学术型硕士培养方案

[数学]

（学科代码：0701）

学科简介（400 字以内）

本学科 2000 年获应用数学博士学位授予权，2003 年设立数学博士后流动站，2010 年经国务院学位办批准，获得数学一级学科博士学位授予权，2011 年、2016 年、2021 年连续三次入选江苏省重点学科，2023 年入选江苏省优势学科，在第五轮教育部学科评估中获得 A-， ESI 排名全球第 60 位（全国第 4 位）。学科建有江苏省应用数学科学研究中心等多个科研平台，近年来承担多项国家级和省级自然科学基金项目，科研到款达 1.5 亿元。研究成果获国家自然科学二等奖(参与)、江苏省科学技术一等奖、教育部自然科学奖二等奖、国家一级学会科学技术一等奖等奖项。学科师资力量雄厚，现有教授 26 人，副教授 44 人；博导 32 人，硕导 64 人，其中包括发达国家科学院院士 1 人、汤森路透(Thomson Reuters)/科睿唯安(Clarivate Analytics)全球高被引科学家 5 人、首届全国创新争先奖获得者 1 人，以及国家级高层次人才、国家优秀青年基金获得者、江苏省杰出青年基金获得者等一批国家级和省级优秀人才。本学科强调数学理论和方法的研究及其与应用学科的交叉。近五年培养博士 102 人、硕士 201 人。

培养目标（150 字左右,以下内容仅供参考）

掌握马克思主义基本原理，坚持四项基本原则，热爱祖国，遵纪守法，品行端正，具有为人民服务和为社会主义建设事业献身的精神。

具备扎实的数学理论基础和良好的数学素养，掌握数学的基本原理和方法，理解数学思想，了解本领域的应用背景、研究进展和发展方向，具有一定的创新意识和创新能力，具备较强的专业实践能力。

本学科硕士毕业生将初步具备独立从事数学理论及跨学科应用领域的科研、教学等能力。能胜任在科研机构、高新技术、数学教育、企事业单位等从事数学及相关跨学科领域的技术研发、科学研究或管理等方面的工作。

至少熟练掌握一门外语。

研究方向

1、代数、数论及其应用
2、分析与几何拓扑
3、偏微分方程
4、动力系统与随机微分方程
5、大规模科学计算与介质成像
6、微分方程数值方法与智能科学计算
7、随机优化与统计学习

8、数智系统与优化控制

培养年限

学制 3 年，最长可延至 4 年。

学分要求和课程设置（见附表）

开题报告

按照《东南大学研究生论文选题和开题报告的原则与要求》执行。

中期考核

按照《东南大学硕士研究生中期考核与筛选办法》执行。

学位论文

文献阅读（仅供参考,下同）

在论文选题及研究方向范围内至少阅读文献 50 篇，其中外文文献 30 篇，完成一篇综述。

论文撰写

除符合学校规定外，学位论文必须是一篇系统、完整的学术论文，要求概念清楚、立论正确、论述严谨、计算正确、数据可靠，且层次分明、文笔简洁、流畅、图标清晰。

论文学术水平

学位论文应在调查研究的基础上，选择有一定学术价值，对国民经济发展有一定意义的课题。围绕论文开展科研工作的时间不少于 1 年。本学科申请硕士学位前应满足数学学院硕士研究生申请学位科研成果考核标准。

附表：

组别	课程编号	课程名称	开课学期	学时	学分	授课方式	考试方式	备注
公共必修课	MS000343	理论与实践	春 秋季	32	2	面授	笔试	留学生选中国概况
	DB000113	中国概况	春 秋季	32	2	面授	笔试	
	MS000151	学位英语	春 秋季	64	4	面授	笔试	留学生选汉语
	MS000156	汉语	春 秋季	64	4	面授	笔试	
公共选修课	MS000344	当代科技	春 秋季	16	1			
	MS000137	创新思维与创业实验	春 秋季	32	2	MOOC		必选一门

	MS000135	创新创业与管理基础	春 秋季	32	2	MOOC		
	MS000340	科研伦理与学术规范概论	春 秋季	16	1	MOOC		
	MS000345	人工智能通识导论	秋季	16	1	MOOC		
专业必修课	MS007202	基础代数	秋季	48	3	面授	笔试	至少选4门
	MS007103	微分流形	秋季	48	3	面授	笔试	
	MS007201	代数拓扑	春季	48	3	面授	笔试	
	MS007114	线性和非线性泛函分析	秋季	48	3	面授	笔试	
	MS007102	实分析	秋季	48	3	面授	笔试	
	MS007312	偏微分方程	秋季	48	3	面授	笔试	
	MS007314	动力系统	春季	48	3	面授	笔试	
	MS007105	随机微分方程	春季	48	3	面授	笔试	
	MS007601	偏微分方程数值解	春季	48	3	面授	笔试	
	MS007608	高等数值分析	秋季	48	3	面授	笔试	
	MS007402	分析概率论	秋季	48	3	面授	笔试	
	MS007434	随机过程论	春季	48	3	面授	笔试	
	MS007502	组合最优化	春季	48	3	面授	笔试	
	MS007700	非线性控制	春季	48	3	面授	笔试	
专业选修课		满足课程总学分要求 至少选一门跨一级学科课程； 至少选一门人工智能技术素养课程； 至少选一门“课程思政”示范课程。			≥6			
综合素养环节	社会实践/创新创业实践	竞赛、教学实践、出国短访、生产实践（临床实践）或社会调查等。			3		考查	
	选听人文与科学素养系列讲	至少 8 次，其中必须选听法律、心理健康讲座至少 1 次（留学生至少 3 次）。			1		考查	

	座					
	参加学术活动及学术论文撰写	参加学术研讨活动至少 2 次并撰写学术论文 1 篇。	1		考查	

注: 1. 在校期间课程总学分最低要求为：理工类 26 学分，医类 28 学分，文管类 30 学分，其中必修课程最低学分要求为：16 学分， 其余为选修课程。此外，还应完成综合素养环节 5 学分。

2．必修课程学习一般应在入学后一学年内完成。

3．必修课程和公共选修课根据此表，专业选修课从“研究生课程目录”中选择。

培养方案审批意见

学科点意见	**负责人：** **日　期：**
所在院（系）审 批 意 见	**负责人：** **日　期：**
所在学位评定分委员会审批意见	**分委员会主席：** **日　期：**
研究生院审批意见	**负责人：** **日　期：**
备　注	

Discipline：Mathematics

(Discipline Code:0701)

Brief Introduction to Discipline (within 400 words)

The discipline was entitled to offer Doctoral degrees in Applied Mathematics in 2000. In 2003, it has the Post-Doctoral Research Station in Mathematics. In 2010, Mathematics was entitled to offer Doctoral degrees by Office of disciplines and degree of the State Council. In 2011、2016 and 2021, Mathematics was named the key discipline of Jiangsu Province for three consecutive times, and selected as a top discipline in Jiangsu Province in 2023, and was awarded an A - in the fifth round of discipline evaluation by the Ministry of Education, and the ESI indicator of scientific research papers entered the top 60 globally and top 4 in China. The discipline has established multiple research platforms such as the Jiangsu Province Applied Mathematics Science Research Center. In recent years, we have undertaken a number of national and provincial natural science fund projects，research funding reached 150 million yuan. We have been awarded the Second Prize of the National Natural Science Award (Participant), the First Prize for Scientific and Technological Progress Award in Jiangsu Province, the Second Prize for Natural Science Award or Scientific and Technological Progress Award from the Ministry of Education, National First-Class Society Science and Technology Award, etc. Currently, there are 26 full professors and 44 associate professors in the discipline. We have 32 doctoral supervisors and 64 master's supervisors. Among them, there are 1 academician of developed country's Academy of science， 5 global highly cited scientists of Thomson Reuters/ Clarivate Analytics, 1 winner of the first National Innovation Award. We also have a number of national and provincial talents such as the winner of national excellent youth fund, and the winner of Jiangsu outstanding youth fund, etc. This discipline emphasizes the study of mathematical theory and methods and its intersection with applied disciplines. In the past five years, 102 PhD students and 201 Master students graduated from the department.

Objectives (about 150 words; the following is for reference only）:

Students will grasp the fundamental principles of Marxism, stick to the Four Cardinal Principles, have the sense of patriotic duty, abide by the laws and regulations, and behave upright. Meanwhile, the students will develop their spirit of serving the people and devoting to the construction of socialism.

With the study of mathematics majors, the students are required to grasp the basic theories and methods of mathematics, to understand mathematical ideas, to be familiar with the application background of mathematics, and to understand the application of mathematics in other disciplines. Furthermore, the students will have a solid mathematical foundation and basic mathematical qualities for further research and study, and will also have a certain ability to independently carry out scientific research and solve related technical problems. They will be competent in scientific research, mathematics education, research and development of related technologies in enterprises and institutions.

Students will acquire proficiency in at least one language other than Chinese.

Research Directions

〔no more than 6-8 research directions for First-class Discipline; 3-4 research directions for Second-class Discipline〕

Algebra、Number theory and its applications
Analysis and Geometric Topology
Partial Differential Equation
Dynamica Systems and Stochastic Differential Equations
Large-scale Scientific Computing and Imaging Media
Numerical Solution of Differential Equations and Intelligent Scientific Computing
Stochastic Optimization and Statistical Learning
Intelligent Systems and Optimal Control

Duration

3 years usually, and no more than 4 years.

Credit Requirements and Curricula (refer to the Appendix)

Thesis Proposal

in accordance with Principles and Requirements of Southeast University on Topic Selection and Topic Report of Graduate Thesis

Interim Assessment

in accordance with Measures of Southeast University on Medium-term Assessment and Screening for Master Graduates

Thesis

〔including requirements on literature reading, thesis writing, publication, etc.〕

Literature Reading (for reference only)

Students are required to read at least 50 literatures (including 30 literatures written in foreign languages) related to their thesis and research direction, and write a review.

Thesis Writing (for reference only)

In addition to compliance with the provisions of University, thesis must be written in a systematic and complete manner, presenting clear concepts, correct arguments, realistic description, concise writing structure, smooth and concise writing style, correct calculation, reliable data, and clear icons.

Thesis Evaluation (for reference only)

Thesis should be written based on students' own study and research. The findings presented in the thesis should have higher academic value and positive impact on economic development of China. Students are required to conduct at least one year research and meet the assessment standards for academic research achievements required for applying for a Master's Degree in the School of Mathematics before being eligible for applying for a Master's Degree.

Appendix

Course Type	Course Number	Courses	Terms	Class Hours	Credits	Teaching Type	Assessment	Note
Public Compulsory Courses	MS000343			32	2			international students only
	DB000113	Introduction to China		32	2			
	MS000151	Academic English for Graduate Students		64	4			international students only
	MS000156	Chinese Language		64	4			
Public Elective Courses	MS000344			16	1			
	MS000137	Innovative thinking and entrepreneurial experiment		32	2			Choose either of the two
	MS000135	Innovation, entrepreneurship and management foundation		32	2			
	MS000340	Introductions of Research Ethics and Academic Norms		16	1			
	MS000345			16	1			
Specialized Compulsory Courses	MS007202	Basic Algebra						Choose at least four courses
	MS007103	Differential Manifolds						
	MS007201	Algebraic Topology						
	MS007114	Linear and Nonlinear Functional Analysis						
	MS007102	Real Analysis						
	MS007312	Partial Differential Equations						
	MS007314	Dynamical Systems						
	MS007105	Stochastic						

		Differential Equations						
	MS007601	Numerical Methods for Partial Differential Equations						
	MS007608	Advanced Numerical Analysis						
	MS007402	The Theory of Analytical Probability						
	MS007434	Stochastic Processes						
	MS007502	Combinatorial Optimization						
	MS007700	Nonlinear control						
Specialized Elective Courses		Must fulfill the overall course credit requirement. Take at least one course from a different discipline; Take at least one course on AI tech literacy; Take at least one 'curriculum ideological and political education' model course.			≥6			
Integrated Quality Training	Innovation and Entrepreneurship Practice	Contests, teaching practice, international short visits, practice and internship (clinical practice), social survey, etc.			3		Non-exam	
	Lectures on Humanities	Students are required to attend at least 8 lectures, including compulsory lectures on			1		Non-exam	

	and Scientific Literacy	academic atmosphere construction, law and psychological health (at least 3 lectures for international students).				
	Academic Activity Participation and Academic Writing Practice	Students are required to participate in at least 2 academic activities, and write 1 academic paper.	1		Non-exam	

Note:

(1) The minimum credits for master students: 26 credits for students of science and engineering, 28 credits for students of medical science, 30 credits for students of liberal arts, economics and management. In addition, students should obtain 5 credits from Integrated Quality Training.

(2) All compulsory courses are normally required to be completed within one year after registration.

(3) Compulsory courses and public elective courses are subject to this course plan; specialized elective courses can be chosen from "Graduate Courses Catalog".

Approval for Academic Program

Approved by Discipline Group	Person in charge: Date:
Approved by School (Department)	Person in charge: Date:
Approved by Sub-committee of Degree Assessment	Chairman of sub-committee: Date:
Approved by Graduate School	Person in charge: Date:
Note	