计算机科学与技术（0812）

Computer Science and Technology (0812)

学科门类：工学（08）　一级学科：计算机科学与技术（0812）

Discipline Category: Engineering (08)

First-Class Discipline: Computer Science and Technology (0812)

一、学科简介

河海大学计算机科学与技术学科始于 1978 年开始招生的电子计算机及应用本科专业，1996 年获得计算机应用技术硕士学位授予权，同年被评为水利部重点学科，2000 年获得计算机科学与技术一级学科硕士点，2005 年获得计算机应用技术二级学科博士学位授予权，2009 年获计算机科学与技术博士后流动站。2010 年获得“计算机科学与技术”一级学科博士学位授予权。

学科以培养具有全球视野的水利信创高层次人才为目标，基于江苏省重点实验室、高校协同创新中心等科研平台形成了信息技术应用创新关键能力与跨学科交叉发展并重的人才培养体系。特色研究方向包括知识工程与领域机器学习、分布式计算与安全、泛在网络与水下传感技术、计算机图形学与领域建模等。学科培养了一批业界精英人才，包括水利部信息中心正副主任，及七大流域机构、省级水利厅三分之二以上的信息主管，被誉为我国水利信息化人才的摇篮。

学科坚持引育并举，近年来先后有 30 人次到海外知名高校访问，从国内外引进高层次人才 10 人，有 20 人次被遴选为省部级学术带头人，1 人获宝钢教育优秀教师奖，1 人获江苏省教育工作先进个人。依托国家创新引智基地，聘请中国工程院外籍院士 ShermanShen 等国内外知名学者 18 人参加团队建设。通过研究生基地共建，聘请水利行业、知名 IT 企业等领军人才 42 人担任兼职导师，服务跨学科交叉特色人才培养。

I. Discipline Overview

The Computer Science and Technology discipline of Hohai University (hereinafter referred to as HHU-

CS) originated from the Electronic Computer discipline established in 1978 to cultivate specialists for large-scale water conservancy projects. It was authorized to offer Master and Doctorate degrees in the first-class discipline Computer Science and Technology in 2000 and 2010, respectively. HHU-CS was named as one of the key disciplines of the Ministry of Water Resources of the People's Republic of China in 1996 and one of the state-level characteristic disciplines in China in 2008. In 2009, a post-doctoral research station of Computer Science and Technology was established. In 2019, HHU-CS was selected as China's first batch to develop a state-level "First-Rate" undergraduate major. Long committed to innovation and research of water conservancy information technologies, our discipline has been a headstream of the key technologies in this area and a cradle of specialists in the smart water conservancy industry.

Our aim is to cultivate high-caliber water conservancy IT innovators with a global vision. Based on an array of research platforms, including a Jiangsu Provincial Key Laboratory and a Center for Synergetic Innovation among Higher Education Institutions, HHU-CS covers such areas as Knowledge Engineering and Industry-Specific Machine Learning, Distributed Computing and Security, Ubiquitous Networks and Underwater Sensing Technology, Computer Graphics and Industry-Specific Modeling, etc. A complete cultivation system has been established, placing equal emphases on fostering key capabilities for IT application and innovation as well as fueling interdisciplinary development. Our alumni include Director and Deputy Director of the Information Center of the Ministry of Water Resources of China, and over two thirds of the information directors of provincial departments and the seven regional water resources authorities across China.

HHC-CS attaches equal importance to attracting and cultivating talents in an effort to pursue diversified development. In recent years, thirty visits have been paid to renowned universities overseas. Ten high-level talents have been recruited from at home and abroad. Besides, our faculty members have been selected as provincial or ministerial academic leaders for 20 times cumulatively; one has been granted Baosteel Education Award for Excellent Teachers, and one, the title of "Distinguished Worker of Jiangsu Province". Using the

leverage of theNational Base for Innovation and Wisdom Pooling, our team has been joined by 18 accomplished scholars, including Dr. Sherman Shen, an international fellow of the Chinese Academy of Engineering. Additionally, 42 leading experts from the water conservancy industry and some celebrated IT companies have been employed as adjunct supervisors for joint postgraduate programs to cultivate interdisciplinary talents.

二、培养目标

1. 硕士层次外国留学生应当在计算机科学与技术领域中具有较好的国际视野，能够在多个国家的实际环境中运用和发展计算机科学与技术的知识、技能和方法，并具备参与国际事务和国际竞争的能力。

2. 以英语为专业教学语言的学科、专业中，外国留学生毕业时，硕士研究生的中文能力应当至少达到《国际汉语能力标准》三级水平。

3. 本学科硕士留学研究生旨在培养水文学及水资源领域的高级专门人才。培养在本学科领域内掌握坚实的基础理论和系统的专门知识；具有从事科学研究工作或独立担负专门技术工作的能力；了解中国文化并具备汉语日常交流能力的高级专门人才。

II. Training Objectives

1. International master graduates are expected to have good international view in computer science and technology, to apply and develop the theories, skills, and methodologies in computer science and technology in the actual environment of several countries, and to participate in the international academic affairs.

2. International master graduates must meet the requirement of Level 3 in Chinese Language Proficiency Scales upon graduation if they conduct their coursework in English.

3. The discipline aims to cultivate specialists in the field of computer science and technology. They should master solid basic theories and systematic expertise in this discipline; have the ability to engage in scientific research or take up specialized technical work independently; understanding Chinese culture and having

preliminary ability of daily communication in Chinese.

三、主要研究方向

1. 知识工程与领域机器学习

2. 分布式计算与安全

3. 泛在网络与水下传感技术

4. 计算机图形学与领域建模

III. Research Directions

1. Knowledge Engineering and Industry-Specific Machine Learning

2. Distributed Computing and Security

3. Ubiquitous Networks and Underwater Sensing Technology

4. Computer Graphics and Industry-Specific Modeling

四、学制和学习年限

学术学位全英文硕士留学研究生的标准学制为 3 年。实行弹性学制，学习年限最短不少于 2 年，最长不超过 5 年。

IV. Number of Years Requirement

The master program typically requires 3 years to complete. However, the completing time may vary to 2 years as the minimum and 5 years as the maximum.

五、学分要求和课程设置

1. 学术学位全英文硕士留学研究生课程总学分为 28 学分，其中学位课程为 20 学分，非学位课程为 8 学分。另设教学环节。所有课程学习一般应在入学后 1 年内完成。

2. 汉语课每学分为 24 学时，中国概况课每学分为 18 学时，其他课程每学分为 16 学时。

3. 中国国情教育（水韵课堂）为系列专题讲座，要求学生按照要求完成规定的学习任务。

4. 对于汉语水平已达到毕业要求的学生，可申请免修汉语，具体要求详见留学生课程免修有关规定。

具体课程设置如下：

V. Credit Requirements and Curriculum

1. International academic master students will complete 28 credits, 20 of which are from degree courses, and 8 of which are from non-degree courses. Students will also complete academic activities. Coursework will be completed in one year after registration.

2. Each credit of Chinese language course is 24 credit hours. Each credit of Introduction to China is 18 credit hours. For other courses, each credit is 16 credit hours.

3. “Water Harmony Lectures” is a series of seminars, which require students to complete the specified learning tasks.

4. For students who have met the Chinese language requirement for the master degree, Chinese language courses can be exempted, of which the details can be referred to in relevant regulations.

The specific curriculum is as follows:

计算机科学与技术全英文学术型留学硕士研究生课程设置

Curriculum for English Taught International Academic Master Students Majoring in Computer Science and Technology

课程类别 Category		课程代码 Course Code	课程名称 Course Name	学分 Credit	学时 Hours	开课学期 Term	备注 Remarks
学位课程 Degree Course 20 学分	公共课程 General Courses	2022LM000001	汉语I Chinese Language I	2	48	秋 Autumn	必修 Compulsory
		2022LM000002	汉语II Chinese Language II	2	48	春 Spring	
		2022LM000003	中国概况 Introduction to China	2	36	秋 Autumn	
		2022LM110001	论文写作指导 Guide of Thesis Writing	2	32	秋、春 Autumn/ Spring	
	基础课程 Basic Courses	2022LM880001	矩阵论 Matrix Theory	2	32	春 Spring	
		2022LM880002	最优化方法 Optimization Methods	2	32	秋 Autumn	
		2022LM070103	数字视频基础 Digital Video Basics	2	32	春 Spring	选修 4 学分 Optional 4 Credits at least
		2022LM070104	分布式计算 Distributed Computing	2	32	秋 Autumn	
		2022LM070106	程序设计基础 Programming Basics	2	32	秋 Autumn	
		2022LM070108	通信网理论基础 Fundamentals of Communication Networks	2	32	秋 Autumn	
	专业课程 Major Courses	2022LM070105	机器学习 Machine Learning	2	32	秋 Autumn	选修 4 学分 Optional 4 Credits at least
		2022LM070107	信息安全 Information Security	2	32	春 Spring	
		2022LM070102	数字信号处理 Digital Signal Processing	2	32	秋 Autumn	
		2022LM070110	数据管理技术 Data Management Technology	2	32	秋 Autumn	
非学位课程 Non-degree Course 8 学分		2022LM110002	中国国情教育（水韵课堂） Water Harmony Lectures	1	16	秋、春 Autumn/ Spring	必修 Compulsory
		2022LM070109	算法设计与分析 Design and Analysis of Algorithms	2	32	春 Spring	选修 7 学分 Optional 7 Credits at least
		2022LM070111	移动通信 Mobile Telecommunications	2	32	春 Spring	
		2022LM070112	计算机辅助设计 Computer-Aided Design	2	32	春 Spring	
		2022LM990701	数字通信 Digital Communications	2	32	春 Spring	
		2022LM330001	程序设计方法 Methods of Programming	2	32	秋 Autumn	
		2022LM070113	数值计算编程语言 Numerical Computing Programming Language	2	32	春 Spring	
		2022LM070114	视觉信息处理 Visual Information Processing	2	32	秋 Autumn	
		选修硕士课程 Optional courses for master					选修 Optional
教学环节		学术活动（含博导讲座）					必修

Academic Activities	Seminar and Conferences	Compulsory
	实践活动 Practice Activity	
	科学研究 Scientific Research	

六、教学环节

1. 个人培养计划

学术学位硕士研究生入学后，应在导师指导下，在规定时间内按照培养方案和学位论文工作有关规定，结合研究方向和本人实际情况制定个人培养计划，其中学习计划在入学 2 个月内提交。

2. 学术活动

学术学位硕士研究生学术活动包括参加国内外学术会议、专家学术讲座，以及研究生学术研讨活动等。申请学位论文答辩前必须参加 10 次以上的学术交流活动，其中博导讲座至少 2 次。研究生参加学术活动必须填写相关学术活动登记本。

3. 实践活动

为培养劳动实践能力和责任意识，学术学位硕士研究生必须参加实践活动，实践活动形式包括助教、助管、助研、生产实践、社会实践等。由导师对学生实践环节的时长和效果进行考核和评价。

VI. Academic Activities

1. Study Proposal

The master students must prepare a study proposal on how they will complete the master degree by considering their research interests, advice from their research advisors, and other requirements mentioned in this document. The proposal must be submitted in two months after official registration.

2. Seminars and Presentations

Master students must participate in academic conferences, seminars by experts and PhD advisors, and discussion panels. Before their dissertation defense, master students must participate in seminars and conferences over 10 times, including at least 2 seminars by PhD advisors. All the seminars and presentations should be recorded in relevant record book.

3. Practice Activities

Master students are required to participate in practice activities to prepare professional development. Practice activities include teaching assistantship, research assistantship, management assistantship, and

industry engagement etc., which are to be assessed by the advisors.

七、论文工作

可使用英文撰写论文，研究工作必须经过文献阅读、论文选题、论文计划及开题报告、论文中期检查、科研成果产出、学位论文预审、学位论文评阅、学位论文答辩等环节。具体按照《河海大学硕士学位论文工作管理办法》和学院相关文件执行。

VII. Dissertation

The dissertations of academic master students are required to complete the stages of literature review, topic selection, dissertation plan and dissertation proposal, mid-term examination, output of scientific research achievements, pre-examination, review and assessment, and dissertation defense. Detailed requirements can be referred to in “Hohai University Master's Dissertation Management Measures” and relevant documents in college of Information and Communication Engineering. Dissertation in English is acceptable.

八、本学科推荐阅读的重要书目、专著和学术期刊

VIII. Recommended Bibliographies, Monographs and Academic Journals of the Discipline

1. Thomas H.Cormen,Charles E.Leiserson,Ronald L.Rivest,Clifford Stein 著,殷建平,徐云,王刚等译. 算法导论(原书第 3 版)[M].北京:机械工业出版社,2013.

2. 布莱恩特,奥哈拉伦. 深入理解计算机系统(英文版·第 2 版)[M].北京:机械工业出版社,2001.

3. 霍普克罗夫特. 自动机理论、语言和计算导论(原书第 3 版)[M].孙家骕等译.北京:机械工业出版社,2008.

4. 普雷斯曼. 软件工程:实践者研究方法(原书第 7 版)[M].郑人杰等译.北京:机械工业出版社,2011.

5. 伽玛著,李英军等译. 设计模式:可复用面向对象软件的基础[M].北京:机械工业出版社,2019.

6. 塔嫩鲍姆著,陈向群,马洪兵等译. 现代操作系统(原书第 3 版)[M].北京:机械工业出版社,2009.

7. [斯托林斯著,彭蔓蔓等译. 计算机组成与体系结构:性能设计(原书第 8 版)[M].北京:机械工业出版社,2011.

8. 西尔伯沙茨等著,杨冬青等译. 数据库系统概念(原书第 6 版)[M].北京:机械工业出版社,2012.

9. 米歇尔著,曾华军等译. 机器学习[M].北京:机械工业出版社,2008.

10. 拉塞尔,诺维格. 人工智能:一种现代的方法(第 3 版)[M].北京:清华大学出版社,2011.

11. 查尔斯·彼得佐德. 隐匿在计算机软硬件背后的语言[M].北京:电子工业出版社,2010.

12. 哈罗德·阿伯森. 计算机程序的构造和解释(原书第 2 版)[M].北京:机械工业出版社,2004.

13. 兰德尔·布莱恩特. 深入理解计算机系统(原书第 2 版)[M].北京:机械工业出版社,2011.

14. 雷·库兹韦尔. 奇点临近[M].北京:机械工业出版社,2011.

15. 罗纳德·格雷厄姆. 具体数学[M].北京:人民邮电出版社,2013.

16. 詹姆斯·F·黑罗斯. 计算机网络(原书第 7 版)[M].北京:机械工业出版社,2018.

17. 诺姆·尼桑. 计算机系统要素电子工业出版社,2007.

18. 戴维·A·帕特森. 计算机组成与设计(原书第 5 版)[M].北京:机械工业出版社,2015.

19. 矢泽久雄. 计算机是怎样跑起来的[M].北京:人民邮电出版社,2015.

20. 汤姆·斯图尔特. 计算的本质:深入剖析程序和计算机[M].北京:人民邮电出版社,2014.

21. 詹姆斯·F·库罗斯. 计算机网络(第 6 版):自顶向下方法[M].北京:机械工业出版社,2014.

22. 查尔斯·佩措尔德. 编码:隐匿在计算机软硬件背后的语言[M].北京:电子工业出版社,2012.

23. 罗纳德·格雷厄姆. 具体数学(英文版第 2 版):计算机科学基础[M].北京:机械工业出版社,2002.

24. 埃里克·雷曼. 计算机科学中的数学[M].北京:电子工业出版社,2018.

25. 派特. 计算机系统概论:(原书第 2 版)[M].北京:机械工业出版社,2008.

26. 贝赫鲁兹·佛罗赞. 计算机科学导论:原书第 3 版[M].北京:机械工业出版社,2015.

27. 西摩·佩珀特. 因计算机而强大:计算机如何改变我们的思考与学习[M].北京:新星出版社,2019.

28. 贝鲁兹·福鲁赞. 计算机科学导论[M].北京:机械工业出版社,2009.

29. 兰德尔·布莱恩特. 深入理解计算机系统:Computer Systems: A Programmer's Perspective[M].北京:电子工业出版社,2006.

30. 格伦·布鲁克希尔. 计算机科学概论(第 11 版)[M].北京:人民邮电出版社,2011.

31. 约翰·轩尼诗. 计算机体系结构:量化研究方法(第 5 版)[M].北京:人民邮电出版社,2012.

32. 丹尼尔·希利斯. 通灵芯片:计算机运作的简单原理[M].上海:上海世纪出版集团，2009.

33. 约翰·轩尼诗. 计算机体系结构:量化研究方法(英文版·第 5 版)[M].北京:机械工业出版社,2012.

34. 史奈德. 计算机图形学几何工具算法详解[M].北京:电子工业出版社,2005.

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36. 弗雷德里克·P·布鲁克斯. 设计原本:计算机科学巨匠 Frederick P. Brooks 的思考[M].北京:机械工业出版社,2011.

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49. 伊恩·古德费洛. 深度学习[M].北京:人民邮电出版社,2017.

50. ACM Transactions on Computer Systems, ACM, http://tocs.acm.org/

51. IEEE Transactions on Computers, IEEE, http://www.computer.org/portal/web/tc

52. ACM Transactions on Architecture and Code Optimization, ACM, http://taco.acm.org/

53. ACM Transactions on Embedded Computing Systems, ACM, http://acmtecs.acm.org

54. Parallel Computing, Elsevier, http://www.journals.elsevier.com/parallel-computing

55. IEEE/ACM Transactions on Networking IEEE, ACM http://www.comsoc.org/net/

56. ACM Transactions on Internet Technology, ACM, http://toit.acm.org/

56. ACM Transactions on Multimedia Computing, Communications and Applications, ACM, http://tomccap.acm.org/

57. Journal of Cryptology, Springer, http://www.iacr.org/jofc/jofc.html

58. ACM Transactions on Information and System Security, ACM, http://tissec.acm.org/

59. ACM Transactions on Software Engineering Methodology, ACM, http://www.acm.org/pubs/tosem/

60. IEEE Transactions on Software Engineering, IEEE, http://www.computer.org/portal/web/tse/home

61. ACM Transactions on Database Systems, ACM, http://www.acm.org/tods/

62. IEEE Transactions on Knowledge and Data Engineering, IEEE Computer Society, http://www.computer.org/tkde/

63. ACM Transactions on Graphics, ACM, http://www.acm.org/tog

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