

材料与化工(085600)全日制博士培养方案

Materials and Chemical Engineering

一、基本信息 Basic Information

院系名称 School	(160)环境科学与工程学院 School of Environmental Science & Engineering			适用年级 Grade	2025
适用专业 Major	材料与化工(085600) Materials and Chemical Engineering				
项目类型 Program Type	全日制博士				
最低学分 Min Credit	19.5	最低GPA学分 Min GPA Credit	0	最低GPA Min GPA	0

二、学科简介 Introduction

1984年获准环境化学硕士点，开始培养环境领域硕士生，1998年调整为环境工程硕士点，同年又获准环境科学硕士点，2000年获准环境工程二级学科博士点，2003年获准环境科学与工程一级学科博士点，同年设立环境科学与工程博士后流动站。在流域水污染控制、区域大气污染控制、废弃物资源化、环境功能材料、土壤-地下水污染修复、环境化学与毒理学、环境管理、海洋环境等方向，具有鲜明的特色与厚重的积累。学院拥有完善的教学与科研体系和先进分析测试平台，承担着大量的国家级、省部级、国际合作以及企业委托的科研项目。

As early as the 1984 we began to cultivate the master's students in environmental field. It was adjusted to the master degree of environmental engineering in 1998. The environmental science master station was established at the same year. In 2000, a second-rate discipline of environmental engineering for doctor-degree program was established. The first-rate discipline of environmental science and engineering for doctor-degree program was established in 2003. The school was approved to have post-doctoral mobile center of first class discipline of Environmental Science and Engineering in 2003. The major research fields are regional water pollution control, regional air pollution control, solid waste treatment and disposal, environment function materials, soil and groundwater remediation, environmental chemistry and toxicology, environmental management, marine environment, etc. The school has advanced teaching and research system, and the public service platform, the center laboratory, guarantees the advanced analysis and test. The school also undertakes many national, international and industrial scientific research projects.

三、培养目标 Program Objective

培养德、智、体、美全面发展，热爱祖国、遵纪守法、品行端正，具有艰苦奋斗、为人民服务和社会主义建设事业献身精神，热爱环境事业，在环境工程技术领域具有坚实宽广的基础理论和系统深入的专门知识，熟练掌握英语，能熟练阅读本专业英文文献和撰写英文论文，并具有国际学术交流能力，熟悉环境学科在国内外发展的历史、现状及趋势，应具备解决复杂工程技术问题、进行工程技术创新以及决策和组织实施工程技术研发工作的能力，在推动产业发展和工程技术进步方面做出创造性成果，能主动适应工程实践需要，能从事科学研究工作或担负专门技术工作的，引领工程科技发展前沿面向工业界、面向世界、面向未来的高端工程人才。

Cultivate the all-round development of morality, intelligence, body and beauty, love the motherland, abide by the law, behave in a correct manner, have the spirit of hard work, serve the people and dedicate themselves to the cause of socialist construction, love the environmental cause, and have a solid and broad field in the field of environmental engineering technology. Basic theory and systematic in-depth expertise, proficient in English, proficient in reading English literature and writing English papers, and have the ability of international academic exchanges, familiar with the history, current situation and trend of environmental discipline development at home and abroad, should It has the ability to solve complex engineering and technical problems, carry out engineering technology innovation, and plan and organize the implementation of engineering technology research and development. It can make creative achievements in promoting industrial development and engineering technology advancement, can actively adapt to engineering practice needs, and can engage in scientific research. Or take on the work of specialized technology, leading the development of engineering theory to the high-end engineering talents facing the industry, the world, and the future.

四、培养方式及学习年限 Training Mode and Study Duration

本项目标准学制为4年，采用全日制学习、校/企导师联合培养模式。非专项联培工程博士须1年以上在合作导师所在单位联合培养；专项联培博士需从第二年开始在联培单位进行联合培养。未能按时完成学业者，博士生可最长可延长2学年。

This program requires a full-time study for 4 years under both a campus supervisor and an enterprise supervisor. Doctoral candidates of Engineering major should be cultivated jointly at the enterprise with the off-campus supervisor for at least one year, and the joint-cultivation should start at the second year for students of joint-cultivation programs. For those unable to graduate on time, upon approval of the application, the maximum period of study can be extended by two years.

五、课程学习要求 Course Requirement

课程类别 Course Type	学分要求 Min Credits	GPA 学分要求 Min GPA Credit	备注 Note
公共基础课 General Fundamental Courses	8.5		
专业基础课 Program Core Courses	4		
专业前沿课 Program Frontier Courses	5		
专业选修课 Program Elective Courses	2		

六、培养过程要求 Training Requirement

一、课程学习

完成时间：普通生原则上第2学期结束前完成，不能晚于第3学期；直博生原则上第3学期结束前完成，不能晚于第4学期。

二、资格考试

完成时间：普通生原则上第3学期结束前完成，不能晚于第4学期；直博生原则上第4学期结束前完成，不能晚于第5学期。

前置要求：参加资格考试时，学生应已按培养计划进度完成专业基础课的学习。未完成专业基础课学习者，因故未学者或有其它特殊原因者，可申请推迟参加资格考试。参加国际联培的博士生原则上应在入学前通过资格考试。

评审组织：资格考试分为笔试和面试两部分，由培养集中组织。

归档要求：学生在交我办(my.sjtu.edu.cn)发起申请并完成在线归档，附件须完备。

三、开题报告

完成时间：资格考试通过后一年内完成，一般10月底前完成（因故未学者或有其它特殊原因者，可申请推迟博士论文开题；参加国际联培的博士生若出国前未进行开题报告，可在合作高校举行论文开题工作）。

评审组织：论文开题报告会由课题组长或导师具体组织实施，专家组应由3-5名具有博士生导师资格的教授组成。

归档要求：学生在交我办(my.sjtu.edu.cn)发起申请并完成在线归档，附件须完备。

四、年度考核

完成时间：每年10月底前完成，论文开题通过满六个月以上者应参加。

评审组织：年度报告会由课题组长或导师具体组织实施，专家组应由3-5名具有博士生导师资格的教授组成。

归档要求：学生在交我办(my.sjtu.edu.cn)发起申请并完成在线归档，附件须完备。

五、学校交流

完成时间：就学期前（正式答辩前）须在高水平国际学术会议上作学术交流至少1次。

交研形式：交研形式包括口头报告、海报展示，或做论文摘要被会议录用等，交流内容应与博士学位论文研究工作密切相关。

六、工程实践

在联培单位需累计开展不少于一年的工程实践，由校企导师组提供联合指导。具体要求：

- 1、应在第三学年结束前递交《上海交通大学全日制工程博士研究生工程实践总结报告》，由校企导师组出具考核评定意见、院系组织公开考核答辩，考核答辩可与年度考核等其他培养环节合并举行。
- 2、应在第三学年结束前完成工程实践课程并通过考核。考核结果为“通过”或“不通过”，由院系教务在必修环节录入《工程实践I》、《工程实践II》的课程成绩。

1. Course Learning

Time of completion: In principle, for normal doctoral candidates, it should be completed before the end of the second semester, and not later than the fourth semester; as for doctoral candidates after bachelor's degree, it should be completed before the end of the third semester, and not later than the fifth semester.

2. Qualification Examination

Time of completion: In principle, for normal doctoral candidates, it should be completed before the end of the third semester, not later than the fifth semester; as for doctoral candidates after bachelor's degree, it should be completed before the end of the fourth semester, and not later than the sixth semester.

Prerequisites: When taking the qualification exam, students should have completed courses learning. Doctoral students of international joint cultivation program should, in principle, pass the qualification test before attending the foreign university.

Review Organizing: Organized by the school collectively.

Filing: Students should apply and file on my.sjtu.edu.cn with complete reports and reviewing procedure.

3. Thesis Proposals

Time of completion: In principle, it should be completed within one year after passing the qualification exam, usually held in October (doctoral students of international joint cultivation program can hold it in the foreign university).

Exception: The thesis proposals representation is held simultaneously with qualification examination for Class of 2019 and before.

Review Organizing: Held by the supervisor, and the review committee consists of 3 or 5 professors with the qualification of doctoral tutor.

Filing: Students should apply and file on my.sjtu.edu.cn with complete reports and reviewing procedure.

4. Annual Progress Reports

Time of completion: Generally in October, students who have passed the thesis proposal for more than six months should participate.

Review Organizing: Held by the supervisor, and the review committee consists of 3 or 5 professors with the qualification of doctoral tutor.

Filing: Students should apply and file on my.sjtu.edu.cn with complete reports and reviewing procedure.

5. Academic Exchange

Time of completion: During the study period (before the formal thesis defense), students must participate at least once at a high-level international academic conference with the following forms of achievements.

七、学术成果要求 Requirement on Academic Achievements

(一) 创新性成果具体要求

在《上海交通大学环境科学与工程学院代表性期刊分类目录》所列期刊上公开发表（或录用）学术论文篇，同时提交以下研究成果之一：

- (1) 获得国家级或省部级科技成果奖项，其中国家级科技成果奖和省部级科技成果一等奖需排名前四位，省部级科技成果二等奖需排名前四位；
- (2) 以本人贡献为主的研究成果形成国际标准、国家标准或行业标准项，要求本人排名前四位；
- (3) 以第一发明人或第二发明人（导师为第一发明人）获得发明专利授权并有良好应用。

发表学术论文达到相应学科（环境科学与工程）学术型博士创新成果要求；

经学院学位评定委员会认定的其他创新成果。

(二) 创新性成果认定办法

学术论文第一作者及通讯单位应为上海交通大学环境科学与工程学院，且导师为作者之一；学生第一作者，按篇计；导师第一、学生第二的，按1/5篇计；共同一作，仅计算排名第一的共同作者，按篇计。

国家级或省部级科技成果奖的获奖单位应包含上海交通大学。

发明专利是由国家知识产权局、PCT等受理的发明专利，全日制博士生授权发明专利第一完成单位应为上海交通大学，非全日制博士生授权发明专利完成单位应包含上海交通大学。

国际或国家标准包括中国国家标准管理委员会、ISO、IEEE、ASME等国际标准组织制定的标准；行业标准是由相关行业归口部门统一管理的标准。标准制定单位需包含上海交通大学。

5-一项研究成果原则上仅用于一位博士生作为代表生成果申请学位。

(1) Specific requirements for innovative achievements

1. Publicly publish (or accept) one academic paper in the journals listed in the "Classified Catalogue of Representative Journals of the School of Environmental Science and Engineering of Shanghai Jiaotong University", and submit one of the following research results at the same time:

(1) Obtain 1 national or provincial scientific and technological achievement award, among which the national scientific and technological achievement award and the first prize of provincial and ministerial scientific and technological achievement must be ranked in the top 5, and the second prize of provincial and ministerial scientific and technological achievement must be ranked in the top 3 ;

(2) The research results based on my own contributions form 1 international standard, national standard or industry standard, and I am required to rank in the top 3;

(3) The first inventor or the second inventor (the tutor is the first inventor) obtains 1 invention patent authorization and has a good application.

- The first author of the academic paper and the corresponding unit should be the School of Environmental Science and Engineering, Shanghai Jiaotong University, and the supervisor is one of the authors; the first author of the student is counted as 1; the first author of the tutor and the second of the student are counted as 0.5 Count; if a work is co-authored, only the first co-author will be counted, and it will be counted as one.
2. The award-winning units of the National or Provincial Science and Technology Achievement Award should include Shanghai Jiaotong University.
3. Invention patents are invention patents authorized by the State Intellectual Property Office, PCT and other organizations. The first completion unit of a full-time doctoral student's authorized invention patent should be Shanghai Jiao Tong University, and a part-time doctoral student's authorized invention patent should be completed by Shanghai Jiaotong University. the University.
4. International or national standards include the standards established by the China National Standards Administration, ISO, IEEE, ASME and other international standardization organizations; industry standards are standards that are managed uniformly by relevant industry departments. The standard-setting unit must include Shanghai Jiaotong University.
5. In principle, a research result can only be used by one doctoral student as a representative result to apply for a degree.

八、学位论文 Thesis/dissertation work

学位论文是授予学位的主要依据(专业学位博士也可通过规定的实践成果进行学位评定,实践成果评定方式视具体情况另行规定),应能反映出作者在本学科上已掌握坚实的基础理论、系统深入的专门知识所体现该学科的研究方法。

1 选题与综述

博士学位论文的选题应在本学科及相关领域具有开拓性、前沿性和创新性,应能对经济建设和社会发展具有较大的理论意义或应用价值。文献综述应在全面搜集、阅读大量有关研究文献的基础上,经过归纳整理、分析鉴别,对所研究的问题在一定时期内已经取得的科研成果、存在问题以及新的发展趋势等进行系统、全面、客观的叙述和评论,为论文题目的确定提供支撑和论证。

2 规范性要求

博士学位论文必须是一篇系统、完整的学术论文,是学位申请者在导师指导下独立完成的研究成果,不得抄袭和剽窃他人成果,能够表明作者具有独立从事科学研究工作的能力,且在本门学科上掌握了坚实的基础理论和系统深入的专业知识。

博士学位论文的学术观点必须明确,立场正确,推理严谨,数据真实,图表规范,层次分明,语言准确,且文字通顺。

博士学位论文字数一般为 8 ~1 0 万,论文中使用的术语、符号、代号必须全文统一并符合规范化要求。计量单位一律采用国务院发布的《中华人民共和国法定计量单位》。根据国家标准《学位论文编写规则》(GB/T 7713.1),学位论文应使用中文撰写。国际留学生或申请国际平等答辩的论文可以用英文撰写论文,但必须列出详细的中文摘要。学位论文撰写格式应符合《上海交通大学博士、硕士学位论文撰写指南》要求。

3 成果创新性要求

博士学位论文相关创新成果应在本学科领域体现一流水平、具有创造性;成果应为学位申请人攻读博士学位期间独立完成,并以学位论文的形式完整呈现。

成果创新性是评价学位论文水平的重要参考,可通过高水平的学术论文、学术会议论文、专著、专利、作品、研究报告等多种研发呈现。

The dissertation is the main basis for degree evaluation, and it should reflect that the author has mastered a solid and broad basic theory, systematic and in-depth expertise and standardized scientific research methods in the subject.

1. Topic selection and summary

The topic selection of a doctoral dissertation should be pioneering, cutting-edge and innovative in this discipline and related fields, and have greater theoretical significance or application value in response to economic construction and social development. The literature review should be based on a comprehensive collection and reading of a large number of relevant research literature, through induction, sorting, analysis and identification, and a systematic and comprehensive analysis of the research results, existing problems, and new development trends that have been achieved within a certain period of time. , Objective narratives and comments provide support and demonstration for the establishment of the thesis topic.

2. Normative requirements

The doctoral dissertation must be a systematic and complete academic thesis. It is the research result independently completed by the applicant under the guidance of the supervisor. It is not allowed to plagiarize or plagiarize the results of others. It can show that the author has the ability to independently engage in scientific research and is in this He has mastered solid a broad basic theories and systematic and in-depth professional knowledge in the subject.

The academic point of view of the doctoral dissertation must be clear, correct, rigorous in reasoning, truthful in data, standardized in diagrams, clear in layers, accurate in language, and unobstructed in text.

The number of words in a doctoral dissertation is generally 80,000 to 100,000. The terms, symbols, and codes used in the dissertation must be unified in the full text and meet the standardization requirements. All units of measurement shall be the "Statutory Units of Measurement of the People's Republic of China" issued by the State Council. According to the national standard "Rules for Writing Dissertations" (GB/T 7713.1), dissertations should be written in Chinese. International students or essays applying for international review and defense can write essays in English, but a detailed Chinese abstract must be listed. The format of dissertation writing should meet the requirements of "Guidelines for Writing Doctoral and Master Thesis of Shanghai Jiaotong University".

3. Innovative requirements for results

The innovative achievements related to the doctoral dissertation should reflect the first-class level and creativity in the subject field; the achievements should be completed independently by the degree applicant during the period of studying for the doctoral degree, and be fully presented in the form of a dissertation.

九、课程设置 Courses

详见下页 Please refer to the next page.

撰稿人签字:

日 期:

校稿人签字:

日 期:

审核人签字:

日 期:

主管院长签字:

院系公章

日期:

课程类别 Category	课程代码 Course Code	课程名称 Course Name		学分 Credit	授课语言 Language	开课学期 Semester	是否必修 Compusory	可以计算 GPA	必须计算GPA	备注 Note	多选组 Course Group
		中文Chinese	English 英文								
任意选修课 Elective Courses	GE6007	大学生心理健康	Mental Health for College Students	2	中文	春秋季	是	否	否	“好大学在线”慕课学习	
公共基础课 General Fundamental Courses	GE9003	工程实践I	Engineering Practice I	1	中文	春秋季	是	否	否		最少2门、最低2分
	GE9004	工程实践II	Engineering Practice II	1	中文	春秋季	是	否	否		最少2门、最低2分
	FL6001	学术英语	English for Academic Purposes	2	英文	秋季	是	否	否		
	GE6001	学术写作、规范与伦理	Scientific Writing, Integrity and Ethics	1	英文	春秋季	是	否	否	秋季中文班, 春季英文班	
	GE6003	实验室安全教育	Laboratory Safety Education	0.5	中文	春秋季	是	否	否	“好大学在线”慕课学习	
	GE6011	学术报告会	Academic Lectures	1	中文	春秋季	是	否	否		
	MARX7001	中国马克思主义与当代	Marxism in China	2	中文	春秋季	是	否	否		
专业基础课 Program Core Courses	ENVR7005	大气污染控制理论与技术	Theories and Technology of Air Pollution Control	2	中文	秋季	否	否	否		
	ENVR7101H	高等环境化学	Advanced Environmental Chemistry	3	英文	秋季	否	否	否		
	ENVR7110	环境能源技术	Environmental Energy Technology	2	英文	秋季	否	否	否		
	ENVR7004H	水污染控制理论与技术	Theory and Technology for Water Pollution Control	3	中文	春季	否	否	否		
	ENVR7006	废弃物的处理与资源化	Solid Waste Disposal And Recycling	2	中文	春季	否	否	否		
	ENVR7020	环境学科人工智能应用实践	Artificial Intelligence in Environmental Science	2	中文	春季	否	否	否	AI+	
	ENVR7102H	环境管理	Environmental Management	2	英文	春季	否	否	否		
专业前沿课 Program Frontier Courses	ENVR6101	土壤—地下水污染修复	Soil and Groundwater Pollution Remediation	2	中文	秋季	否	否	否		
	ENVR7016	铁环境化学与污染控制技术	Iron Environmental Chemistry and Pollution Control Technology	2	中文	秋季	否	否	否		
	ENVR7019	饮用水深度处理	Advanced Treatment of Drinking Water	2	中文	秋季	否	否	否		
	ENVR7103	产业生态学	Industrial Ecology	2	英文	秋季	否	否	否		
	ENVR9001	环境科学与工程学科前沿进展	Frontiers of Priority of Environmental Engineering	3	中文	秋季	是	否	否		
	ENVR7105	可持续能源技术	Technologies for Sustainable Energy	2	英文	春季	否	否	否		
	ENVR9002	碳中和与气候变化研究前沿	Research Frontiers of Carbon Neutrality and Climate Change	2	中文	春季	否	否	否		
	ENVR9003	工程经济学	Engineering Economics	2	中文	春季	否	否	否		
专业选修课 Program Elective Courses	ENVR7007	环境污染与控制化学	Chemistry of Environmental Pollution and Control	2	中文	秋季	否	否	否		
	ENVR7008	环境催化与环境功能材料专题	Environmental Catalysis and Functional Materials	2	中文	秋季	否	否	否		
	ENVR7009	高等环境毒理学	Advanced Environmental Toxicity	2	中文	秋季	否	否	否		
	ENVR7014	环境电化学	Environmental Electrochemistry	2	中文	秋季	否	否	否		
	ENVR7015	大气化学	Atmospheric Chemistry	2	中文	秋季	否	否	否		
	ENVR7018	环境地球化学	Environmental Geochemistry	2	中文	秋季	否	否	否		
	ENVR7104	环境经济学	Environmental Economics	2	中英并行开班	秋季	否	否	否		
	ENVR7106	环境微生物技术与应用	Environmental microbiology: technology and application	2	中文	秋季	否	否	否		

专业选修课 Program Elective Courses	ENVR6012	气溶胶物理与化学	Aerosol Physics and Chemistry	2	中文	春季	否	否	否		
	ENVR7111	环境催化原理与应用	The Principles and Application of Environmental Catalysis	2	英文	春季	否	否	否		