2 credits), compulsory.

专业选修课 Program Elective Courses	/	/	/	
任意选修课 Elective Courses				非必需 Not compulsory.

六、培养过程要求 Training Requirement

网络空间安全学科博士培养过程包括资格考试、开题报告和年度进展报告等主要环节。其中：

✓ 本项目资格考试原则上应在入学后第二学年第一学期内完成；对第一次学科资格考试成绩不通过者，可在下一学期申请重考；两次资格考试不通过者，不能继续攻读博士学位。

✓ 学位论文开题工作应该在通过资格考试后，一般应该在第二学年结束前完成；首次论文开题未通过者，可在下一学期申请重新开题；两次论文开题均不通过者，不能继续攻读博士学位。

✓ 博士生在完成学位论文开题报告后按自然年进行年度考核。

The program of professional Ph.D. in cyberspace security involves crucial procedures as the qualification examination, the opening report, and the annual progress report.

A). One who applies for this program should pass the qualification examination in the first school term during the second year after enrollment in principle. One who fails the qualification examination can apply for a reexamination in the next school term. One who fails both examinations cannot proceed to pursue the Ph.D. degree.

B). The opening report could be done after one passing the qualification examination. It should usually be done before the end of the second school year. One who fails the first round of opening report examination can apply for opening again in the next school term. One who fails both examinations cannot proceed to pursue the Ph.D. degree.

C). A Ph.D. candidate has to report his/her progress annually after the opening report.

七、学术成果要求 Requirement on Academic Achievements

网络空间安全学科非全日制工程博士学位申请人就读博士期间，应做出创造性成果，成果应与学位论文密切相关，且以上海交通大学博士研究生身份署名，成果形式包括科技奖励、行业标准、发明专利、学术论文等，至少满足以下具体要求之一:

- ✓ 获省部级以上科技成果奖 1 项，省部级科技成果一等奖需排名前 5 位、二等奖需排名前 3 位;
- ✓ 以本人贡献为主的研究成果形成行业标准 1 项;
- ✓ 以第一发明人或第一著作人获得重要发明专利授权或软件著作权至少 2 项，并有良好的应用;
- ✓ 在网络空间安全学科学位评定委员会认定的刊物上(CCF、中科院及 CACR 类期刊/会议)，以上海交通大学为第一单位发表(或录用) 2 篇与学位论文主要内容相关的学术论文（经学校批准或授权的特定培养项目或学院按照相关约定执行），具体要求如下:

—— 工学: 发表（或录用）2 篇学术论文，至少 1 篇发表（或录用）在 SCI（科学引文索引）或 EI（工程索引）检索的刊物上。在 EI 检索刊物上发表的论文需为英文（或其第一外国语）。

学位申请人为第一作者发表的论文以 1 篇计; 以第二作者发表的论文（第一作者必须是其导师）以 1/2 篇计; 第三作者及以后者不计。

A candidate for part-time professional Ph.D. in cyberspace security should conduct original research which is closely related to his/her thesis under the title of SJTU Ph.D. candidate. The results can be presented as science and technology award, industrial standard, patent, or research paper. At least one of the following criteria has to be met:

1. Win the first/second-rank prize of the Provincial Science and Technology Progress Award (the candidate must be ranked within the top five/three authors).

2. Propose one industrial standard which is primarily based on his/her research.

3. License two important patents or two software copyrights as the first-author. The patents or software should be widely adopted by the industry.

4. Publish (or receive two acceptance letters) two academic papers closely related to his/her research topic in journals/conferences appointed by the degree council (please refer to the lists given by CCF, CAS, and CACR), in which Shanghai Jiao Tong University is the first corresponding institution. Works authorized by the university or specific programs are interpreted by the university or the responsible school. Specifically:

For engineering discipline: Publish two academic papers, in which one of them is published (or is received by) an EI/SCI journal. The work published in the EI journal has to be presented in English (or the first foreign language of the candidate).

If the candidate is the first author, then the work counts for one paper. If the adviser is the first author and the candidate is the second author, then the work counts for zero point five paper. In other cases, the publication is not considered to meet the graduation criteria.

八、学位论文 Thesis/dissertation work

博士研究生在规定的学习年限内完成培养计划,课程成绩合格并达到规定的总学分,符合学校和学院规定的学术论文发表要求,通过学位论文评审且无学术诚信问题者,可申请参加博士学位论文答辩。具体流程按照《上海交通大学关于申请授予博士学位的规定》(https://www.gs.sjtu.edu.cn/info/1140/7323.htm)执行。

A Ph.D. candidate who passes all planned courses, earns enough credit, meets the academic paper publication criterion formulated by the university and the school, finishes dissertation review and is clear from academic plagiarism can apply for dissertation defense.

For detailed requirements, please refer to https://www.gs.sjtu.edu.cn/info/1140/7323.htm.

九、课程设置 Courses

课程类别 Category	课程代码 Course Code	课程名称 Course Name		学分 Credit	授课语言 Language*	开课学期 Semester	可以计算 GPA	必须计算 GPA	备注 Note
		中文 Chinese	English 英文						
公共基础课	MARX7001	中国马克思主义与当代	Development History of MarxistIdeological	2	中文 in Chinese	秋季 Fall	是 Yes	否 No	必修 Compulsory

General Courses	GE6001	学术写作、规范与伦理	Academic writing, norms and ethics	1	中文 in Chinese	春季 Spring	是 Yes	否 No	必修 Compulsory
	GE9002	工程科技前沿专题	frontier engineering science and technology	1	中文 in Chinese	秋季 Fall	是 Yes	否 No	必修 Compulsory
	MATH6002	工程数学	Engineering Mathematics	2	中文 in Chinese	秋季 Fall	是 Yes	否 No	必修 Compulsory
专业基础课 Program Core Courses	MATH6010	图与网络	Graph Theory and Network Analysis	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	数学类专业基础课 ≥2 学分
	NIS7001	随机过程与排队论	Stochastic Process and Queuing Theory	2	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	MATH6005	矩阵理论	Matrix theory	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
	STAT6001	基础数理统计	Element of Statistics	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	NIS7017	基础代数	Foundations of Abstract Algebra	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	NIS7006H	有限域理论及其应用	Finite fields and their applications	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	NIS7007	信息论与编码	Information Theory and Coding	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	NIS7008	通信理论与系统	Communication Theory and Systems	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
	NIS7009H	网络空间安全理论与技术基础	Cyber Security Essentials: Principles and Practice	2	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	NIS7018	密码学数学基础	Mathematic Fundamentals of Cryptography	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	NIS7019	密码算法	Cryptographic Algorithms	3	中文 in Chinese	春季 Spring	是 Yes	否 No	
	NIS7020	计算机通信网络协议	Computer networking	3	中文 in Chinese	春季 Spring	是	否 No	

		与安全	protocol and security				Yes		
	NIS7021	软件与系统安全	Software and System Security	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	NIS7022	网络安全防护原理	Principles of Cyber Security Protection	2	中文 in Chinese	春季 Spring	是 Yes	否 No	
	NIS7023	多媒体内容安全	Multi-media Content Security	3	中文 in Chinese	秋季 Fall	是 Yes	否 No	
	NIS7024	人工智能安全原理	Principles of Artificial Intelligence Security	2	中文 in Chinese	春季 Spring	是 Yes	否 No	
	NIS7025	大数据分析与安全	Analysis and Security for Big Data	2	中文 in Chinese	春季 Spring	是 Yes	否 No	
专业前沿课 Program Frontier Courses	GE9001	创新工程实践	Innovative Engineering Practices	2	中文 in Chinese	春 / 秋 Spring/Fall	否 No	否 No	必修 Compulsory
专业选修课 Program Elective Courses	NIS8012	密码协议	Cryptographic Protocols	2	中文 in Chinese	春季 Spring	否 No	否 No	
	NIS8013	高等密码工程	Advanced Cryptographic Engineering	2	中文 in Chinese	春季 Spring	否 No	否 No	
	NIS8014	移动网络安全	Mobile Network Security	2	中文 in Chinese	秋季 Fall	否 No	否 No	
	NIS8015	网络安全前沿技术	Advanced Network Security	2	中文 in Chinese	秋季 Fall	否 No	否 No	
	NIS8016	无线电安全	Radio Security	2	中文 in Chinese	秋季 Fall	否 No	否 No	
	NIS8017	漏洞挖掘与分析	Security Vulnerability Assessment	2	中文 in Chinese	春季 Spring	否 No	否 No	
	NIS8018	系统安全前沿技术	Advances in Software and System Security	2	中文 in Chinese	春季 Spring	否 No	否 No	
	NIS8019	网络渗透测试导引	Introduction to Network Penetration Testing	2	中文 in Chinese	秋季 Fall	否 No	否 No	
	NIS8020	区块链原理及应用	Principle and Applications of	2	中文 in Chinese	春季 Spring	否 No	否 No	

			Blockchain						
	NIS8021	自然语言处理前沿技术	Frontier Technology in Natural Language Processing	2	中文 in Chinese	秋季 Fall	否 No	否 No	
	NIS8022	数字取证前沿技术	Frontier Technology in Digital Forensics	2	中文 in Chinese	春季 Spring	否 No	否 No	
	NIS8023	社交网络数据分析	Data Analysis on Social Networks	2	中文 in Chinese	春季 Spring	否 No	否 No	
	NIS8011	网络空间安全前沿专题	Frontiers in cyberspace security	2	中文 in Chinese	春季 Spring	否 No	否 No	