

# **Master's degree program in Computer Science and Technology**

**Discipline code: 0812**

## **Discipline overview and research directions**

This discipline began to enroll postgraduates in 1985, was approved as the second-class master degree discipline of "computer application technology" in 1990, and was approved as the first-class master degree discipline of "computer science and technology" and the second-class doctor degree discipline of "computer application technology" in 2005. The first-class discipline of "computer science and technology" was approved as a post-doctoral research center in 2014, the key first-class discipline of Jiangsu Province during the 13th five year plan in 2016, the first-class doctor degree discipline and the third phase discipline construction discipline of Jiangsu Province's advantageous discipline in 2018.

In the construction of nearly 40 years, especially since the approval of the second-class doctor degree discipline of "computer application technology" in 2005, we have paid attention to combining the advantages of engineering of our university, giving full play to the basic and cutting-edge characteristics of computer discipline, and forming distinctive characteristics in the industry application and regional service through interdisciplinary and penetration. Jiangsu industrial network security technology key laboratory and Jiangsu ubiquitous data intelligent perception and analysis application engineering research center are established on this discipline. Related technologies radiate to agricultural engineering, vehicle engineering, intelligent transportation and other fields, forming discipline characteristics with "computer application technology" as the core discipline and industry application as the innovation carrier. The discipline focuses on economic development services for Jiangsu region. In the last five years, 45 patents have achieved achievement transformation, supported more than 40 enterprises with key technologies, and generated greater economic and social benefits. It has won 20 provincial and ministerial awards, including 3 provincial and ministerial level second prizes for scientific and technological progress, and more than 10 national industry association first and second prizes for scientific and technological progress.

More than 30 doctors and 1000 masters have been trained in this discipline. Most graduates work in universities, research institutes and important enterprises and institutions, and become technical leaders or backbones. One graduate student has won the national fund for Distinguished Young Scholars, and five have

won first and second-class achievements in the hidden front.

The main research directions are:

1. Multimedia and Intelligent Computing
2. System security and information security
3. Internet of things equipment and system
4. Data processing and data engineering
5. Service computing and software system

### **Training objectives**

1. Postgraduate students should be familiar with China's basic national conditions and the basic knowledge of traditional Chinese culture, understand the basic social system and foreign policy of China, understand the mainstream values and public moral concepts of Chinese society, and have a good sense of rule of law and moral consciousness., and has a strong dedication and dedication to science.

2. Master solid and broad basic theories and systematic in-depth expertise in the field of computer science and technology, have the ability to independently engage in scientific research work, and make creative achievements in computer science or expertise. Proficient in at least one foreign language, with a certain international perspective and proficiency in international academic exchange.

3. Have a good international vision in this discipline, and have proficient international academic exchange ability with international perspective using foreign language.

### **Training modes and the duration of study**

#### **(I) The duration of study**

The full-time postgraduate study period is 3 years, and the on-the-job postgraduate study period is generally 4 years. If necessary, the extension can be applied for up to five years. The training period is 2.5-4 years. The working time of the dissertation is not less than 1.5 years. If graduation in 2.5 years, one paper should be published in class B or above journals or conferences recommended by CCF, and the academic paper requires the applicant as the first author, or the tutor as the first author and the applicant as the second author.

#### **(II) Training modes**

The training process of graduate students is divided into course study, practice and dissertation work. The

total credits for course study and practice should reach 28 credits. The training process strengthens bilingual teaching, including the direct use of English original textbooks to cultivate students' international academic communication skills. The cultivation of graduate students implements the tutor responsibility system, and the guidance team under the guidance of the tutor guides the whole process of graduate training. The tutor is not only responsible for formulating graduate training plans, guiding scientific research, professional practice and degree thesis, but also for guiding, demonstrating and supervising the ideological ethics and academic ethics of graduate students.

### Course credits

#### Credit requirements

The total credits of the course shall be no less than 22 credits, including no less than 14 credits for degree courses and no less than 8 credits for elective courses.

#### Curriculum

Course Category		Course Name	Credit	Term (Spring/ Autumn)	School by which Courses opened	type of the course	Remark
Degree courses	Public degree course	Integrated Chinese I	1.5	1	Language & Culture Center		Compulsory
		Integrated Chinese II	2.5	2	Language & Culture Center		
		Overview of China	3	1	OEC		
	Basic Theory Course	Concrete Mathematics	2	1	School of Computer Science & Communication Engineering	Full English	At least 4 credits
		The Theory of Matrices	2	1	School of Mathe matical Sciences		
		Mathematical Statistics	2	1	School of Finan ce and Economic s		
		Numerical Analysis	2	1	School of Mathe matical Sciences		

	<b>Core Specialized Degree Courses</b> 核心专业学位课	Introduction of Computation Theory	3	1	School of Computer Science & Communication Engineering	Full English	Compulsory
<b>Non-degree course</b>	<b>Specialized Elective Courses</b>	Embedded System Development and Practice	2	2	School of Computer Science & Communication Engineering	Experiment Platform	At least 2 credits
		Big Data Processing and Practice	2	2	School of Computer Science & Communication Engineering	Experimental Platform (Bilingual)	
		Computer Vision Algorithms and Applications	2	2	School of Computer Science & Communication Engineering	Experimental Platform (Bilingual)	
		Software System Design	2	2	School of Computer Science & Communication Engineering	Experiment Platform	
		Information Security Offense and Defense Practice	2	2	School of Computer Science & Communication Engineering	Experiment Platform	

		New progress of Computer Science and Technology	2	2	School of Computer Science & Communication Engineering	Frontier Lecture	Compulsory
		Machine Learning	2	1	School of Computer Science & Communication Engineering	Full English	At least 4 credits
		Cryptography and Network Security	2	1	School of Computer Science & Communication Engineering	Full English	
		Wireless Sensor Network	2	1	School of Computer Science & Communication Engineering	Full English	
		Advance computer graphics	2	2	School of Computer Science & Communication Engineering	Full English	
		Information Security	2	1	School of Computer Science & Communication Engineering	Full English	
		Software Testing Theory and Technology	2	2	School of Computer Science & Communication Engineering	Full English	

		Cloud Computing	2	2	School of Computer Science & Communication Engineering 计算机科学与 通信工程学院	Full English 全英文	
		Multimedia Technology	2	1	School of Computer Science & Communication Engineering	Full English	
		Multimedia Computing (Optional Course For Ph.D Students)	2	1	School of Computer Science & Communication Engineering	Full English	
		Security calculation and System Security (Optional Course For Ph.D Students)	2	1	School of Computer Science & Communication Engineering	Full English	
		Internet of Things Communication Technology (Optional Course For Ph.D Students)	2	1	School of Computer Science & Communication Engineering	Full English	
		Cloud Computing and Network Computing (Optional Course For Ph.D Students)	2	1	School of Computer Science & Communication Engineering	Full English	

		Advanced Information Retrieval (Optional Course For Ph.D Students)	2	1	School of Computer Science & Communication Engineering	Full English	
		Biocomputing and Big Data (Optional Course For Ph.D Students)	2	1	School of Computer Science & Communication Engineering	Full English	
		Service Computing and Service System (Optional Course For Ph.D Students)	2	1	School of Computer Science & Communication Engineering	Full English	
		Data Mining	2	2	School of Computer Science & Communication Engineering	Full English	
		Case of Trusted Iot System	2	2	School of Computer Science & Communication Engineering	Full English	
	<b>Public Elective Courses</b>	All graduate programs in all disciplines throughout the school					Optional

Note: Please specify the type of the course { English taught course, bilingual course, cutting-edge lecture or experimental course }

### Practice credit requirements

Practice credits and theory credits can not transfer to each other, only when both of the practice credits and theory credits requirements are satisfied, the MSc students may proceed to submission and defense of their dissertations. The total practice credits are no less than 6.

### **1、 Academic activities (2 credits)**

MSc students must participate in various kinds of academic activities, which include “Lectures on academic ethics” organized by JSU, lectures presented by well-known scholars, seminars as well as graduate forum, during the MSc period, the students must present no less than 10 times.

Assessment of academic activities is in charge of discipline-team. The students who have an academic paper that is accepted in the international conference or top level national conference can be regarded as qualified academic report. The students will obtain 2 credits when they have qualified academic activity attendance and published papers or reports.

### **2、 Literature Review (2 credits)**

MSc students should read at least 20 literatures including at least 10 foreign literatures for the development of the ability to acquire knowledge by themselves. The ability to do literature review will be assessed by the group of experts. the students will get 2 credits when qualified, otherwise, they will not be able to enter the stage of research proposal making.

### **3、 Academic report (1 credit/time)**

MSc students must attend demonstration of literature review, progress report or research seminar no less than two times. The discipline team leader will assess the report, the qualified students will get 1 credit per time.

### **4、 Practice (1 credit)**

MSc students should attend a practical session during their master’s on less than one month. The practical session includes teaching practical and production practice. Teaching practice consists of the tasks of coursework correction, question answering and experimental teaching. Production teaching requires technical experience of students in an industry place for at least one month. MSc students need choose one of them and thereafter they must complete a practical report. The practical session is assessed by the master’s supervisors. The qualified students will obtain 1 credit.

## **Dissertation and degree requirements**

The MSc research of this discipline consists of fields in the computer science and technology and the research of application foundation, and promotes the study of theory and technologies in the leading and the cross subjects. Degree thesis should represent that the MSc students have a firm and comprehensive grasp of



basic theories and profound and systematic specialized knowledge in the discipline concerned, master the scientific research approaches and experiment skills of their research areas, and have the ability to undertake the research task independently.

Degree thesis should be fluent, logical and well reasoned. The main opinions should have sufficient novelty. The degree thesis must consist of abstract (English & Chinese), introduction, main body, conclusion and references, and so on.

The degree thesis process is distributed into four stages: proposal, progression report, dissertation writing up and dissertation defense.

### **1、 Proposal**

MSc students must conduct massive literature review and related investigation before writing up. This aims to investigate the history and current situation of their research areas, and then identify the research topic and complete the proposal. The proposal should describe some key issues of the research, such as: topic basis, research approaches, expected goals and novelty and schedule.

Proposal presentations of MSc students are organized after a permission of the supervisor in each research group. The research group sets up an assessment team (excluding the supervisor and other committee members) for the proposal presentations. The assessment team has at least 5 specialists from this subject or the related subject, and one of them manages the assessment work. The proposal assessment adopts team-scoring system. The amount of the postponed MSc students must be greater than 10% of the total. The time and location of the presentation will be published online. Each MSc student is allowed to attend the proposal presentation at most two times, and the second time must be arranged after at least three months. The MSc students who have been postponed twice must drop out.

The dissertation defense must be arranged 8 months later after getting a pass of the proposal.

### **2、 Progression Report**

The progression report must be conducted around 6 months later after the proposal.

### **3、 Complete complete scientific research training and obtain corresponding scientific research results**

MSc students must participate in the complete process of scientific research training during the school period, including assistance in project application writing, undertaking project research points, assistance in organizing final research materials and results.

MSc students should write academic papers during their studies, and publish or accept 1 academic paper as the first author or the tutor as the first author and the applicant as the second author in the computer-related domestic and international core journals or international conferences. Or one national or international invention patent is authorized by the first author or the tutor as the first author and the applicant as the second author.

#### **4、 Dissertation Writing-up**

The MSc students must complete degree dissertation independently under the direction of the supervisor. Dissertation format can be found from “Jiangsu University Degree Thesis Writing-up Format Requirements”.

#### **5、 Dissertation Assessment and Defense**

Dissertation assessment and defense requirements can be found from “Jiangsu University Academic Degree-conferring Detailed Codes” and “Jiangsu University Degree Thesis Blind Review Implementation Details”.

#### **Other Requirements**

Literature reading: The professional postgraduate must read the number of literature not less than 20 including at least 10 English literatures before the research proposal making, and write the appropriate reading notes, fill out the "literature read the report form."

### **Appendix: Catalogue of professional journals to be read**

#### **Main Classic works**

- [1] Introduction to Automata Theory, Languages, and Computation, John E. Hopcroft Jeffrey D. Ullman. Science Press, 1991.
- [2] Principles of Database System, J. D. Ullman.
- [3] Randomized Algorithms, Rajeev. Motwani and Prabhakar Raghavan, Cambridge University Press, 1995.
- [4] Approximation Algorithms for NP-hard Problems, D.S.HOCHBAUM, PWS, 1997.
- [5] Algorithm analysis and design, Ma Shaohan, Shandong University press, 1993. (in Chinese)
- [6] Computer graphics tutorial, Tang Rongxi, Wang Jiaye, Science Press, 2001 Edition. (in Chinese)
- [7] Introduction to Computer Graphics, J. D. Foley, Addison-Wesley Publishing company, 1994, ISBN:0-201-60921-5.
- [8] Computer Network, Andrew S. Tanenbaum.
- [9] Computational geometry, Su Buqing, Liu Dingyuan, Shanghai Science and Technology Literature Press.

(in Chinese)

- [10] Multimedia system design, Andleigh,Thakrar.
- [11] Combinatorial optimization--- Algorithms and complexity, C.H.Papadimitriou K.Steiglitz.
- [12] The principle of artificial intelligence, Shi Chunyi, Tsinghua University press, 1993.10.(in Chinese).
- [13] Design and analysis of parallel algorithms, Chen Guoliang, higher education press, 1994.5. (in Chinese)
- [14] Computer System Architecture, M. Morris Mano.
- [15] Logic in Computer Science (Second Edition), Lu Zhongwan, Peking University Press. (in Chinese)
- [16] Software Architecture-Perspective on an Emerging Discipline, Mary Shaw, et al.
- [17] Cryptography Theory and Practice, (Second Edition), Stinson.
- [18] Distributed computing system, and Jiubin, higher education press, 1994.6. (in Chinese)
- [19] Artificial neural network model and application, Zhang Liming, Fudan University press, 1993.7. (in Chinese)

### **Major Chinese academic journals**

- [1] SCIENCE CHINA
- [2] Chinese Journal of Computers
- [3] Journal of Software
- [4] Journal of Computer Research and Development
- [5] Journal of Computer-Aided Design & Computer Graphics
- [6] Journal of Electronics
- [7] Journal of Automation
- [8] Journal of Communications
- [9] Journal of Image and Graphics

### **Major foreign academic journals**

- [1] ACM Transactions on Computer Systems
- [2] IEEE Transactions on Computers
- [3] IEEE Transactions on Parallel and Distributed Systems
- [4] IEEE/ACM Transactions on Networking
- [5] IEEE Journal of Selected Areas in Communications
- [6] IEEE Transactions on Mobile Computing
- [7] IEEE Transactions on Dependable and Secure Computing
- [8] IEEE Transactions on Information Forensics and Security
- [9] Journal of Cryptology
- [10] ACM Transactions on Programming Languages & Systems
- [11] ACM Transactions on Software Engineering Methodology

- [12] IEEE Transactions on Software Engineering
- [13] ACM Transactions on Database Systems
- [14] ACM Transactions on Information and Systems
- [15] IEEE Transactions on Knowledge and Data Engineering
- [16] VLDB Journal
- [17] Information and Computation
- [18] SIAM Journal on Computing
- [19] ACM Transactions on Graphics
- [20] IEEE Transactions on Image Processing
- [21] IEEE Transactions on Visualization and Computer Graphics
- [22] Artificial Intelligence
- [23] IEEE Trans on Pattern Analysis and Machine Intelligence
- [24] International Journal of Computer Vision
- [25] Journal of Machine Learning Research
- [26] ACM Transactions on Computer-Human Interaction
- [27] International Journal of Human Computer Studies
- [28] Proceedings of the IEEE
- [29] Journal of the ACM

**Major international authoritative academic conferences**

- [1] Architectural Support for Programming Languages and Operating Systems
- [2] Conference on File and Storage Technologies
- [3] High-Performance Computer Architecture
- [4] International Symposium on Computer Architecture
- [5] MICRO
- [6] ACM International Conference on Mobile Computing and Networking
- [7] ACM International Conference on the applications, technologies, architectures, and protocols for computer communication
- [8] IEEE International Conference on Computer Communications
- [9] ACM Conference on Computer and Communications Security
- [10] International Cryptology Conference
- [11] European Cryptology Conference
- [12] IEEE Symposium on Security and Privacy
- [13] Usenix Security Symposium
- [14] ACM SIGSOFT Symposium on the Foundation of Software Engineering/ European Software Engineering Conference
- [15] Conference on Object-Oriented Programming Systems, Languages, and Applications
- [16] International Conference on Software Engineering

- [17] USENIX Symposium on Operating Systems Design and Implementations
- [18] ACM SIGPLAN Symposium on Programming Language Design & Implementation
- [19] ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages
- [20] ACM Symposium on Operating Systems Principles
- [21] ACM Conference on Management of Data
- [22] ACM Knowledge Discovery and Data Mining
- [23] International Conference on Research and Development in Information Retrieval
- [24] International Conference on Very Large Data Bases
- [25] IEEE International Conference on Data Engineering
- [26] ACM Symposium on Theory of Computing
- [27] IEEE Symposium on Foundations of Computer Science
- [28] IEEE Symposium on Logic in Computer Science
- [29] ACM International Conference on Multimedia
- [30] ACM SIGGRAPH Annual Conference
- [31] IEEE Visualization Conference
- [32] AAAI Conference on Artificial Intelligence
- [33] IEEE Conference on Computer Vision and Pattern Recognition
- [34] International Conference on Computer Vision
- [35] International Conference on Machine Learning
- [36] International Joint Conference on Artificial Intelligence
- [37] ACM Conference on Human Factors in Computing Systems
- [38] ACM International Conference on Ubiquitous Computing
- [39] Real-Time Systems Symposium