

# 2023 级数学一级学科硕士研究生培养方案\_数学教育（全英文）

## 学术学位\_硕士研究生\_数学科学学院\_

### 一、指导思想

推进学校开放式办学，吸引更多优秀国际学生到我校攻读研究生学位，营造研究生国际化培养氛围，充分发挥华东师范大学数学教育学科优势，为服务国家发展战略培养具有国际视野、学术素养高、实务能力强的知华友华人才。

### 二、培养目标

#### 1. 人才的基本定位

实事求是，勇于创新，遵守学术规范、恪守学术道德、崇尚学术诚信。具有宽广的数学基础和扎实的专业知识，具有良好的国际视野、前沿知识以及自我发展能力，毕业后能胜任与数学教育相关的教学、科研或其它实际工作。

#### 2. 对毕业生综合素质的要求

- 1) 掌握坚实的基础理论和系统的专门知识，具有良好的数学素养。掌握现代数学若干研究方向的基本研究方法和研究技巧，具有综合运用数学理论解决数学问题与实际问题的能力，并具有基本的运用数学软件的能力。
- 2) 了解数学的发展过程和发展规律，着重培养学生的逻辑思维，形象思维，批判性思维，创造性思维。使学生的创新意识得到提升，能够用数学思维和科学精神指导工作，服务现代智能社会的发展。

### 三、二级学科（专业）

数学教育（0701Z1）

### 四、毕业与学位要求

#### 1. 培养环节

1.1 基本文献阅读能力：硕士研究生在读期间要完成指定文献的阅读。

1.2 开题报告：对论文选题的新颖性、研究方法的合理性和拟解决问题的学术价值等方面进行评价。

1.3 学术活动：所有硕士研究生必须参加各类学术讲座、论坛、竞赛等学术活动，在学期间须参加不少于 30 次的学术讲座。

1.4 实践环节与科研训练：所有硕士研究生均须参加教学实习或科研实践，包括授课、辅导、组织课堂讨论、指导实验、批改作业及实验报告、指导毕业论文等。

1.5 中期考核：包括课程修读、基本文献阅读能力、学术活动、实践环节和科研训练、开题报告、研究伦理与学术规范测试等完成情况，应在第五学期结束前完成。中期考核通过者，方可进入毕业论文预答辩或答辩程序。

#### 2. 学位论文

论文评阅与答辩：硕士研究生学位论文须通过论文评阅和公开答辩才能取得毕业证书和硕士学位。

### 五、学习年限与培养方式

#### 1. 学习年限

硕士研究生基本学习年限为3年，最长学习年限为5年。

## 2. 培养方式

全日制。

## 六、学分要求

1. 硕士研究生修读总学分：\_\_26\_\_。各类别学分要求如下：

学位公共课（必修）6 学分，学位公共课（选修）\_\_2\_\_ 学分，学位基础课\_\_6\_\_ 学分，学位专业课（必修）\_\_6\_\_ 学分，学位专业课（选修）\_\_4\_\_ 学分，跨一级学科课程\_\_2\_\_ 学分。

2. 国际留学硕士生需修读《中国概况》或《中国文明导论》和汉语课程等有关课程。以外语为专业教学语言的学科、专业的留学生毕业时，中文能力应当至少达到《国际汉语能力标准》三级水平。

## 七、创新成果考核

鼓励投稿发表，但不作考核要求。

## 八、学位论文要求

学位论文是对硕士研究生进行科学研究的全面训练，是培养其综合运用所学知识分析问题和解决问题能力的重要环节，也是衡量硕士研究生能否获得学位的重要依据之一。硕士研究生在修完规定的各门课程，考试和考查合格，并通过中期考核后，应撰写学位论文。硕士研究生在学期间完成学位论文要保证一年的工作时间。

硕士学位论文工作是硕士研究生在导师及导师小组指导下，独立设计和完成某一科研课题，培养独立的科研工作能力的过程。为保证硕士学位论文质量，导师和院系应注意抓好学位论文选题、开题报告、论文指导、组织答辩等几个关键环节。

硕士学位论文可以是基础研究或应用基础研究，也可以结合科研攻关任务从事应用开发研究，但须有自己的见解或特色。各专业应根据学校对研究生学位论文撰写的要求，结合本学科、专业的特点，根据不同规格、类型人才的培养要求，制定本专业硕士学位论文的具体标准及要求。

## 九、必修课程教材

### | 课程名称 | 教材及参考文献

#### | 现代数学基础 I |

[1] Gilbert Strang, Calculus, [Wellesley-Cambridge Press](#), 1991

[2] Gilbert Strang, Introduction to Linear Algebra, fifth edition, Wellesley-Cambridge Press 2016.

[3] J.H.Silvermann, A Friendly Introduction to Number Theory, Fourth Edition ,Pearson Education, Inc. 2012.

#### | 现代数学教育研究导论 |

[1] Cai, J. (Ed.) (2017). Compendium for research in mathematics education. Reston, VA: The National Council of Teachers of Mathematics.

[2] Clements, M. A. K., Bishop, A., Keitel-Kreidt, C., Kilpatrick, J., & Leung, F. K. S. (Eds.) (2013). Third international handbook of mathematics education. New York: Springer.

[3] Fan, L. (2014). Investigating the pedagogy of mathematics: How do teachers develop their knowledge? London: Imperial College Press.

[4] Fan, L., Wong, N. Y., Cai, J., & Li, S. (Eds.) (2004). How Chinese learn

mathematics: Perspective from insiders. Singapore: World Scientific.

[5] Fan, L., Wong, N. Y., Cai, J., & Li, S. (Eds.) (2015). How Chinese teach mathematics: Perspective from insiders. Singapore: World Scientific.

[6] Grouws, D. A. (Ed.) (1992). Handbook of research on mathematics teaching and learning. New York: Macmillan.

[7] Wood. T. (Ed.) (2008). International handbook of mathematics teacher education. Rotterdam, The Netherlands: Sense Publishers.

[8] Kaiser, G, Luna, E., & Huntley, L (Eds.) (1999). International comparison in mathematics education. Philadelphia, PA: Falmer Press.

[9] Latest research publications in mathematics education published online and in research journals.

#### | 数学教育心理研究基础 |

[1] Proceedings of PME

[2] Latest journal articles from Educational Studies in Mathematics, ZDM-Mathematics Education, Mathematical Thinking and Learning and etc.

#### | 数学教育研究方法 |

[1] Cai, J. (Ed.) (2017). Compendium for Research in Mathematics Education [M]. Reston, VA: The National Council of Teachers of Mathematics.

[2] Creswell, J.W. (2002). 研究设计与写作指导: 定性、定量与混合研究的路径 (Research design: qualitative, quantitative, and mixed methods approaches). 重庆: 重庆大学出版社. C3 K282 2007

[3] Gall, J.P., Gall, M.D., & Borg, W.R. (2007). 教育研究方法: 实用指南. 北京: 北京大学出版社. G40-034 G236 2007

[4] Kelly, A. E., & Lesh, R. A. (2000). Handbook of research design in mathematics and science education. New Jersey: Lawrence Erlbaum Associates Publishers. N4H236

[5] Schoenfeld, A. (2000). Purpose and methods of research in mathematics education. Notices of the AMS, 6-7, 641-649.

[6] Wiersma, W., & Jurs, S. G. (2009). Research methods in education: An introduction (9th ed.). Boston: Pearson. G420 W648 2009

[7] 范良火, 黄毅英, 蔡金法, & 李士琦. (2017). 华人如何学数学. 南京: 江苏凤凰教育出版社.

[8] 范良火, 黄毅英, 蔡金法, & 李士琦. (2017). 华人如何教数学. 南京: 江苏凤凰教育出版社.

[9] 王建磐. (2017). 中国数学教育: 传统与现实. 南京: 江苏凤凰教育出版社.

[10] 王孝玲. (2005). 教育测量. 上海: 华东师范大学出版社. G449 W233 2005

[11] 袁振国. (2000). 教育研究方法. 北京: 高等教育出版社. G40-034 Y794

#### | 数学教育国际比较研究 |

[1] Fan, L., Wong, N., Cai, J. & Li, S. (2004). How Chinese learn mathematics: Perspectives from insiders. World Scientific.

[2] Fan, L., Wong, N., Cai, J. & Li, S. (2015). How Chinese teach mathematics: Perspectives from insiders. World Scientific.

[3] Ma, L. (1999). Knowing and Teaching Elementary Mathematics: Teachers' Understanding of Fundamental Mathematics in China and the United States. New York: Routledge.

[4] Hiebert, J., Gallimore, R., Garnier, H., Giwin, K. B., Hollingsworth, H., Jacobs, J., ... Stigler, J. (2003). Teaching mathematics in seven countries: Results from the TIMSS 1999 video study. Washington, DC: U. S. Department of Education, National Center for Education Statistics.

[5] Kaiser, G, Luna, E., & Huntley, L (Eds.) (1999). International comparison

in mathematics education [M]. Philadelphia, PA: Falmer Press.

[6] Tatto, M. T., Peck, R., Schwille, J., Bankov, K., Senk, S. L., Rodriguez, M., ...Rowley, G. (2012). Policy, Practice, and Readiness to Teach Primary and Secondary Mathematics in 17 Countries: Findings from the IEA Teacher Education and Development Study in Mathematics (TEDS-M). The Netherlands: International Association for the Evaluation of Educational Achievement (IEA).

[7] Porter, A. C., & Gamoran, A. (2002). Methodological Advances in Cross-National Surveys of Educational Achievement. Washington, DC: National Academy Press.

## 十、基本文献阅读书目

[1] Academic Writing: A Handbook for International Students, Bailey, S. (Ed.), Routledge, 2018.

[2] Adding It Up: Helping Children Learn Mathematics, Fitzpatrick, J., et al. (Eds.), The National Research Council, National Academy Press, 2001.

[3] A Mathematical Introduction to Logic by Herbert B. Enderton, Academic Press

[4] Basic Algebra I, II by Jacobson, W H Freeman

[5] Carpenter, T., & Fennema, E. (1997). Making sense: teaching and learning mathematics with understanding. Heinemann.

[6] Compendium for Research in Mathematics Education, Cai, J. (Ed.), The National Council of Teachers of Mathematics, 2017.

[7] Cai, J. (Ed.) (2017). Compendium for research in mathematics education. Reston, VA: The National Council of Teachers of Mathematics.

[8] Clements, M. A. K., Bishop, A., Keitel-Kreidt, C., Kilpatrick, J., & Leung, F. K. S. (Eds.) (2013). Third international handbook of mathematics education. New York: Springer.

[9] Creswell, J.W. (2002). 研究设计与写作指导：定性、定量与混合研究的路径 (Research design: qualitative, quantitative, and mixed methods approaches). 重庆: 重庆大学出版社. C3 K282 2007

[10] Dweck, C., & Boaler, J. (2015). Mathematical mindsets: Unleashing students' potential through creative math, inspiring messages and innovative teaching. Jossey-Bass.

[11] Elementary Number Theory by Gareth A. Jones and Josephine M. Jones, Springer

[12] Fan, L. (2014). Investigating the pedagogy of mathematics: How do teachers develop their knowledge? London: Imperial College Press.

[13] Fan, L., Wong, N. Y., Cai, J., & Li, S. (Eds.) (2004). How Chinese learn mathematics: Perspective from insiders. Singapore: World Scientific.

[14] Fan, L., Wong, N. Y., Cai, J., & Li, S. (Eds.) (2015). How Chinese teach mathematics: Perspective from insiders. Singapore: World Scientific.

- [15] Fabio Cirrito, International Baccalaureate Mathematics Higher Level (core) . IBID Press
- [16] Gilbert Strang, Calculus, [Wellesley-Cambridge Press](#), 1991
- [17] Gilbert Strang, Introduction to Linear Algebra, fifth edition, Wellesley-Cambridge Press 2016.
- [18] Grouws, D. A. (Ed.) (1992). Handbook of research on mathematics teaching and learning. New York: Macmillan.
- [19] Gall, J.P., Gall, M.D., & Borg, W.R. (2007). 教育研究方法: 实用指南. 北京: 北京大学出版社. G40-034 G236 2007
- [20] Graph Theory by Reinhard Diestel, Springer
- [21] Hiebert, J., Gallimore, R., Garnier, H., Giwin, K. B., Hollingsworth, H., Jacobs, J., ... Stigler, J. (2003). Teaching mathematics in seven countries: Results from the TIMSS 1999 video study. Washington, DC: U. S. Department of Education, National Center for Education Statistics.
- [22] H. Ramsy Fowler, Jane E. Aaron. The little brown handbook, 北京大学出版社, 2007.
- [23] J.H. Silvermann, A Friendly Introduction to Number Theory, Fourth Edition ,Pearson Education, Inc. 2012.
- [24] Kaiser, G, Luna, E., & Huntley, L (Eds.) (1999). International comparison in mathematics education. Philadelphia, PA: Falmer Press.
- [25] Kelly, A. E., & Lesh, R. A. (2000). Handbook of research design in mathematics and science education. New Jersey: Lawrence erlbaum associates publishers. N4H236
- [26] Lee, P. Y., & Lee, N. H. (2009). Teaching secondary school mathematics: A resource book. McGraw-Hill Education.
- [27] Lobato, J. (Ed.). (2011). Teaching and learning mathematics: Translating research for secondary school teachers. Reston, VA: NCTM.
- [28] Ma, L. (1999). Knowing and Teaching Elementary Mathematics: Teachers' Understanding of Fundamental Mathematics in China and the United States. New York: Routledge.
- [29] Mathematics for the international student, Mathematics HL (options) by Peter Blythe, etc, Haese and Harris Publications
- [30] Mathematics Standard Level by Laurie Buchanan, Oxford University Press
- [31] Mathematics: analysis and approaches HL by M. Haese, etc. Harris Publications
- [32] Mathematics: analysis and approaches SL by M. Haese, etc. Harris Publications
- [33] Mathematics: applications and interpretation HL by M. Haese, etc. Harris Publications
- [34] Mathematics: applications and interpretation SL by M. Haese, etc. Harris Publications
- [35] Mathematics: core topics HL by M. Haese, etc. Harris Publications
- [36] Mathematics: core topics SL by M. Haese, etc. Harris Publications
- [37] Mathematics for the international student 6 MYP 1 by P. Vollmar, Haese, etc, Harris Publications

- [38] Mathematics for the international student 7 MYP 2 by P. Vollmar, Haese, etc, Haese and Harris Publications
- [39] Mathematics for the international student 8 MYP 3 by P. Vollmar, Haese, etc, Haese and Harris Publications
- [40] Mathematics for the international student 9 MYP 4 by P. Vollmar, Haese, etc, Haese and Harris Publications
- [41] Mathematics for the international student 10 MYP 5 by P. Vollmar, Haese, etc, Haese and Harris Publications
- [42] Mathematical Analysis by Xuecheng Pang, ECNU Press
- [43] Mathematical Statistics and Data Analysis by John A. Rice, Duxbury Press
- [44] Naïve Set Theory by Paul R. Halmos, Springer
- [45] Porter, A. C., & Gamoran, A. (2002). Methodological Advances in Cross-National Surveys of Educational Achievement. Washington, DC: National Academy Press.
- [46] Renzulli, J. S. What makes giftedness? Reexamining a definition[J]. The Phi Delta Kappan, 1978(3), 180-184, 261.
- [47] Rafael Angel, Internal Assessment for the IB Diploma
- [48] Schoenfeld, A. (2000). Purpose and methods of research in mathematics education. Notices of the AMS, 6-7, 641-649.
- [49] Smith, M., & Stein, M. K. (2011). 5 practices for orchestrating productive mathematics discussions. Reston, VA: NCTM.
- [50] Schoenfeld, A. H., Purpose and methods of research in mathematics education, Notice of the AMS[J], 641-649, 2000.
- [51] Tatto, M. T., Peck, R., Schwille, J., Bankov, K., Senk, S. L., Rodriguez, M., ...Rowley, G. (2012). Policy, Practice, and Readiness to Teach Primary and Secondary Mathematics in 17 Countries: Findings from the IEA Teacher Education and Development Study in Mathematics (TEDS-M). The Netherlands: International Association for the Evaluation of Educational Achievement (IEA).
- [52] Tao Tang, Jiu Ding. Mathematical Writing in English (数学之英文写作), 高等教育出版社, 2013
- [53] Wiersma, W., & Jurs, S. G. (2009). Research methods in education: An introduction (9th ed.). Boston: Pearson. G420 W648 2009
- [54] William Strunk Jr. The elements of style (英语写作手册风格的要素), 外语教学与研究出版社, 2016.
- [55] Wood. T. (Ed.) (2008). International handbook of mathematics teacher education. Rotterdam, The Netherlands: Sense Publishers.
- [56] Wood. T. (Ed.), International Handbook of Mathematics Teacher Education. Sense Publishers, 2008.
- [57] Wilson, Introduction to Graph Theory , Springer
- [58] Walter Rudin, Principles of Mathematical Analysis , McGraw-Hill Book Company
- [59] IBO .Extended Essay Guide

- [60] IBO. (2013). Approaches to teaching and learning in the Diploma Programme.
- [61] IBO. (2014). Middle Years Programme Mathematics guide.
- [62] IBO. (2019). Diploma Programme Mathematics: analysis and approaches guide.
- [63] IBO. (2019). Diploma Programme Mathematics: applications and interpretation guide.
- [64] IBO . General regulations: Diploma Programme
- [65] IBO . Approaches to teaching and learning in the Diploma Programme
- [66] IBO .Theory of knowledge guide by IBO
- [67] IBO .Mathematics: analysis and approaches guide
- [68] IBO .Mathematics: applications and interpretation guide by
- [69] IBO .MYP Mathematics guide
- [70] IBO .Mathematics HL subject outline
- [71] IBO .Mathematics SL subject outline
- [72] IBO .Further mathematics HL subject outline
- [73] IBO .Mathematics HL guide
- [74] IBO .Mathematics SL guide
- [75] IBO .Mathematical studies SL guide
- [76] IBO .Further mathematics HL guide
- [77] IBO .Mathematics HL Additional Notes and Guidance on the exploration
- [78] IBO .Mathematics SL Additional Notes and Guidance on the exploration
- [79] IBO .Diploma Programme: Assessment appeals procedure

## 课程设置

已制定最少修读总学分：26

课程类别	最少修读学分	课程代码	课程名称	学分	开课时间	面向二级学科	备注
学位公共课 (必修)	6		无				
学位基础课 (必修)	6	MATH2821102098	现代数学教育研究导论(Introduction to Contemporary Research in Mathematics Education)	3			
		MATH2811102304	现代数学基础 I(Introduction to Modern Mathematics I)	3			
学位专业课 (必修)	6	MATH2811102100	数学教育研究方法(Research Methods in Mathematics Education)	3			
		MATH2811102040	数学教育国际比较研究(International Comparative Research in Mathematics Education)	3			
		MATH2811102239	数学教育心理研究基础(Research on the Psychology of Mathematics Education)	3			
学位专业课 (选修)	4	MATH2811102222	数学史与数学文化(Mathematical culture and History of Mathematics)	2			
		MATH2821102137	数学资优教育研究(Research on Mathematics Gifted Education)	3			

		MATH2811102280	数学学术英语写作 (Academic Writing in Math)	2			
		MATH2811102283	数学教学法聚焦 IB 数学 (Approaches to Teaching Mathematics Focusing on IB Mathematics)	2			
		MATH2811102284	IB 数学内容 (IB Math content)	2			
		MATH2811102303	数学教育研究与论文写作 (Mathematics Education Research and Thesis Writing)	3			
		MATH2811102305	现代数学基础 II (Introduction to Modern Mathematics II)	3			
跨学科或跨专业课程 (选修)	2	无					
公共选修课 (选修)	2	无					

## 培养环节

环节	内容与要求
1. 基本文献阅读能力考核	<p>(1) 考核要求 硕士研究生在读期间要完成指定文献的阅读。基本文献阅读能力训练为培养过程必修环节，但不计学分。</p> <p>(2) 考核结果及分流说明 由导师自行考核，考核结果不计入总学分，但纳入毕业答辩资格审核范围。</p>
2. 开题报告	<p>(1) 准入条件 参加开题报告的硕士生需修满本专业培养方案规定学分。</p> <p>(2) 考核要求 由导师自行安排 3 名专家组成员，其中具有硕导资格的专家不少于 3 名，所有专家都需要有硕士学位。开题报告需要专家组审核。</p> <p>(3) 考核结果及分流说明 开题报告考核通过者，方可进入论文研究工作。未通过者可申请在 3 个月后进行第二次开题。第二次开题仍未通过者，按照肄业处理。研究过程中，如论文课题出现重大变动的，应重新组织开题。</p>
3. 学术活动	<p>(1) 考核要求 所有硕士研究生必须参加各类学术讲座、论坛、竞赛等学术活动，在学期间须参加不少于 30 次的学术讲座。</p> <p>(2) 考核结果及分流说明 由导师及导师小组考核，考核结果不计入总学分，但纳入毕业答辩资格审核范围。</p>
4. 实践环节和科研训练	<p>(1) 考核要求 所有硕士研究生均须参加教学实习，包括授课、辅导、组织课堂讨论、批改作业等。参加 IB 项目的硕士生将组织到 IB 学校进行教育实习。</p> <p>(2) 考核结果及分流说明 由导师及导师小组考核，考核结果不计入总学分，但纳入毕业答辩资格审核范围。</p>
5. 中期考核	<p>(1) 准入条件 中期考核前需完成相关的培养环节。</p> <p>(2) 考核要求 包括课程修读、基本文献阅读能力、学术活动、实践环节和科研训练、开题报告、研究伦理与学术规范测试等完成情况，应在第五学期结束前完成。以上各环节考核通过者，中期考核通过，否则为不通过。</p> <p>(3) 考核结果及分流说明 中期考核通过者，方可进入毕业论文预答辩或答辩程序。不通过者，根据学业进展情况，可作延长学习年限、结业或肄业处理。</p>