**环境科学与工程（国际学生 英文授课）硕士研究生培养方案**

**Academic Plan of Master Degree in Environmental Science and Engineering Major for International Student**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 学院  School | | 信息与安全工程学院  School of Information and Safety Engineering | | | | | 培养类别  Program | | √国际学生(硕，英文)  International students (Master, English) | | | | | | | | |
| 一级学科名称  First level discipline | | 环境科学与工程  Environmental science and engineering | | | | | 一级学科代码  First level discipline code | | 0830 | | | | | | | | |
| 适用年级  Grade | | 从 2022 级开始适用  From 2022 | | | | | | | 修订时间  Time of revision | | | 2022年 5月  May, 2022 | | | | | |
| 覆盖专业  Specialties | | 专业名称：环境科学与工程(0830)；  Specialty name：Environmental science and engineering (0830) | | | | | | | | | | | | | | | |
| 基本学制  Length of schooling | | 英文授课硕士研究生基本学制为2年。  2 years for master degree international student. | | | | | | | | | | | | | | | |
| 学分  Credits | | 学术型硕士（国际学生）： 总学分≥35学分，其中学位课学分≥35学分，非学位课自行选修  International master students: overall credits ≥ 35 credits, credits of degree course ≥35 credits | | | | | | | | | | | | | | | |
| 培养目标  Subjects | | 1. 对中国的认识和理解（Knowledge and understanding of China）   国际学生应当熟悉中国历史、地理、社会、经济等中国国情和文化基本知识，了解中国政治制度和外交政策，理解中国社会主流价值观和公共道德观念，形成良好的法治观念和道德意识。  International students should be familiar with the basic knowledge of China's national conditions and culture such as Chinese history, geography, society, and economy, understand China's political system and foreign policy, understand the mainstream values of Chinese society and public morality, and form a good concept of the rule of law and moral awareness.  2、跨文化和全球胜任力（Cross-cultural and global competencies）  国际学生应当具备包容、认知和适应文化多样性的意识、知识、态度和技能，能够在不同民族、社会和国家之间的相互尊重、理解和团结中发挥作用。  International students should have the awareness, knowledge, attitudes and skills to embrace, recognize and adapt to cultural diversity, and be able to function in mutual respect, understanding and solidarity among different peoples, societies and nations.  国际学生应当在本学科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本学科的知识、技能和方法，并具备参与国际事务和国际竞争的能力。  International students should have a good international perspective in this subject area, be able to apply and develop the knowledge, skills and methods of this subject in the actual environment of many countries, and have the ability to participate in international affairs and international competition.  3、汉语水平（Chinese language proficiency）  应当能够顺利使用英语完成本学科、专业的学习和研究任务，并具备使用英语从事本专业相关工作的能力；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。  International students should be able to successfully use English to complete the study and research tasks of the discipline and major, and have the ability to use English to engage in the relevant work of the major; their Chinese proficiency should at least reach Level 3 of HSK when they graduate.  4、为了适应具有中国特色的社会主义建设事业的需要，培养面向现代化、面向世界、面向未来的德、智、体、美等全面发展、高层次的环境工程技术研发、工程设计、运行和管理人才，本硕士专业要求研究生达到以下水平：  （1）拥护党的基本路线，坚持正确的政治方向，热爱祖国、遵纪守法、品行端正；具有较强的事业心和社会责任感，愿为人民服务，愿为社会主义现代化建设事业服务。  （2）熟练地掌握一门外语，具备阅读专业外文资料和撰写专业论文的能力水平，能用英语进行学术交流。  （3）勤奋好学，掌握学本科坚实的基础理论、系统的专业知识和熟练的专业技能，系统了解本学科国内外研究现状，发展趋势和前沿领域；熟悉本学科的先进研究方法和手段；能做到理论和实践相结合，能够运用科学方法，客观地分析问题、解决问题，并具备一定的创新能力；具备独立开展环境工程领域科研工作和从事环境保护工作的能力。  （4）身心健康。具有良好的道德素质、学术修养、团队协作精神和高尚的品格。具有献身科技、服务社会的历史使命感和社会责任感；要具备实事求是的科学与协作精神；要树立法制观念，严守学术道德，保护知识产权，尊重他人研究成果。  In order to meet the needs of the socialist construction cause with Chinese characteristics, and to train all-round development of modern, world-oriented, future-oriented moral, intellectual, physical and aesthetic, high-level environmental engineering technology research and development, engineering design, operation and management personnel, this master's degree requires graduate students to reach the following level:  (1) To uphold the Party's basic line, adhere to the correct political direction, love the motherland, abide by the law and be of good character, have a strong sense of cause and social responsibility, and are willing to serve the people and the cause of socialist modernization.  (2) Master a foreign language skillfully, have the ability to read professional foreign language materials and write professional papers, can carry out academic exchanges in English.  (3) Hard-working, master the undergraduate solid foundation theory, systematic professional knowledge and skilled professional skills, systematic understanding of the subject at home and abroad research status, development trends and frontier areas; familiar with the discipline's advanced research methods and means; can do the combination of theory and practice, can use scientific methods, objective analysis of problems, problem solving, and have a certain degree of innovation ability;  (4) Physical and mental health. Have good moral quality, academic training, team spirit and noble character. We should have a sense of historical mission and social responsibility to devote ourselves to science and technology and serve the society, we should have the spirit of science and cooperation that seek truth from facts, we should establish the concept of the rule of law, strictly abide by academic ethics, protect intellectual property rights and respect the research results of others. | | | | | | | | | | | | | | | |
| 科研能力及创新培养等要求  Research capacity and innovation training | | 1. 科研成果要求：至少有1项科研或学术成果，如研究报告、学术著作（参编）、学术论文、专利、各级奖励等。  2. 创新培养要求：研究生应积极参与学校研究生创新课题的申报，积极参与本专业校内外高水平学术讲座，了解和追踪本学科研究的进展和前沿问题。  1. Scientific research results require at least one scientific or academic achievement, such as research reports, academic works (participation), academic papers, patents, awards at all levels, etc.  2. Innovation training requirements: Graduate students should actively participate in the declaration of innovation topics of graduate students in schools, actively participate in high-level academic lectures both inside and outside the university, and understand and track the progress and cutting-edge issues of research in the discipline. | | | | | | | | | | | | | | | |
| 培养方式  Training mode | | 实行导师（组）培养制，培养工作遵循下列原则：  1. 加强政治思想教育。关心研究生的政治思想和道德品质修养，促进德、智、体、美、劳全面发展。  2. 系统的理论学习与科学研究活动相结合的原则；  3. 导师负责制与导师组集体培养相结合的原则；  4. 自学为主，课堂为辅。导师注重启发、引导和把关。强调研究生独立地深入思考和正确判断，培养其分析和解决问题的能力；  5. 贯彻因材施教的原则。针对学生的专业背景与个人特点，调动研究生学习与科研的积极性，充分发挥其个人才能和特长；  The mentor (group) training system is implemented, and the training work follows the following principles:  1. Strengthen political and ideological education. Concerned about graduate students' political thought and moral quality cultivation, and promote the all-round development of moral, intellectual, physical, esthetic and labour develop;  2.The principle of combining systematic theoretical learning with scientific research activities;  3. The principle of combining mentor responsibility with the collective training of mentor groups;  4. Self-study is the main, the classroom is supplemented. Mentors focus on inspiration, guidance, and control. It emphasizes that graduate students think independently and make correct judgments, and cultivate their ability to analyze and solve problems.  5. Implement the principle of teaching according to your talents. According to the student's professional background and personal characteristics, mobilize the enthusiasm of graduate study and scientific research, give full play to their personal talents and special skills; | | | | | | | | | | | | | | | |
| 覆盖专业简介及研究方向  Introduction of specialty and research field | | 覆盖专业简介  Introduction | | | | | | | | | 研究方向名称  Research field | | | | | | |
| 环境科学与工程（0830）Environmental science and engineering | | | 以实现人类-环境系统的协调与持续发展为目的，针对我国经济持续高速发展过程中面临的各类环境问题，广泛开展以水、气、固等环境要素为研究对象的污染物产生、预防、控制、与再资源化的全过程控制理论与技术。基础与应用研究范围涵盖污染水体修复与治理、污染土壤修复、典型气体污染物控制原理与技术、特殊行业危废处理以及物理性污染控制等领域。  In order to realize the coordination and sustainable development of human-environmental system, in view of all kinds of environmental problems faced in the process of sustained and high-speed economic development of our country, the whole process control theory and technology of pollutant generation, prevention, control, and re-resourceization with water, gas, solid and other environmental elements as the object of study are widely carried out. Basic and applied research covers the repair and treatment of contaminated water bodies, soil restoration, typical gas pollutant control principles and technologies, risk waste treatment in special industries, and physical pollution control. | | | | | | 01 环境科学  01 Environmental science | | | | | | |
| 02 环境工程  02 Environmental engineering | | | | | | |
| 03环境管理  03 Environmental management | | | | | | |
| 课程设置  Curriculum | | | | | | | | | | |  | |  | | | | |
| 课程类别  Course Type | | 课程编号  Course coding | 课程名称  Course name | | | | | | | | 总学  分Credits | | 总学时  Academic hours | 周学时  Weekly  Hours | | 开课  学期  Semester | 备注  Remark |
| 公共必修课  Public  Compulsory  Courses | | 11191001 | 汉语1 Chinese Language I | | | | | | | | 4 | | 64 | 4 | | 1 |  |
| 11191002 | 汉语2 Chinese Language II | | | | | | | | 4 | | 64 | 4 | | 2 |  |
| 11191003 | 中国概况 Introduction to China | | | | | | | | 2 | | 32 | 4 | | 1 |  |
| 学科基础课  Subject Basic Courses | |  | 环境系统工程  Environmental systems engineering. | | | | | | | | 2 | | 32 | 4 | | 1 |  |
|  | 现代环境工程原理  Principles of environmental engineering | | | | | | | | 2 | | 32 | 4 | | 1 |  |
|  | 现代环境管理学  Modern environmental management | | | | | | | | 2 | | 32 | 4 | | 1 |  |
|  | 环境科学与工程前沿  Frontiers in environmental science and engineering | | | | | | | | 2 | | 32 | 4 | | 1 |  |
|  | 文献检索与科技论文写作  Literature retrieval and scientific paper writing | | | | | | | | 2 | | 32 | 4 | | 1 |  |
| 专业课  （必修）  Specialized Courses  (required) | |  | 污水处理与资源化理论与技术  Theory and technology of wastewater treatment and resource recovery | | | | | | | | 2 | | 32 | 4 | | 2 |  |
|  | 大气污染物控制理论与技术  The theory and technology of atmospheric pollutant control | | | | | | | | 2 | | 32 | 4 | | 2 |  |
|  | 高级固体废物管理  Advanced Solid Waste Management | | | | | | | | 2 | | 32 | 4 | | 2 |  |
|  | 现代环境仪器分析  Modern environmental instrument analysis | | | | | | | | 2 | | 32 | 4 | | 1 |  |
|  | 环境功能材料  Environmental Functional Materials | | | | | | | | 2 | | 32 | 4 | | 3 |  |
| 专业课  （选修）  Specialized Courses  (optional) | |  | 环境毒理学  Environmental Toxicology | | | | | | | | 2 | | 32 | 4 | | 3 | 6选3 |
|  | 物理性污染控制原理与技术  Principles and techniques of physical pollution control | | | | | | | | 2 | | 32 | 4 | | 3 |
|  | 环境与资源经济学Environmental and Natural Resource Economics | | | | | | | | 2 | | 32 | 4 | | 3 |
|  | 环境风险管理  Environmental Risk Management | | | | | | | | 2 | | 32 | 4 | | 3 |
|  | 环境信息技术及实践  Environmental Information Technology and its Practices | | | | | | | | 2 | | 32 | 4 | | 3 |
|  | 职业环境健康风险与防护  Health Risk of Professional Environment and Protection | | | | | | | | 2 | | 32 | 4 | | 3 |
| 学分总计  Total credits | | 36 | | | | | | | | | | | | | | | |
| 其他要求  Other requirement | |  | | | | | | | | | | | | | | | |
| 其他培养环节及要求（选填）  Other Educational Processes and Requirements (Selection) | | | | | | | | | | | | | | | | | |
| 其他培养环节  Other Program segments | | | 内容或要求  Contents or requirements | | | | | | | 考核时间及方式  Due Time & Methods of Examination | | | | | | | |
| 科研及学术成果  Publication and academic achievement | | | 主要包括：研究报告、学术著作（参编）、学术论文、专利、各级奖励等。  Mainly includes: research reports, academic works (participation), academic papers, patents, awards at all levels. | | | | | | | 硕士学位论文答辩前，提交相关材料，要求至少有1项科研或学术成果。  Before the master's degree thesis is defended, the relevant materials are submitted and at least 1 scientific research or academic achievement is required. | | | | | | | |
| 中期考核（博士必填）  Middle-term assessment | | |  | | | | | | |  | | | | | | | |
| 文献综述与开题报告  Literature review  and research proposal | | | 研究生应填写规定格式的开题报告，就论文选题意义、主要研究内容和研究方案等进行论证，经导师（组）审定通过后，开始撰写学位论文。  Graduate students should fill out the opening report in the prescribed format, demonstrate the significance of the thesis selection, the main research content and the research program, and then begin to write the degree thesis after being approved by the tutor (group). | | | | | | | 原则上在第二学期末提交，用英文撰写  By the end of second semester, written in English | | | | | | | |
| 社会实践  Social practice | | | 社会实践主要包括参与科研项目、社会调查、毕业实习、“三助”活动等；教学实践：参与本科生实验或课程助教、指导本科生参与实践活动。  Social practice mainly includes participating in scientific research projects, social investigation, graduation internship, "three help" activities, teaching practice: participating in undergraduate experiments or course teaching assistants, guiding undergraduates to participate in practical activities. | | | | | | | 硕士学位论文答辩前，提交相关材料，要求至少参与社会实践活动或教学实践各1项。  Before replying to a master's degree thesis, submit relevant materials and request at least 1 item each to participate in social practice activities or teaching practice. | | | | | | | |
| 教学实践  Teaching Practice | | | 教学实践一般在校园进行，如：参与实验室相关事宜  Teaching practice is usually done on campus, e.g. in lab center. | | | | | | | 学生可申请做助教  Can be implemented as teaching assistants | | | | | | | |
| 学术训练  Academic training | | | 由导师根据学生情况制定相关计划  Conducted by the supervisor according to the individual students’ academic levels | | | | | | | 具体执行与评价由导师决定  Implemented and evaluated by the supervisor | | | | | | | |
| 语言能力  Language ability | | | 根据教育部《来华留学生高等教育质量规范（试行）》（教外（2018）50号文），以英文为授课语言的专业，毕业时中文能力应当达到《国际汉语能力标准》三级水平。  According to the Ministry of Education's "Higher Education Quality Standards for International Students in China (Trial)" (Jiaowai (2018) No. 50), English is the language of instruction for majors whose Chinese proficiency should reach Level 3 of the "International Chinese Proficiency Standards" upon graduation | | | | | | | 毕业资格审核前完成；未通过汉语水平考试HSK三级者不能通过毕业资格审核。  Completed before the graduation qualification review; those who fail HSK Level 3 of the Chinese Proficiency Test cannot pass the graduation qualification review. | | | | | | | |
| 学位论文  Dissertation | | | 硕士学位论文必须在导师的指导下由硕士生独立完成。学位论文应有一定理论意义和应用价值，应在梳理所涉及领域已有成果的基础上撰写自己的理论、应用方面的研究成果。学位论文题目及摘要翻译成中文。  Master's degree thesis must be completed independently by the master's student under the guidance of the tutor. Degree thesis should have certain theoretical significance and application value, and should write its own theoretical and applied research results on the basis of combing the achievements already made in the field involved.Dissertation title and abstract need to be translated into Chinese. | | | | | | | | | | | | | | |
| 本学科主要文献、目录及刊物（选填）  Main Documents, Catalogs and Publications of the Major (Selected) | | | | | | | | | | | | | | | | | |
| 序号  No. | 著作或期刊名称  Publication Title | | | 作者  Author | | 期刊或出版社  Journal or publishing house | | 出版时间  Time of publication | | | 考核方式  Assessment method | | | | 备注（选读/必读）  Remark | | |
| 1 | 当代给水与废水处理原理（第2版）  Contemporary Principles of Water And Wastewater Treatment (Version 2) | | | 许保玖，龙腾锐  Xu Baoxuan, Long Tengrui. | | 高等教育出版社  Higher Education Press. | | 2000/09 | | | Non-test based assessment | | | | Selective reading | | |
| 2 | 工业废水处理工程设计实例  Examples of engineering design for industrial wastewater treatment) | | | 曾郴林，刘情生  Zeng Yulin, Liu Yisheng. | | 中国环境出版社  China Environment Press. | | 2017/01 | | | Non-test based assessment | | | | Selective  reading | | |
| 3 | 废水工程：处理及回用（第4版）  Wastewater Engineering: Treatment and Reuse (Version 4) | | | Metcalf &Eddy, Inc | | 化学工业出版社Chemical Industry Press. | | 2004/10 | | | Non-test based assessment | | | | Selective  reading | | |
| 4 | 污染控制微生物学（第4版）  Pollution Control Microbiology (Version 4) | | | 任南琪  Ren Nanqi | | 哈尔滨工业大学出版社Harbin University of Technology Press | | 2011/12 | | | Non-test based assessment | | | | Selective  reading | | |
| 5 | 环境污染及其防治（英文版）  Environmental pollution and its prevention and control (English version) | | | “世界学术研究前言丛书”编委会  Editorial Board of the "World Academic Research Preamble Series" | | 世界图书出版公司  World Book Publishing Company | | 2017/08 | | | Non-test based assessment | | | | Selective  reading | | |
| 6 | Atmospheric Chemistry and Physics: From Air Pollution to Climate Change(英语) 精装 | | | John H. Seinfeld，Spyros N. Pandis | | Wiley | | 2016/04 | | | Non-test based assessment | | | | Selective  reading | | |
| 7 | 大气污染控制工程（原著第二版）  Air Pollution Control Project (Original 2nd Edition) | | | [美]诺埃尔·德·内韦尔  Noel de Neville | | 化学工业出版社Chemical Industry Press. | | 2005/07 | | | Non-test based assessment | | | | Selective  reading | | |
| 8 | 固体废物污染控制原理与技术  Principles and techniques for pollution control of solid waste | | | 周少奇  Zhou Shaoqi. | | 清华大学出版社Tsinghua University Press. | | 2009/03 | | | Non-test based assessment | | | | Selective  reading | | |
| 9 | 环境材料学Environmental materials Science | | | 翁端 、冉锐  Duan Wen, Rui Ran. | | 清华大学出版社Tsinghua University Press. | | 2015/12 | | | Non-test based assessment | | | | Selective  reading | | |
| 10 | Brebbia, C. A., Ed | | | Environmental Health Risk VII | | WIT Press | | 2013/01 | | | Non-test based assessment | | | | Selective  reading | | |
| 文献阅读考核方式：1.考核：将此文献作为课程考核或中期考核的考试范围；  2.考查：结合开题报告或学科综合考试进行；  3.报告：撰写读书报告；  4.其他：请注明。  Examination methods of literature reading:：  1.Assessment: Take the documents as the scope of course assessment or mid-term assessment.  2.Examination: combined with the proposals or comprehensive subject examination;  3.Report: Write a reading report;  4.Others: Please note. | | | | | | | | | | | | | | | | | |
| **审核意见** | | | | | | | | | | | | | | | | | |
| 导师组意见 | | | 导师组组长（签名）：  年 月 日 | | | | | | | | | | | | | | |
| 学院（中心）意见 | | | 负责人（盖章）：  年 月 日 | | | | | | | | | | | | | | |
| 学校培养指导委员会意见： | | | 盖章：  年 月 日 | | | | | | | | | | | | | | |