（085400） 电子信息学科 2020 级非全日制博士培养方案(计算机系)

2020 Part-time PhD Program for Electronic Information

一、基本信息 Basic Information

院系名称 School	(033)电子信息与电气工程学院(计算机系) 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
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	0	**最低 GPA** Min GPA	0

二、学科简介 Introduction

发展现状:

上海交通大学计算机科学与工程系以“计算机科学与技术”为一级学科，2000 年获得该一级学科博士学位授予权，其下包含计算机软件与理论、计算机体系结构、计算机应用三个二级学科。其中“计算机软件与理论”于 2002 年获批为国家重点学科，是当时上海地区高校计算机专业唯一的重点学科。2007 年，“计算机软件与理论”方向顺利通过国家重点学科的五年评估，同时，“计算机应用技术”方向申报国家重点学科亦获得成功，从而使上海交大计算机系“计算机科学与技术”一级学科成为国家重点一级学科。2012 年教育部学科评估排名并列第四。

研究方向:

在延续传统学科架构的同时，计算机系根据计算机学科本身的发展以及社会需求,通过人才引进和师资构成，逐步发展为七个研究所（研究方向），分别是:

•高可靠软件与理论

•并行与分布计算

•网络与服务计算

•智能人机交互

•密码与信息安全

•计算机应用

•计算机体系结构

计算机系依据师资队伍国际化程度高的优势，在科学研究方面努力开展“国际前沿学术研究、原创性学术研究”，同时力求将各个研究方向建设成国际知名研究团队。在整体学科建设方面，计算机系以“创建国际一流计算机学科”为宗旨，力求在人才培养、科研实力和学术地位各方面均与世界一流计算机学科接轨。

The Department of Computer Science and Engineering of Shanghai Jiao Tong University is accredited with national first-level discipline, “Computer science and technology”. A PhD degree granting department since 2000, it carries three nationally accredited second-level disciplines: “computer software and theory”, “computer architecture” and “computer applications”. In 2002, “computer software and theory” was rated as the national key discipline, the only one for the computer science discipline in universities and colleges in Shanghai. It then successfully passed the five-year assessment of the national

key discipline in 2007. In the same year, “computer applications” was recognized as the national key discipline, which made “computer science and technology” a national key first-level discipline. In the 2012 discipline evaluation by the Ministry of Education, computer science and technology at SJTU ranked 4th nationally.

Research Areas

To further develop the discipline and meet the society’s needs, CSE Department, while carrying on the traditional disciplinary framework, has introduced talents of different specialties and formed seven research institutes (research areas):

• Theoretical Computer Science

• Parallel and Distributed Computing

• Network and Service Computing

• Intelligent Human-Computer Interaction

• Cryptography and Information Security

• Computer Application

• Computer Architecture

With its highly internationalized teaching staff, the department endeavors to conduct international advanced and original academic researches and build internationally renowned research teams. It aims to create an internationally excellent discipline of computer science in regards to talent cultivation, scientific research and academic standing.

三、培养目标 Program Objective

计算机科学与技术学科的博士研究生，需掌握坚实宽广的本门学科的专业基础理论知识，学风严谨，品行端正，有较强的事业心和献身精神。在相应的研究方向上掌握系统深入的专门理论知识、技术与方法，具备独立从事科学工作研究的能力，在科学研究或专门技术上做出创造性的成果。能够胜任高等院校、科研机构及相关产业部门的研究、教学和技术开发工作，具有一流行业领军人才和科学家的基本素质。

对于“知识探究、能力建设、人格养成” 三位一体育人培养路径，以及与之相适应的人才培养支持系统（校内外各类培养平台资源）建设，计算机学科拟采取如下改革措施:

课程设置方案

为加强学科交叉和实践教学，拟推行基于本硕博贯通机制的课程设置方案，具体来说分为本硕贯通和硕博贯通两部分，一部分在大三大四阶段，另一部分在直博生和硕博连读生的初级阶段。体制上要保持有机的结合，课程形式上加强实践教学：例如大班重理论、小班重实践，大班和小班合成一个课程的有机整体；又如有校外规模化企业参加的我系实践选修课程平台等等。另外，强调学科交叉、打破学科边界的课程形式还有：学生就读其他院系的课程；学生跨学科实验室轮转；教师课程大纲兼顾其他院系等等。

学术交流平台

本硕博贯通的培养机制必然会导致博士生在同一单位长期驻留。其优越性在于科研队伍的稳定性，这是我们承接大型科研项目的基石。但弊端也同样引人注目，即学术界最忌讳近亲繁殖。为了避免这一问题严重化，我们除了在人员的淘汰补录机制和培养方案课程设置工作以外，还要结合前文所述的国际合作平台予以加强。

职业发展规划

我们知道博士生毕业后就职于精英高校的是少数，许多博士毕业生根据未来的收入与福利选择工作领域，他们更需要在科研实践中去寻找工作岗位的需求。博士生培养机制效率上的契合度、形式上的灵活性，以及跨学科实践的变革导向，能提供给他们更好的机会。我们的辅助机构要切实将:

毕业博士生的联系信息、职业发展信息、个人体验与感悟信息;

特别是理论与实践的工作亮点，

详尽保存和理性分析，切实将其视为教育与学术统一体的一部分。这将稳固博士生的科研投入心态、甚至可以开拓其科研思路、扩展其人际交往技能、不让他们在学业和择业中感到“孤独”。

最终通过基础知识的学习和科学实践活动的熏陶，使得博士研究生对科研工作和学习生活充满热爱，逐步形成一流行业领军人才和科学家的基本素质，达到具有科学素养的人格养成目标。

PhD candidates of the discipline of computer science and technology are expected to master solid and broad knowledge of basic theories in computer science, have a rigorous attitude towards study, be virtuous, and be devoted and dedicated to scientific undertakings. They are expected to acquire

systematic and in-depth specialized theoretical knowledge, technology and method in their research areas, have the ability to independently conduct scientific research, and make innovative achievements. PhD candidates shall be capable of undertaking the research and teaching, and promoting technology development in institutions of higher education, research institutes, and relevant industrial sectors. They shall have the basic qualities of first-class industrial leading talents and scientists.

For the cultivating path of “knowledge exploring, capability building, and personality forming” and the construction of the corresponding support system of talent cultivation (various cultivation platforms and resources both inside and outside the university), we have adopted the following measures:

Curriculum

Curriculum based on a successive undergraduate-postgraduate-doctoral program will be adopted to enhance interdisciplinary combination and practical teaching. Such curriculum will be applied to the junior and senior year of the successive undergraduate-postgraduate program and to the early stage of the successive postgraduate-doctoral program for students entering a doctoral program after obtaining a Bachelor’s degree as well as students of the successive postgraduate-doctoral program. The principle is to maintain dynamic combination of theory and practice by integrating large classes for theory teaching with small classes for practice, and to strengthen practice teaching by constructing a practice platform of optional courses participated by large-scale enterprises. Other forms that emphasize on crossing disciplines and breaking disciplinary boundaries include: students are allowed to take courses offered by other departments; students are allowed to rotate in laboratories of different disciplines; certain courses offered by the Department of Computer Science and Engineering will be available to students from other departments, etc.

Platform for academic exchange

The successive undergraduate-postgraduate-doctoral program is bound to retain doctoral students in the department for a long time. It guarantees the stability of the research team, which is the foundation of undertaking large scientific research projects. However, the disadvantage of the consequent “inbreeding” is also remarkable, which the academic community always tries to avoid. To prevent the aggravating of this problem, we must make efforts in international cooperation as well as in the mechanism of eliminating and recruiting personnel and in curriculum design.

Career development planning

After graduation only a fraction of the doctoral students gain employment in top universities, while most select their jobs on the basis of future income and welfare, and thus need to learn about the requirements of job positions in scientific research practice. A mechanism for cultivating doctoral students that fits the requirements of jobs and has a flexible form, plus the interdisciplinary reform, will provide better opportunities to students. Our auxiliary organizations should keep a detailed record and make rational analysis of:

· the contact information, career development, personal experiences and inspirations of graduates, and

· the highlights of their work with regard to theory and practice in particular,

and consider it as part of the unity of education and academics. This will help to stabilize the mentality of doctoral students for scientific research, expand their perspectives, enhance the interpersonal skills, and avoid the feeling of loneliness in their school years or during the process of job selection. Doctoral students are expected to develop enthusiasm for research, study and life through studying basic knowledge and participating in research practice, gradually acquire the basic qualities of first-class industrial leading talents and scientists and achieve the goal of cultivating the personality with scientific literacy.

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

普博生学习年限一般为 4 年，经批准可适当缩短或延长，最短不少于 2 年，最长（含休学）不超过 7 年。

The study period of regular PhD program is 3 to 4 years. It can be shortened or extended with approval. The period shall not be less than 2 years or more than 7years (including suspension).

五、课程学习要求 Course Requirement

课程学习由“公共课”、“专业课”组成，学生应根据培养方案的要求，结合知识结构、行业背景和研究项目需求选修课程，课程总学分

应至少达到 16 个学分，公共课⩾6 学分，专业课⩾10 学分，课程学习原则上要求 1 年内完成。

《创新工程实践》 的要求:

1、参与相关专业硕士实践类课程的教学或辅导，不少于 16 学时；或作重要工程前沿讲座至少 8 次（每次计 2 个学时）;

2、在读期间协助校内导师指导至少 1 名专业学位硕士，工作量不少于 16 课时;

3、递交《上海交通大学工程博士实践活动总结报告》，由校内外导师、学院审核通过，获得本课程学分。

Total credits⩾16

各类课程具体要求如下:

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	0	
专业基础课 Program Core Courses	6	3	0	
专业前沿课 Program Frontier Courses	4	2	0	
专业选修课 Program Elective Courses	0	0	0	
任意选修课 Elective Courses	0			非必需

六、培养过程要求 Training Requirement

1. 重要时间节点

（1）普博生的资格考试原则上应在入学后第二学年第一学期内完成;

（2）博士生学位论文开题工作应该在通过资格考试后，普博生一般应该在第二学年结束前完成;

（3）非全日制工程博士需 1 年以上在合作导师所在单位联合培养。

2. 创新实践要求

① 参与相关专业实践类课程的教学或辅导，不少于 16 学时；或作重要工程前沿讲座至少 8 次（每次计 2 个学时）;
② 在读期间协助校内导师指导至少 1 名专业学位硕士，工作量不少于 16 课时;
③ 递交《上海交通大学工程博士实践活动总结报告》，由校内外导师、学院审核通过，获得本课程学分。

1. Key Time

(1) In principle, the qualification examination of general PhD students should be completed within the first semester of the second academic year after enrollment.

(2) The opening work of doctoral dissertation should be completed by the end of the second academic year after passing the qualification examination.

(3) The part-time doctor of engineering needs more than one year's training in the cooperative tutor's unit.

2.Practice Training

① Participate in the teaching or tutoring of relevant professional practice courses, not less than 16 hours, or give at least 8 lectures at the forefront of important engineering (2 hours at a time);

② Assist in the guidance of at least one master of professional degree during the course of study, with a workload of not less than 16 hours;

③ Submit the Summary report of practical activities of Engineering Ph.D. of Shanghai Jiaotong University, which is examined and approved by the tutor and college of Shanghai Jiaotong University, and obtains the credit of this course.

七、学术成果要求 Requirement on Academic Achievements

对于 2020 级及其之后入学的“计算机科学与技术”学科非全日制工程博士研究生，申请授予博士学位所需研究成果应至少满足以下 2 项要求之一:

1、发表学术论文达到计算机学科学术型博士的要求，需同时满足以下 2 项要求:

（1）满足上海交通大学规定的如下毕业条件:

>=2 篇，至少 1 篇 SCI 或 1 篇 EI 学术期刊（EI 论文须为英文）

（2）满足以下条件之一:

a) 发表 B 档（含）以上论文 2 篇;

b) 发表 A 档论文 1 篇，另外发表中文指定期刊或 CCF-C 档期刊论文 1 篇;

c) 发表 B 档论文 1 篇，另外发表中文指定期刊或 CCF-C 档期刊论文 2 篇。

2. 发表 B 档（含）以上论文 1 篇或 C 档（含）以上期刊论文 1 篇。且至少满足以下形式之一:

（1）以本人贡献为主的研究成果已经形成行业标准或国家、国际标准;

（2）获得国家级科技成果奖、或省部级科技成果一等奖（署名前 5 位）、 或省部级科技成果二等奖（署名前 3 位）;

（3）以第一发明人获得重要发明专利授权至少二项，并有良好的应用证明。

注 1 解释权：本文的解释权属于“计算机科学与技术”及“软件工程”学科学位委员会。如有特殊情况，需经 3 位委员联名提议，委员会如认定确属特殊情况，应给予讨论。

注 2 质量认定：本文所指发表论文档次依据《上海交通大学 SCI 论文 A 档/B 档期刊分类目录》、《中国计算机学会推荐国际学术刊物与会议》，详见各有关文件。中文指定期刊为“中国科学、科学通报、计算机学报、软件学报”。列表如有更新，按照申请人入学后的各列表并集处理。

注 3 数量认定：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；其他情况不计。在第 2 项要求中，学位申请人至少要有 1 篇第一作者论文。

Students of part-time engineering doctorate program entering the university at 2020 are required to meet one of the following two requirements:

1. Meet the graduation requirements for students of academic doctorate program, which require students to:

(1) Meet the graduation requirements of SJTU to have at least two academic papers (as first author & with SJTU being the first affiliation) , and one of them must be published on (or accepted by) Journals which are indexed by SCI or EI（in English）.and,

(2）Meet at least one of the following requirements:

Have two papers published on (or accepted by) B-class Journals or Conferences;

Have one paper published on (or accepted by) A-class Journals or Conferences, and one paper published on (or accepted by) the Chinese journals specified below or C-class journals recommended by China Computer Federation;

Have one paper published on (or accepted by) B-class Journals or Conferences, and two papers published on (or accepted by) the Chinese journals specified below or C-class journals recommended by China Computer Federation;

2. Have one paper published on (or accepted by) C-class Journals or one paper published on (or accepted by) B-class Journals or Conferences, and meet at least one of the following requirements:

(1) Research achievements with the degree applicant being the chief contributor are selected to be industrial, national or international standards;

(2) Win state-level scientific and technological achievement awards or the first prize of provincial/ministerial-level scientific and technological achievement awards (the degree applicant should be within the first five authors), or the second prize of provincial/ministerial-level scientific and technological achievement awards (the degree applicant should be within the first three authors),

(3) Obtain at least two significant granted patents as the first inventor and can prove that the patents are of application value.

NOTE:

The Academic Degree Committee of Computer Science and Technology and Software Engineering reserves the right of final explanation. Special cases have to be proposed by 3 committee members and recognized by the committee before being discussed.

The class of papers referred to in this paper are based on the “SJTU Classified Catelogue of SCI A-class/B-class Journals “and the “List of International Academic Journals and Conferences Recommended by China Computer Federation”. The Chinese journals include Science China, Chinese Science Bulletin, Chinese Journal of Computers, and Journal of Software.

A paper with the applicant being the first author is qualified as one paper, while that with the applicant being the second author (the supervisor being the first author) is qualified as half a paper. The applicant must have at least one first-author paper.

八、学位论文 Thesis/dissertation work

博士研究生应选择学科前沿领域或对科技进步、经济建设和社会发展有重要意义的课题开展研究。博士学位论文能够表明作者具有独立从事科学研究工作的能力，反映作者在本门学科上掌握了坚实宽广的基础理论和系统深入的专业知识。博士学位论文具体要求详见:

上海交通大学关于申请授予博士学位的规定

上海交通大学博士、硕士学位论文撰写指南

PhD candidates shall choose issues with significant values to science and technology development, economic construction and social development in the frontier area of computer science. The dissertation shall prove that the author has acquired the ability to independently undertake scientific research and mastered solid understanding of basic theories and in-depth systematic specialized knowledge.

For more specific requirements for Doctoral Dissertations please refer to:

The Requirements of Shanghai Jiao Tong University for Applying PhD Degree

Guidance for Writing PhD and Master Dissertation in Shanghai Jiao Tong University

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 General Courses	GE6001	学术写作、规范和伦理	Scientific writing, integrity and ethics	1	英文	秋季	否	否	必修 Compulsory
	MARX7001	中国马克思主义与当代	Marxism in China	2	中文	秋季	否	否	必修 Compulsory
	MATH6002	工程数学	Mathematics in Engineering	2	中文	秋季	否	否	必修 Compulsory
	GE9002	工程科技前沿专题	Selected topics in Engineering Frontiers	1	中文	秋季	否	否	必修 Compulsory
专业基础课 Program Core Courses	AU7012	先进工程控制导论	Introduction to Advanced Engineering Control	2	中文	春秋季	否	否	
	CS7301	现代密码算法	Modern Cryptographic Algorithm	3	中文	春季	否	否	
	CS7302	程序语言理论	Programming Language	3	中文	春季	否	否	
	CS7303	图像处理与机器视觉	Image Processing and Machine Vision	3	英文	秋季	否	否	

	CS7304H	统计学习理论与方法	Theory and Methods for Statistical Learning	3	中文	秋季	否	否	
	CS7305	可证明安全理论	On the Principle of Provable Security	3	中文	春季	否	否	
	CS7308	区块链技术	Blockchain Technologies	3	中文	秋季	否	否	
	CS7309	强化学习理论与算法	Reinforcement Learning: From Theory to Algorithm	3	中文	秋季	否	否	
	CS7310H	算法设计与分析	Algorithm Design and Analysis	2	中文	秋季	否	否	
	CS7312	计算复杂性高级论题	Advanced Topics in Computational Complexity	3	中文	春季	否	否	
	CS7313	计算复杂性	Computational Complexity	3	中文	秋季	否	否	
	CS7314	高级物联网理论与技术	Advanced Topics on Internet of Things	3	中文	秋季	否	否	
	CS7315	基因组学之大数据学习	Learning from big data in genomics	3	中文	秋季	否	否	
	CS7317	信息论与编码	Coding and Information Theory	3	英文	秋季	否	否	
	CS7319	类脑智能	Brain like Intelligence	3	中文	秋季	否	否	
	CS7323	从数据学习因果结构	Learning Causality From Data	3	中文	秋季	否	否	
	CS7324	博弈论及其互联网的应用	Game Theory and the Internet Application (GTIA)	2	中文	春季	否	否	
	EE7006	能源互联网前沿理论与工程	Frontier Theories and Engineering Advances of Energy Interconnection Network	2	待定	春秋季	否	否	
	NIS8011	网络空间安全前沿专题	Topics of Cyberspace Security Frontier	2	待定	春秋季	否	否	
	ICE7204H	小波与稀疏信号处理	Wavelet and Sparse Signal Processing	2	中文	秋季	否	否	
	CS7341	算法分析与理论	Algorithm analysis and Theory	3	中文	春季	否	否	
	MEM6001	定量分析：模型与方法	Quantitative Analysis: Models and Methods	3	中文	春秋季	否	否	
	MEM6002	工程管理导论	Introduction to Engineering Management	2	中文	春秋季	否	否	
	MEM600	工程经济学	Engineering Economics	2	中文	春秋季	否	否	

	3								
	MEM6006	工程信息管理	Engineering Information Management	2	中文	春秋季	否	否	
	MEM6301	人力资源与沟通管理	Human Resource Management & Communication Management	2	中文	春秋季	否	否	
	MEM6302	领导力	Leadership	2	中文	春秋季	否	否	
	MEM6303	工程管理实践案例分析	Project Management Case Studies	2	中文	春秋季	否	否	
	MEM6304	库存与供应链管理	Inventory and Supply Chain Management	2	中文	春秋季	否	否	
	MEM6305	风险管理与高效决策	Risk Management and Efficient Decision Making	2	中文	春秋季	否	否	
	MEM6306	系统创新与工程实践	System Innovation and Engineering Practice	2	中文	春秋季	否	否	
	MEM6307	社会创新与创业发展	Social Innovation and Entrepreneurship Development	2	中文	春秋季	否	否	
	MEM6308	名企走访实践	Visiting Practice for Famous Enterprises	1	中文	春秋季	否	否	
	GE9001	创新工程实践	Innovative Engineering Practice	2	中文	春秋季	否	否	必修 Compulsory
专业前沿课 Program Frontier Courses	GE6012	学术报告与研讨会	Academic Seminars	2	中文	春秋季	否	否	必修 Compulsory
	MEM8301	大数据与互联网思维	Big Data and Internet Thinking	2	中文	春秋季	否	否	
专业选修课 Program Elective Courses	MEM8302	物联网技术与发展趋势	Technology and Trends for Internet of Things	2	中文	春秋季	否	否	
	MEM8303	人工智能	Artificial Intelligence	2	中文	春秋季	否	否	
	MEM8304	网络信息安全理论与技术	Theory and Technology of Network Information Security	2	中文	春秋季	否	否	
	MEM8305	移动互联网前沿技术	Mobile Internet	2	中文	春秋季	否	否	
	MEM8306	新能源技术及应用	New Energy Technology and Application	2	中文	春秋季	否	否	
任意选修课 Elective									

Courses									