学术型硕士培养方案模板

[系统科学]

（学科代码：0711）

学科简介（400 字以内）

东南大学系统科学学科历史悠久，学科交叉特色明显，旨在针对信息产业中国家重大战略需求方面的前瞻性、关键性科学问题以及核心技术，打造国际一流水平的系统科学中心平台。2022 年，该学科获批为一级学科博士点，并在软科 2022 年中国最好“系统科学”学科排名中位列第五。2023 年，该学科与华为共建获批江苏高校优势学科建设工程四期项目应用转型类学科，积极引领学术和行业的发展，服务于国家发展需求和社会治理需要。现拥有江苏国家应用数学（东南大学）中心、江苏省网络群体智能重点实验室、华为-东南大学网络群体智能联合创新实验室等合作平台。教职工 40 人，教授/研究员 20 人，副教授/副研究员 13 人，讲师 7 人，博导 24 人，硕导 28 人，国家级高层次人才 8 人，国家级高层次青年人才 16 人。近五年承担了国家重点研发计划、政府间合作项目、科技创新 2030-“新一代人工智能”重大项目，获得国家自然科学基金（含重点项目和联合基金项目）、国防重大专项、以及华为/腾讯/国家电网等企业项目支持，总经费超亿元。发表 ESI 高被引论文 60 余篇，多项研究成果获得国家和省级科学技术奖项。

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。

硕士生的培养导向为培养交叉学科、复合型人才，强调理论和实践相结合。所培养的学生应拥有系统思维，具有创新意识和创新能力，掌握扎实的数理基础和系统科学的基本概念、方法、工具，了解系统科学的研究进展与发展方向；具有系统科学专业实践能力；有开阔的国际视野，严谨求实的态度和科学作风，良好的道德素养，以及社会责任感和使命感。毕业生将初步具备独立从事系统科学理论及其应用方面的科研、教学等能力，具有跨学科复合型人才的基本素质，就业面广；可在高新技术、金融企业、事业单位以及政府机构从事整体系统分析、数据、模型、政策制定等技术、研究或管理工作。

至少熟练掌握一门外语。

研究方向

1、系统理论
2、系统分析与集成
3、复杂系统建模与调控
4、大数据与智能系统
5、无人系统与具身智能
6、人工智能与大模型

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

[文献阅读要求、学位论文撰写要求、发表成果要求等方面](楷体_GB2312 小四号书写）

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至少发表 1 篇本专业领域的论文。

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		32	2	面授	笔试	
	MS000151	硕士学位外语	春秋季	64	4	面授	笔试	留学生选汉语
	MS000156	汉语		64	4	面授	笔试	
公共选修课	MS000344	当代科技	春秋季	16	1			
	MS000340	科研伦理与学术规范概论	春秋季	16	1	MOOC		

	MS000135	创新创业与管理基础	春秋季	32	2			必选一门
	MS000137	创新思维与创业实验	秋季	32	2			
	MS007345	人工智能通识导论	秋季	16	1			
专业必修课	MS007502	组合最优化	春季	48	3	面授	笔试	至少选 4 门
	MS007308	信息科学中的数学方法	秋季	32	2	面授	笔试	
	MS007700	非线性控制	春季	48	3	面授	笔试	
	MS007702	深度强化学习数学基础及算法	秋季	48	3	面授	笔试	
	MS007704	机器人与具身自主系统	秋季	48	3	面授	笔试	
	MS007705	高级机器学习	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座	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	
	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：Systems Science

(Discipline Code: 0711)

Brief Introduction to Discipline (within 400 words)

The discipline of Systems Science at Southeast University has a profound historical lineage and distinct interdisciplinary features. It is dedicated to addressing forward-looking and critical scientific questions, as well as core technological aspects, aligned with the significant strategic demands of the nation's information industry. The overarching goal is to establish a world-class platform for Systems Science.

In 2022, the discipline was approved as a first-tier doctoral program and achieved an impressive fifth rank in ARWU Ranking of the Best Subjects in China for "Systems Science". In 2023, the discipline, in partnership with Huawei, gained approval for the fourth phase of Jiangsu Provincial Key Disciplinary Development Project, focusing on applied transformative disciplines. It plays an active role in leading academic and industry development to serve national needs and societal governance.

The discipline currently hosts collaborative platforms, including the Jiangsu National Applied Mathematics (Southeast University) Center, Jiangsu Provincial Key Laboratory for Networked Collective Intelligence, and Huawei-Southeast University Joint Innovation Laboratory for Networked Collective Intelligence. The academic staff comprises 40 members, including 20 professors or research fellows, 13 associate professors or associate research fellows, and 7 lecturers. Moreover, the discipline boasts 24 doctoral advisors and 28 master's advisors, including 8 national-level high-level experts and 16 national-high-level young talents.

In recent years, the discipline has undertaken national key research and development initiatives, intergovernmental cooperative projects, and contributions to the transformative "New Generation Artificial Intelligence" major program in Science and Technology Innovation 2030. Funding has been secured from various sources, including the National Natural Science Foundation (including key and joint projects), major national defense initiatives, and support from enterprises such as Huawei, Tencent, and State Grid Corporation of China, totaling over a hundred million yuan. The discipline has published over 60 highly cited papers in Essential Science Indicators (ESI) and received multiple research achievements, garnering national and provincial scientific and technological awards.

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.

The master's education orientation is geared towards cultivating talents with an interdisciplinary and multifaceted perspective, emphasizing the integration of theory and practice. The cultivated students are expected to possess a systematic mindset, demonstrating innovative awareness and capacity, as well as a solid grounding in mathematical principles and fundamental concepts, methodologies, and tools of systems science. They should be acquainted with the progress and developmental trajectories within the domain of systems science. Additionally, they should possess practical capabilities aligned with the discipline of systems science, exhibit a global outlook, exhibit a rigorous and pragmatic approach, adhere to scientific integrity, uphold ethical standards, and exhibit a sense of social responsibility and mission.

Upon graduation, students will have developed preliminary competencies to independently engage in scientific research, teaching, and other activities pertaining to systems science theories and their applications. They will possess the foundational qualities of interdisciplinary talents, enhancing their

employability across a wide spectrum. Graduates can embark on careers encompassing comprehensive systems analysis, data interpretation, modeling, policy formulation, and related technical, research, or management roles within high-tech enterprises, financial institutions, public organizations, and government bodies.

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〕

1. Systems Theory
2. System Analysis and Integration
3. Modeling and Control of Complex Systems
4. Big Data and Intelligent Systems
5. Unmanned Systems and Embodied Intelligence
6. Artificial Intelligence and Large Models

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 to publish at least one paper in the area of their disciplines 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		Spring and autumn	32	2	Face to face teaching	Written examination	
	DB000113	Introduction to China		32	2	Face to face teaching	Written examination	International students only
	MS000151	Academic English for Graduate Students	Spring and autumn	64	4	Face to face teaching	Written examination	
	MS000156	Chinese Language		64	4	Face to face teaching	Written examination	International students only
Public Elective Courses	MS000344		Spring and autumn	16	1			
	MS000340	Introductions of Research Ethics and Academic Norms		16	1			Compulsory
	MS000135	Innovation Entrepreneurship and Management Basis	Spring and autumn	32	2			Choose either of the two
	MS000137	Innovative thinking And Entrepreneurship Experiment	Autumn	32	2			
	MS007345			16	1			
Specialized Compulsory Courses	MS007502	Combinatorial Optimization	Spring	48	3	Face to face teaching	Written examination	Choose at least four
	MS007308	Mathematical Methods in Information Science	Autumn	32	2	Face to face teaching	Written examination	

	MS007700	Nonlinear Control	Spring	48	3	Face to face teaching	Written examination	
	MS007702	Mathematical Fundamentals and Algorithms of Deep Reinforcement Learning	Autumn	48	3	Face to face teaching	Written examination	
	MS007704	Robots and Embodied Autonomous Systems	Autumn	48	3	Face to face teaching	Written examination	
	MS007705	Advanced Machine Learning	Spring	48	3	Face to face teaching	Written examination	
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	Societal Engagement Practice / Innovation and Entrepreneurship Practice	Contests, teaching practice, international short visits, practice and internship (clinical practice), social survey, et.			3		Examination	
	Lectures on Humanities and Scientific Literacy	Students are required to attend at least 8 lectures, including compulsory lectures on academic atmosphere construction, law and psychological health (at least 3 lectures for international students)			1		Examination	
	Academic Activity Participation and Academic	Students are required to participate in at least 2 academic activities, and write 1 academic paper			1		Examination	

	Writing Practice					

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	