**（083900）网络空间安全学科2020级全日制学术硕士研究生培养方案**

**2020 Full-time Master Program for Cyberspace Security**

**一、基本信息** Basic Information

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| **适用专业**Major | 网络空间安全Cyberspace Security | **标准学制**Duration | 2.5年Years |
| **学习形式**Study Mode | 全日制 Full time |
| **项目类型**Program Type | 学术型Academic |
| **培养层次**Program Level | 硕士生 Master Student |
| **最低学分**Min Credit | 28 | **最低GPA学分**Min GPA Credit | 18 | **最低GPA**Min GPA | 2.8 |

**二、学科简介**Introduction

网络安全技术研究院与网络空间安全学院共建"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。

本学科在学术研究和技术创新领域具有雄厚基础和实力，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，学科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，学科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。

学科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。

Cyberspace Security first-level discipline is being jointly built by the Institute of Cyber Science and Technology with the School of Cyber Science and Engineering, aiming to cultivate information security professionals at different levels including bachelors, masters, and doctoral students.

The Cyberspace Security discipline has substantial accumulation and potent in both academic research and technological innovation on cyberspace security. The Cyberspace Security discipline 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 Cyberspace Security discipline 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 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 Cyberspace Security discipline 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 Cyberspace Security discipline has subscribed exchanges and firm collaborations with famous Chinese and foreign companies such as Intel, Microsoft, Ali, Baidu, Tencent, etc. Professors of the Cyberspace Security discipline 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 Cyberspace Security discipline 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 Cyberspace Security discipline 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

培养适应国家建设需要的，在网络空间安全原理与技术方面具有扎实、宽广的理论基础，能够进行创新性研究，具有独立研究、分析与解决本学科专业问题能力，并具有一定组织才能的专业人才。

* 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；
* 至少掌握一门外国语，能熟练地阅读网络空间安全专业的外文资料，具有一定的写作能力和进行学术交流的能力；
* 掌握扎实的网络空间安全基础理论和专业知识，了解相关学科的基础知识；
* 具有良好的自主学习能力，能够主动了解并掌握网络空间安全新理论和新技术；
* 具备科研创新能力、一定的工程实践能力和良好的团队协作能力，能够运用现代科学研究的方法和手段，结合其它学科的发展，在网络空间安全学科领域找到着力点，取得创新成果，进行网络空间安全基础研究和应用研究。

To meet the needs of the country, the objective of the program for academic master in cyberspace security is to cultivate professionals in information security with a solid and broad theoretical foundation in principles and technologies of cyberspace security, being capable of independently conducting research, analyzing and solving related problems, and have certain organizational talent. 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). Master at least one foreign language, be able to browse materials in cyberspace security, writing, reporting, and communicating in that foreign language.

C). Acquire substantial fundamental theory and professional knowledge in cyberspace security and understand the basis of related disciplines.

D). Be able to learn independently and actively keep pace with the development of the theory and technologies of cyberspace security.

E). Be able to innovate, engineer, and team-work. Be capable of conducting basic and applied research in cyberspace security with scientific methods and knowledge from other related disciplines.

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

网络空间安全学科学术硕士采用全日制学习、导师制培养模式；新生入学后两周内经师生互选确定导师。

本项目学制2.5年，未能按时完成学业者，最长可延长1学年。

The cultivation of an academic master in cyberspace security is full-time and tutor-advised. A student decides her/his academic adviser within two weeks after enrollment through a mutually choosing process between tutors and students.

The duration of this program is two years and six months, one who fails to meet the criteria of graduation can apply for an extension of at most one year.

**五、课程学习要求** Course Requirement

须修读完成不少于28学分，其中GPA学分不少于18（数学类课程至少6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 twenty-eight, with no less than eighteen credits from GPA courses (at least six 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:

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| --- | --- | --- | --- | --- |
| **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 | 6 | FL6001学术英语(2学分)，GE6001学术写作、规范与伦理(1学分)，MARX6001中国特色社会主义理论及实践(2学分)，MARX6003自然辩证法(1学分)这四门课程为必修、GPA课程。FL6001 English for academic purpose (2 credits), GE6001 Academic writing, norms and ethics (1 credit), MARX6001 Theory and practice of socialism with Chinese characteristics (2 credits) and MARX6003 dialectics of nature (1 credit) are compulsory and GPA source courses. |
| 专业基础课Program Core Courses | / | / | / | 数学类课程≥6学分No less than six credits have to come from maths courses. |
| 专业前沿课Program Frontier Courses | 2 | 1 | / | GE6012学术报告与研讨会(2学分)，必修GE6012 Academic reports and seminars (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

网络空间安全学科学术硕士培养过程包括开题报告和中期检查两个主要环节。其中：

* 学位论文开题工作应在第二学年第一学期结束前进行，由学科组负责人或导师召集至少3名相关学科专家对开题报告进行论证。首次学位论文开题未通过的，可在下一学期再次申请开题；两次论文开题均未通过的，由开题报告专家组作出应予退学处理建议。
* 中期检查应在学位论文送审前3个月进行，基本要求：完成培养计划中规定的全部课程学习并成绩合格；GPA不低于2.8；学位论文开题已通过。中期检查不通过的硕士研究生，应给予警告，并要求其给出改进措施，上报网络空间安全学科学位委员会。经整改可于下一学期再次进行中期检查，2次中期检查不通过者，由专家组作出应予退学处理建议。

The program of academic master's in cyberspace security involves two crucial procedures: the opening report and mid-term inspection.

A). The opening report should be done before the end of the first school term in the second year. The deputy of the research group or the adviser should convene at least three professionals to discuss the validity of the report. One who fails this first round of examination can apply for opening again in the next school term. One who fails both examinations would receive dropout advice from the committee of the opening report.

B). The mid-term inspection should be done three months before the dissertation undergoes review. The prerequisites are: passing all courses in the plan, having a GPA of no less than 2.8, passing the opening report examination. One who fails the mid-term inspection would be warned and has to provide supplementary materials to the degree council in cyberspace security then he/she can apply for mid-term inspection in the next school term. One who fails both inspections would receive dropout advice from the panel of mid-term inspection.

**七、学术成果要求** Requirement on Academic Achievements

网络空间安全学科学术硕士须以第一作者在以下期刊/会议上发表学术论文1篇：

a) SCI期刊；

b) CCF、中科院、CACR列表推荐的学术期刊/会议（以入学时公布的列表为准）；

c)中国科学、科学通报、计算机学报、软件学报、电子学报、通信学报、密码学报、网络与信息安全学报。

注：对于有多个第一作者的情况，则1 篇论文只能用于计算1次。对于被列入负面期刊/会议清单的论文，或在专业学术领域内不被认可的期刊/会议上发表的论文，导师或学位委员会有权通过必要的程序认定该论文不得作为毕业要求。

The academic master in cyberspace security should publish at least one paper as the first author in the following journals/conferences:

1. . SCI journals.
2. .Journals/conferences from the recommendation list from CCF, CAS, CACR (taking the list published at the year of enrollment as the standard.)
3. . *Science China, Chinese Science Bulletin, Chinese Journal of Computers, Journal of Software, Acta Electronica Sinica, Journal on Communications, Journal of Cryptologic Research, Chinese Journal of Network and Information Security.*

Remark: In cases of more than one co-first authors: each paper can only count once. For one paper published in journals/conferences in the blacklist or not recognized in this discipline, the academic adviser and degree council have the right of nullifying it after necessary procedures.

**八、学位论文** Thesis/dissertation work

网络空间安全学科学术硕士的学位论文必须是一篇（或由一组论文组成的一篇）系统的、完整的学术论文，是学位申请者在导师的指导下独立完成的研究成果，不得抄袭和剽窃他人成果。学位论文的学术观点必须明确，且立论正确，推理严谨，数据可靠，层次分明，文字通畅。学位论文一般应使用中文撰写。学位论文具体要求参照《上海交通大学博士、硕士学位论文撰写指南》（<https://www.gs.sjtu.edu.cn/info/1143/5801.htm>）执行。

硕士研究生在完成培养计划规定的课程学习、修满培养方案所要求的学分、课程成绩平均绩点（GPA）达到要求、完成培养方案规定的各项工作、学术成果达到网络空间安全学科在学期间发表学术论文的相关要求后，可申请参加硕士学位论文答辩。具体流程按照《上海交通大学关于申请授予硕士学位（学术型）的规定》（<https://www.gs.sjtu.edu.cn/info/1140/7325.htm>）执行。

The dissertation for the academic master in cyberspace security has to be one systematic and complete academic paper or one proceeding consists of a series of papers. It should be the result of independent research under the supervision of the adviser. Plagiarism of any kind would not be tolerant. The dissertation should be clear in presentation, justified in position, rigor in deduction, reliable in data, and eloquent in language. The dissertation is usually presented in Chinese.

For detailed requirements, please refer to <https://www.gs.sjtu.edu.cn/info/1143/5801.htm>.

A student pursuing the master’ s degree should pass all courses in the plan, earn according credits and GPA, finish works assigned, and have the paper published before applying for the defense of the dissertation.

For detailed requirements, please refer to <https://www.gs.sjtu.edu.cn/info/1140/7325.htm>.

**九、课程设置** Courses

详见下页

Please refer to the next page.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **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** | **必须计算GPA** | **备注 Note** |
| **中文Chinese** | **English 英文** |
| 公共基础课General Courses | FL6001 | 学术英语 | English for Academic Purposes | 2 | 英文 in English | 秋季 Fall | 是 Yes | 必修 Compulsory  |
| 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 | 必修 Compulsory |
| MARX6001 | 中国特色社会主义理论及实践 | Theory and Practice of Socialism with Chinese Characteristics | 2 | 中文 in Chinese | 秋季 Fall | 是 Yes | 必修 Compulsory |
| MARX6003 | 自然辩证法 | Dialectics of Nature | 1 | 中文 in Chinese | 秋季 Fall | 是 Yes | 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 | 否 No | 数学类课程≥ 6学分 |
| NIS7001 | 随机过程与排队论 | Stochastic Process and Queuing Theory | 2 | 中文 in Chinese | 秋季 Fall | 否 No |
| MATH6005 | 矩阵理论 | Matrix Theory | 3 | 中文 in Chinese | 春季 Spring | 否 No |
| STAT6001 | 基础数理统计 | Element of Statistics | 3 | 中文 in Chinese | 秋季 Fall | 否 No |
| NIS7017 | 基础代数 | Foundations of Abstract Algebra | 3 | 中文 in Chinese | 秋季 Fall | 否 No |
| NIS7006h | 有限域理论及应用 | Finite Fields and Their Applications | 3 | 中文 in Chinese | 秋季 Fall | 否 No |  |
| NIS7007 | 信息论与编码 | Information Theory and Coding | 3 | 中文 in Chinese | 秋季 Fall | 否 No |  |
| NIS7008 | 通信理论与系统 | Communication Theory and Systems | 3 | 中文 in Chinese | 春季 Spring | 否 No |  |
| NIS7009 | 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 | 否 No |  |
| NIS7018 | 密码学数学基础 | Mathematic Fundamentals of Cryptography | 3 | 中文 in Chinese | 秋季 Fall | 否 No |  |
| NIS7019 | 密码算法 | Cryptographic Algorithms | 3 | 中文 in Chinese | 春季 Spring | 否 No |  |
| NIS7020 | 计算机通信网络协议与安全 | Computer Networking Protocol and Security | 3 | 中文 in Chinese | 春季 Spring | 否 No |  |
| NIS7021 | 软件与系统安全 | Software and System Security | 3 | 中文 in Chinese | 秋季 Fall | 否 No |  |
| NIS7022 | 网络安全防护原理 | Principles of Cyber Security Protection | 2 | 中文 in Chinese | 春季 Spring | 否 No |  |
| NIS7023 | 多媒体内容安全 | Multi-media Content Security | 3 | 中文 in Chinese | 秋季 Fall | 否 No |  |
| NIS7024 | 人工智能安全原理 | Principles of Artificial Intelligence Security | 2 | 中文 in Chinese | 春季 Spring | 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 | 否 No |  |
| 专业前沿课Program Frontier Courses | GE6012 | 学术报告与研讨会 | Academic Reports and Seminars | 2 | 中/英文 in Chinese / English | 春/秋 Spring/Fall | 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 |  |
| NIS8013 | 高等密码工程 | Advanced Cryptographic Engineering | 2 | 中文 in Chinese | 春季 Spring | 否 No |  |
| NIS8014 | 移动网络安全 | Mobile Network Security | 2 | 中文 in Chinese | 秋季 Fall | 否 No |  |
| NIS8015 | 网络安全前沿技术 | Advanced Network Security | 2 | 中文 in Chinese | 秋季 Fall | 否 No |  |
| NIS8016 | 无线电安全 | Radio Security | 2 | 中文 in Chinese | 秋季 Fall | 否 No |  |
| NIS8017 | 漏洞挖掘与分析 | Security Vulnerability Assessment | 2 | 中文 in Chinese | 春季 Spring | 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 |  |
| NIS8019 | 网络渗透测试导引 | Introduction to Network Penetration Testing | 2 | 中文 in Chinese | 秋季 Fall | 否 No |  |
| NIS8020 | 区块链原理及应用 | Principle and Applications of Blockchain | 2 | 中文 in Chinese | 春季 Spring | 否 No |  |
| 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 |  |
| NIS8022 | 数字取证前沿技术 | Frontier Technology in Digital Forensics | 2 | 中文 in Chinese | 春季 Spring | 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 |  |
| 任意选修课 | Elective Courses |  |  |  |