

# 数学 (0701)

## Mathematics

学科门类：理学 (07) 一级学科：数学 (0701)

Discipline Category: Sciences (07)

First-Class Discipline: Mathematics (0701)

### 一、学科简介

河海大学数学一级学科硕士点于 2005 年设立。本学科点下设基础数学 (070101)、应用数学 (070104)、计算数学 (070102)、运筹学与控制论 (070105)、概率论与数理统计 (070103) 五个二级学科点，现有包括省级以上高层次人才在内的在职教师 57 人，其中，教授 5 人，副教授 31 人，具有博士学位 43 人，博士生导师 4 人，硕士生导师 23 人。曾获江苏省教学成果奖，获批国家及江苏省在线课程、省级教育教学改革项目多项。近五年先后承担了国家、省部级项目近 40 项，各类横向课题 20 多项，获省部级科学技术奖二等奖等 1 项，发表高质量学术论文 200 余篇。

#### I. Discipline Overview

Mathematics is one of the first-class disciplines of Hohai University and was authorized to confer master's degrees in five sub-disciplines of mathematics in 2005, namely, Pure Mathematics (070101), Applied Mathematics (070104), Computational Mathematics (070102), Operational Research and Control Theory (070105), Probability Theory and Mathematical Statistics (070103). Currently the discipline of Mathematics has 57 academic staff, among whom are 5 professors and 31 associate professors, including 4 PhD supervisors and 24 Master supervisors. They won Teaching Achievement Award in Jiangsu Province, and had a number of national and Jiangsu online courses and provincial education and teaching reform projects approved. Over the past five years, the college has undertaken nearly 40 national, provincial and ministerial projects, over 20 horizontal research topics, won one Second Class Prize for Provincial and Ministerial Science and Technology,

and published more than 200 high-quality academic papers.

## 二、培养目标

1. 河海大学硕士层次外国留学生应当在数学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数学的知识、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本学科领域的优秀人才：能够掌握坚实的基础理论和系统的专门知识；能使用英文进行国际交流和熟练阅读本学科相关文献,能承担与数学相关的科研、教学或其他实际工作；能够将基础理论融合应用于水利、人工智能、数据分析等领域。

## II. Training Objectives

1. International graduate students of Hohai University are expected to have good international view, to be able to apply and develop mathematical theories, skills, and methodologies in real-life situations in different countries, and to be well-prepared to participate in the international academic affairs and competitions.

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

3. The master program aims to provide advanced education. Graduates shall: i. have a firm and comprehensive grasp of basic mathematical theories and profound and systematic specialized knowledge in the discipline; ii . use English for international communication and skillfully read relevant literature of mathematics, and be able to undertake scientific research, teaching or other practical work related to mathematics; iii. be able to apply basic mathematical theories to the fields of water conservancy, artificial intelligence, data analysis, etc.

## 三、主要研究方向

1. 基础数学

2. 计算数学
3. 应用数学
4. 运筹学与控制论
5. 概率论与数理统计

### III. Research Directions

1. Pure Mathematics
2. Computational Mathematics
3. Applied Mathematics
4. Operational Research and Control Theory
5. Probability Theory and Mathematical Statistics

### 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. Each international graduate student shall complete 28 credits in all, 20 of which are from degree courses, and 8 from non-degree ones. Each shall attend academic activities as well. All coursework shall be completed within one year after registration.

2. Each credit of Chinese language course is worth 24 credit hours and 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. Each student shall complete the learning tasks as specified.

4. Students who have met the Chinese language requirement for a master’s degree, can be granted an exemption from all Chinese Language courses. For details, refer to course exemption regulations for international students.

Curriculum can be seen as follows:

数学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 in Mathematics

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 Courses 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	2022LM140101	抽象代数 Abstract Algebra	3	48	秋 Autumn	选修 10 学分 Optional 10 credits at least
		2022LM140102	控制理论基础 Foundation of Control Theory	2	32	秋 Autumn	
		2022LM140103	数值逼近 Numerical Approximation	2	32	春 Spring	
		2022LM140104	泛函分析 Functional Analysis	2	32	秋 Autumn	
		2022LM070105	机器学习 Machine learning	2	32	秋 Autumn	
		2022LM140106	高等数理统计 Advanced Mathematical Statistics	2	32	春 Spring	
		2022LM140107	多元统计分析 Multivariate Statistical Analysis	2	32	秋 Autumn	
		2022LM880004	数学物理方程 Partial Differential Equations	2	32	春 Spring	
		2022LM880003	数值分析 Numerical Analysis	3	48	秋 Autumn	
		2022LM330001	程序设计方法 Methods of Programming	2	32	秋 Autumn	
	专业课程 Major Courses	2022LM880002	最优化方法 Optimization Method	2	32	秋 Autumn	选修 2 学分 Optional 2 credits at least
2022LM140108		傅里叶分析、小波及其应用 Fourier Analysis, Wavelet and Their Applications	2	32	秋 Autumn		
2022LM140109		计算几何 Computational Geometry	2	32	春 Spring		
非学位课程 Non-degree Courses 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	
	2022LM090103	现代计算力学 Modern Computational Mechanics	2	32	春 Spring	选修 7 学分 Optional 7 credits at least	
	2022LM140111	Python 科学计算与数据处理 Python for Scientific Computation and Data Analysis	2	32	秋 Autumn		
	2022LM770004	有限元法 Finite Element Method	3	48	秋 Autumn		
	选修硕士课程 Optional courses for master's degree						
教学环节 Academic Activity	学术活动（含博导讲座） Seminar and Conferences (including seminars by PhD advisors)				必修 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

学术学位硕士学位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》和理学院相关文件执行。留学硕士研究生可使用英文撰写论文。

## 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 Colleges of Science. 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. 拉克斯(Peter D. Lax), 侯成军, 王利光译. 泛函分析. 人民邮电出版社, 2010.
2. 齐民友, 徐超江, 王维克. 现代偏微分方程引论. 武汉大学出版社, 2005.
3. 袁亚湘, 孙文瑜. 最优化理论与方法. 科学出版社, 2003.
4. 金治明. 随机分析基础及其应用. 国防工业出版社, 2004.
5. Gene H. Golub. 矩阵计算(英文版·第4版). 人民邮电出版社, 2014.
6. 蒋尔雄, 赵风光, 苏仰锋. 数值逼近(第二版). 复旦大学出版社, 2008.
7. 周志华. 机器学习. 清华大学出版社, 2016.
8. 卯诗松, 王静龙, 濮晓龙. 高等数理统计(第二版). 北京: 高等教育出版社, 2006.

9. J.C. Robinson. Infinite-Dimensional Dynamical systems: An Introduction to Dissipative Parabolic PDEs and the Theory of Global Attractors. Cambridge University Press,2001.
10. K. C. Chang. Methods in Nonlinear Analysis.Springer-Verlag,2005.
11. Frith John. Partial Differential Equations, Fourth Edition.世界图书出版公司 2019.
- 12.Sastry, Shankar. Nonlinear systems: analysis, stability, and control Interdisciplinary applied mathematics.北京:世界图书出版公司,2007.
13. Hassan K. Khalil. Nonlinear systems (3th ed.) .Beijing: Publishing House of Electronics Industry, 2019.
14. Dummit, David S, Foote, Richard. Abstract Algebra. John Wiley & Sons Inc,2011.
15. 期刊: 数理统计与管理
16. 期刊: 数学年刊 (A 辑)
17. 期刊: 数学物理学报 (A 辑)
18. 期刊: 运筹学学报
19. 期刊: 控制理论与应用
20. 期刊: Acta Mathematica Scientia, SpringerLink.
21. 期刊: Bulletin des Sciences Mathématiques, ScienceDirect.
22. 期刊: Journal of Differential Equations, ScienceDirect.
23. 期刊: Journal of the Franklin Institute, ScienceDirect.
24. 期刊: Journal of Computational and Applied Mathematics, ScienceDirect.
25. 期刊: Journal of Mathematical Analysis and Applications, ScienceDirect.
26. 期刊: Nonlinear Analysis: Theory, Methods & Applications, ScienceDirect.
27. 期刊: Bulletin of Mathematical Sciences, World Scientific.
28. 期刊: Discrete & Continuous Dynamical Systems-Series A , Elsevier.
29. 期刊: Communications on Pure and Applied Analysis , Elsevier.

30. 期刊: Nonlinearity, IOP Publishing.

31. 期刊: IEEE Transactions on Automatic Control, IEEE CSS.